

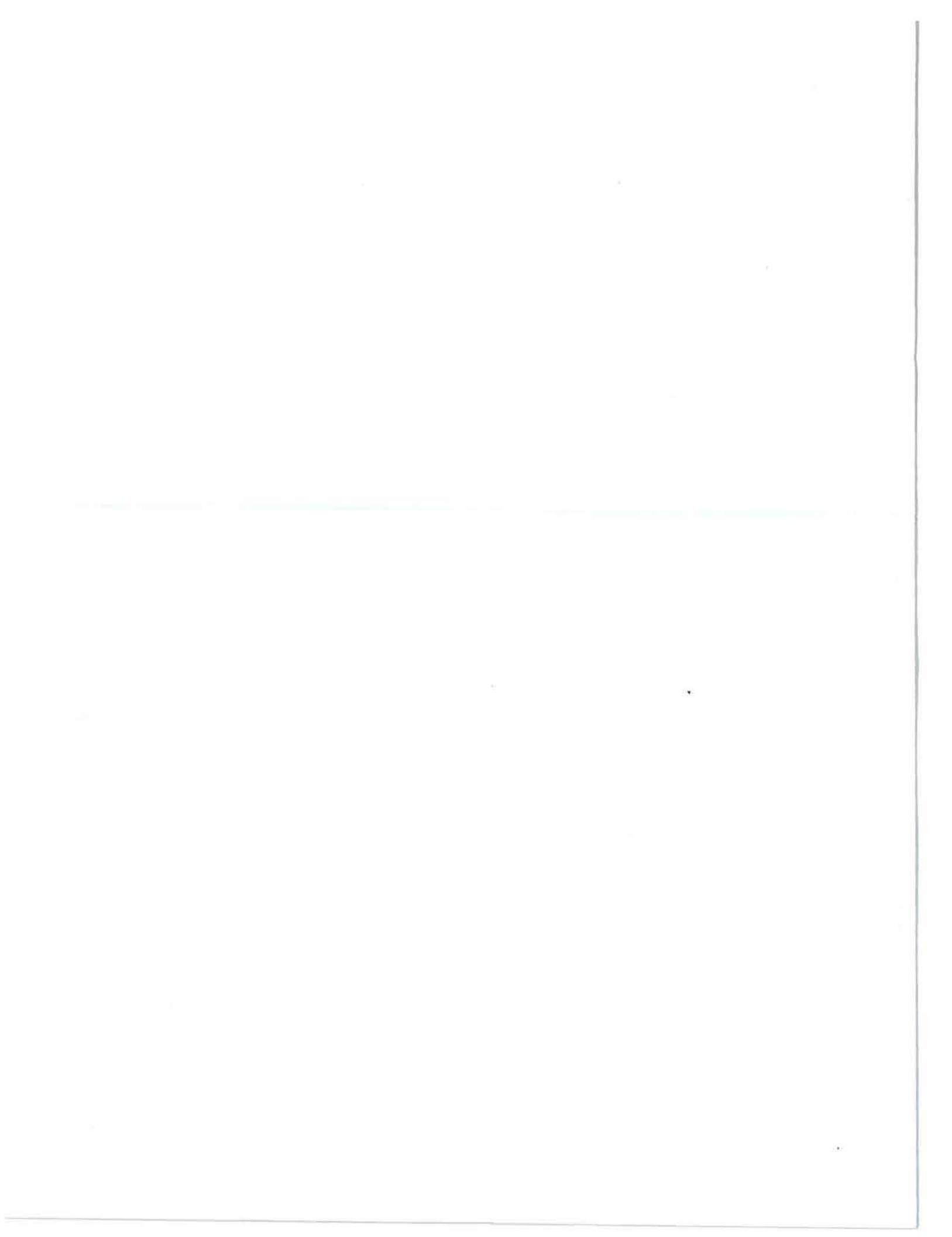
***82nd Annual Research Report***  
***RICE RESEARCH STATION***

***Crowley, Louisiana***  
***1990***

**LOUISIANA**  
**AGRICULTURAL EXPERIMENT STATION**  
**Kenneth W. Tipton, Vice Chancellor & Director**

**LOUISIANA STATE UNIVERSITY**  
**AGRICULTURAL CENTER**  
**H. Rouse Caffey, Chancellor**

**U.S. DEPARTMENT OF AGRICULTURE**  
**AGRICULTURE RESEARCH SERVICE**  
**COOPERATING**



# TABLE OF CONTENTS

|                                                                                                                                                             | <u>Page</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| INTRODUCTION . . . . .                                                                                                                                      | 1           |
| MONTHLY RAINFALL DATA. . . . .                                                                                                                              | 2           |
| RICE BREEDING. . . . .                                                                                                                                      | 3-96        |
| Developing superior rice varieties for Louisiana. . . . .                                                                                                   | 3-71        |
| Multiple generation rice breeding nursery . . . . .                                                                                                         | 72          |
| Grain fissuring and milling yields of current rice<br>varieties as affected by harvest moisture. . . . .                                                    | 73-76       |
| Special purpose rice breeding . . . . .                                                                                                                     | 77          |
| Tolerance of rice varieties and experimental lines to<br>rice herbicides. . . . .                                                                           | 78-86       |
| Relationship of main crop growth parameters and ratooning<br>ability of rice cultivars. . . . .                                                             | 87-96       |
| CEREAL CROPS BIOTECHNOLOGY RESEARCH. . . . .                                                                                                                | 97-98       |
| Rice and wheat improvement through biotechnology. . . . .                                                                                                   | 97-98       |
| THE RELATIONSHIP BETWEEN HARVEST MOISTURE AND MILLING YIELD FOR<br>COMMERCIAL AND EXPERIMENTAL RICE LINES. . . . .                                          | 99          |
| RICE FERTILIZATION AND CULTURAL MANAGEMENT . . . . .                                                                                                        | 100-176     |
| Effect of N rate and timing on agronomic performance of<br>selected rice varieties and experimental lines in Louisiana<br>rice producing areas . . . . .    | 100-133     |
| Evaluation of commercial varieties, hybrids, and advanced<br>experimental lines for straighthead. . . . .                                                   | 134-137     |
| Influence of post-heading nitrogen fertilization on<br>performance and ratoon crop grain yields of Tebonnet,<br>Maybelle, and Texmont rice . . . . .        | 138-142     |
| Influence of seeding rate on performance and grain yield<br>of selected rice varieties grown in water-seeded and<br>dry-seeded cultural systems. . . . .    | 143-150     |
| No-till and stale seedbed rice production for Louisiana . . . . .                                                                                           | 151-156     |
| Nitrogen management in furrow-irrigated Lemont rice . . . . .                                                                                               | 157-161     |
| Evaluation of NBPT as a urease inhibitor in drill-seeded<br>Lemont rice. . . . .                                                                            | 162-165     |
| Evaluation of NBPT as a urease inhibitor and coated<br>calcium carbide as a nitrification inhibitor in<br>drill-seeded Lemont rice . . . . .                | 166-169     |
| An evaluation of the potential benefits of currently<br>recommended best management practices on sustainability<br>of rice production in Louisiana. . . . . | 170-176     |

|                                                                                                                                                                                                     | <u>Page</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| FOUNDATION SEED RICE PROGRAM . . . . .                                                                                                                                                              | 177-179     |
| BIRD MANAGEMENT IN RICE. . . . .                                                                                                                                                                    | 180-181     |
| Blackbird preference for two rice varieties . . . . .                                                                                                                                               | 180-181     |
| RICE PHYSIOLOGY. . . . .                                                                                                                                                                            | 182-256     |
| Introduction. . . . .                                                                                                                                                                               | 182         |
| <u>Seedling Vigor Studies</u> . . . . .                                                                                                                                                             | 183-229     |
| Gibberellic acid seed treatment and rice variety screen . . . . .                                                                                                                                   | 183-185     |
| Gibberellic acid and seeding rate in rice ( <u>Oryza</u><br><u>sativa</u> 'LEMONT') . . . . .                                                                                                       | 186-191     |
| Gibberellic acid and plant depth in rice ( <u>Oryza</u><br><u>sativa</u> 'LEMONT') . . . . .                                                                                                        | 192-196     |
| Gibberellic acid seed treatment and foliar application<br>in dry broadcast rice ( <u>Oryza sativa</u> 'LEMONT'). . . . .                                                                            | 197-200     |
| Gibberellic acid seed treatment and foliar application<br>in semidwarf and tall long-grain rice ( <u>Oryza sativa</u><br>'LEMONT' and 'TEBONNET') . . . . .                                         | 201-207     |
| ABG-3125 and seedling vigor in rice ( <u>Oryza sativa</u> 'LEMONT') . . . . .                                                                                                                       | 208-211     |
| Varietal response to foliar gibberellic acid in rice<br>( <u>Oryza sativa</u> L.) . . . . .                                                                                                         | 212-215     |
| Gibberellic acid and ratoon cropping in rice ( <u>Oryza</u><br><u>sativa</u> 'TEBONNET') . . . . .                                                                                                  | 216-221     |
| Foliar gibberellic acid and postemergence herbicide<br>compatibility in rice ( <u>Oryza sativa</u> 'LEMONT'). . . . .                                                                               | 222-229     |
| <u>Red Rice Studies</u> . . . . .                                                                                                                                                                   | 230-247     |
| Herbicides and plant growth regulators for red rice<br>( <u>Oryza sativa</u> L.) control and seedhead suppression in rice<br>( <u>Oryza sativa</u> 'Maybelle'). . . . .                             | 230-233     |
| Plant growth regulators for red rice ( <u>Oryza sativa</u> L.)<br>panicle suppression in very early season rice ( <u>Oryza</u><br><u>sativa</u> 'ALAN,' 'AS3510,' 'MAYBELLE,' 'TEBONNET') . . . . . | 234-239     |
| Plant growth regulator seed treatment and postemergence<br>herbicide application for control of red rice ( <u>Oryza</u><br><u>sativa</u> L.) in rice ( <u>Oryza sativa</u> 'LEMONT') . . . . .      | 240-243     |
| Plant growth regulator seed treatment and postemergence<br>herbicide application for control of red rice ( <u>Oryza</u><br><u>sativa</u> L.) in rice ( <u>Oryza sativa</u> 'TEBONNET') . . . . .    | 244-247     |
| <u>Yield Enhancement Studies</u> . . . . .                                                                                                                                                          | 248-256     |
| AC-94377 and yield enhancement in rice ( <u>Oryza sativa</u> 'LEMONT'). . . . .                                                                                                                     | 248-250     |
| Ceres 211 and water-seeded rice ( <u>Oryza sativa</u> 'LEMONT') . . . . .                                                                                                                           | 251-253     |
| An experimental plant growth regulator and yield enhancement<br>in rice ( <u>Oryza sativa</u> 'LEMONT'). . . . .                                                                                    | 254-256     |
| RICE WEED CONTROL STUDIES. . . . .                                                                                                                                                                  | 257-283     |
| CHEMICAL CONTROL OF RED RICE IN RICE . . . . .                                                                                                                                                      | 284-297     |



|                                                                                                              | <u>Page</u> |
|--------------------------------------------------------------------------------------------------------------|-------------|
| RICE INSECTS RESEARCH. . . . .                                                                               | 298-342     |
| Rice water weevil control: Carbofuran. . . . .                                                               | 298-301     |
| Rice water weevil control: Carbofuran and isozophos. . . . .                                                 | 302-304     |
| Rice water weevil control: Cycloprothrin . . . . .                                                           | 305-307     |
| Rice water weevil control: Carbofuran and cycloprothrin. . . . .                                             | 308-311     |
| Rice water weevil control: Nematodes . . . . .                                                               | 312-315     |
| Sticky trap monitoring studies. . . . .                                                                      | 316-317     |
| Effect of plant density on rice water weevil populations. . . . .                                            | 318-319     |
| Determination of damaging rice water weevil populations<br>using cages. . . . .                              | 320         |
| Screening of anther-culture lines for resistance to rice<br>water weevil damage. . . . .                     | 321         |
| Screening anther culture lines for resistance to the<br>rice water weevil. . . . .                           | 322-323     |
| Screening tissue culture lines for resistance to the rice<br>water weevil . . . . .                          | 324-325     |
| Screening rice lines for resistance to the rice water weevil. . . . .                                        | 326-327     |
| Screening rice breeding lines for tolerance to the rice<br>water weevil . . . . .                            | 328-332     |
| Use of velvetbean caterpillar pheromone traps in soybean<br>pest management and migration research . . . . . | 333-342     |
| DISEASE CONTROL STUDIES. . . . .                                                                             | 343-384     |
| Rice disease control studies. . . . .                                                                        | 343-346     |
| Rovral spreader sticker study . . . . .                                                                      | 347-348     |
| Benlate spreader sticker study. . . . .                                                                      | 349-350     |
| Tilt spreader sticker study . . . . .                                                                        | 351-352     |
| Effect of time of fungicide application . . . . .                                                            | 353-355     |
| Soil fungicides vs. seed soaking and seed treatments. . . . .                                                | 356-357     |
| Ridomil cultural management . . . . .                                                                        | 358-359     |
| Uniform rice disease nurseries. . . . .                                                                      | 360-361     |
| Sheath blight yield loss and scouting methods . . . . .                                                      | 362-363     |
| Chemical control of blast in Louisiana. . . . .                                                              | 364-366     |
| Fungicidal control of rice foliar and stem diseases . . . . .                                                | 367-378     |
| Chemical control of rice seedling diseases. . . . .                                                          | 379-384     |
| ROTATIONAL CROPS RESEARCH. . . . .                                                                           | 385-399     |
| Introduction. . . . .                                                                                        | 385         |
| Soybean variety test. . . . .                                                                                | 386-390     |
| Grain sorghum variety test. . . . .                                                                          | 391-393     |
| Off station variety test. . . . .                                                                            | 394-395     |
| Kenaf variety test. . . . .                                                                                  | 396-397     |
| Soybean physiology test . . . . .                                                                            | 398-399     |

|                                                                                                                   | <u>Page</u> |
|-------------------------------------------------------------------------------------------------------------------|-------------|
| SOYBEAN WEED CONTROL RESEARCH. . . . .                                                                            | 400-408     |
| Introduction. . . . .                                                                                             | 400         |
| Soybean tolerance to pre- and postemergence herbicides. . . . .                                                   | 401-402     |
| General weed control test . . . . .                                                                               | 403-404     |
| Sicklepod control study . . . . .                                                                                 | 405-406     |
| Stale seedbed test. . . . .                                                                                       | 407-408     |
| AQUACULTURE RESEARCH . . . . .                                                                                    | 409-410     |
| FORAGE CROPS BIOTECHNOLOGY RESEARCH. . . . .                                                                      | 411         |
| Bermudagrass improvement through tissue culture . . . . .                                                         | 411         |
| SOYBEAN BIOTECHNOLOGY RESEARCH . . . . .                                                                          | 412-413     |
| Soybean improvement through tissue culture. . . . .                                                               | 412-413     |
| BEEF CATTLE NUTRITION RESEARCH . . . . .                                                                          | 414-419     |
| Influence of fish meal and supplemental fat in diets for<br>finishing steers . . . . .                            | 414-419     |
| INTERNATIONAL RICE TRAINING PROGRAM. . . . .                                                                      | 420-421     |
| ECONOMICS OF ENTERPRISE SELECTION AND WHOLE FARM DECISION MAKING<br>IN THE LOUISIANA RICE GROWING AREAS . . . . . | 422-426     |
| STATION PERSONNEL. . . . .                                                                                        | 427-432     |

## INTRODUCTION

Research work at the Rice Research Station, Crowley, Louisiana, is conducted cooperatively by the Louisiana Agricultural Experiment Station and the United States Department of Agriculture, Agricultural Research Service. The 1990 rice research program included breeding, biotechnology, variety testing, production and distribution of foundation seed, fertilization, soil and water management, cultural practices, weed control, insect studies, disease investigations, rice drying, bird control in rice, and physiology studies. Forages and crops grown in rotation with rice were evaluated relative to increasing the efficiency of land use. The aquaculture research program places emphasis upon production practices, crawfish forages, and multi-cropping of crawfish with agronomic crops. Although most of the research work was performed by members of the Rice Station staff, several staff members from Baton Rouge conducted research at this station.

The research activities of this station include both fundamental and applied research, although the latter predominates due to the mission of the Rice Research Station. Research accomplishments and general progress of the Rice Station during 1990 are presented in this report representing the 82nd Annual Research Report of the Rice Research Station, Louisiana Agricultural Experiment Station, L.S.U. Agricultural Center.

In addition to research responsibilities of the Rice Research Station staff and cooperators, a large number of farmers, extension personnel, and others were trained and otherwise contacted during 1990. Approximately 750 persons attended the annual Rice Research Station field day to view plots and participate in discussions of research findings. Field days were also conducted in East Carroll, Morehouse, and Vermilion parishes. In addition, the staff participated in industry meetings, both on and off the station, and worked individually with farmers and others in solving immediate problems. Several thousand people received services from the Rice Research Station during 1990.

Projects at this station are conducted under the supervision of research workers from the Rice Research Station and also by cooperating personnel from certain departments of the Louisiana Agricultural Experiment Station. Following the reports, station personnel and cooperators in 1990 are listed.

MONTHLY RAINFALL DATA  
RICE RESEARCH STATION -- CROWLEY, LA  
1990

| Date  | Jan.  | Feb. | Mar. | Apr. | May  | June  | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year Total |
|-------|-------|------|------|------|------|-------|------|------|-------|------|------|------|------------|
| 1     | .20   |      | .08  |      |      | .40   |      |      |       |      |      |      | -          |
| 2     |       |      | 2.60 |      |      |       |      | .37  |       |      |      |      | -          |
| 3     |       | .10  |      | .08  |      |       |      |      |       |      |      | 2.50 | -          |
| 4     | .30   | .80  |      |      | .27  |       | .30  |      |       | .75  |      |      | -          |
| 5     | .53   |      |      |      |      |       | .10  |      | .90   | .05  | .50  |      | -          |
| 6     | .50   | .06  |      | .40  |      |       |      |      |       |      |      |      | -          |
| 7     | 1.00  | .16  |      |      |      |       |      | .12  |       |      |      | 1.20 | -          |
| 8     | .20   | .34  |      |      |      |       |      |      |       |      |      |      | -          |
| 9     |       | .72  |      |      | 2.56 |       |      |      |       |      | 1.23 |      | -          |
| 10    |       | 1.10 |      | .01  |      |       |      |      |       |      |      |      | -          |
| 11    |       |      |      | 1.06 |      | .50   |      |      | .98   |      |      |      | -          |
| 12    |       |      |      |      |      |       | .15  |      | .73   |      |      |      | -          |
| 13    |       |      | .80  |      |      |       | 1.07 |      | .15   |      |      |      | -          |
| 14    |       |      |      |      |      | .69   |      |      | .50   |      |      |      | -          |
| 15    |       | .13  | .22  | .40  |      |       |      |      |       |      |      |      | -          |
| 16    |       | .79  | .18  |      |      |       |      |      |       |      |      |      | -          |
| 17    | .07   | .20  | .20  |      | .01  |       | .60  |      |       |      |      |      | -          |
| 18    | .09   |      |      |      |      |       |      |      | .01   | .02  |      | .10  | -          |
| 19    | .33   | 1.10 |      |      |      |       |      |      |       |      |      |      | -          |
| 20    | .10   | .20  |      |      |      |       |      | .20  |       |      |      |      | -          |
| 21    | .50   | .02  |      |      |      | .05   |      |      | .32   |      |      |      | -          |
| 22    |       | 2.26 |      |      |      | .17   | .53  |      | .23   | 1.60 |      | .10  | -          |
| 23    |       |      |      |      |      |       | .11  |      | .32   |      | .20  | .60  | -          |
| 24    | .88   |      |      |      |      |       | .35  |      |       |      |      |      | -          |
| 25    | 4.55  |      |      |      |      |       | .62  |      |       |      |      |      | -          |
| 26    |       |      |      |      |      |       |      |      |       |      |      |      | -          |
| 27    |       |      |      | .91  |      |       |      |      |       |      |      |      | -          |
| 28    |       |      | .03  | .10  | .90  | .10   |      | .78  |       |      | .90  | .30  | -          |
| 29    | 2.00  |      | .60  |      | .86  |       | .20  |      |       |      |      |      | -          |
| 30    | .01   |      | 1.35 |      |      |       |      |      |       |      |      |      | -          |
| 31    |       |      |      |      |      |       |      | .12  |       |      |      |      | -          |
| Mo.   |       |      |      |      |      |       |      |      |       |      |      |      |            |
| Total | 11.26 | 7.98 | 6.06 | 2.96 | 4.60 | 1.91  | 4.03 | 1.59 | 4.14  | 2.42 | 2.83 | 4.80 | 59.38      |
| 1989  | 5.30  | 0.72 | 4.30 | 1.36 | 7.75 | 15.93 | 9.65 | 7.11 | 1.86  | 1.06 | 5.90 | 6.65 | 67.59      |

## RICE BREEDING

### DEVELOPING SUPERIOR RICE VARIETIES FOR LOUISIANA<sup>1</sup>

S.D. Linscombe, F. Jodari, A.P. Fabacher, R.P. Frey,  
R.J. Guidry, C.G. Gravot, H.L. Hoffpauir, and R. Pollingue

The rice variety development program at the Rice Research Station (RRS) is carried out primarily under LAES Project 2760. The objectives of this project are as follows:

1. To develop superior rice varieties for Louisiana production with emphasis on improvements in yield, quality, lodging resistance, seedling vigor, disease and insect resistance, earliness, ratoon production, and fertilizer responsiveness.
2. To develop and/or improve methods of rice breeding, selection, and evaluation.
3. To conduct genetic studies with implications for rice varietal development.

The 1990 rice breeding nursery covered approximately 24 acres, including 29,700 breeding rows, 256 F<sub>1</sub> transplant populations, 187 F<sub>2</sub> bulk populations, and approximately 1700 yield plots (on-station). Off-station testing added another 850 plots to the testing program.

The artificial hybridization program included 197 initial crosses and backcrosses for varietal improvement. X<sub>2</sub> populations of 19 lines were grown for selection purposes.

A strong emphasis is placed on developing lodging resistant semidwarf lines with high yield potential and superior quality and cooking characteristics. Yield testing includes both water- and drill-seeded tests. Laboratory seedling vigor and test tube milling evaluations are conducted on all advanced progeny rows.

Pest evaluations of promising selections are being conducted by cooperating research projects. Particular emphasis is being placed on trying to incorporate higher levels of disease resistance, especially to sheath blight and blast, into breeding lines. In cooperation with the Rice Pathology project, advanced progeny rows were evaluated for leaf blast susceptibility in the RRS blast nursery. Also, 6,000 advanced breeding rows were inoculated with the sheath blight organism (Rhizoctonia solani) and rated for resistance prior to selection in the breeding nursery. This screening was done in cooperation with Dr. Don Groth, Rice Pathologist.

---

<sup>1</sup> This project is supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

Off-station tests of advanced experimentals were conducted in East Carroll, Morehouse, Rapides, Tensas, and Vermilion (two locations) parishes. These tests provide needed information on the performance of advanced experimental lines in different environments. Four advanced experimentals were tested in nitrogen (N) rate x timing studies by the Rice Fertilization and Cultural Management project. These included two early maturing, semidwarf long grains (LA 2201 and LA 2207) and one early maturing, semidwarf medium grain (LA 2214) tested at five locations. LA 2201 has been released as Lacassine. Also, LA 2215 (an early maturing, aromatic semidwarf long grain) was evaluated at the RRS.

#### COOPERATIVE UNIFORM REGIONAL RICE NURSERY (URN)

Public rice breeders in the United States conduct cooperative yield nurseries in which experimental lines and commercial varieties are grown and evaluated at research stations in Arkansas, Louisiana, Mississippi, Texas, and Florida. The nurseries are grown to test adaptation of the entries in the diverse rice growing environments of the southern U.S. The entries in the 1990 nursery included material from Arkansas, California, Louisiana, Mississippi, Texas, and some cultivars from foreign countries. Information on performance characteristics is compiled and stored in the Rice Data Bank by the Department of Experimental Statistics, Louisiana Agricultural Experiment Station, LSU Agricultural Center.

**Experiment:** URN - Group I

**Location:** Rice Research Station

**Seeding Rate/Date:** 150 lb/A, Mar 29, 1990

**Planting Method:** Water-seeded (pre-germinated seed)

**Fertilization:** 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4; 70 lb N/A, Sep 3 (second crop)

**Plot Size:** 4.66 x 18 ft (84 ft<sup>2</sup>)

**Water Management:** Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 14;  
second crop flooded, Aug 3; harvest drainage (second crop),  
Oct. 10

**Herbicides:** Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), May 4

**Harvest:** Main crop, Aug 1; Second crop, Oct 18

**Experimental Design:** Randomized complete block with four replications

**Comments:** First and second crop yields were excellent for most entries in this group. Entries 2, 5, 8, and 11 are Louisiana lines. Entry 6 has been released as 'Rosemont' from the Texas program (Tables 1 and 2).

TABLE 1. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP,  
GROUP I, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE         | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 1             | L201/7402003     | 5                   | 81                       | 47                      | 3              | 7989            | A                   | 56-71                  |
| 4             | MARS/TBNT        | 5                   | 79                       | 44                      | 8              | 7942            | AB                  | 61-71                  |
| 7             | L201/7402003     | 5                   | 80                       | 45                      | 3              | 7844            | ABC                 | 57-71                  |
| 3             | SBNT/L201        | 5                   | 78                       | 40                      | 0              | 7378            | ABCD                | 64-73                  |
| 6             | 9881/331581//..  | 6                   | 81                       | 36                      | 0              | 7346            | ABCDE               | 61-71                  |
| 12            | 8003050/CA82Y24  | 6                   | 82                       | 38                      | 0              | 7345            | ABCDE               | 62-72                  |
| TEXMONT       | TEXMONT          | 6                   | 80                       | 37                      | 0              | 7333            | ABCDE               | 61-73                  |
| 10            | LBLE/L201        | 5                   | 79                       | 42                      | 8              | 7261            | ABCDE               | 66-73                  |
| 2             | 82CAY21//LMNT/.. | 5                   | 81                       | 39                      | 0              | 7259            | ABCDE               | 59-71                  |
| 8             | 82CAY21/LEAH     | 5                   | 82                       | 37                      | 0              | 7253            | ABCDE               | 57-73                  |
| MAYBELLE      | MAYBELLE         | 5                   | 75                       | 39                      | 0              | 7094            | BCDEF               | 64-73                  |
| 5             | 82CAY21//LMNT/.. | 6                   | 81                       | 40                      | 0              | 7035            | CDEF                | 57-71                  |
| TEBONNET      | TEBONNET         | 6                   | 82                       | 54                      | 20             | 6842            | DEF                 | 62-72                  |
| ALAN          | ALAN             | 4                   | 77                       | 41                      | 0              | 6742            | DEF                 | 62-72                  |
| 11            | LMNT/DELLA       | 6                   | 81                       | 37                      | 0              | 6504            | EF                  | 64-73                  |
| 9             | LBLEX2-2/BJ1F1/. | 7                   | 85                       | 38                      | 0              | 6361            | F                   | 64-72                  |
| C.V.          |                  | 9.6                 | 1.4                      | 3.5                     | -              | 7.1             |                     | 3.3-1.4                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.



TABLE 2. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN, RATOON, AND TOTAL CROP, GROUP I. CROWLEY, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 12                    | 33                | 7345               | 3628                 | 10973          | A                |
| TEXMONT               | 29                | 7333               | 3561                 | 10893          | A                |
| 6                     | 31                | 7346               | 3534                 | 10880          | A                |
| MAYBELLE              | 34                | 7094               | 3657                 | 10750          | AB               |
| 10                    | 34                | 7261               | 3267                 | 10528          | ABC              |
| 8                     | 28                | 7253               | 3242                 | 10495          | ABC              |
| 1                     | 36                | 7989               | 2441                 | 10429          | ABC              |
| 4                     | 35                | 7942               | 2480                 | 10421          | ABC              |
| 7                     | 36                | 7844               | 2446                 | 10290          | ABCD             |
| 5                     | 31                | 7035               | 2714                 | 9749           | BCDE             |
| ALAN                  | 33                | 6742               | 2959                 | 9701           | CDE              |
| 2                     | 34                | 7259               | 2120                 | 9379           | DE               |
| 3                     | 35                | 7378               | 1972                 | 9350           | DE               |
| TEBONNET              | 44                | 6842               | 1957                 | 8799           | EF               |
| 11                    | 32                | 6504               | 1764                 | 8268           | FG               |
| 9                     | 31                | 6361               | 1488                 | 7849           | G                |
| C.V.                  | 3.0               | 7.1                | 19.9                 | 6.3            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: URN - Group II

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Mar 29, 1990

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4; 70 lb N/A, Sep 10 (second crop)

Plot Size: 4.66 x 18 ft (84 ft<sup>2</sup>)

Water Management: Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 27;  
second crop flooded, Aug 12; harvest drainage (second crop),  
Oct. 15

Herbicides: Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Harvest: Main crop, Aug 9; Second crop, Oct 28

Experimental Design: Randomized complete block with four replications

Comments: Entries 22, 25, 28, and 31 are Louisiana lines. Entry 25 (2214) is  
a semidwarf medium grain currently being considered for release. Entry 31  
is a semidwarf long grain being considered for release. Entry 24 has been  
released as 'Orion' from the Arkansas program (Tables 3 and 4).

TABLE 3. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP, GROUP II, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE          | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|-------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 25            | MARS/M201//MARS   | 5                   | 87                       | 37                      | 0              | 8491            | A                   | 69-75                  |
| 31            | 82CAY21/LMNT      | 5                   | 81                       | 39                      | 0              | 8104            | AB                  | 62-72                  |
| 24            | BRAZ/MARS         | 5                   | 86                       | 43                      | 0              | 7635            | ABC                 | 56-74                  |
| 30            | ZNTH/3/164986-4/. | 5                   | 81                       | 44                      | 5              | 7603            | ABC                 | 68-73                  |
| MERCURY       | MERCURY           | 4                   | 83                       | 37                      | 8              | 7527            | ABC                 | 65-74                  |
| 32            | L201//TBNT/BLMT   | 5                   | 84                       | 43                      | 8              | 7505            | ABC                 | 51-69                  |
| 27            | ZADT/STTD         | 5                   | 85                       | 45                      | 0              | 7340            | BC                  | 64-73                  |
| 22            | SMARS/MARS//MARS  | 5                   | 87                       | 35                      | 0              | 7146            | BC                  | 64-73                  |
| MARS          | MARS              | 4                   | 86                       | 46                      | 23             | 7089            | BC                  | 63-74                  |
| 26            | GCHW/LMNT//CB801  | 6                   | 88                       | 40                      | 0              | 7004            | C                   | 56-72                  |
| 23            | GFMT*2/IRGA 409   | 6                   | 87                       | 38                      | 10             | 6870            | C                   | 59-70                  |
| MILLIE        | MILLIE            | 5                   | 79                       | 42                      | 0              | 6686            | CD                  | 61-72                  |
| SKYBONNET     | SKYBONNET         | 6                   | 86                       | 49                      | 0              | 6614            | CD                  | 63-71                  |
| 29            | 8303116/CB801     | 9                   | 88                       | 38                      | 0              | 5759            | DE                  | 53-73                  |
| 21            | M101/MARS         | 6                   | 81                       | 44                      | 0              | 5372            | EF                  | 69-74                  |
| 28            | LBNT//9881/...    | 9                   | 105                      | 40                      | 0              | 4636            | F                   | 64-71                  |
| C.V.          |                   | 6.0                 | 1.1                      | 2.7                     | -              | 9.1             |                     | 8.5-2.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 4. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN, RATOON, AND TOTAL CROP, GROUP II. CROWLEY, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 31                    | 29                | 8104               | 2247                 | 10351          | A                |
| 25                    | 28                | 8491               | 1092                 | 9583           | AB               |
| MERCURY               | 29                | 7527               | 1846                 | 9374           | BC               |
| 27                    | 33                | 7340               | 1991                 | 9330           | BC               |
| MILLIE                | 31                | 6686               | 2547                 | 9233           | BCD              |
| 24                    | 30                | 7635               | 1359                 | 8994           | BCDE             |
| MARS                  | 34                | 7089               | 1751                 | 8840           | BCDE             |
| 22                    | 27                | 7146               | 1515                 | 8660           | BCDE             |
| 30                    | 34                | 7603               | 1028                 | 8631           | BCDE             |
| 32                    | 33                | 7505               | 942                  | 8447           | CDEF             |
| SKYBONNET             | 36                | 6614               | 1636                 | 8250           | DEFG             |
| 23                    | 30                | 6870               | 1083                 | 7953           | EFG              |
| 26                    | 31                | 7004               | 473                  | 7477           | FGH              |
| 29                    | 29                | 5759               | 1525                 | 7284           | GH               |
| 21                    | 33                | 5372               | 1518                 | 6890           | H                |
| 28                    | 28                | 4636               | 1104                 | 5626           | I                |
| C.V.                  | 4.6               | 9.1                | 24.0                 | 7.5            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

**Experiment:** URN - Group III

**Location:** Rice Research Station

**Seeding Rate/Date:** 150 lb/A, Mar 29, 1990

**Planting Method:** Water-seeded (pre-germinated seed)

**Fertilization:** 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4; 70 lb N/A, Sep 11 (second crop)

**Plot Size:** 4.66 x 18 ft (84 ft<sup>2</sup>)

**Water Management:** Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 27;  
second crop flooded, Aug 12; harvest drainage (second crop),  
Oct. 10

**Herbicides:** Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), May 4

**Harvest:** Main crop, Aug 9; Second crop, Oct 28

**Experimental Design:** Randomized complete block with four replications

**Comments:** Lacassine is a newly released semidwarf long grain from the Crowley program. Entry 51 (2207) is a semidwarf long grain currently being considered for release. Entry 49 has been released as 'Delmont' from the Texas program. It is a semidwarf, aromatic long grain (Tables 5 and 6).

TABLE 5. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP, GROUP III. CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE          | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|-------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 51            | 82CAY21/LMNT      | 4                   | 84                       | 38                      | 3              | 8828            | A                   | 62-72                  |
| NEWBONNET     | NEWBONNET         | 5                   | 87                       | 46                      | 10             | 8509            | AB                  | 64-73                  |
| 45            | NWBT/LMNT         | 6                   | 86                       | 39                      | 0              | 8429            | ABC                 | 57-74                  |
| 50            | L201/3/164986-4/. | 5                   | 82                       | 41                      | 78             | 8061            | ABCD                | 49-70                  |
| 49            | DLLAX2/LMNT*5     | 6                   | 88                       | 38                      | 0              | 8043            | ABCD                | 59-74                  |
| 47            | TBNT/BLMT//VSTA/. | 5                   | 83                       | 45                      | 5              | 7983            | BCDE                | 54-72                  |
| 41            | LMNT//V6DW//STTD  | 6                   | 81                       | 45                      | 0              | 7814            | BCDE                | 60-71                  |
| LEMONT        | LEMONT            | 6                   | 86                       | 39                      | 18             | 7732            | BCDE                | 62-73                  |
| 46            | DLLAX2/LMNT*2     | 6                   | 85                       | 38                      | 8              | 7700            | BCDE                | 59-74                  |
| 43            | 8303116/CB801     | 7                   | 91                       | 41                      | 0              | 7605            | CDE                 | 59-71                  |
| 48            | 82CAY21/LMNT      | 6                   | 90                       | 36                      | 0              | 7492            | DE                  | 64-73                  |
| 52            | B786A3*F1/LMNT    | 6                   | 86                       | 43                      | 0              | 7389            | DE                  | 66-73                  |
| GULFMONT      | GULFMONT          | 6                   | 91                       | 39                      | 0              | 7388            | DE                  | 63-73                  |
| 44            | RA73/LBNT         | 5                   | 85                       | 48                      | 25             | 7180            | E                   | 58-72                  |
| 42            | LMNT/DLLA         | 7                   | 85                       | 37                      | 0              | 7175            | E                   | 53-74                  |
| KATY          | KATY              | 4                   | 86                       | 47                      | 70             | 6203            | F                   | 56-68                  |
| C.V.          |                   | 8.2                 | 1.2                      | 3.2                     | -              | 6.5             |                     | 7.2-1.3                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 6. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN, RATOON, AND TOTAL CROP, GROUP III. CROWLEY, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 51                    | 31                | 8828               | 2904                 | 11732          | A                |
| 47                    | 31                | 7983               | 3392                 | 11375          | AB               |
| 41                    | 35                | 7814               | 3412                 | 11227          | AB               |
| 42                    | 33                | 7175               | 3415                 | 10590          | BC               |
| LEMONT                | 33                | 7732               | 2534                 | 10265          | C                |
| 45                    | 33                | 8429               | 1761                 | 10190          | CD               |
| 50                    | 31                | 8061               | 2001                 | 10062          | CD               |
| 48                    | 34                | 7492               | 2337                 | 9829           | CDE              |
| 52                    | 28                | 7389               | 2339                 | 9728           | CDE              |
| 49                    | 31                | 8043               | 1594                 | 9637           | DE               |
| 46                    | 32                | 7700               | 1664                 | 9364           | DEF              |
| NEWBONNET             | 34                | 8509               | 493                  | 9002           | EFG              |
| 43                    | 31                | 7605               | 1039                 | 8644           | FG               |
| GULFMONT              | 31                | 7388               | 1112                 | 8500           | FG               |
| 44                    | 33                | 7180               | 1058                 | 8238           | G                |
| KATY                  | 33                | 6203               | 1972                 | 8174           | G                |
| C.V.                  | 7.7               | 6.5                | 13.2                 | 5.9            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: URN - Group IV

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Mar 30, 1990

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4

Plot Size: 4.66 x 18 ft (84 ft<sup>2</sup>)

Water Management: Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 27

Herbicides: Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 5

Harvest: Aug 11

Experimental Design: Randomized complete block with four replications

Comments: Louisiana entries 62 and 68 are sister lines to entries 31 and 51 and have shown excellent yield potential. Entry 62 has somewhat low milling characteristics but entry 68 appears to be an excellent miller. Entry 72 is a sister line to Texmont and is a potential candidate for release. It has shown somewhat higher levels of blast resistance than Texmont (Table 7).



TABLE 7. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, GROUP IV, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE          | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|-------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 64            | LBNT/STBN//NWBT   | 5                   | 82                       | 44                      | 10             | 8769            | A                   | 58-74                  |
| 67            | VSTA/RU7901017    | 6                   | 88                       | 47                      | 3              | 8759            | A                   | 64-73                  |
| 62            | 82CAY21/LMNT      | 5                   | 82                       | 39                      | 0              | 8731            | A                   | 58-70                  |
| 68            | 82CAY21/LMNT      | 6                   | 84                       | 38                      | 0              | 8128            | A                   | 64-74                  |
| 63            | 8303116/LMNT      | 6                   | 86                       | 42                      | 3              | 8127            | AB                  | 65-73                  |
| 66            | 8303116/LMNT      | 6                   | 88                       | 40                      | 0              | 8059            | AB                  | 63-72                  |
| 72            | 8303116/LMNT      | 6                   | 84                       | 38                      | 0              | 7775            | ABC                 | 56-71                  |
| TORO-2        | TORO-2            | 6                   | 87                       | 43                      | 0              | 7552            | BCD                 | 62-73                  |
| 70            | L201//TBNT/BLMT   | 6                   | 90                       | 40                      | 0              | 7412            | BCDE                | 52-72                  |
| 61            | RU7801067/SKBT    | 6                   | 84                       | 44                      | 0              | 7354            | BCDE                | 54-70                  |
| 71            | L201//TBNT/BLMT   | 6                   | 91                       | 42                      | 0              | 7090            | BCDE                | 60-68                  |
| RICO 1        | RICO 1            | 6                   | 89                       | 45                      | 78             | 7073            | BCDE                | 62-70                  |
| 65            | LBNT//9881/...    | 8                   | 107                      | 43                      | 33             | 6956            | CDE                 | 65-72                  |
| 69            | B786A3*F1/7603091 | 7                   | 99                       | 39                      | 0              | 6602            | DE                  | 61-74                  |
| STARBONNET    | STARBONNET        | 5                   | 98                       | 52                      | 38             | 6444            | EF                  | 63-69                  |
| JASMINE 85    | JASMINE 85        | 7                   | 107                      | 46                      | 75             | 5549            | F                   | 58-67                  |
| C.V.          |                   | 7.8                 | 1.1                      | 3.0                     | -              | 8.5             |                     | 5.5-3.3                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: URN - Group V

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Mar 30, 1990

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4; 70 lb N/A, Sep 10

Plot Size: 4.66 x 18 ft (84 ft<sup>2</sup>)

Water Management: Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 14;  
second crop flooded, Aug 10; harvest drainage (second crop),  
Oct 10

Herbicides: Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Harvest: First crop, Aug 6; second crop, Oct 24

Experimental Design: Randomized complete block with two replications

Comments: Most entries were in URN for the first time. Several entries  
displayed excellent first and second crop potential (Tables 8 and 9).

TABLE 8. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP, GROUP V. CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE          | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|-------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 96            | BN73/NV76//BN73/. | 5                   | 81                       | 43                      | 0              | 8451            | A                   | 56-72                  |
| 95            | 8303116/CB801     | 7                   | 83                       | 37                      | 10             | 7999            | AB                  | 55-72                  |
| 82            | 80Y50/LBLE        | 7                   | 81                       | 35                      | 0              | 7940            | ABC                 | 46-73                  |
| 84            | LBLE/L201         | 5                   | 80                       | 42                      | 5              | 7904            | ABCD                | 58-70                  |
| 114           | L201//TBNT/BLMT   | 5                   | 78                       | 41                      | 0              | 7714            | ABCDE               | 50-72                  |
| 108           | BN73/NV76//BN73/. | 6                   | 81                       | 42                      | 0              | 7711            | ABCDE               | 62-71                  |
| 106           | LMNT//82CAY21/... | 6                   | 83                       | 38                      | 0              | 7660            | ABCDE               | 64-72                  |
| 88            | NWBT/LMNT//L201   | 6                   | 84                       | 33                      | 0              | 7544            | ABCDEF              | 63-71                  |
| 102           | LBNT/STBN//NWBT   | 5                   | 79                       | 42                      | 0              | 7541            | ABCDEF              | 64-72                  |
| 100           | TBNT/LA110//LMNT  | 5                   | 77                       | 41                      | 0              | 7437            | ABCDEF              | 69-75                  |
| 90            | RA73/LBNT//NWRX   | 6                   | 82                       | 43                      | 0              | 7195            | BCDEFG              | 55-72                  |
| 112           | LMNT*2/82CAY20    | 6                   | 81                       | 38                      | 25             | 7167            | BCDEFG              | 58-69                  |
| 85            | 82CAY21/LMNT      | 6                   | 81                       | 37                      | 5              | 7116            | BCDEFG              | 61-73                  |
| 105           | LBNT/9902//NWBT   | 6                   | 82                       | 44                      | 0              | 7082            | BCDEFG              | 64-72                  |
| 91            | 82CAY21//TTEP/... | 6                   | 85                       | 35                      | 0              | 7026            | BCDEFGH             | 59-70                  |
| 94            | NWBT/LMNT//TBNT   | 6                   | 83                       | 38                      | 0              | 6993            | BCDEFGH             | 57-72                  |
| 87            | TBNT/LA110//LMNT  | 6                   | 83                       | 42                      | 0              | 6980            | BCDEFGH             | 55-72                  |
| 116           | LBLE-X2-2/...     | 7                   | 85                       | 36                      | 0              | 6893            | BCDEFGH             | 57-71                  |
| 103           | TBNT IP           | 6                   | 78                       | 46                      | 10             | 6882            | BCDEFGH             | 58-71                  |
| 97            | NWBT/LMNT//TBNT   | 6                   | 84                       | 39                      | 0              | 6843            | BCDEFGH             | 58-72                  |
| 98            | 8303116/LMNT      | 5                   | 77                       | 36                      | 0              | 6762            | CDEFGH              | 62-71                  |
| 115           | 82CAY21/TBNT      | 6                   | 74                       | 35                      | 0              | 6728            | DEFGH               | 66-73                  |
| 93            | TBNT/NTAI         | 6                   | 84                       | 42                      | 0              | 6727            | EFGH                | 65-74                  |
| 81            | TBNT/L110//MARS/. | 6                   | 80                       | 44                      | 0              | 6703            | EFGH                | 59-70                  |
| 99            | V6DW/STTD//L201   | 5                   | 79                       | 43                      | 65             | 6678            | EFGH                | 45-70                  |
| 92            | 8303181/CB801     | 7                   | 87                       | 35                      | 0              | 6674            | EFGH                | 62-70                  |
| 83            | 8303116/LMNT      | 6                   | 79                       | 37                      | 5              | 6599            | EFGH                | 60-70                  |
| 110           | GFMT*2/IRGA-409   | 7                   | 85                       | 38                      | 0              | 6597            | EFGH                | 61-71                  |
| 104           | NWBT/8303181      | 6                   | 81                       | 38                      | 5              | 6591            | EFGH                | 62-70                  |
| 89            | GFMT*2/IRGA-409   | 7                   | 87                       | 39                      | 0              | 6412            | FGHI                | 58-70                  |
| 109           | MARS/M201//MARS   | 5                   | 84                       | 32                      | 0              | 6404            | FGHI                | 68-75                  |
| 86            | LBLE-X2-2/...     | 7                   | 86                       | 41                      | 0              | 6376            | FGHI                | 60-70                  |
| 101           | DLIA-X2/LMNT*2    | 6                   | 87                       | 37                      | 0              | 6361            | FGHI                | 60-74                  |
| 107           | 303116/LMNT       | 5                   | 77                       | 40                      | 55             | 6218            | GHIJ                | 59-71                  |
| LABELLE       | LABELLE           | 6                   | 80                       | 50                      | 50             | 5876            | HIJ                 | 59-68                  |
| 111           | L201/3/164986-4/. | 5                   | 80                       | 42                      | 50             | 5837            | HIJ                 | 57-72                  |
| S-101         | S-101             | 4                   | 76                       | 36                      | 45             | 5406            | IJ                  | 61-73                  |
| CM 101        | CM 101            | 2                   | 70                       | 31                      | 0              | 5197            | J                   | 64-71                  |
| C.V.          |                   | 6.3                 | 1.6                      | 3.0                     | -              | 7.0             |                     | 5.0-2.3                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 9. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN, RATOON, AND TOTAL CROP, GROUP V. CROWLEY, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 82                    | 30                | 7940               | 2643                 | 10583          | A                |
| 83                    | 28                | 6599               | 3549                 | 10148          | AB               |
| 98                    | 30                | 6762               | 2957                 | 9718           | ABC              |
| 88                    | 27                | 7544               | 2129                 | 9673           | ABCD             |
| 115                   | 31                | 6728               | 2916                 | 9643           | ABCD             |
| 100                   | 35                | 7437               | 2204                 | 9641           | ABCD             |
| 85                    | 29                | 7116               | 2385                 | 9500           | ABCDE            |
| L-202                 | 31                | 6704               | 2499                 | 9203           | BCDEF            |
| 114                   | 34                | 7714               | 1466                 | 9180           | BCDEF            |
| 108                   | 36                | 7711               | 1428                 | 9139           | BCDEFG           |
| 96                    | 37                | 8451               | 468                  | 8918           | BCDEFGH          |
| 84                    | 33                | 7904               | 976                  | 8880           | BCDEFGH          |
| 102                   | 35                | 7541               | 1322                 | 8863           | BCDEFGH          |
| 95                    | 30                | 7999               | 741                  | 8740           | CDEFGH           |
| LABELLE               | 42                | 5876               | 2790                 | 8665           | CDEFGHI          |
| 107                   | 33                | 6218               | 2416                 | 8634           | CDEFGHI          |
| 106                   | 32                | 7294               | 1254                 | 8547           | CDEFGHIJ         |
| 103                   | 39                | 6882               | 1525                 | 8406           | DEFGHIJK         |
| 87                    | 31                | 6980               | 1328                 | 8308           | EFGHIJK          |
| 112                   | 33                | 7167               | 1135                 | 8302           | EFGHIJK          |
| 90                    | 36                | 7195               | 936                  | 8130           | FGHIJKL          |
| 93                    | 33                | 6727               | 1376                 | 8103           | FGHIJKL          |
| 105                   | 38                | 7082               | 992                  | 8074           | FGHIJKL          |
| 91                    | 31                | 7026               | 1025                 | 8050           | FGHIJKL          |
| 94                    | 32                | 6993               | 938                  | 7931           | FGHIJKLM         |
| 109                   | 30                | 6404               | 1515                 | 7919           | FGHIJKLM         |
| 99                    | 37                | 6678               | 1213                 | 7890           | FGHIJKLM         |
| 86                    | 32                | 6376               | 1453                 | 7829           | GHIJKLM          |
| 89                    | 31                | 6412               | 1405                 | 7817           | HIJKLM           |
| CM 101                | 34                | 5197               | 2574                 | 7770           | HIJKLM           |
| S-101                 | 32                | 5406               | 2267                 | 7673           | HIJKLM           |
| 97                    | 33                | 6843               | 783                  | 7626           | HIJKLM           |
| 116                   | 29                | 6893               | 525                  | 7417           | IJKLM            |
| 104                   | 31                | 6591               | 811                  | 7401           | IJKLM            |
| 81                    | 31                | 6703               | 695                  | 7398           | IJKLM            |
| 113                   | 33                | 6981               | 402                  | 7383           | IJKLM            |
| 92                    | 28                | 6674               | 582                  | 7256           | JKLM             |
| 110                   | 31                | 6597               | 513                  | 7110           | KLM              |
| 111                   | 35                | 5837               | 1023                 | 6860           | LM               |
| 101                   | 33                | 6361               | 329                  | 6690           | M                |
| C.V.                  | 3.9               | 6.9                | 21.9                 | 6.4            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: URN - Group VI

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Mar 30, 1990

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4; 70 lb N/A, Sep 10

Plot Size: 4.66 x 18 ft (84 ft<sup>2</sup>)

Water Management: Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 27;  
second crop flooded, Aug 12; harvest drainage (second crop),  
Oct 15

Herbicides: Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Harvest: First crop, Aug 9; second crop, Oct 28

Experimental Design: Randomized complete block with two replications

Comments: Entry 146 is currently being increased as a potential release. It is  
a conventional long grain that has shown good yield and milling potential,  
especially in north Louisiana (Tables 10 and 11).

TABLE 10. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP, GROUP VI, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 121           | BN73/NV76//N73/.   | 6                   | 84                 | 50                      | 0              | 8221            | A                   | 57-74                  |
| 148           | LBNT/9902/3/...    | 7                   | 82                 | 38                      | 0              | 8106            | AB                  | 63-73                  |
| 134           | LMNT//82CAY21/..   | 5                   | 84                 | 38                      | 0              | 8083            | ABC                 | 55-70                  |
| 127           | MARS/TBNT          | 5                   | 90                 | 50                      | 0              | 7974            | ABCD                | 65-72                  |
| 129           | GCHW/LMNT//CB801   | 6                   | 85                 | 40                      | 0              | 7972            | ABCD                | 63-73                  |
| 142           | LBNT/STBN//NWB     | 5                   | 80                 | 45                      | 0              | 7830            | ABCDE               | 59-72                  |
| 156           | L201//TBNT/BLMT    | 6                   | 81                 | 39                      | 0              | 7783            | ABCDE               | 53-73                  |
| 143           | SMARS/MARS//MARS   | 5                   | 88                 | 35                      | 0              | 7701            | ABCDE               | 63-73                  |
| 130           | BP87/9902          | 6                   | 83                 | 41                      | 0              | 7700            | ABCDEF              | 57-73                  |
| 125           | LMNT*2/8001190     | 6                   | 91                 | 37                      | 5              | 7682            | ABCDEF              | 56-71                  |
| 145           | L201//TBNT/BLMT    | 5                   | 88                 | 46                      | 0              | 7582            | ABCDEF              | 57-71                  |
| 146           | 8002610/CICA 9     | 6                   | 89                 | 46                      | 0              | 7524            | ABCDEF              | 63-72                  |
| 155           | SMARS/MARS//MARS   | 6                   | 88                 | 38                      | 0              | 7484            | ABCDEF              | 63-73                  |
| 151           | CSLI/ZADT          | 5                   | 88                 | 44                      | 0              | 7479            | ABCDEF              | 64-73                  |
| 131           | LBNT//9881/...     | 6                   | 89                 | 41                      | 10             | 7340            | ABCDEF              | 54-72                  |
| 124           | BN73/NV76//BN73/.  | 6                   | 83                 | 48                      | 5              | 7324            | ABCDEF              | 61-70                  |
| 136           | 18355/LBLE//NWB    | 5                   | 83                 | 37                      | 0              | 7320            | ABCDEF              | 48-77                  |
| 137           | BRAZ/T487//MARS    | 5                   | 87                 | 43                      | 50             | 7298            | ABCDEF              | 67-75                  |
| 152           | 82CAY21/LMNT       | 6                   | 80                 | 37                      | 0              | 7297            | ABCDEF              | 55-70                  |
| 123           | 8003050/CA82Y24//. | 6                   | 83                 | 39                      | 0              | 7269            | ABCDEF              | 62-71                  |
| 138           | GCHW/LMNT//CB801   | 6                   | 88                 | 40                      | 0              | 7258            | ABCDEF              | 58-76                  |
| 135           | GCHW/LMNT//CB801   | 6                   | 84                 | 39                      | 20             | 7243            | ABCDEF              | 60-72                  |
| 144           | 8303116/LMNT       | 6                   | 86                 | 42                      | 15             | 7232            | ABCDEF              | 61-74                  |
| 139           | TBNT/L110//MARS/.  | 7                   | 84                 | 45                      | 0              | 7170            | ABCDEF              | 61-73                  |
| 128           | LMNT*2/8001190     | 6                   | 89                 | 38                      | 0              | 7157            | ABCDEF              | 66-73                  |
| 133           | 18355/LBLE//NWB    | 6                   | 83                 | 32                      | 0              | 6992            | ABCDEF              | 60-73                  |
| 141           | GFMT*2/IRGA-409    | 6                   | 85                 | 37                      | 5              | 6890            | BCDEF               | 60-73                  |
| 122           | 80Y50/LBLE         | 6                   | 87                 | 39                      | 0              | 6838            | CDEF                | 57-71                  |
| REXMONT       | REXMONT            | 7                   | 88                 | 36                      | 30             | 6818            | DEF                 | 54-70                  |
| 126           | 8303181/CB801      | 7                   | 84                 | 35                      | 0              | 6720            | DEF                 | 63-74                  |
| 149           | SMARS/MARS//MARS   | 6                   | 88                 | 35                      | 0              | 6685            | EFG                 | 59-73                  |
| 140           | LMNT/DLLA          | 7                   | 88                 | 37                      | 5              | 6579            | EFG                 | 59-72                  |
| 154           | MARS/NWRX//TBNT/.  | 6                   | 89                 | 46                      | 5              | 6394            | FGH                 | 55-71                  |
| LEBONNET      | LEBONNET           | 6                   | 87                 | 49                      | 40             | 6056            | GHI                 | 53-73                  |
| 153           | LMNT/CB801         | 8                   | 96                 | 38                      | 0              | 6016            | HIJ                 | 45-67                  |
| 132           | 8303181/CB801      | 8                   | 86                 | 39                      | 0              | 5963            | IJK                 | 66-74                  |
| 147           | 8303116/LMNT       | 8                   | 92                 | 36                      | 0              | 5701            | JK                  | 61-74                  |
| 150           | B786A3*F1/7603091  | 7                   | 88                 | 34                      | 0              | 5612            | K                   | 63-76                  |
| DELLA         | DELLA              | 6                   | 91                 | 53                      | 85             | 4469            | L                   | 58-73                  |
| NATO          | NATO               | 6                   | 86                 | 58                      | 45             | 4347            | L                   | 66-72                  |
| C.V.          |                    | 9.5                 | 2.4                | 2.6                     | -              | 7.2             |                     | 8.4-2.1                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 11. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN, RATOON, AND TOTAL CROP, GROUP VI. CROWLEY, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 142                   | 35                | 7830               | 2865                 | 10694          | A                |
| 126                   | 28                | 6720               | 3725                 | 10445          | AB               |
| 124                   | 38                | 7324               | 2720                 | 10044          | ABC              |
| 121                   | 40                | 8221               | 1788                 | 10009          | ABC              |
| 143                   | 28                | 7701               | 2162                 | 9863           | ABCD             |
| 132                   | 32                | 5963               | 3846                 | 9809           | ABCD             |
| 152                   | 30                | 7297               | 2436                 | 9733           | ABCD             |
| 141                   | 30                | 6890               | 2810                 | 9700           | ABCDE            |
| 122                   | 30                | 6838               | 2712                 | 9550           | ABCDE            |
| 123                   | 32                | 7269               | 2259                 | 9528           | ABCDE            |
| 133                   | 25                | 6992               | 2526                 | 9518           | ABCDE            |
| 139                   | 34                | 7170               | 2292                 | 9462           | ABCDE            |
| 155                   | 29                | 7484               | 1939                 | 9423           | ABCDE            |
| 134                   | 31                | 8083               | 1203                 | 9286           | ABCDE            |
| 127                   | 36                | 7974               | 1262                 | 9236           | ABCDE            |
| 130                   | 34                | 7700               | 1506                 | 9206           | ABCDE            |
| 125                   | 29                | 7682               | 1520                 | 9201           | ABCDE            |
| 151                   | 34                | 7479               | 1701                 | 9180           | ABCDE            |
| 145                   | 34                | 7582               | 1562                 | 9144           | ABCDE            |
| 131                   | 30                | 7340               | 1733                 | 9072           | ABCDEF           |
| 136                   | 29                | 7320               | 1750                 | 9070           | ABCDEF           |
| 144                   | 30                | 7232               | 1825                 | 9056           | ABCDEF           |
| 156                   | 30                | 7783               | 1232                 | 9015           | ABCDEF           |
| 149                   | 27                | 6685               | 2148                 | 8833           | BCDEFG           |
| 129                   | 30                | 7972               | 833                  | 8805           | BCDEFG           |
| 148                   | 31                | 8106               | 691                  | 8797           | BCDEFG           |
| 138                   | 31                | 7258               | 1173                 | 8431           | CDEFGH           |
| 128                   | 29                | 7157               | 1270                 | 8427           | CDEFGH           |
| 150                   | 28                | 5612               | 2604                 | 8216           | DEFGH            |
| 135                   | 31                | 7243               | 958                  | 8201           | DEFGH            |
| 146                   | 34                | 7524               | 459                  | 7983           | EFGH             |
| 137                   | 31                | 7298               | 653                  | 7951           | EFGH             |
| REXMONT               | 26                | 6818               | 575                  | 7393           | FGH              |
| 153                   | 28                | 6016               | 1368                 | 7384           | FGH              |
| LEBONNET              | 38                | 6056               | 1091                 | 7147           | GH               |
| 140                   | 29                | 6579               | 437                  | 7016           | H                |
| 154                   | 33                | 6394               | 609                  | 7002           | H                |
| 147                   | 25                | 5701               | 1242                 | 6943           | H                |
| NATO                  | 42                | 4347               | 810                  | 5156           | I                |
| DELLA                 | 35                | 4469               | 65                   | 4534           | I                |
| G.V.                  | 5.7               | 7.2                | 25.8                 | 8.2            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: URN - Group VII

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Mar 30, 1990

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 26;  
45 lb N/A, May 4

Plot Size: 4.66 x 18 ft (84 ft<sup>2</sup>)

Water Management: Flooded, Mar 28; drained, Apr 3; reflooded, Apr 6;  
drained, Apr 19; reflooded, Apr 20; harvest drainage, July 27

Herbicides: Stam (propanil) 3 lb ai/A, Apr 19; Londax (bensulfuron-methyl)  
0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Harvest: Aug 13

Experimental Design: Randomized complete block with two replications

Comments: Several entries show excellent first and second crop yield potential  
(Table 12).



TABLE 12. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, GROUP VII, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE             | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|----------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 194           | VSTA/NTAI//LMNT      | 6                   | 86                       | 44                      | 0              | 8804            | A                   | 62-74                  |
| GUI CHOW      | GUI CHOW             | 7                   | 100                      | 43                      | 90             | 8556            | AB                  | 36-73                  |
| 186           | L201//TBNT/BLMT      | 6                   | 84                       | 36                      | 0              | 8216            | ABC                 | 59-73                  |
| 190           | LMNT/CB801           | 8                   | 87                       | 39                      | 0              | 8214            | ABC                 | 63-77                  |
| 162           | 82CAY21/LMNT         | 5                   | 82                       | 39                      | 0              | 8186            | ABC                 | 57-70                  |
| 174           | LMNT*2/CR1113        | 6                   | 87                       | 37                      | 0              | 8156            | ABC                 | 51-71                  |
| 188           | V6DW/STTD//L201      | 6                   | 83                       | 42                      | 0              | 8136            | ABC                 | 58-73                  |
| 171           | MERC/RICO            | 6                   | 87                       | 44                      | 35             | 7988            | ABC                 | 46-71                  |
| 178           | LMNT/CB801//...      | 7                   | 90                       | 35                      | 0              | 7868            | ABCD                | 45-72                  |
| 177           | MARS/M201//MARS      | 5                   | 87                       | 37                      | 0              | 7832            | ABCD                | 38-73                  |
| 187           | 8303116/CB801        | 7                   | 88                       | 39                      | 0              | 7793            | ABCD                | 43-72                  |
| 189           | 82CAY21/LMNT         | 6                   | 77                       | 36                      | 0              | 7746            | ABCD                | 64-72                  |
| TEQING        | TEQING               | 7                   | 101                      | 43                      | 90             | 7698            | ABCD                | 35-70                  |
| 191           | DAWN//BP87/9902      | 5                   | 92                       | 44                      | 0              | 7697            | ABCD                | 60-71                  |
| 193           | L201//TBNT/BLMT      | 6                   | 84                       | 41                      | 0              | 7665            | ABCD                | 48-72                  |
| 165           | LMNT*2/8001190       | 6                   | 87                       | 38                      | 0              | 7655            | ABCD                | 60-73                  |
| 175           | B786A3*F1/7603091    | 6                   | 87                       | 37                      | 0              | 7590            | ABCD                | 64-76                  |
| IRGA 409      | IRGA 409             | 4                   | 101                      | 46                      | 90             | 7581            | ABCD                | 59-69                  |
| 179           | STBN/LBNT            | 6                   | 88                       | 49                      | 30             | 7572            | ABCD                | 58-72                  |
| 163           | 8303116/LMNT         | 6                   | 87                       | 40                      | 0              | 7562            | ABCD                | 63-72                  |
| 184           | RXMT/LEAH            | 7                   | 91                       | 36                      | 0              | 7495            | ABCD                | 35-76                  |
| 182           | L201/3/NV66/...      | 5                   | 85                       | 47                      | 0              | 7447            | ABCD                | 57-70                  |
| 185           | 7501082/TTEP//...    | 4                   | 89                       | 46                      | 5              | 7425            | ABCD                | 65-73                  |
| 167           | BP87/9902            | 6                   | 83                       | 41                      | 35             | 7405            | ABCD                | 51-73                  |
| 192           | CI11048/LEAH//...    | 6                   | 86                       | 39                      | 0              | 7401            | ABCD                | 71-77                  |
| 195           | MARS IP              | 4                   | 84                       | 43                      | 45             | 7240            | ABCD                | 62-73                  |
| 169           | B786A3*F1/LMNT       | 7                   | 91                       | 40                      | 0              | 7225            | ABCD                | 62-76                  |
| 164           | B722/STTT//LBNT      | 6                   | 81                       | 44                      | 0              | 7196            | ABCD                | 59-70                  |
| 172           | 8303116/CB801        | 8                   | 96                       | 37                      | 0              | 7159            | ABCD                | 44-69                  |
| 173           | TBNT/NTAI            | 6                   | 95                       | 48                      | 0              | 7139            | BCD                 | 65-74                  |
| A-301         | A-301                | 6                   | 86                       | 40                      | 0              | 7134            | BCD                 | 50-74                  |
| 183           | M201/VSTA            | 7                   | 82                       | 36                      | 10             | 7128            | BCD                 | 59-74                  |
| 181           | 8303181/CB801        | 7                   | 84                       | 38                      | 25             | 7098            | BCD                 | 57-72                  |
| 170           | TBNT/NTAI            | 7                   | 92                       | 42                      | 0              | 7077            | BCD                 | 67-74                  |
| 166           | 8003050/CA82Y24//... | 7                   | 91                       | 37                      | 0              | 6962            | BCD                 | 62-74                  |
| 176           | VSTA/NTAI//LMNT      | 6                   | 83                       | 38                      | 10             | 6941            | BCD                 | 58-75                  |
| 168           | MERC//MERC/RICO      | 6                   | 83                       | 43                      | 90             | 6910            | BCD                 | 49-74                  |
| 196           | LEAH/8003050         | 7                   | 92                       | 35                      | 0              | 6768            | CD                  | 27-76                  |
| 180           | MARS/M201//MARS      | 6                   | 91                       | 36                      | 0              | 6677            | CD                  | 66-73                  |
| 161           | L201/3/TTEP/...      | 7                   | 89                       | 36                      | 0              | 6298            | D                   | 42-73                  |
| C.V.          |                      | 8.9                 | 1.8                      | 3.1                     | -              | 8.9             |                     | 8.3-1.4                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

## COMMERCIAL VARIETY TESTS

The rice breeding project annually conducts yield trials on commercial rice varieties. Included in the tests are the major commercial varieties and advanced experimentals in the final stages of testing before release from the cooperating public and private breeding programs.

These tests were conducted at four locations in Louisiana in 1990. These include the Rice Research Station, the Northeast Research Station at St. Joseph, and on-farm locations in East Carroll and Vermilion parishes. The East Carroll location was carried out in cooperation with the rice fertilization and cultural management project.

These tests included the following entries:

| Entry                   | Grain Type         | Source                                               |
|-------------------------|--------------------|------------------------------------------------------|
| <b>Very Early Group</b> |                    |                                                      |
| AS3510                  | Long               | Alexandria Seed Company                              |
| L-202                   | "                  | Rice Experiment Station, Biggs, CA                   |
| Labelle                 | "                  | TAES, USDA, Beaumont, TX                             |
| Maybelle                | "                  | TAES, USDA, Beaumont, TX                             |
| RAX 2015                | "                  | Ring Around Hybrid Seed Company,<br>East Bernard, TX |
| RAX 2033                | "                  | "                                                    |
| RAX 2039                | "                  | "                                                    |
| Rosemont                | "                  | TAES, USDA, Beaumont, TX                             |
| RT 7015                 | "                  | Ricetec Seed Company, Alvin, TX                      |
| Skybonnet               | "                  | TAES, USDA, Beaumont, TX                             |
| Tebonnet                | "                  | AAES, Stuttgart, AR                                  |
| Texmont                 | "                  | AAES, Stuttgart, AR                                  |
| <b>Early Group</b>      |                    |                                                      |
| AR 1121                 | Medium             | AAES, Stuttgart, AR                                  |
| AS 3058                 | Medium             | Alexandria Seed Company                              |
| Della                   | Long (aromatic)    | LAES, Crowley, LA                                    |
| Gulfmont                | Long               | TAES, USDA, Beaumont, TX                             |
| Jasmine 85              | Long (aromatic)    | TAES, USDA, Beaumont, TX                             |
| Katy                    | Long               | AAES, Stuttgart, AR                                  |
| Lacassine               | "                  | LAES, Crowley, LA                                    |
| LA 2207                 | "                  | "                                                    |
| LA 2214                 | Medium             | "                                                    |
| LA 2215                 | Long (aromatic)    | "                                                    |
| Lemont                  | Long               | TAES, USDA, Beaumont, TX                             |
| Mars                    | Medium             | AAES, Stuttgart, AR                                  |
| Mercury                 | Medium             | LAES, Crowley, LA                                    |
| Newbonnet               | Long               | AAES, Stuttgart, AR                                  |
| RAX 2220                | Long               | Ring Around Hybrid Seed Company,<br>East Bernard, TX |
| Rico 1                  | Medium             | TAES, USDA, Beaumont, TX                             |
| Toro 2                  | Long (low amylose) | LAES, Crowley, LA                                    |
| TX 3072                 | Long               | TAES, USDA, Beaumont, TX                             |
| V4716                   | Medium             | Ricetec Seed Company, Alvin, TX                      |
| V7817                   | Long               | Ricetec Seed Company, Alvin, TX                      |

**Experiment:** Commercial Variety Test

**Location:** Rice Research Station

**Seeding Rate/Date:** 100 lb/A, Apr 10, 1990

**Planting Method:** Drill seeded

**Fertilization:** 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Apr 10;  
70 lb N/A, May 1 (Preflood); Very early group, 70 lb N/A, Aug 10

**Plot Size:** 4.66 x 16 ft (74.5 ft<sup>2</sup>)

**Water Management:** Flushed, Apr 10, Apr 17; flooded, May 2; harvest  
drainage, July 20; reflooded (very early group), Aug 10;  
harvest drainage (second crop) (very early group), Oct 10

**Herbicides:** Arrosolo (propanil) 3 lb ai/A + molinate (3 lb ai/A), May 1; Londax  
(bensulfuron-methyl) 0.9 oz ai/A, May 7

**Harvest:** Very early group, Aug 6; second crop, Oct 20

**Experimental Design:** Randomized complete block design with four replications

**Comments:** Yields were excellent for most commercial variety entries at this  
location. Milling was down somewhat for some entries, probably due to  
higher than normal temperature at heading (Tables 13-15).

TABLE 13. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP. CROWLEY, LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS<br>TO 50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@12%) | DUNCAN'S<br>TEST *** | MILLING %<br>(WHL-TOT) |
|---------------|----------------|---------------------|---------------------------|-------------------------|----------------|-------------------------|----------------------|------------------------|
| MAYBELLE      | L              | 4                   | 68                        | 42                      | 0              | 8401                    | A                    | 61-71                  |
| TEBONNET      | L              | 5                   | 74                        | 55                      | 0              | 7810                    | AB                   | 59-70                  |
| RAX 2015      | L              | 7                   | 71                        | 44                      | 0              | 7503                    | BC                   | 56-71                  |
| RT 7015       | L              | 6                   | 73                        | 39                      | 0              | 7366                    | BCD                  | 58-69                  |
| L-202         | L              | 5                   | 72                        | 40                      | 0              | 7141                    | CDE                  | 51-67                  |
| RAX 2039      | L              | 8                   | 71                        | 46                      | 0              | 7110                    | CDE                  | 53-72                  |
| 8603006       | L              | 6                   | 75                        | 34                      | 0              | 6806                    | DEF                  | 58-70                  |
| TEXMONT       | L              | 6                   | 73                        | 37                      | 0              | 6741                    | DEF                  | 59-69                  |
| RAX 2033      | L              | 7                   | 70                        | 42                      | 0              | 6480                    | EFG                  | 54-70                  |
| SKYBONNET     | L              | 7                   | 77                        | 49                      | 0              | 6326                    | FG                   | 64-71                  |
| LABELLE       | L              | 5                   | 72                        | 51                      | 25             | 5908                    | G                    | 61-69                  |
| AS 3510       | L              | 5                   | 62                        | 45                      | 20             | 4745                    | H                    | 58-68                  |
| C.V.          |                | 6.1                 | 0.7                       | 2.3                     | -              | 6.1                     |                      | 3.2-1.6                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 14. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, MAIN, RATOON, AND TOTAL CROP. VERY EARLY GROUP. CROWLEY, LA.

| 1990 ENTRY           | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A@12%M----- |                   |                    |                      |                |                  |
| MAYBELLE             | 36                | 8401               | 4280                 | 12681          | A                |
| RAX 2015             | 32                | 7503               | 4136                 | 11639          | B                |
| L-202                | 31                | 7141               | 4018                 | 11159          | BC               |
| RAX 2039             | 35                | 7110               | 3760                 | 10869          | BC               |
| TEXMONT              | 32                | 6741               | 4097                 | 10837          | BC               |
| RT 7015              | 33                | 7366               | 3245                 | 10612          | C                |
| 8603006              | 33                | 6806               | 3675                 | 10481          | C                |
| LABELLE              | 44                | 5908               | 3332                 | 9240           | D                |
| TEBONNET             | 43                | 7810               | 1359                 | 9169           | D                |
| SKYBONNET            | 42                | 6326               | 2178                 | 8503           | D                |
| RAX 2033             | 30                | 6480               | 2020                 | 8499           | DE               |
| AS 3510              | 37                | 4745               | 2908                 | 7653           | E                |
| C.V.                 | 4.6               | 6.2                | 12.1                 | 5.9            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 15. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, EARLY GROUP. CROWLEY, LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS<br>TO 50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@12%) | DUNCAN'S<br>TEST *** | MILLING %<br>(WHL-TOT) |
|---------------|----------------|---------------------|---------------------------|-------------------------|----------------|-------------------------|----------------------|------------------------|
| MARS          | M              | 4                   | 85                        | 49                      | 0              | 8286                    | A                    | 65-70                  |
| LA 214        | M              | 5                   | 85                        | 39                      | 0              | 8080                    | AB                   | 66-72                  |
| RICO 1        | M              | 6                   | 88                        | 47                      | 13             | 8066                    | AB                   | 65-71                  |
| V 4716        | M              | 5                   | 83                        | 41                      | 0              | 8004                    | AB                   | 67-71                  |
| LA 207        | L              | 5                   | 83                        | 40                      | 0              | 7905                    | ABC                  | 59-68                  |
| 8803072       | L              | 8                   | 84                        | 39                      | 0              | 7815                    | ABC                  | 63-71                  |
| NEWBONNET     | L              | 5                   | 88                        | 49                      | 0              | 7654                    | ABCD                 | 57-66                  |
| TORO 2        | L              | 5                   | 85                        | 45                      | 0              | 7615                    | ABCD                 | 61-72                  |
| LEMONT        | L              | 7                   | 85                        | 38                      | 0              | 7521                    | BCD                  | 61-71                  |
| LA 201        | L              | 6                   | 82                        | 37                      | 0              | 7410                    | BCD                  | 61-72                  |
| GULFMONT      | L              | 6                   | 82                        | 39                      | 0              | 7258                    | CD                   | 65-73                  |
| KATY          | L              | 5                   | 84                        | 50                      | 0              | 7125                    | DE                   | 57-67                  |
| 8801121       | M              | 6                   | 85                        | 44                      | 23             | 7019                    | DE                   | 63-71                  |
| V 7817        | L              | 8                   | 95                        | 36                      | 0              | 6583                    | EF                   | 57-70                  |
| LA 215        | L              | 7                   | 82                        | 38                      | 0              | 6570                    | EF                   | 61-73                  |
| AS 3058       | M              | 5                   | 78                        | 47                      | 0              | 6347                    | FG                   | 64-69                  |
| JASMINE 851   | L              | 6                   | 99                        | 48                      | 13             | 6321                    | FG                   | 54-67                  |
| RAX 2220      | L              | 7                   | 85                        | 48                      | 0              | 5871                    | GH                   | 48-70                  |
| DELLA         | L              | 5                   | 89                        | 55                      | 43             | 5806                    | GH                   | 58-69                  |
| MERCURY       | M              | 5                   | 82                        | 38                      | 0              | 5397                    | H                    | 59-71                  |
| C.V.          |                | 7.5                 | 1.3                       | 3.1                     | -              | 5.8                     |                      | 3.2-1.5                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

**Experiment:** Commercial Variety Test

**Location:** East Carroll Parish, Buford Perry Farm

**Seeding Rate/Date:** 100 lb/A, May 1, 1990

**Planting Method:** Drill seeded

**Fertilization:** 90 lb N/A, June 13; 45 lb N/A, July 11

**Plot Size:** 7 x 25 ft (175 ft<sup>2</sup>)

**Water Management:** Flushed, May 5, May 26, June 9; flooded, June 14; harvest drainage, Aug 31

**Herbicides:** 5.0 lb ai/A Stam (propanil), May 23; 3.0 lb ai/A Ordram (molinate), June 22

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), June 22; 0.25 lb ai/A methyl parathion, Aug 17

**Fungicides:** 0.5 lb ai/A Benlate (benomyl), Aug 18

**Harvest:** Sept 27

**Experimental Design:** Randomized complete block design with four replications

**Comments:** Yields were excellent for most entries in the very early group with the exceptions of Texmont, Maybelle, and AS 3510 which had severe bird depredation at maturity. Yield and milling were excellent to good in the early group. Severe lodging was observed in Mars and Della (Tables 16 and 17).

TABLE 16. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP. EAST CARROLL PARISH, LA.

| 1990 ENTRY | GRAIN<br>TYPE* | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@ 12%) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|------------|----------------|---------------------------|-------------------------|----------------|--------------------------|--------------------|------------------------|
| 8603006    | L              | 93                        | 38                      | 0              | 9662                     | A                  | 59-72                  |
| RT 7015    | L              | 96                        | 40                      | 0              | 8582                     | AB                 | 62-71                  |
| L-202      | L              | 91                        | 38                      | 0              | 8382                     | B                  | 53-70                  |
| SKYBONNET  | L              | 101                       | 50                      | 3              | 8225                     | B                  | 65-72                  |
| TEBONNET   | L              | 101                       | 54                      | 25             | 7927                     | BC                 | 63-71                  |
| RAX 2033   | L              | 84                        | 41                      | 0              | 7729                     | BC                 | 49-70                  |
| RAX 2015   | L              | 84                        | 42                      | 0              | 7376                     | BCD                | 53-70                  |
| RAX 2039   | L              | 83                        | 44                      | 0              | 7017                     | CD                 | 50-70                  |
| LABELLE    | L              | 94                        | 51                      | 28             | 6424                     | DE                 | 63-71                  |
| TEXMONT    | L              | 91                        | 37                      | 0              | 5872                     | E                  | 56-69                  |
| MAYBELLE   | L              | 87                        | 39                      | 0              | 4351                     | F                  | 55-70                  |
| AS 3510    | L              | 80                        | 40                      | 0              | 2794                     | G                  | 54-68                  |
| G.V.       |                | 2.1                       | 5.0                     | -              | 10.7                     |                    | 5.3-2.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

BIRD DAMAGE ON MAYBELLE, TEXMONT, AND AS 3510.



TABLE 17. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, EARLY GROUP.  
EAST CARROLL PARISH, LA.

| 1990 ENTRY | GRAIN<br>TYPE* | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@ 12%) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|------------|----------------|---------------------------|-------------------------|----------------|--------------------------|--------------------|------------------------|
| JASMINE 85 | L              | 108                       | 45                      | 0              | 10555                    | A                  | 53-72                  |
| RICO 1     | M              | 97                        | 45                      | 13             | 10208                    | A                  | 64-72                  |
| NEWBONNET  | L              | 98                        | 46                      | 0              | 9835                     | AB                 | 61-70                  |
| LA 214     | M              | 96                        | 39                      | 0              | 9835                     | B                  | 69-73                  |
| 8803072    | L              | 100                       | 38                      | 0              | 9697                     | B                  | 64-73                  |
| LA 207     | L              | 104                       | 40                      | 0              | 9052                     | BC                 | 68-72                  |
| GULFMONT   | L              | 103                       | 38                      | 0              | 9046                     | BC                 | 67-73                  |
| V 4716     | M              | 97                        | 40                      | 0              | 8843                     | BC                 | 71-73                  |
| AS 3058    | M              | 94                        | 47                      | 30             | 8523                     | CD                 | 63-70                  |
| RAX 2220   | L              | 98                        | 48                      | 0              | 8437                     | CD                 | 51-72                  |
| TORO 2     | L              | 95                        | 44                      | 5              | 8271                     | CD                 | 60-73                  |
| LEMONT     | L              | 104                       | 36                      | 0              | 8223                     | CD                 | 68-74                  |
| V 7817     | L              | 109                       | 35                      | 0              | 8099                     | CDE                | 65-71                  |
| 8801121    | M              | 94                        | 45                      | 35             | 8023                     | CDEF               | 65-70                  |
| LA 201     | L              | 101                       | 36                      | 0              | 7697                     | DEFG               | 65-73                  |
| LA 215     | L              | 100                       | 36                      | 0              | 7578                     | DEFG               | 63-73                  |
| KATY       | L              | 102                       | 43                      | 0              | 7111                     | EFG                | 65-71                  |
| MARS       | M              | 98                        | 49                      | 90             | 7039                     | FG                 | 65-69                  |
| MERCURY    | M              | 91                        | 41                      | 0              | 6724                     | G                  | 62-72                  |
| DELLA      | L              | 98                        | 52                      | 90             | 5628                     | H                  | 48-70                  |
| C.V.       |                | 1.8                       | 4.6                     | -              | 7.5                      |                    | 3.7-1.1                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Commercial Variety Test

Location: Vermilion Parish, Bobby Trahan Farm

Seeding Rate/Date: 100 lb/A, Apr 12, 1990

Planting Method: Drill seeded

Fertilization: 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Apr 12;  
70 lb N/A, May 14

Plot Size: 4.66 x 16 ft (74.5 ft<sup>2</sup>)

Water Management: Flushed, Apr 14; flooded, May 14; harvest  
drainage, (very early group) July 20, (early group) Aug 5

Herbicides: Arrosolo 3 lb ai/A (propanil and molinate), May 11

Harvest: Very early group, Aug 2; early group, Aug 17

Experimental Design: Randomized complete block design with four replications

Comments: These tests were covered by bird netting to prevent severe bird depredation on headed rice that was experienced at this location in 1989. Yields were generally lower than other locations due to severe sheath blight infection, especially in the early group (Tables 18 and 19).

TABLE 18. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP. PINE ISLAND, LA.

| 1990 ENTRY | GRAIN<br>TYPE* | DAYS TO 50%<br>HEADING | PLANT<br>HGT(IN) | LODGING<br>(%) | YIELD<br>(LB/A @ 12%) | DUNCAN'S<br>TEST** |
|------------|----------------|------------------------|------------------|----------------|-----------------------|--------------------|
| RAX 2015   | L              | 70                     | 40               | 0              | 5455                  | A                  |
| TEBONNET   | L              | 78                     | 51               | 0              | 5313                  | AB                 |
| RAX 2039   | L              | 70                     | 42               | 0              | 5085                  | ABC                |
| L-202      | L              | 76                     | 34               | 0              | 4847                  | BCD                |
| RAX 2033   | L              | 70                     | 41               | 0              | 4816                  | BCD                |
| RT 7015    | L              | 77                     | 34               | 0              | 4600                  | CD                 |
| MAYBELLE   | L              | 71                     | 39               | 68             | 4475                  | D                  |
| 8603006    | L              | 77                     | 32               | 0              | 3881                  | E                  |
| TEXMONT    | L              | 73                     | 34               | 3              | 3880                  | E                  |
| LABELLE    | L              | 73                     | 46               | 13             | 3714                  | E                  |
| SKYBONNET  | L              | 78                     | 43               | 0              | 3371                  | EF                 |
| AS 3510    | L              | 68                     | 38               | 10             | 3203                  | F                  |
| C.V.       |                | 5.5                    | 6.7              | -              | 7.7                   |                    |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 19. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, EARLY GROUP.  
PINE ISLAND, LA.

| 1990 ENTRY  | GRAIN<br>TYPE* | DAYS TO 50%<br>HEADING | PLANT<br>HGT(IN) | LODGING<br>(%) | YIELD<br>(LB/A @ 12%) | DUNCAN'S<br>TEST** |
|-------------|----------------|------------------------|------------------|----------------|-----------------------|--------------------|
| JASMINE 851 | L              | 99                     | 43               | 8              | 5872                  | A                  |
| LA 2214     | M              | 87                     | 34               | 0              | 5577                  | AB                 |
| 8801121     | M              | 86                     | 38               | 5              | 5382                  | ABC                |
| RICO 1      | M              | 88                     | 41               | 35             | 5105                  | BCD                |
| V 4716      | M              | 84                     | 35               | 0              | 5049                  | BCD                |
| MARS        | M              | 86                     | 40               | 55             | 5029                  | BCD                |
| AS 3058     | M              | 81                     | 42               | 23             | 4883                  | CD                 |
| RAX 2220    | L              | 87                     | 45               | 0              | 4586                  | DE                 |
| LEMONT      | L              | 83                     | 33               | 70             | 4133                  | EF                 |
| TORO 2      | L              | 86                     | 42               | 60             | 4131                  | EF                 |
| NEWBONNET   | L              | 88                     | 41               | 13             | 3997                  | EFG                |
| KATY        | L              | 83                     | 41               | 45             | 3936                  | EFG                |
| 8803072     | L              | 80                     | 34               | 78             | 3859                  | FG                 |
| MERCURY     | M              | 85                     | 34               | 0              | 3798                  | FGH                |
| V 7817      | L              | 97                     | 33               | 0              | 3695                  | FGH                |
| GULFMONT    | L              | 79                     | 35               | 88             | 3475                  | FGHI               |
| LA 2201     | L              | 79                     | 34               | 90             | 3429                  | GHI                |
| LA 2207     | L              | 83                     | 33               | 60             | 3365                  | GHI                |
| DELLA       | L              | 89                     | 49               | 50             | 3145                  | HI                 |
| LA 2215     | L              | 78                     | 31               | 90             | 2840                  | I                  |
| C.V.        |                | 1.5                    | 3.5              | -              | 7.8                   |                    |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT  
THE 0.05 LEVEL.

TABLE 1. AGRONOMIC PERFORMANCE OF 1990 UNIFORM RICE NURSERY, MAIN CROP,

**Experiment:** Commercial Variety Test

**Location:** Northeast Research Station, St. Joseph

**Seeding Rate/Date:** 100 lb/A, Apr 24, 1990

**Planting Method:** Drill seeded

**Fertilization:** 65-65-65 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Apr 24;  
60 lb/A N, May 15

**Plot Size:** 4.66 x 16 ft (74.5 ft<sup>2</sup>)

**Water Management:** Flushed, Apr 25; flooded, May 17; harvest drainage  
(very early group), Aug 1, (early group) Aug 15

**Herbicides:** Stam (propanil) 3 lb ai/A + Facet (quinclorac) 0.4 lb ai/A, May  
22; Basagran (bentazon) 2 lb ai/A, June 20

**Harvest:** Very early group, Aug 14; early group, Sep 5

**Experimental Design:** Randomized complete block design with four replications

**Comments:** AS 3510, Labelle, Skybonnet, Maybelle, and Texmont were damaged by  
bird depredation at maturity. The remaining entries for the most part  
displayed very good yield potential (Tables 20 and 21).

TABLE 20. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP. ST. JOE., LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS<br>TO 50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A<br>@12%) | DUNCAN'S<br>TEST *** |
|---------------|----------------|---------------------|---------------------------|-------------------------|-------------------------|----------------------|
| RAX 2033      | L              | 7                   | 74                        | 42                      | 7425                    | A                    |
| L-202         | L              | 6                   | 82                        | 38                      | 7151                    | A                    |
| 8603006       | L              | 6                   | 84                        | 37                      | 7133                    | A                    |
| RT 7015       | L              | 6                   | 85                        | 37                      | 7039                    | A                    |
| RAX 2015      | L              | 7                   | 74                        | 42                      | 6387                    | A                    |
| RAX 2039      | L              | 8                   | 74                        | 44                      | 6367                    | A                    |
| MAYBELLE      | L              | 6                   | 79                        | 41                      | 4561                    | B                    |
| TEBONNET      | L              | 6                   | 86                        | 52                      | 4500                    | B                    |
| TEXMONT       | L              | 7                   | 84                        | 33                      | 4258                    | B                    |
| SKYBONNET     | L              | 7                   | 90                        | 50                      | 3981                    | BC                   |
| LABELLE       | L              | 6                   | 80                        | 51                      | 2612                    | CD                   |
| AS 3510       | L              | 7                   | 68                        | 44                      | 1336                    | D                    |
| C.V.          |                | 9.7                 | 2.0                       | 2.9                     | 20.5                    |                      |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 21. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, EARLY GROUP ST. JOE., LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS<br>TO 50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A<br>@12%) | DUNCAN'S<br>TEST *** |
|---------------|----------------|---------------------|---------------------------|-------------------------|-------------------------|----------------------|
| JASMINE 851   | -              | 7                   | 100                       | 45                      | 8528                    | A                    |
| RICO 1        | -              | 5                   | 92                        | 50                      | 8463                    | A                    |
| LA 214        | -              | 5                   | 90                        | 39                      | 8145                    | AB                   |
| NEWBONNET     | -              | 5                   | 91                        | 45                      | 7652                    | ABC                  |
| V 7817        | -              | 8                   | 100                       | 36                      | 7373                    | ABCD                 |
| MERCURY       | -              | 5                   | 91                        | 42                      | 7291                    | ABCD                 |
| GULFMONT      | -              | 6                   | 91                        | 40                      | 7149                    | ABCDE                |
| LA 207        | -              | 5                   | 91                        | 37                      | 7140                    | ABCDE                |
| KATY          | -              | 6                   | 93                        | 49                      | 7107                    | ABCDE                |
| LEMONT        | -              | 6                   | 92                        | 37                      | 7012                    | ABCDE                |
| 8801121       | -              | 6                   | 89                        | 47                      | 6975                    | ABCDE                |
| LA 201        | -              | 6                   | 90                        | 37                      | 6529                    | BCDEF                |
| MARS          | -              | 4                   | 90                        | 51                      | 6386                    | BCDEF                |
| V 4716        | -              | 6                   | 90                        | 38                      | 6331                    | CDEF                 |
| 8803072       | -              | 7                   | 88                        | 35                      | 5872                    | CDEFG                |
| TORO 2        | -              | 5                   | 90                        | 47                      | 5845                    | DEFG                 |
| RAX 2220      | -              | 7                   | 94                        | 44                      | 5420                    | EFG                  |
| DELLA         | -              | 6                   | 95                        | 58                      | 5015                    | FG                   |
| LA 215        | -              | 7                   | 86                        | 39                      | 4829                    | FG                   |
| AS 3058       | -              | 5                   | 84                        | 48                      | 4227                    | G                    |
| C.V.          |                | 8.8                 | 2.2                       | 5.4                     | 15.9                    |                      |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

## ADVANCED YIELD TESTS

The rice breeding project annually conducts on-farm testing of advanced experimental lines to complement tests conducted on-station. The goal of this activity is to sample additional environments in yield testing of new promising selections from the breeding program. These additional yield evaluations are needed to identify the performance characteristics, strengths, and weaknesses of the test entries. Multi-location and multi-year testing is essential to provide the information needed to make decisions relative to the release of new varieties.

Advanced yield tests were conducted at the Rice Research Station and at four other locations in Louisiana in 1990 in cooperation with commercial growers and the Rice Research Station Fertilization and Cultural Management Project. Twenty-four experimentals and six checks were included in this year's testing program. Second crop information was generated at the Rice Research Station and at the Vermilion Parish location.



**Combined Analyses:** Four-location means for the commercial variety tests are presented in Tables 22 and 23. The means for milling are for two locations (Rice Research Station and East Carroll Parish).

**TABLE 22. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP FOUR LOCATION MEANS, CROWLEY, LA.**

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@ 12%) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|---------------|----------------|---------------------|---------------------------|-------------------------|----------------|--------------------------|--------------------|------------------------|
| RT 7015       | L              | 6                   | 83                        | 37                      | 0              | 6897                     | A                  | 60-70                  |
| L-202         | L              | 5                   | 80                        | 38                      | 0              | 6880                     | A                  | 52-69                  |
| 8603006       | L              | 6                   | 82                        | 35                      | 0              | 6870                     | A                  | 58-71                  |
| RAX 2015      | L              | 7                   | 75                        | 42                      | 0              | 6680                     | A                  | 55-71                  |
| RAX 2033      | L              | 7                   | 74                        | 42                      | 0              | 6612                     | A                  | 52-70                  |
| RAX 2039      | L              | 8                   | 75                        | 44                      | 0              | 6395                     | A                  | 51-71                  |
| TEBONNET      | L              | 6                   | 85                        | 53                      | 8              | 6387                     | A                  | 61-71                  |
| SKYBONNET     | L              | 7                   | 86                        | 48                      | 1              | 5476                     | B                  | 65-71                  |
| MAYBELLE      | L              | 5                   | 76                        | 40                      | 23             | 5447                     | B                  | 58-71                  |
| TEXMONT       | L              | 6                   | 80                        | 35                      | 1              | 5188                     | B                  | 57-69                  |
| LABELLE       | L              | 6                   | 80                        | 50                      | 22             | 4664                     | B                  | 62-70                  |
| AS 3510       | L              | 6                   | 70                        | 42                      | 10             | 3019                     | C                  | 56-68                  |
| C.V.          |                | 10.5                | 3.9                       | 5.6                     | -              | 19.9                     |                    | 5.4-2.1                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 23. AGRONOMIC PERFORMANCE OF 1990 COMMERCIAL VARIETY TESTS, EARLY GROUP  
FOUR LOCATION MEANS CROWLEY, LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@ 12%) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|---------------|----------------|---------------------|---------------------------|-------------------------|----------------|--------------------------|--------------------|------------------------|
| RICO 1        | M              | 6                   | 91                        | 46                      | 20             | 7960                     | A                  | 65-71                  |
| LA 2214       | M              | 5                   | 89                        | 38                      | 0              | 7909                     | A                  | 68-72                  |
| JASMINE 85    | L              | 6                   | 101                       | 45                      | 7              | 7819                     | AB                 | 54-69                  |
| NEWBONNET     | L              | 5                   | 91                        | 45                      | 4              | 7284                     | ABC                | 59-68                  |
| V 4716        | M              | 5                   | 88                        | 39                      | 0              | 7056                     | BCD                | 69-72                  |
| LA 2207       | L              | 5                   | 90                        | 38                      | 20             | 6865                     | CDE                | 63-70                  |
| 8801121       | M              | 6                   | 89                        | 44                      | 21             | 6849                     | CDE                | 64-70                  |
| 8803072       | L              | 7                   | 88                        | 37                      | 26             | 6811                     | CDE                | 64-72                  |
| GULFMONT      | L              | 6                   | 89                        | 38                      | 29             | 6732                     | CDE                | 66-73                  |
| LEMONT        | L              | 6                   | 91                        | 36                      | 23             | 6722                     | CDE                | 65-73                  |
| MARS          | M              | 4                   | 90                        | 47                      | 48             | 6685                     | CDE                | 65-70                  |
| TORO 2        | L              | 5                   | 89                        | 44                      | 22             | 6465                     | CDE                | 60-72                  |
| V 7817        | L              | 8                   | 100                       | 35                      | 0              | 6437                     | CDE                | 61-70                  |
| KATY          | L              | 5                   | 90                        | 46                      | 15             | 6320                     | DEF                | 61-69                  |
| LA 2201       | L              | 6                   | 88                        | 36                      | 30             | 6266                     | DEFG               | 63-72                  |
| RAX 2220      | L              | 7                   | 91                        | 46                      | 0              | 6078                     | EFG                | 49-71                  |
| AS 3058       | M              | 5                   | 84                        | 46                      | 18             | 5995                     | EFG                | 64-70                  |
| MERCURY       | M              | 5                   | 87                        | 39                      | 0              | 5802                     | FGH                | 60-71                  |
| LA 2215       | L              | 7                   | 86                        | 36                      | 30             | 5454                     | GH                 | 62-73                  |
| DELLA         | L              | 5                   | 93                        | 54                      | 61             | 4898                     | H                  | 53-69                  |
| C.V.          |                | 8.9                 | 5.3                       | 5.3                     | -              | 15.9                     |                    | 4.8-2.0                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Mar 28, 1990

Planting Method: Drill seeded

Fertilization: 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Mar 28; 70 lb N/A, May 1; 70 lb N/A, Aug 13 (second crop)

Plot Size: 4.66 x 25 ft (116.5 ft<sup>2</sup>)

Water Management: Flushed, Mar 28; flushed, Apr 10, Apr 17; flooded, May 2; harvest drainage, July 25; second crop flooded, Aug 13; harvest drainage (second crop), Oct 28

Herbicides: Arrosolo (3 lb ai/A propanil + 3 lb ai/A molinate), May 1; Londax (bensulfuron-methyl) 0.9 oz ai/A, May 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran); May 14

Harvest: First crop, Aug 10; second crop, Nov 9

Experimental Design: Randomized complete block with four replications

Comments: Grain yields were excellent while milling yields were somewhat low (Tables 24 and 25).

TABLE 24. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, MAIN CROP. RICE RESEARCH STATION, CROWLEY, LA.

| 1990 ENTRY | PEDIGREE         | SEEDLING<br>VIGOR* | DAYS TO 50%<br>HEADING | PLANT<br>HGT(IN) | LODGING<br>(%) | YIELD<br>LB/A @12% | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|------------|------------------|--------------------|------------------------|------------------|----------------|--------------------|--------------------|------------------------|
| RICO 1     | RICO 1           | 5                  | 93                     | 43               | 5              | 8845               | A                  | 62-68                  |
| 2209       | 8002610/CICA9    | 5                  | 93                     | 46               | 0              | 8455               | AB                 | 58-66                  |
| 2212       | 82CAY21/LMNT     | 6                  | 90                     | 39               | 0              | 8322               | ABC                | 51-66                  |
| TEBONNET   | TEBONNET         | 5                  | 86                     | 53               | 5              | 8296               | ABCD               | 59-69                  |
| 2224       | MERC/RICO 1      | 4                  | 90                     | 43               | 0              | 8098               | BCDE               | 58-68                  |
| 2216       | 80Y50/LBLE       | 6                  | 86                     | 37               | 0              | 8087               | BCDEF              | 50-69                  |
| 2207       | 82CAY21/LMNT     | 5                  | 90                     | 40               | 0              | 8076               | BCDEF              | 58-67                  |
| 2204       | 82CAY21/LMNT     | 5                  | 87                     | 38               | 0              | 7985               | BCDEF              | 55-66                  |
| 2218       | RAX CLEAR        | 7                  | 101                    | 39               | 0              | 7947               | BCDEF              | 59-65                  |
| 2205       | 82CAY21//LMNT/.. | 6                  | 89                     | 41               | 0              | 7927               | BCDEF              | 56-67                  |
| 2223       | MERC//MERC/RICO  | 5                  | 86                     | 46               | 23             | 7910               | BCDEF              | 54-69                  |
| 2214       | MARS/M201//MARS  | 5                  | 92                     | 36               | 0              | 7857               | BCDEFG             | 64-71                  |
| 2206       | NWBT/LMNT//TBNT  | 6                  | 92                     | 38               | 0              | 7761               | CDEFGH             | 57-68                  |
| 2201       | NWBT/LMNT        | 7                  | 93                     | 37               | 0              | 7728               | CDEFGH             | 61-70                  |
| 2208       | 82CAY21//LMNT/.. | 7                  | 87                     | 39               | 0              | 7711               | CDEFGH             | 52-67                  |
| 2219       | 82CAY21/TBNT     | 5                  | 78                     | 36               | 0              | 7612               | DEFGH              | 60-69                  |
| 2217       | 82CAY21/LMNT     | 5                  | 89                     | 38               | 0              | 7562               | EFGH               | 58-67                  |
| 2203       | 82CAY21/LMNT     | 6                  | 90                     | 37               | 0              | 7510               | EFGHI              | 61-70                  |
| TEXMONT    | TEXMONT          | 5                  | 83                     | 37               | 0              | 7492               | EFGHI              | 58-68                  |
| 2220       | 82CAY21/LMNT     | 6                  | 85                     | 37               | 0              | 7398               | FGHIJ              | 57-69                  |
| LEMONT     | LEMONT           | 6                  | 96                     | 37               | 0              | 7186               | GHIJ               | 60-69                  |
| 2202       | 82CAY21/LEAH     | 5                  | 86                     | 36               | 0              | 7149               | HIJ                | 51-68                  |
| 2221       | TBNT IP          | 5                  | 86                     | 45               | 0              | 7091               | HIJ                | 54-69                  |
| 2222       | LMNT*2/8001190   | 6                  | 96                     | 37               | 0              | 6884               | IJK                | 52-66                  |
| 2210       | LMNT/DELLA       | 6                  | 88                     | 37               | 0              | 6825               | JK                 | 61-71                  |
| KATY       | KATY             | 5                  | 95                     | 47               | 0              | 6790               | JK                 | 56-65                  |
| 2211       | LBNT//9881/..    | 7                  | 106                    | 40               | 0              | 6430               | K                  | 54-65                  |
| MERCURY    | MERCURY          | 4                  | 88                     | 38               | 0              | 6372               | K                  | 60-71                  |
| 2213       | LBNT//9881/..    | 7                  | 101                    | 39               | 0              | 6261               | K                  | 56-68                  |
| 2215       | LMNT/DELLA       | 7                  | 91                     | 36               | 0              | 6255               | K                  | 59-70                  |
| C.V.       |                  | 7.2                | 1.1                    | 2.3              | -              | 5.4                |                    | 4.0-                   |

\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 25. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, MAIN, RATOON, AND TOTAL CROP. RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY    | PEDIGREE          | RATOON<br>HEIGHT<br>(IN) | MAIN<br>CROP<br>YIELD | RATOON<br>CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|------------------|-------------------|--------------------------|-----------------------|-------------------------|----------------|------------------|
| ---LBS/A@12%M--- |                   |                          |                       |                         |                |                  |
| 2216             | 80Y50/LBLE        | 28                       | 8087                  | 3652                    | 11739          | A                |
| TEXMONT          | TEXMONT           | 30                       | 7492                  | 4036                    | 11527          | AB               |
| 2204             | 82CAY21/LMNT      | 29                       | 7985                  | 3424                    | 11409          | ABC              |
| 2219             | 82CAY21/TBNT      | 28                       | 7612                  | 3647                    | 11259          | ABC              |
| 2208             | 82CAY21//LMNT/... | 29                       | 7711                  | 3376                    | 11087          | BCD              |
| 2207             | 82CAY21/LMNT      | 30                       | 8076                  | 3003                    | 11079          | BCD              |
| 2212             | 82CAY21/LMNT      | 30                       | 8322                  | 2708                    | 11029          | BCD              |
| 2202             | 82CAY21/LEAH      | 27                       | 7149                  | 3744                    | 10893          | BCDE             |
| 2205             | 82CAY21//LMNT/... | 30                       | 7927                  | 2958                    | 10885          | BCDE             |
| 2223             | MERC//MERC/RICO   | 32                       | 7910                  | 2958                    | 10868          | BCDE             |
| 2214             | MARS/M201//MARS   | 28                       | 7857                  | 2997                    | 10854          | BCDE             |
| 2220             | 82CAY21/LMNT      | 28                       | 7398                  | 3420                    | 10817          | CDE              |
| 2217             | 82CAY21/LMNT      | 29                       | 7562                  | 3170                    | 10732          | CDE              |
| 2224             | MERC/RICO 1       | 32                       | 8098                  | 2340                    | 10438          | DEF              |
| TEBONNET         | TEBONNET          | 41                       | 8296                  | 1957                    | 10252          | EFG              |
| 2203             | 82CAY21/LMNT      | 28                       | 7510                  | 2734                    | 10243          | EFG              |
| RICO 1           | RICO 1            | 32                       | 8845                  | 1016                    | 9861           | FGH              |
| 2218             | RAX CLEAR         | 27                       | 7947                  | 1871                    | 9819           | FGH              |
| 2210             | LMNT/DELLA        | 30                       | 6825                  | 2892                    | 9717           | GHI              |
| 2221             | TEBONNET IP       | 33                       | 7091                  | 2359                    | 9450           | HI               |
| 2201             | NWBT/LMNT         | 32                       | 7728                  | 1715                    | 9443           | HIJ              |
| 2222             | LMNT*2/8001190    | 30                       | 6884                  | 2471                    | 9355           | HIJ              |
| 2209             | 8002610/CICA9     | 34                       | 8455                  | 867                     | 9322           | HIJK             |
| MERCURY          | MERCURY           | 29                       | 6372                  | 2831                    | 9204           | HIJKL            |
| 2206             | NWBT/LMNT//TBNT   | 30                       | 7761                  | 1386                    | 9147           | IJKL             |
| 2215             | LMNT/DELLA        | 29                       | 6255                  | 2727                    | 8982           | JKL              |
| LEMONT           | LEMONT            | 30                       | 7186                  | 1511                    | 8697           | KL               |
| KATY             | KATY              | 35                       | 6790                  | 1824                    | 8614           | L                |
| 2213             | LBNT//9881/...    | 30                       | 6261                  | 1408                    | 7669           | M                |
| 2211             | LBNT//9881/...    | 29                       | 6430                  | 718                     | 7148           | M                |
| C.V.             |                   | 3.1                      | 5.4                   | 13.5                    | 4.1            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Rapides Parish, Will Bollich Farm

Seeding Rate/Date: 150 lb/A, Apr 27, 1990

Planting Method: Water seeded (pre-germinated seed)

Fertilization: 120 lb N/A preplant incorporated, Apr 25

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Water Management: Flooded, Apr 26; drained, Apr 29; flooded, May 1; harvest drainage, Aug 7

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), May 18; 4.0 lb ai/A Ordram (molinate), June 2

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 2

Fungicides: 0.28 lb ai/A Tilt (propiconazole), June 25; 0.5 lb ai/A Benlate (benomyl), July 25

Harvest: Aug 22

Experimental Design: Randomized complete block with four replications

Comments: Severe sheath blight probably decreased grain and milling yields on very susceptible entries (Table 26).

TABLE 26. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, RAPIDES PARISH, LA.

| 1990<br>ENTRY | PEDIGREE         | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2218          | RAX CLEAR        | 4                   | 81                       | 37                      | 0              | 9801            | A                   | 61-68                  |
| 2214          | MARS/M201//MARS  | 5                   | 81                       | 39                      | 0              | 8511            | B                   | 64-69                  |
| RICO 1        | RICO 1           | 5                   | 81                       | 43                      | 0              | 8442            | BC                  | 64-70                  |
| 2222          | LMNT*2/8001190   | 5                   | 82                       | 35                      | 0              | 8254            | BCD                 | 49-66                  |
| 2204          | 82CAY21/LMNT     | 5                   | 76                       | 37                      | 0              | 7790            | CDE                 | 56-69                  |
| 2212          | 82CAY21/LMNT     | 6                   | 78                       | 37                      | 0              | 7754            | CDE                 | 57-69                  |
| 2220          | 82CAY21/LMNT     | 5                   | 76                       | 37                      | 0              | 7649            | DE                  | 57-70                  |
| 2209          | 8002610/CICA 9   | 5                   | 83                       | 43                      | 0              | 7426            | EF                  | 60-67                  |
| 2206          | NWBT/LMNT//TBNT  | 7                   | 82                       | 38                      | 0              | 7338            | EFG                 | 59-70                  |
| 2203          | 82CAY21/LMNT     | 5                   | 79                       | 35                      | 0              | 7238            | EFGH                | 59-71                  |
| 2217          | 82CAY21/LMNT     | 5                   | 80                       | 36                      | 0              | 7165            | EFGH                | 61-69                  |
| 2208          | 82CAY21//LMNT/.. | 6                   | 76                       | 41                      | 23             | 7109            | EFGH                | 52-69                  |
| 2216          | 80Y50/LBLE       | 7                   | 80                       | 37                      | 0              | 7080            | EFGH                | 46-70                  |
| 2211          | LBNT//9881/..    | 6                   | 85                       | 36                      | 0              | 7076            | EFGH                | 61-71                  |
| 2224          | MERC/RICO 1      | 5                   | 80                       | 42                      | 0              | 7063            | EFGH                | 61-70                  |
| 2202          | 82CAY21/LEAH     | 4                   | 76                       | 35                      | 0              | 7019            | EFGH                | 53-71                  |
| 2207          | 82CAY21/LMNT     | 5                   | 81                       | 36                      | 0              | 6828            | FGHI                | 60-68                  |
| MERCURY       | MERCURY          | 3                   | 78                       | 37                      | 0              | 6767            | FGHIJ               | 56-69                  |
| 2201          | NWBT/LMNT        | 6                   | 81                       | 35                      | 0              | 6739            | FGHIJ               | 62-72                  |
| 2213          | LBNT//9881/..    | 7                   | 84                       | 36                      | 0              | 6631            | GHIJ                | 54-71                  |
| TEBONNET      | TEBONNET         | 5                   | 77                       | 52                      | 10             | 6617            | GHIJ                | 58-69                  |
| 2223          | MERC//MERC/RICO  | 5                   | 78                       | 44                      | 0              | 6493            | HIJK                | 57-70                  |
| LEMONT        | LEMONT           | 6                   | 84                       | 34                      | 0              | 6470            | HIJK                | 58-71                  |
| KATY          | KATY             | 5                   | 83                       | 43                      | 0              | 6452            | HIJK                | 60-67                  |
| 2210          | LMNT/DELLA       | 6                   | 79                       | 36                      | 3              | 6195            | IJK                 | 58-71                  |
| 2205          | 82CAY21//LMNT/.. | 4                   | 76                       | 38                      | 5              | 6067            | IJK                 | 54-68                  |
| 2219          | 82CAY21/TBNT     | 6                   | 71                       | 34                      | 0              | 6038            | JK                  | 56-70                  |
| TEXMONT       | TEXMONT          | 6                   | 74                       | 34                      | 0              | 5825            | KL                  | 56-68                  |
| 2215          | LMNT/DELLA       | 6                   | 78                       | 36                      | 10             | 5779            | KL                  | 52-71                  |
| 2221          | TBNT IP          | 5                   | 78                       | 43                      | 0              | 5132            | L                   | 55-68                  |
| C.V.          |                  | 9.9                 | 1.4                      | 3.8                     | -              | 6.7             |                     | 4.2-1.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Morehouse Parish, Zaunbrecher Farm

Seeding Rate/Date: 150 lb/A, May 9, 1990

Planting Method: Water seeded (pre-germinated seed)

Fertilization: 120 lb N/A preplant incorporated, May 7

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Water Management: Flooded, May 8; drained, May 13; flooded, May 16; drained, May 23; flooded, May 26; harvest drainage, Aug 29

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 25; 0.9 oz ai/A Londax (bensulfuron-methyl), June 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 15

Fungicides: 0.5 lb ai/A Benlate (benomyl), Aug 17

Harvest: Sept 19

Experimental Design: Randomized complete block with four replications

Comments: Excellent grain and milling yields displayed by most entries. Some stands were thin early but excellent tillering led to excellent plant population at maturity (Table 27).



TABLE 27. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, MOREHOUSE PARISH, LA.

| 1990<br>ENTRY | PEDIGREE         | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|---------------|------------------|--------------------------|-------------------------|----------------|-----------------|--------------------|------------------------|
| 2218          | RAX CLEAR        | 85                       | 36                      | 0              | 10124           | A                  | 61-68                  |
| 2209          | 8002610/CICA 9   | 87                       | 46                      | 0              | 9129            | B                  | 62-69                  |
| 2206          | NWBT/LMNT//..    | 89                       | 38                      | 0              | 8947            | BC                 | 58-69                  |
| 2201          | NWBT/LMNT        | 88                       | 36                      | 0              | 8738            | BCD                | 60-69                  |
| 2220          | 82CAY21/LMNT     | 84                       | 38                      | 0              | 8680            | BCD                | 59-69                  |
| 2214          | MARS/M201//MARS  | 89                       | 38                      | 60             | 8635            | BCDE               | 64-70                  |
| 2222          | LMNT*2/8001190   | 86                       | 35                      | 0              | 8455            | BCDEF              | 58-68                  |
| 2224          | MERC/RICO 1      | 97                       | 36                      | 0              | 8268            | BCDEF              | 65-70                  |
| 2203          | 82CAY21/LMNT     | 87                       | 36                      | 0              | 8158            | BCDEF              | 60-70                  |
| 2211          | LBNT//9881//..   | 95                       | 48                      | 0              | 8135            | BCDEFG             | 62-69                  |
| 2202          | 82CAY21/LEAH     | 80                       | 37                      | 0              | 8018            | CDEFGH             | 57-68                  |
| 2210          | LMNT/DELLA       | 94                       | 37                      | 0              | 7982            | CDEFGH             | 64-71                  |
| 2217          | 82CAY21/LMNT     | 91                       | 37                      | 0              | 7944            | CDEFGH             | 61-68                  |
| 2216          | 80Y50/LBLE       | 96                       | 35                      | 0              | 7911            | CDEFGH             | 64-70                  |
| LEMONT        | LEMONT           | 97                       | 36                      | 0              | 7906            | CDEFGH             | 64-70                  |
| 2207          | 82CAY21/LMNT     | 96                       | 37                      | 0              | 7797            | DEFGH              | 63-69                  |
| 2212          | 82CAY21/LMNT     | 88                       | 39                      | 0              | 7723            | DEFGHI             | 57-67                  |
| 2204          | 82CAY21/LMNT     | 78                       | 40                      | 0              | 7692            | DEFGHI             | 59-68                  |
| 2208          | 82CAY21/LMNT//.. | 95                       | 36                      | 0              | 7679            | DEFGHI             | 64-70                  |
| RICO 1        | RICO 1           | 88                       | 43                      | 85             | 7662            | DEFGHI             | 61-69                  |
| 2205          | 82CAY21/LMNT//.. | 85                       | 39                      | 0              | 7574            | EFGHI              | 59-68                  |
| KATY          | KATY             | 93                       | 47                      | 0              | 7527            | FGHI               | 61-67                  |
| 2223          | MERC//MERC/RICO  | 97                       | 36                      | 0              | 7507            | FGHI               | 65-71                  |
| 2219          | 82CAY21/TBNT     | 69                       | 35                      | 0              | 7083            | GHIJ               | 59-69                  |
| 2215          | LMNT/DELLA       | 89                       | 36                      | 0              | 6996            | HIJ                | 62-70                  |
| 2221          | TBNT IP          | 90                       | 48                      | 18             | 6977            | HIJ                | 60-68                  |
| TEBONNET      | TEBONNET         | 86                       | 52                      | 60             | 6686            | IJK                | 61-68                  |
| MERCURY       | MERCURY          | 84                       | 37                      | 68             | 6305            | JK                 | 60-70                  |
| TEXMONT       | TEXMONT          | 80                       | 34                      | 0              | 5879            | K                  | 47-64                  |
| 2213          | LBNT//9881//..   | 97                       | 38                      | 0              | 5813            | K                  | 61-69                  |
| C.V.          |                  | 2.9                      | 9.5                     | -              | 8.1             |                    | 3.6-1.6                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

**Experiment:** Advanced Yield Test

**Location:** East Carroll Parish, Buford Perry Farm

**Seeding Rate/Date:** 100 lb/A, May 1, 1990

**Planting Method:** Drill seeded

**Fertilization:** 90 lb N/A, June 13; 45 lb N/A, July 11

**Plot Size:** 7 x 25 ft (175 ft<sup>2</sup>)

**Water Management:** Flushed, May 5, May 26, June 9; flooded, June 14; harvest drainage, Aug 31

**Herbicides:** 5.0 lb ai/A Stam (propanil), May 23; 3.0 lb ai/A Ordram (molinate), June 22

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), June 22; 0.25 lb ai/A methyl parathion, Aug 17

**Fungicides:** 0.5 lb ai/A Benlate (benomyl), Aug 18

**Harvest:** Sept 27

**Experimental Design:** Randomized complete block with four replications

**Comments:** Excellent yield and milling for most entries in spite of very thin early stands. Some lodging observed in Rico 1 and entry LA 2223 (Table 28).

TABLE 28. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, EAST CARROLL PARISH, LA.

| 1990<br>ENTRY | PEDIGREE         | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|---------------|------------------|--------------------------|-------------------------|----------------|-----------------|--------------------|------------------------|
| 2218          | RAX CLEAR        | 97                       | 36                      | 0              | 10482           | A                  | 65-71                  |
| RICO 1        | RICO 1           | 97                       | 45                      | 13             | 10245           | AB                 | 64-72                  |
| 2214          | MARS/M201//MARS  | 96                       | 39                      | 0              | 9870            | ABC                | 69-73                  |
| 2216          | 80Y50/LBLE       | 98                       | 39                      | 0              | 9836            | ABC                | 51-72                  |
| 2209          | 8002610/CICA 9   | 98                       | 44                      | 0              | 9770            | ABCD               | 62-70                  |
| 2222          | LMNT*2/8001190   | 101                      | 37                      | 0              | 9441            | ABCDE              | 60-71                  |
| 2224          | MERC/RICO 1      | 95                       | 45                      | 0              | 9201            | ABCDEF             | 55-69                  |
| 2207          | 82CAY21/LMNT     | 104                      | 40                      | 0              | 9084            | ABCDEFGF           | 68-72                  |
| 2205          | 82CAY21//LMNT/.. | 96                       | 38                      | 0              | 8898            | BCDEFGH            | 63-71                  |
| 2220          | 82CAY21/LMNT     | 99                       | 39                      | 0              | 8848            | BCDEFGH            | 59-73                  |
| 2211          | LBNT//9881/..    | 107                      | 40                      | 0              | 8707            | CDEFGH             | 68-73                  |
| 2212          | 82CAY21/LMNT     | 95                       | 39                      | 0              | 8570            | CDEFGHI            | 57-70                  |
| 2217          | 82CAY21/LMNT     | 99                       | 37                      | 0              | 8442            | CDEFGHIJ           | 68-72                  |
| 2206          | NWBT/LMNT//TBNT  | 101                      | 37                      | 0              | 8431            | CDEFGHIJ           | 65-73                  |
| 2204          | 82CAY21/LMNT     | 94                       | 38                      | 0              | 8427            | CDEFGHIJ           | 62-71                  |
| 2208          | 82CAY21//LMNT/.. | 92                       | 40                      | 3              | 8404            | CDEFGHIJ           | 57-71                  |
| 2203          | 82CAY21/LMNT     | 97                       | 37                      | 0              | 8403            | CDEFGHIJ           | 63-73                  |
| TEBONNET      | TEBONNET         | 99                       | 52                      | 0              | 8288            | DEFGHIJ            | 64-72                  |
| LEMONT        | LEMONT           | 104                      | 36                      | 0              | 8253            | EFGHIJ             | 68-74                  |
| 2213          | LBNT//9881/..    | 103                      | 37                      | 0              | 8182            | EFGHIJK            | 61-72                  |
| 2221          | TBNT IP          | 100                      | 45                      | 0              | 8109            | EFGHIJK            | 57-70                  |
| 2202          | 82CAY21/LEAH     | 91                       | 34                      | 0              | 7777            | FGHIJK             | 57-72                  |
| 2201          | NWBT/LMNT        | 101                      | 36                      | 0              | 7724            | FGHIJK             | 65-73                  |
| 2215          | LMNT/DELLA       | 100                      | 36                      | 0              | 7606            | GHIJK              | 63-73                  |
| 2210          | LMNT/DELLA       | 96                       | 36                      | 0              | 7433            | HIJK               | 63-74                  |
| KATY          | KATY             | 102                      | 43                      | 0              | 7137            | IJK                | 65-71                  |
| 2223          | MERC//MERC/RICO  | 90                       | 48                      | 28             | 7021            | JK                 | 56-71                  |
| MERCURY       | MERCURY          | 91                       | 41                      | 0              | 6749            | K                  | 62-72                  |
| TEXMONT       | TEXMONT          | 91                       | 34                      | 0              | 5158            | L                  | 48-66                  |
| 2219          | 82CAY21/TBNT     | 84                       | 33                      | 0              | 5021            | L                  | 62-71                  |
| C.V.          |                  | 1.8                      | 4.7                     | -              | 10.6            |                    | 3.7-1.3                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Vermilion Parish, Errol Lounsberry Farm

Seeding Rate/Date: 150 lb/A, Apr 19, 1990

Planting Method: Water seeded (pre-germinated seed)

Fertilization: 90-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O), Apr 17; 75 lb N/A, Aug 10

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Water Management: Flooded, Apr 18; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 27; second crop flooded, Aug 11; harvest drainage (second crop), Oct 8

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl) + 3.0 lb ai/A Ordram (molinate), May 12

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 25

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 19; 0.5 lb ai/A Benlate (benomyl), July 11

Harvest: Aug 8; second crop, Oct 23

Experimental Design: Randomized complete block with four replications

Comments: Less disease pressure was found in 1990 because of drier conditions. Yields were average to good but milling yields were low (Tables 29 and 30).

TABLE 29. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, VERMILION PARISH, LA.

| 1990<br>ENTRY | PEDIGREE         | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2218          | RAX CLEAR        | 4                   | 77                       | 37                      | 0              | 8689            | A                   | 58-67                  |
| 2222          | LMNT*2/8001190   | 5                   | 74                       | 36                      | 0              | 7870            | B                   | 45-64                  |
| 2201          | NWBT/LMNT        | 5                   | 73                       | 34                      | 0              | 7361            | BC                  | 61-70                  |
| 2206          | NWBT/LMNT//..    | 6                   | 73                       | 37                      | 0              | 7207            | BCD                 | 55-69                  |
| 2212          | 82CAY21/LMNT     | 5                   | 68                       | 37                      | 0              | 7179            | BCD                 | 50-66                  |
| 2204          | 82CAY21/LMNT     | 4                   | 67                       | 35                      | 0              | 7008            | CD                  | 58-68                  |
| 2208          | 82CAY21//LMNT/.. | 5                   | 68                       | 36                      | 0              | 6880            | CD                  | 51-67                  |
| 2203          | 82CAY21/LMNT     | 5                   | 71                       | 35                      | 0              | 6877            | CD                  | 58-69                  |
| 2205          | 82CAY21/LMNT/..  | 4                   | 67                       | 36                      | 0              | 6865            | CDE                 | 55-67                  |
| 2216          | 80Y50/LBLE       | 6                   | 70                       | 35                      | 0              | 6844            | CDE                 | 48-68                  |
| TEBONNET      | TEBONNET         | 5                   | 67                       | 48                      | 3              | 6837            | CDE                 | 57-68                  |
| 2213          | LBNT//9881/..    | 6                   | 74                       | 36                      | 0              | 6818            | CDE                 | 52-68                  |
| LEMONT        | LEMONT           | 6                   | 74                       | 34                      | 0              | 6813            | CDE                 | 54-68                  |
| 2207          | 82CAY21/LMNT     | 3                   | 72                       | 35                      | 0              | 6806            | CDE                 | 57-68                  |
| 2217          | 82CAY21/LMNT     | 4                   | 72                       | 35                      | 0              | 6707            | CDEF                | 57-68                  |
| RICO 1        | RICO 1           | 5                   | 76                       | 38                      | 0              | 6597            | CDEFG               | 62-69                  |
| 2223          | MERC//MERC/RICO  | 5                   | 72                       | 42                      | 0              | 6549            | CDEFG               | 45-69                  |
| 2209          | 8002610/CICA 9   | 5                   | 77                       | 44                      | 0              | 6533            | CDEFG               | 57-66                  |
| 2211          | LBNT//9881/..    | 6                   | 77                       | 36                      | 0              | 6514            | CDEFG               | 54-68                  |
| 2202          | 82CAY21/LEAH     | 4                   | 68                       | 33                      | 0              | 6506            | CDEFG               | 49-69                  |
| TEXMONT       | TEXMONT          | 6                   | 66                       | 35                      | 0              | 6439            | DEFG                | 51-68                  |
| 2221          | TBNT IP          | 4                   | 65                       | 42                      | 0              | 6437            | DEFG                | 45-69                  |
| 2220          | 82CAY21/LMNT     | 4                   | 67                       | 32                      | 0              | 6377            | DEFG                | 58-69                  |
| 2214          | MARS/M201//MARS  | 4                   | 76                       | 34                      | 0              | 6348            | DEFG                | 63-69                  |
| 2215          | LMNT/DELLA       | 6                   | 71                       | 35                      | 0              | 6333            | DEFG                | 46-70                  |
| 2210          | LMNT/DELLA       | 5                   | 68                       | 34                      | 0              | 6322            | DEFG                | 53-70                  |
| 2219          | 82CAY21/TBNT     | 5                   | 58                       | 34                      | 0              | 5977            | EFG                 | 59-69                  |
| 2224          | MERC/RICO 1      | 5                   | 73                       | 38                      | 0              | 5833            | FG                  | 57-69                  |
| KATY          | KATY             | 5                   | 73                       | 44                      | 0              | 5762            | G                   | 59-67                  |
| MERCURY       | MERCURY          | 3                   | 72                       | 34                      | 0              | 4843            | H                   | 40-69                  |
| C.V.          |                  | 8.4                 | 1.5                      | 4.4                     | -              | 7.7             |                     | 8.9-1.7                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 30. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, MAIN, RATOON, AND TOTAL CROP. VERMILION PARISH, LA.

| 1990 ENTRY            | RATOON HT<br>(IN) | MAIN CROP<br>YIELD | RATOON CROP<br>YIELD | TOTAL<br>YIELD | DUNCANS<br>TEST* |
|-----------------------|-------------------|--------------------|----------------------|----------------|------------------|
| -----LBS/A @12%M----- |                   |                    |                      |                |                  |
| 2218                  | 26                | 8689               | 1535                 | 10224          | A                |
| 2203                  | 27                | 6877               | 3006                 | 9883           | AB               |
| 2204                  | 27                | 7008               | 2799                 | 9808           | AB               |
| 2212                  | 28                | 7179               | 2628                 | 9807           | AB               |
| 2201                  | 29                | 7361               | 2166                 | 9527           | ABC              |
| 2223                  | 33                | 6549               | 2834                 | 9383           | ABCD             |
| 2205                  | 29                | 6865               | 2515                 | 9379           | ABCD             |
| 2216                  | 29                | 6844               | 2512                 | 9356           | ABCD             |
| 2222                  | 27                | 7870               | 1425                 | 9295           | ABCDE            |
| 2214                  | 28                | 6348               | 2925                 | 9273           | ABCDE            |
| 2207                  | 28                | 6806               | 2462                 | 9268           | ABCDE            |
| 2217                  | 28                | 6707               | 2537                 | 9244           | ABCDE            |
| 2202                  | 27                | 6506               | 2630                 | 9136           | BCDE             |
| 2208                  | 29                | 6880               | 2225                 | 9106           | BCDE             |
| TEXMONT               | 28                | 6439               | 2673                 | 9050           | BCDE             |
| TEBONNET              | 37                | 6837               | 2141                 | 8979           | BCDEF            |
| RICO 1                | 30                | 6597               | 2346                 | 8943           | BCDEF            |
| 2210                  | 30                | 6322               | 2574                 | 8896           | BCDEF            |
| 2220                  | 26                | 6377               | 2358                 | 8735           | CDEF             |
| 2215                  | 27                | 6333               | 2302                 | 8636           | CDEF             |
| 2224                  | 31                | 5833               | 2799                 | 8631           | CDEF             |
| 2206                  | 28                | 7207               | 1383                 | 8590           | CDEF             |
| 2221                  | 32                | 6437               | 2079                 | 8515           | CDEF             |
| 2219                  | 27                | 5977               | 2518                 | 8494           | CDEF             |
| 2213                  | 28                | 6818               | 1600                 | 8418           | DEFG             |
| LEMONT                | 28                | 6813               | 1506                 | 8318           | DEFGH            |
| 2209                  | 31                | 6533               | 1732                 | 8265           | EFGH             |
| 2211                  | 30                | 6514               | 1424                 | 7938           | FGH              |
| KATY                  | 35                | 5762               | 1671                 | 7484           | GH               |
| MERCURY               | 28                | 4843               | 2520                 | 7363           | H                |
| C.V.                  | 5.4               | 7.7                | 10.5                 | 6.8            |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Combined Analyses: Table 31 contains yield agronomic and milling data averaged over the five locations in 1990. Entries 2209, 2214, 2204, and 2207 are currently being increased as potential varietal releases.

TABLE 31. AGRONOMIC PERFORMANCE OF 1990 ADVANCED YIELD TEST, FIVE LOCATION MEANS, LA.

| 1990<br>ENTRY | GRAIN<br>TYPE* | SEEDLING<br>VIGOR** | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A<br>@ 12%) | DUNCAN'S<br>TEST** | MILLING %<br>(WHL-TOT) |
|---------------|----------------|---------------------|---------------------------|-------------------------|----------------|--------------------------|--------------------|------------------------|
| RAX CLEAR     | M              | 5                   | 88                        | 37                      | 0              | 9409                     | A                  | 61-67                  |
| RICOL         | M              | 5                   | 87                        | 42                      | 21             | 8358                     | B                  | 63-70                  |
| 2209          | L              | 5                   | 87                        | 44                      | 0              | 8263                     | BC                 | 60-68                  |
| 2214          | M              | 5                   | 87                        | 37                      | 12             | 8244                     | BCD                | 65-70                  |
| 2222          | L              | 5                   | 88                        | 36                      | 0              | 8181                     | BCD                | 53-67                  |
| 2216          | L              | 6                   | 86                        | 37                      | 0              | 7952                     | BCDE               | 52-70                  |
| 2206          | L              | 6                   | 87                        | 38                      | 0              | 7937                     | BCDE               | 59-70                  |
| 2212          | L              | 5                   | 84                        | 38                      | 0              | 7909                     | BCDEF              | 54-68                  |
| 2220          | L              | 5                   | 82                        | 37                      | 0              | 7790                     | BCDEF              | 58-70                  |
| 2204          | L              | 5                   | 80                        | 38                      | 0              | 7780                     | BCDEF              | 58-68                  |
| 2207          | L              | 4                   | 89                        | 38                      | 0              | 7718                     | CDEF               | 61-69                  |
| 2224          | M              | 5                   | 87                        | 41                      | 0              | 7692                     | CDEFG              | 59-69                  |
| 2201          | L              | 6                   | 87                        | 36                      | 0              | 7658                     | CDEFG              | 62-71                  |
| 2203          | L              | 5                   | 85                        | 36                      | 0              | 7637                     | DEFG               | 60-71                  |
| 2217          | L              | 5                   | 86                        | 37                      | 0              | 7564                     | EFG                | 61-69                  |
| 2208          | L              | 6                   | 83                        | 39                      | 5              | 7556                     | EFG                | 55-69                  |
| 2205          | L              | 5                   | 83                        | 38                      | 1              | 7466                     | EFGH               | 58-68                  |
| 2211          | L              | 7                   | 94                        | 40                      | 0              | 7372                     | EFGH               | 60-69                  |
| TEBONNET      | L              | 5                   | 83                        | 51                      | 16             | 7345                     | EFGH               | 60-69                  |
| LEMONT        | L              | 6                   | 91                        | 36                      | 0              | 7325                     | EFGHI              | 61-70                  |
| 2202          | L              | 4                   | 80                        | 35                      | 0              | 7294                     | FGHI               | 54-70                  |
| 2223          | M              | 5                   | 84                        | 43                      | 10             | 7096                     | GHIJ               | 55-70                  |
| 2210          | L              | 6                   | 85                        | 36                      | 1              | 6951                     | HIJ                | 60-71                  |
| 2221          | L              | 5                   | 84                        | 45                      | 4              | 6749                     | IJK                | 54-69                  |
| 2213          | L              | 7                   | 92                        | 37                      | 0              | 6741                     | IJK                | 57-69                  |
| KATY          | L              | 5                   | 89                        | 45                      | 0              | 6733                     | IJK                | 60-67                  |
| 2215          | L              | 6                   | 86                        | 36                      | 2              | 6594                     | JK                 | 56-71                  |
| 2219          | L              | 5                   | 72                        | 34                      | 0              | 6346                     | K                  | 59-70                  |
| MERCURY       | M              | 3                   | 82                        | 37                      | 14             | 6207                     | K                  | 56-70                  |
| TEXMONT       | L              | 6                   | 79                        | 34                      | 0              | 6158                     | K                  | 52-67                  |
| C.V.          |                | 12.0                | 3.9                       | 6.6                     | -              | 11.0                     |                    | 7.0-1.9                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

## PRELIMINARY YIELD TESTS

The preliminary yield tests provide the first stage of replicated testing of promising experimental lines in field plots. Many of these are discarded before harvest or after laboratory evaluation. The more promising entries will be reselected and advanced for further testing.

Experiment: Preliminary Yield Test (Entries 501-850)

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 25, 1990

Planting Method: Drill seeded

Fertilization: 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Apr 25;  
70 lb N/A, May 17

Plot Size: 4.66 x 16 ft (74.5 ft<sup>2</sup>)

Water Management: Flushed, Apr 26; flooded, May 18; harvest drainage, entries 1-150, Aug 10; harvest drainage, entries 151-350, Aug 15

Herbicides: Stam (propanil) 3 lb ai/A, May 16; Londax (bensulfuron-methyl) 0.9 oz ai/A, May 23

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 3

Harvest: Entries 1-50, Aug 22; entries 51-150, Aug 24; entries 251-275, Aug 27; entries 151-250, Aug 28; entries 276-350, Aug 29

Experimental Design: Randomized complete block with two replications

Comments: Excessive sheath blight pressure led to low grain and milling yields of many entries. Severe lodging was displayed by many entries and this was mainly due to weakened culms because of the sheath blight pressure (Tables 32-45).



TABLE 32. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S MILLING %<br>TEST*** (WHL-TOT) |
|---------------|--------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|-----------------------------------------|
| 2518          | LMNT/NWBT//80Y50/. | 6                   | 77                       | 43                      | 0              | 7832            | A 50-69                                 |
| 2503          | LMNT/NWBT/3/..     | 5                   | 74                       | 40                      | 0              | 7456            | AB 58-69                                |
| 2504          | M101/LBLE*2//..    | 6                   | 69                       | 39                      | 0              | 7388            | ABC 55-69                               |
| 2508          | NWBT/LMNT//..      | 6                   | 75                       | 36                      | 0              | 7008            | ABCD 63-70                              |
| 2514          | 80Y50/LBLE//TNBT   | 4                   | 78                       | 44                      | 0              | 6956            | BCDE 63-70                              |
| 2506          | M101/LBLE*2/3/..   | 5                   | 72                       | 41                      | 25             | 6599            | BCDEF 58-68                             |
| L-202         | L 202              | 5                   | 72                       | 41                      | 0              | 6552            | CDEF 52-67                              |
| 2507          | NWBT/LMNT//..      | 7                   | 75                       | 37                      | 0              | 6475            | DEF 61-69                               |
| 2516          | 80Y50/LBLE//TBNT   | 4                   | 77                       | 43                      | 0              | 6393            | DEF 64-70                               |
| TEBONNET      | TEBONNET           | 4                   | 73                       | 51                      | 90             | 6390            | DEF 60-70                               |
| 2502          | 80Y50/LBLE//TBNT   | 4                   | 76                       | 39                      | 0              | 6362            | DEF 63-69                               |
| 2519          | SKBT/L201//..      | 4                   | 68                       | 47                      | 5              | 6325            | DEF 57-70                               |
| 2501          | LMNT/82CAY83       | 5                   | 74                       | 39                      | 10             | 6291            | DEF 60-68                               |
| 2512          | L201/LMNT/TTEPX2   | 5                   | 75                       | 37                      | 0              | 6232            | DEF 31-69                               |
| 2510          | 82CAY21/NWRX       | 4                   | 72                       | 38                      | 0              | 6209            | DEF 58-70                               |
| 2513          | LMNT//82CAY21/TDCN | 6                   | 77                       | 40                      | 0              | 6170            | DEF 62-70                               |
| 2509          | 82CAY21//TTEP/..   | 5                   | 73                       | 36                      | 0              | 6114            | DEF 50-69                               |
| 2520          | 82CAY21/LMNT       | 6                   | 78                       | 41                      | 5              | 6066            | EF 60-70                                |
| 2517          | LBNT//9881/..      | 6                   | 88                       | 40                      | 0              | 6051            | EF 58-67                                |
| 2515          | 80Y50/LBLE//TBNT   | 4                   | 77                       | 42                      | 0              | 5776            | FG 61-69                                |
| 2505          | M101/LBLE*2//..    | 5                   | 73                       | 37                      | 5              | 5767            | FG 53-67                                |
| 2522          | LMNT/8001190       | 4                   | 76                       | 39                      | 0              | 5668            | FG 55-70                                |
| 2511          | L201/LMNT//TTEPX2  | 4                   | 75                       | 38                      | 15             | 5141            | G 27-67                                 |
| 2521          | LMNT/TORO2         | 6                   | 74                       | 36                      | 0              | 5058            | G 47-69                                 |
| MAYBELLE      | MAYBELLE           | 4                   | 67                       | 40                      | 55             | 4180            | H 46-70                                 |
| C.V.          |                    | 9.9                 | 1.3                      | 3.6                     | -              | 6.1             | 5.1-1.2                                 |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 33. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2544          | 82CAY21/TBNT       | 5                   | 77                 | 40                      | 0              | 6708            | A                   | 57-70                  |
| 2536          | TBNT IP            | 4                   | 74                 | 51                      | 90             | 6708            | A                   | 66-73                  |
| 2539          | TBNT IP            | 4                   | 77                 | 50                      | 90             | 6421            | AB                  | 63-71                  |
| 2545          | 82CAY21/TBNT       | 5                   | 79                 | 39                      | 0              | 6361            | ABC                 | 58-70                  |
| 2531          | 82CAY21/LMNT       | 5                   | 78                 | 37                      | 10             | 6099            | ABCD                | 66-72                  |
| L-202         | L 202              | 6                   | 73                 | 38                      | 0              | 6036            | ABCDE               | 55-71                  |
| TEBONNET      | TEBONNET           | 5                   | 74                 | 50                      | 85             | 5951            | ABCDEF              | 63-74                  |
| 2537          | TBNT IP            | 4                   | 73                 | 49                      | 90             | 5942            | ABCDEF              | 66-73                  |
| 2541          | TBNT IP            | 4                   | 75                 | 48                      | 90             | 5898            | ABCDEF              | 65-73                  |
| 2527          | TBNT IP            | 4                   | 72                 | 48                      | 85             | 5872            | ABCDEF              | 61-72                  |
| 2546          | 82CAY21/TTEP//IR-8 | 6                   | 76                 | 41                      | 30             | 5804            | ABCDEF              | 56-71                  |
| 2533          | TBNT IP            | 4                   | 76                 | 50                      | 90             | 5732            | ABCDEF              | 66-73                  |
| 2542          | TBNT IP            | 4                   | 72                 | 47                      | 75             | 5362            | ABCDEFG             | 63-73                  |
| 2529          | LMNT*2/82CAY20     | 6                   | 76                 | 39                      | 45             | 5306            | BCDEFG              | 63-71                  |
| 2528          | 82CAY21/LEAH       | 5                   | 78                 | 37                      | 0              | 5208            | BCDEFG              | 61-70                  |
| 2543          | 82CAY21/LMNT       | 4                   | 77                 | 37                      | 0              | 5153            | BCDEFGH             | 63-71                  |
| 2547          | 80Y50/LBLE//TBNT   | 5                   | 79                 | 38                      | 0              | 5029            | CDEFGH              | 61-70                  |
| 2526          | 82CAY21/LMNT       | 6                   | 78                 | 38                      | 0              | 4995            | CDEFGH              | 57-70                  |
| 2535          | TBNT IP            | 4                   | 74                 | 49                      | 90             | 4776            | DEFGHI              | 57-74                  |
| MAYBELLE      | MAYBELLE           | 4                   | 68                 | 38                      | 25             | 4718            | EFGHI               | 44-74                  |
| 2534          | TBNT IP            | 5                   | 75                 | 49                      | 90             | 4614            | FGHI                | 64-72                  |
| 2530          | LMNT*2/82CAY22     | 5                   | 77                 | 35                      | 0              | 4337            | GHI                 | 63-72                  |
| 2540          | TBNT IP            | 4                   | 72                 | 50                      | 90             | 3858            | HI                  | 61-71                  |
| 2538          | TBNT IP            | 4                   | 73                 | 48                      | 90             | 3663            | I                   | 58-71                  |
| 2532          | TBNT IP            | 4                   | 75                 | 47                      | 90             | 3629            | I                   | 61-71                  |
| C.V.          |                    | 8.1                 | 1.0                | 2.9                     | -              | 10.5            |                     | 3.9-1.0                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 34. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE            | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|---------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2553          | 82CAY21/LEAH        | 5                   | 83                       | 41                      | 0              | 6305            | A                   | 57-69                  |
| 2555          | LMNT*2/82CAY81      | 6                   | 85                       | 41                      | 0              | 6215            | AB                  | 63-72                  |
| 2557          | 82CAY21//LMNT/LEAH  | 5                   | 82                       | 39                      | 0              | 6090            | ABC                 | 60-72                  |
| 2558          | 82CAY21//LMNT/LEAH  | 4                   | 83                       | 39                      | 0              | 5931            | ABCD                | 62-72                  |
| 2551          | 82CAY21/TBNT        | 5                   | 81                       | 38                      | 0              | 5913            | ABCD                | 58-69                  |
| 2564          | LMNT*2/82CAY83      | 5                   | 93                       | 39                      | 0              | 5728            | ABCDE               | 62-71                  |
| KATY          | KATY                | 4                   | 82                       | 47                      | 0              | 5666            | ABCDE               | 60-69                  |
| 2567          | LMNT//82CAY21/TDCN  | 7                   | 87                       | 36                      | 0              | 5508            | ABCDE               | 68-74                  |
| 2566          | LMNT*2/82CAY83      | 5                   | 82                       | 39                      | 0              | 5232            | ABCDEF              | 61-71                  |
| 2565          | LMNT*2/82CAY83      | 5                   | 87                       | 39                      | 0              | 5226            | ABCDEF              | 66-73                  |
| 2552          | 82CAY21/LMNT        | 6                   | 80                       | 38                      | 15             | 5103            | ABCDEF              | 60-72                  |
| 2568          | 80Y50/LBLE//TBNT    | 5                   | 83                       | 41                      | 0              | 5029            | ABCDEF              | 62-69                  |
| 2571          | LMNT/HONG410        | 6                   | 87                       | 37                      | 0              | 5022            | ABCDEF              | 63-72                  |
| 2573          | M101/LBLE*2/3/      | 5                   | 78                       | 43                      | 0              | 5007            | ABCDEF              | 55-69                  |
| 2556          | LMNT//LMNT/CICA 9   | 5                   | 84                       | 38                      | 0              | 4995            | BCDEF               | 59-72                  |
| 2562          | LMNT//NWBT/LEAH     | 5                   | 87                       | 36                      | 0              | 4853            | CDEF                | 57-71                  |
| 2554          | LMNT*2/8001190      | 5                   | 86                       | 39                      | 0              | 4831            | CDEF                | 62-72                  |
| 2569          | 80Y50/LBLE//TBNT    | 4                   | 81                       | 41                      | 0              | 4739            | DEFG                | 60-69                  |
| 2570          | LMNT/86AS2057       | 5                   | 79                       | 50                      | 90             | 4693            | DEFG                | 62-71                  |
| 2560          | LMNT/82CAY82        | 5                   | 86                       | 40                      | 0              | 4462            | EFGH                | 69-73                  |
| 2561          | L201/LMNT//LMNT     | 6                   | 80                       | 31                      | 0              | 4438            | EFGH                | 59-73                  |
| 2563          | LMNT//NWBT/LEAH     | 4                   | 88                       | 34                      | 0              | 4168            | FGH                 | 65-72                  |
| LEMONT        | LEMONT              | 6                   | 84                       | 37                      | 0              | 3914            | GH                  | 61-72                  |
| 2559          | LBNT//9881/331581/. | 6                   | 82                       | 35                      | 30             | 3830            | GH                  | 57-70                  |
| 2572          | M101/LBLE*2//...    | 5                   | 74                       | 38                      | 30             | 3323            | H                   | 39-68                  |
| C.V.          |                     | 6.6                 | 1.1                      | 2.0                     | -              | 10.6            |                     | 4.3-1.8                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 35. AGRONOMIC PERFORMANCE OF 1990 PERLIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2585          | 82CAY21/LMNT       | 7                   | 78                 | 37                      | 0              | 7541            | A                   | 57-68                  |
| 2586          | 82CAY21/LMNT       | 6                   | 79                 | 37                      | 0              | 7151            | AB                  | 55-69                  |
| 2583          | 82CAY21/LEAH       | 4                   | 76                 | 38                      | 0              | 6642            | ABC                 | 50-69                  |
| 2594          | 82CAY21/LMNT       | 7                   | 85                 | 38                      | 0              | 6439            | BCD                 | 54-67                  |
| 2584          | 82CAY21/LEAH       | 5                   | 79                 | 36                      | 0              | 6234            | BCDE                | 53-68                  |
| 2596          | 82CAY21/LMNT       | 6                   | 82                 | 38                      | 0              | 6161            | CDE                 | 61-70                  |
| 2591          | 82CAY21/LMNT       | 4                   | 79                 | 39                      | 10             | 6145            | CDEF                | 58-68                  |
| 2597          | 82CAY21/LMNT       | 6                   | 83                 | 36                      | 0              | 6056            | CDEFG               | 63-72                  |
| 2598          | LMNT*2/CR1113      | 5                   | 84                 | 39                      | 0              | 5936            | CDEFGH              | 60-71                  |
| 2595          | 82CAY21/LMNT       | 6                   | 83                 | 36                      | 0              | 5915            | CDEFGH              | 60-70                  |
| 2590          | 82CAY21/LMNT       | 4                   | 78                 | 40                      | 0              | 5913            | CDEFGH              | 61-69                  |
| 2587          | 82CAY21/LMNT       | 6                   | 85                 | 34                      | 0              | 5811            | CDEFGH              | 65-71                  |
| 2589          | 82CAY21/LMNT       | 5                   | 77                 | 41                      | 10             | 5718            | CDEFGH              | 58-69                  |
| 2588          | 82CAY21/LMNT       | 6                   | 85                 | 35                      | 0              | 5548            | DEFGHI              | 63-70                  |
| 2582          | 82CAY21/LEAH       | 5                   | 78                 | 34                      | 0              | 5512            | DEFGHI              | 50-68                  |
| 2593          | 82CAY21/LMNT       | 4                   | 77                 | 40                      | 15             | 5465            | DEFGHI              | 58-69                  |
| 2579          | RXMT//82CAY21/LMNT | 5                   | 76                 | 39                      | 5              | 5208            | EFGHI               | 53-68                  |
| 2581          | RXMT//82CAY21/LMNT | 6                   | 83                 | 31                      | 0              | 5115            | FGHI                | 59-68                  |
| 2592          | 82CAY21/LMNT       | 4                   | 77                 | 41                      | 10             | 5088            | GHI                 | 55-67                  |
| 2578          | M101/LBLE*2/3/.... | 6                   | 76                 | 39                      | 0              | 4920            | HI                  | 59-67                  |
| GULFMONT      | GULFMONT           | 5                   | 81                 | 38                      | 10             | 4592            | I                   | 57-69                  |
| 2576          | M101/LBLE*2/3/.... | 5                   | 76                 | 42                      | 20             | 4587            | I                   | 43-64                  |
| LEMONT        | LEMONT             | 6                   | 84                 | 36                      | 0              | 4583            | I                   | 57-70                  |
| 2577          | M101/LBLE*2/3/.... | 5                   | 78                 | 41                      | 0              | 4582            | I                   | 43-63                  |
| 2580          | RXMT//82CAY21/LMNT | 6                   | 83                 | 35                      | 0              | 4575            | I                   | 51-68                  |
| C.V.          |                    | 10.5                | 0.8                | 3.5                     | -              | 7.5             |                     | 5.7-2.1                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 36. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2601          | LMNT*2/CR1113      | 6                   | 84                       | 38                      | 0              | 6373            | A                   | 61-70                  |
| 2604          | LMNT*2/CR1113      | 5                   | 78                       | 41                      | 25             | 6098            | AB                  | 62-71                  |
| KATY          | KATY               | 4                   | 82                       | 46                      | 0              | 6093            | AB                  | 59-67                  |
| 2609          | 80Y50/LBLE         | 6                   | 85                       | 35                      | 0              | 6081            | AB                  | 60-70                  |
| 2614          | LMNT/NWBT//LMNT    | 6                   | 79                       | 37                      | 0              | 6023            | ABC                 | 63-71                  |
| 2602          | LMNT*2/CR1113      | 6                   | 78                       | 36                      | 0              | 5869            | ABC                 | 59-71                  |
| 2621          | L201/LMNT//NWBT    | 6                   | 80                       | 35                      | 0              | 5821            | ABC                 | 53-69                  |
| 2616          | LMNT*2/82CAY20     | 5                   | 86                       | 41                      | 0              | 5777            | ABC                 | 66-71                  |
| 2603          | LMNT*2/CR1113      | 5                   | 78                       | 43                      | 20             | 5710            | ABC                 | 59-69                  |
| 2607          | 82CAY21//LMNT/LEAH | 7                   | 83                       | 39                      | 0              | 5694            | ABC                 | 60-70                  |
| 2617          | LMNT*2/82CAY20     | 5                   | 85                       | 37                      | 0              | 5636            | ABC                 | 65-71                  |
| 2618          | LMNT*2/82CAY82     | 6                   | 88                       | 38                      | 0              | 5598            | ABC                 | 64-70                  |
| 2620          | L201/LMNT//LMNT    | 7                   | 88                       | 36                      | 0              | 5555            | ABC                 | 56-68                  |
| 2622          | L201/LMNT//NWBT    | 6                   | 80                       | 36                      | 0              | 5510            | ABCD                | 56-70                  |
| 2610          | 80Y50/LBLE         | 7                   | 87                       | 34                      | 0              | 5488            | ABCD                | 60-70                  |
| 2611          | 82CAY21/LMNT       | 7                   | 82                       | 34                      | 0              | 5389            | ABCD                | 54-69                  |
| 2615          | LMNT/NWBT//LMNT    | 6                   | 87                       | 36                      | 0              | 5341            | ABCD                | 63-70                  |
| 2623          | L201/LMNT//NWBT    | 6                   | 78                       | 35                      | 0              | 5325            | ABCD                | 52-70                  |
| 2612          | DLAX2 HEADROWS     | 7                   | 82                       | 45                      | 0              | 5295            | ABCD                | 59-69                  |
| 2608          | 80Y50/LBLE         | 6                   | 84                       | 36                      | 0              | 5262            | ABCD                | 59-69                  |
| 2606          | 80Y50/LBLE         | 6                   | 83                       | 39                      | 0              | 5221            | BCD                 | 58-69                  |
| 2619          | L201/LMNT//LMNT    | 6                   | 89                       | 33                      | 0              | 5195            | BCD                 | 50-69                  |
| 2605          | 80Y50/LBLE         | 6                   | 81                       | 38                      | 0              | 4924            | CD                  | 58-70                  |
| 2613          | LMNT*2/82CAY22     | 5                   | 76                       | 37                      | 25             | 4904            | CD                  | 55-70                  |
| LEMONT        | LEMONT             | 6                   | 85                       | 37                      | 0              | 4414            | D                   | 61-71                  |
| C.V.          |                    | 7.1                 | 1.0                      | 2.4                     | -              | 8.4             |                     | 5.6-1.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 37. AGRONOMIC PERFORMANCE OF 1990 PERLIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE            | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|---------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2635          | NWBT/LMNT//L202     | 5                   | 79                 | 33                      | 0              | 6522            | A                   | 63-71                  |
| 2640          | 82CAY21/NWRX        | 6                   | 80                 | 39                      | 0              | 6497            | A                   | 58-69                  |
| 2639          | 82CAY21/LEAH        | 5                   | 77                 | 35                      | 0              | 6095            | AB                  | 61-71                  |
| 2647          | 82CAY21//LMNT/LEAH  | 5                   | 77                 | 39                      | 0              | 6082            | ABC                 | 56-69                  |
| 2648          | 82CAY21//LMNT/LEAH  | 5                   | 77                 | 41                      | 0              | 6046            | ABC                 | 53-68                  |
| 2628          | LMNT*2/82CAY20      | 6                   | 84                 | 35                      | 0              | 6015            | ABC                 | 59-71                  |
| 2646          | LMNT/82CAY81        | 5                   | 84                 | 43                      | 25             | 5852            | ABC                 | 60-69                  |
| 2636          | NWBT/LMNT//L202/..  | 5                   | 90                 | 39                      | 0              | 5842            | ABC                 | 62-69                  |
| 2641          | NWBT/LMNT//TBNT     | 6                   | 84                 | 41                      | 0              | 5777            | ABCD                | 66-71                  |
| 2642          | LMNT*2/8001198      | 6                   | 85                 | 37                      | 0              | 5665            | ABCDE               | 62-71                  |
| 2645          | LMNT/82CAY22        | 6                   | 81                 | 40                      | 0              | 5600            | ABCDEF              | 65-72                  |
| 2643          | LMNT*2/8001190      | 6                   | 86                 | 39                      | 0              | 5494            | ABCDEFG             | 66-72                  |
| 2638          | NWBT*2//TTEP/IR-8   | 5                   | 86                 | 35                      | 0              | 5466            | ABCDEFG             | 60-69                  |
| 2629          | LMNT*2/82CAY20      | 7                   | 85                 | 35                      | 0              | 5155            | BCDEFGH             | 62-69                  |
| 2626          | NWBT/LMNT//L202/..  | 5                   | 77                 | 37                      | 0              | 5131            | BCDEFGH             | 56-70                  |
| 2637          | LMNT*2/8001190      | 6                   | 87                 | 36                      | 0              | 5099            | BCDEFGH             | 65-71                  |
| GULFMONT      | GULFMONT            | 5                   | 81                 | 36                      | 0              | 4831            | CDEFGH              | 58-70                  |
| 2634          | L201/LMNT/4/LBNT//. | 8                   | 85                 | 31                      | 0              | 4827            | CDEFGH              | 66-71                  |
| 2632          | 82CAY21//TTEP/...   | 7                   | 85                 | 39                      | 0              | 4578            | DEFGH               | 60-68                  |
| 2630          | LMNT//8203200/...   | 6                   | 82                 | 38                      | 10             | 4530            | DEFGH               | 56-70                  |
| 2644          | LMNT*2/8001190      | 6                   | 87                 | 36                      | 0              | 4480            | EFGH                | 68-72                  |
| LEMONT        | LEMONT              | 6                   | 85                 | 36                      | 0              | 4389            | FGH                 | 60-70                  |
| 2627          | LMNT*2/82CAY22      | 6                   | 83                 | 36                      | 0              | 4255            | GH                  | 57-71                  |
| 2631          | 82CAY21//TTEP/...   | 7                   | 83                 | 38                      | 0              | 4161            | I                   | 57-67                  |
| 2633          | 82CAY21//TTEP/...   | 6                   | 84                 | 35                      | 0              | 4061            | I                   | 56-67                  |
| C.V.          |                     | 5.6                 | 1.0                | 2.4                     | -              | 9.8             |                     | 3.8-1.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 38. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2664          | LMNT*2/CR1113      | 6                   | 82                       | 39                      | 5              | 6846            | A                   | 55-71                  |
| 2658          | LMNT/TTEP          | 5                   | 85                       | 35                      | 20             | 6567            | AB                  | 30-67                  |
| 2657          | LMNT/TTEP          | 5                   | 79                       | 36                      | 30             | 6301            | ABC                 | 34-69                  |
| 2663          | LMNT*2/CR1113      | 5                   | 81                       | 37                      | 35             | 6187            | ABCD                | 52-69                  |
| 2656          | LMNT/DLLA          | 6                   | 78                       | 41                      | 45             | 5869            | BCDE                | 58-72                  |
| 2659          | LMNT/DLLA          | 5                   | 81                       | 38                      | 30             | 5437            | CDEF                | 55-70                  |
| 2672          | TORO2/83CAY44      | 5                   | 75                       | 34                      | 30             | 5428            | CDEF                | 35-68                  |
| KATY          | KATY               | 3                   | 82                       | 45                      | 90             | 5395            | CDEF                | 63-69                  |
| 2661          | 82CAY21/LEAH       | 5                   | 81                       | 35                      | 0              | 5313            | CDEF                | 33-70                  |
| 2665          | LMNT*2/BOND        | 6                   | 82                       | 36                      | 0              | 5297            | DEF                 | 36-71                  |
| 2653          | LMNT//82CAY21/TDCN | 5                   | 79                       | 39                      | 90             | 5086            | EFG                 | 55-70                  |
| 2668          | LMNT//82CAY23/LEAH | 4                   | 86                       | 37                      | 0              | 5069            | EFG                 | 60-70                  |
| 2670          | LMNT/82CAY82       | 5                   | 89                       | 38                      | 15             | 5056            | EFG                 | 59-70                  |
| 2662          | 82CAY21/LEAH       | 5                   | 82                       | 35                      | 0              | 5055            | EFG                 | 36-71                  |
| 2671          | LMNT/TORO2         | 6                   | 76                       | 35                      | 50             | 4859            | EFGH                | 33-71                  |
| 2651          | L210/LMNT//LMNT    | 6                   | 80                       | 37                      | 60             | 4679            | FGHI                | 45-70                  |
| 2652          | LBNT//9881/...     | 6                   | 79                       | 36                      | 90             | 4667            | FGHI                | 42-72                  |
| 2666          | LMNT*2/BOND        | 5                   | 82                       | 36                      | 15             | 4661            | FGHI                | 52-72                  |
| 2669          | LMNT/DLLA          | 5                   | 83                       | 38                      | 50             | 4556            | FGHI                | 44-71                  |
| 2667          | LMNT/8001190       | 5                   | 81                       | 35                      | 10             | 4555            | FGHI                | 55-70                  |
| 2673          | NWRX//9881/...     | 6                   | 83                       | 34                      | 20             | 4478            | FGHI                | 30-71                  |
| LEMONT        | LEMONT             | 6                   | 85                       | 36                      | 45             | 4225            | GHI                 | 50-72                  |
| 2654          | LMNT//82CAY21/TDCN | 5                   | 78                       | 38                      | 80             | 3930            | HI                  | 52-71                  |
| 2655          | LMNT/82CAY82       | 4                   | 88                       | 40                      | 0              | 3774            | I                   | 54-70                  |
| C.V.          |                    | 7.5                 | 1.0                      | 3.5                     | -              | 8.1             |                     | 12.1-1.4               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 39. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2689          | LMNT/TBNT//LMNT    | 6                   | 85                       | 40                      | 5              | 6133            | A                   | 55-73                  |
| 2690          | LMNT/TBNT//LMNT    | 5                   | 86                       | 39                      | 10             | 5929            | AB                  | 56-73                  |
| 2691          | LMNT*2/82CAY83     | 7                   | 86                       | 39                      | 0              | 5877            | ABC                 | 56-72                  |
| 2683          | LMNT*2/82CAY83     | 5                   | 84                       | 38                      | 10             | 5875            | ABC                 | 57-72                  |
| 2694          | LMNT*2/82CAY83     | 6                   | 85                       | 41                      | 35             | 5769            | ABCD                | 51-72                  |
| 2692          | LMNT//8203200/...  | 5                   | 82                       | 38                      | 40             | 5748            | ABCD                | 50-74                  |
| 2678          | LMNT*2/IRGA 409    | 5                   | 80                       | 41                      | 45             | 5564            | ABCDE               | 33-73                  |
| 2693          | LBNT//9881/...     | 5                   | 87                       | 41                      | 0              | 5495            | ABCDE               | 56-73                  |
| 2681          | LMNT*2/82CAY20     | 5                   | 83                       | 41                      | 90             | 5366            | ABCDE               | 53-70                  |
| 2684          | LMNT*2/8001190     | 5                   | 83                       | 38                      | 50             | 5344            | ABCDE               | 66-74                  |
| 2676          | LMNT/82CAY80/3/..  | 6                   | 80                       | 37                      | 25             | 5294            | ABCDEF              | 57-72                  |
| 2698          | LMNT/DLLA          | 7                   | 85                       | 40                      | 0              | 5259            | ABCDEF              | 34-74                  |
| 2696          | TTEP/5*LMNT        | 5                   | 86                       | 40                      | 45             | 5187            | ABCDEF              | 51-72                  |
| 2687          | LMNT*2/IRGA 409    | 6                   | 86                       | 41                      | 0              | 5064            | ABCDEF              | 37-72                  |
| 2677          | LMNT*2/82CAY20     | 4                   | 76                       | 40                      | 90             | 5058            | ABCDEF              | 64-71                  |
| 2688          | LMNT//82CAY21/TDCN | 6                   | 81                       | 39                      | 85             | 5012            | ABCDEF              | 40-70                  |
| 2695          | TTEP/5*LMNT        | 5                   | 84                       | 41                      | 60             | 4991            | ABCDEF              | 55-72                  |
| 2679          | LMNT/TBNT//LMNT    | 5                   | 84                       | 39                      | 25             | 4915            | ABCDEF              | 55-73                  |
| 2682          | LMNT*2/82CAY22     | 5                   | 83                       | 35                      | 70             | 4881            | ABCDEF              | 44-73                  |
| 2680          | LMNT*2/82CAY20     | 5                   | 82                       | 42                      | 90             | 4645            | BCDEF               | 47-72                  |
| 2686          | LMNT*2/IRGA 409    | 4                   | 77                       | 39                      | 90             | 4632            | CDEF                | 62-71                  |
| 2685          | NWBT/LMNT//TBNT    | 5                   | 79                       | 43                      | 90             | 4483            | DEF                 | 55-72                  |
| LEMONT        | LEMONT             | 6                   | 85                       | 37                      | 10             | 4392            | EF                  | 61-73                  |
| 2697          | LMNT/DLLA          | 6                   | 84                       | 37                      | 20             | 4356            | EF                  | 53-70                  |
| GULFMONT      | GULFMONT           | 4                   | 81                       | 37                      | 50             | 4047            | F                   | 60-72                  |
| C.V.          |                    | 6.8                 | 1.2                      | 3.3                     | -              | 10.2            |                     | 13.7-1.2               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.



TABLE 40. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2718          | TTEP/5*LMNT        | 6                   | 85                 | 39                      | 10             | 6252            | A                   | 56-72                  |
| 2716          | LMNT*2/CR1113      | 6                   | 85                 | 38                      | 20             | 5906            | AB                  | 57-69                  |
| 2710          | 82CAY21/LMNT       | 4                   | 78                 | 37                      | 40             | 5850            | ABC                 | 56-69                  |
| 2707          | LMNT/SKBT          | 5                   | 85                 | 39                      | 5              | 5832            | ABC                 | 54-73                  |
| 2715          | LMNT*2/82CAY83     | 6                   | 81                 | 39                      | 45             | 5813            | ABC                 | 55-72                  |
| 2717          | LBNT//9881/...     | 5                   | 89                 | 39                      | 10             | 5745            | ABCD                | 58-70                  |
| 2701          | LMNT/NWBT//80Y50/. | 6                   | 82                 | 42                      | 30             | 5721            | ABCDE               | 48-70                  |
| 2702          | LMNT/NWBT//80Y50/. | 5                   | 75                 | 40                      | 0              | 5627            | ABCDEF              | 42-70                  |
| 2706          | TOR02/LBNTX2       | 5                   | 85                 | 38                      | 50             | 5483            | ABCDEFG             | 42-72                  |
| 2709          | 80CAY50/LBLE//LMNT | 5                   | 78                 | 40                      | 0              | 5471            | ABCDEFG             | 54-71                  |
| 2712          | 82M2003-003/...    | 5                   | 82                 | 40                      | 40             | 5440            | ABCDEFG             | 41-69                  |
| LEMONT        | LEMONT             | 6                   | 84                 | 38                      | 40             | 4894            | BCDEFGH             | 42-73                  |
| 2703          | NWBT/LMNT//...     | 4                   | 82                 | 44                      | 90             | 4881            | BCDEFGH             | 30-67                  |
| 2721          | 82CAY21/LMNT       | 4                   | 81                 | 41                      | 75             | 4858            | BCDEFGH             | 56-68                  |
| 2722          | 82CAY21/LMNT       | 5                   | 79                 | 39                      | 90             | 4852            | BCDEFGH             | 56-67                  |
| 2708          | 80CAY50/LBLE//LMNT | 5                   | 79                 | 40                      | 35             | 4835            | BCDEFGH             | 43-66                  |
| 2720          | 82CAY21/LMNT       | 4                   | 81                 | 41                      | 85             | 4632            | CDEFGH              | 59-69                  |
| 2719          | 80Y50/LBLE         | 7                   | 84                 | 35                      | 0              | 4626            | CDEFGH              | 53-69                  |
| 2714          | L201/LMNT//LMNT    | 6                   | 84                 | 36                      | 45             | 4533            | DEFGH               | 49-72                  |
| 2705          | NWBT/LEAH//DLLAX2  | 4                   | 84                 | 38                      | 45             | 4491            | EFGH                | 32-67                  |
| 2704          | NWBT/LEAH//DLLAX2  | 4                   | 85                 | 39                      | 85             | 4416            | FGH                 | 29-69                  |
| 2723          | 82CAY21/LMNT       | 4                   | 79                 | 39                      | 90             | 4377            | FGH                 | 54-69                  |
| 2713          | LMNT/1403          | 4                   | 76                 | 39                      | 90             | 4261            | GH                  | 48-73                  |
| GULFMONT      | GULFMONT           | 4                   | 80                 | 38                      | 80             | 4176            | H                   | 57-73                  |
| 2711          | LMNT*2/82CAY81     | 5                   | 82                 | 39                      | 90             | 3909            | H                   | 54-70                  |
| C.V.          |                    | 5.8                 | 0.9                | 2.8                     | -              | 10.1            |                     | 12.5-2.6               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 41. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2740          | 82CAY21//LMNT/LEAH | 5                   | 84                 | 39                      | 0              | 6818            | A                   | 60-70                  |
| 2733          | SC20001-5          | 5                   | 84                 | 44                      | 0              | 6532            | AB                  | 46-65                  |
| 2734          | SC20001-33         | 6                   | 83                 | 46                      | 0              | 5666            | BC                  | 51-63                  |
| 2743          | 80Y50/LBLE//LMNT   | 6                   | 87                 | 36                      | 0              | 5593            | BCD                 | 50-73                  |
| 2739          | ELONG.SD.          | 6                   | 83                 | 53                      | 0              | 5422            | CDE                 | 39-71                  |
| LEMONT        | LEMONT             | 6                   | 85                 | 36                      | 20             | 5129            | CDEF                | 50-72                  |
| KATY          | KATY               | 4                   | 82                 | 46                      | 90             | 4535            | DEFG                | 60-69                  |
| 2747          | LMNT/80Y50//LBLE   | 7                   | 88                 | 39                      | 0              | 4480            | EFG                 | 44-71                  |
| A-301         | A-301              | 5                   | 82                 | 42                      | 0              | 4419            | EFG                 | 48-71                  |
| 2730          | LMNT IP            | 5                   | 82                 | 35                      | 80             | 4343            | EFGH                | 46-70                  |
| 2741          | LMNT/DLLA          | 5                   | 82                 | 36                      | 0              | 4333            | EFGH                | 52-72                  |
| 2731          | LMNT IP            | 5                   | 83                 | 35                      | 55             | 4325            | EFGH                | 58-71                  |
| 2732          | LMNT IP            | 5                   | 83                 | 35                      | 80             | 4094            | FGHI                | 55-71                  |
| GULFMONT      | GULFMONT           | 5                   | 79                 | 36                      | 90             | 4093            | FGHI                | 58-71                  |
| 2728          | LMNT IP            | 5                   | 83                 | 36                      | 30             | 4077            | FGHI                | 53-71                  |
| 2726          | LMNT IP            | 5                   | 83                 | 36                      | 80             | 3896            | GHIJ                | 54-71                  |
| 2736          | DMSI/DLLAX2//A301  | 5                   | 77                 | 45                      | 90             | 3844            | GHIJK               | 50-71                  |
| 2746          | CI11048/LEAH//...  | 6                   | 80                 | 37                      | 25             | 3698            | GHIJK               | 24-67                  |
| 2742          | LMNT//LEAH/SKBT    | 6                   | 75                 | 34                      | 65             | 3550            | GHIJK               | 41-71                  |
| 2729          | LMNT IP            | 4                   | 78                 | 42                      | 90             | 3519            | GHIJK               | 53-70                  |
| DELLA         | DELLA              | 4                   | 83                 | 52                      | 45             | 3189            | HIJK                | 54-71                  |
| 2727          | LMNT IP            | 5                   | 79                 | 45                      | 90             | 3060            | IJK                 | 55-71                  |
| LABELLE       | LABELLE            | 5                   | 70                 | 49                      | 85             | 2925            | JK                  | 55-70                  |
| 2744          | CI11048/LEAH//...  | 5                   | 80                 | 36                      | 70             | 2813            | JK                  | 25-66                  |
| 2745          | CI11048/LEAH//...  | 5                   | 85                 | 46                      | 90             | 2734            | K                   | 19-68                  |
| C.V.          |                    | 6.9                 | 1.0                | 2.8                     | -              | 11.1            |                     | 8.3-2.2                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 42. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE            | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|---------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2755          | M101/MARS/3/NTAI//. | 5                   | 77                       | 38                      | 0              | 6693            | A                   | 63-70                  |
| 2753          | M101/MARS/3/NTAI//. | 5                   | 77                       | 38                      | 0              | 6521            | AB                  | 61-70                  |
| 2771          | MARSX5/MARS         | 5                   | 80                       | 45                      | 40             | 6509            | AB                  | 60-67                  |
| 2757          | M101/MARS/3/NTAI//. | 6                   | 78                       | 38                      | 5              | 6477            | AB                  | 61-68                  |
| 2754          | M101/MARS/3/NTAI//. | 5                   | 78                       | 37                      | 0              | 6476            | AB                  | 63-71                  |
| 2756          | M101/MARS/3/NTAI//. | 5                   | 77                       | 38                      | 0              | 6343            | ABC                 | 60-69                  |
| 2752          | M101/MARS/3/NTAI//. | 5                   | 77                       | 38                      | 0              | 6295            | ABCD                | 59-68                  |
| 2760          | M201/4/5242/UNK/3/. | 6                   | 71                       | 37                      | 0              | 5928            | ABCDE               | 61-69                  |
| 2761          | M201/4/5242/UNK/3/. | 6                   | 71                       | 38                      | 0              | 5893            | ABCDE               | 63-69                  |
| MARS          | MARS                | 4                   | 79                       | 48                      | 50             | 5831            | ABCDEF              | 60-67                  |
| 2758          | M201/4/5242/UNK/3/. | 6                   | 70                       | 38                      | 0              | 5790            | ABCDEF              | 62-70                  |
| RICO 1        | RICO 1              | 5                   | 83                       | 44                      | 90             | 5669            | BCDEFG              | 65-71                  |
| 2759          | M201/4/5242/UNK/3/. | 6                   | 69                       | 38                      | 0              | 5662            | BCDEFG              | 61-69                  |
| 2762          | STRN/CICA6/M201     | 5                   | 71                       | 40                      | 5              | 5563            | CDEFGH              | 61-68                  |
| 2766          | MARS*2/L110         | 4                   | 79                       | 37                      | 0              | 5436            | DEFGH               | 62-70                  |
| 2767          | SMARS/MARS/3/...    | 5                   | 77                       | 39                      | 0              | 5192            | EFGHI               | 57-68                  |
| 2769          | LMNT/MERC//MERC     | 5                   | 77                       | 40                      | 0              | 5175            | EFGHI               | 59-66                  |
| 2768          | SMARS/MARS/3/...    | 5                   | 77                       | 38                      | 0              | 5050            | EFGHIJ              | 56-66                  |
| 2772          | 1711X2/MARS//MERC   | 5                   | 77                       | 40                      | 0              | 4975            | FGHIJ               | 53-67                  |
| 2764          | MERC//LMNT/MERC     | 4                   | 67                       | 39                      | 15             | 4839            | GHIJ                | 40-69                  |
| 2751          | MARS//M201/MARS     | 6                   | 74                       | 38                      | 0              | 4822            | GHIJ                | 57-66                  |
| MERCURY       | MERCURY             | 4                   | 77                       | 39                      | 0              | 4760            | HIJ                 | 47-68                  |
| 2770          | MARS*2/L110         | 4                   | 81                       | 38                      | 0              | 4329            | IJ                  | 61-70                  |
| 2763          | SMARS/MARS/3/...    | 5                   | 77                       | 38                      | 0              | 4280            | J                   | 46-62                  |
| 2765          | MERC//M401/NTAI     | 5                   | 74                       | 39                      | 10             | 4240            | J                   | 45-61                  |
| C.V.          |                     | 8.4                 | 1.2                      | 3.3                     | -              | 6.8             |                     | 6.2-2.3                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 43. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE            | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|---------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2785          | BRAZ/T487//MARS     | 5                   | 79                 | 44                      | 85             | 6242            | A                   | 53-70                  |
| 2794          | MARS*2/L110         | 5                   | 82                 | 45                      | 10             | 6172            | A                   | 37-70                  |
| 2779          | LMNT/MERC//MERC     | 5                   | 80                 | 42                      | 10             | 5895            | AB                  | 63-70                  |
| 2798          | M201/8002146        | 6                   | 75                 | 37                      | 0              | 5783            | ABC                 | 58-70                  |
| 2784          | M201/4/5242/UNK/3/. | 7                   | 75                 | 34                      | 0              | 5737            | ABC                 | 52-68                  |
| 2778          | LMNT/MERC//MERC     | 5                   | 78                 | 38                      | 5              | 5561            | ABC                 | 52-68                  |
| 2780          | LMNT/MERC//MERC     | 5                   | 81                 | 43                      | 55             | 5261            | ABCD                | 60-70                  |
| 2776          | MERC/RICO 1         | 6                   | 79                 | 34                      | 5              | 5249            | ABCDE               | 46-65                  |
| MARS          | MARS                | 4                   | 80                 | 46                      | 75             | 5110            | ABCDEF              | 61-69                  |
| 2782          | LMNT/MERC//MERC     | 5                   | 80                 | 42                      | 55             | 5077            | ABCDEF              | 56-67                  |
| 2795          | MARS//M201/MARS     | 6                   | 77                 | 46                      | 75             | 4961            | BCDEF               | 62-71                  |
| 2777          | LMNT/MERC//MERC     | 5                   | 79                 | 39                      | 20             | 4888            | BCDEFG              | 55-68                  |
| RICO 1        | RICO 1              | 6                   | 83                 | 46                      | 90             | 4872            | BCDEFG              | 51-71                  |
| 2783          | MARS//M201/MARS     | 5                   | 76                 | 39                      | 0              | 4663            | CDEFG               | 43-66                  |
| 2786          | 82M2003-005/GCHW    | 5                   | 82                 | 48                      | 60             | 4615            | CDEFG               | 56-67                  |
| 2781          | LMNT/MERC//MERC     | 5                   | 79                 | 41                      | 40             | 4362            | DEFGH               | 51-65                  |
| 2787          | 82M2003-005/GCHW    | 5                   | 81                 | 48                      | 65             | 4306            | DEFGH               | 58-67                  |
| 2793          | MARS*2/L110         | 5                   | 82                 | 46                      | 70             | 4277            | DEFGH               | 49-68                  |
| 2797          | MARSX4/83P3791      | 5                   | 76                 | 47                      | 65             | 4142            | DEFGHI              | 54-67                  |
| 2796          | MARS//M201/MARS     | 5                   | 77                 | 44                      | 85             | 4065            | EFGHI               | 59-69                  |
| 2792          | M101/MARS/3/NTAI//. | 7                   | 78                 | 43                      | 90             | 4050            | FGHI                | 47-64                  |
| 2791          | M101/MARS/3/NTAI//. | 7                   | 77                 | 43                      | 75             | 4019            | FGHI                | 49-65                  |
| 2788          | 9879/9633//NKSL     | 6                   | 82                 | 37                      | 0              | 3709            | GHI                 | 26-66                  |
| 2789          | MARS/L110           | 5                   | 75                 | 42                      | 70             | 3399            | HI                  | 46-67                  |
| 2790          | M101/MARS/3/NTAI//. | 7                   | 77                 | 43                      | 80             | 3101            | I                   | 37-63                  |
| C.V.          |                     | 10.2                | 1.1                | 3.8                     | -              | 10.2            |                     | 10.8-1.9               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 44. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2822          | LMNT*2/1403        | 5                   | 79                       | 39                      | 0              | 6597            | A                   | 46-70                  |
| 2816          | SMARS/MARS//MARS   | 6                   | 83                       | 39                      | 0              | 6243            | AB                  | 40-66                  |
| 2817          | SMARS/MARS//MARS   | 5                   | 82                       | 40                      | 0              | 6154            | AB                  | 45-68                  |
| 2814          | SMARS/MARS//MARS   | 5                   | 81                       | 38                      | 5              | 6138            | AB                  | 33-68                  |
| 2815          | SMARS/MARS//MARS   | 5                   | 80                       | 38                      | 0              | 5983            | AB                  | 45-69                  |
| 2812          | SMARS/MARS//MARS   | 5                   | 80                       | 39                      | 0              | 5815            | AB                  | 39-67                  |
| 2813          | SMARS/MARS//MARS   | 5                   | 79                       | 39                      | 0              | 5814            | ABC                 | 41-68                  |
| 2811          | SMARS/MARS//MARS   | 4                   | 79                       | 39                      | 0              | 5782            | ABC                 | 41-68                  |
| 2806          | SMARS/NATO//TTEP E | 4                   | 81                       | 47                      | 75             | 5758            | BC                  | 40-68                  |
| 2808          | MERC/GCHW/MARS     | 5                   | 78                       | 41                      | 0              | 5735            | BC                  | 29-66                  |
| RICO 1        | RICO 1             | 6                   | 82                       | 45                      | 90             | 5656            | BCD                 | 44-70                  |
| 2809          | MERC/GCHW/MARS     | 6                   | 78                       | 41                      | 0              | 5637            | BCD                 | 25-66                  |
| 2821          | LMNT*2/1403        | 6                   | 79                       | 40                      | 0              | 5632            | BCD                 | 46-68                  |
| 2807          | MERC/GCHW/MARS     | 5                   | 78                       | 40                      | 25             | 5626            | BCD                 | 30-66                  |
| 2820          | MERC/NTAI/NDVF//.. | 6                   | 93                       | 42                      | 0              | 5509            | BCD                 | 56-68                  |
| 2823          | M201/8002146       | 7                   | 75                       | 36                      | 0              | 5501            | BCD                 | 39-67                  |
| 2810          | SMARS/MARS/3/...   | 5                   | 77                       | 39                      | 0              | 4982            | CDE                 | 28-65                  |
| 2801          | MARSX4/83P3791     | 4                   | 76                       | 46                      | 75             | 4875            | DEF                 | 21-65                  |
| 2805          | STRNX5/83P3798     | 7                   | 79                       | 34                      | 0              | 4854            | DEF                 | 17-70                  |
| 2819          | MERC/NTAI/NDVF//.. | 6                   | 93                       | 41                      | 25             | 4832            | DEF                 | 54-69                  |
| 2818          | MERC/NTAI/NDVF//.. | 5                   | 93                       | 40                      | 85             | 4613            | EF                  | 46-68                  |
| 2804          | STRNX5/83P3798     | 7                   | 79                       | 33                      | 0              | 4469            | EF                  | 11-67                  |
| 2802          | MARSX4/83P3791     | 5                   | 77                       | 46                      | 65             | 4374            | EF                  | 18-63                  |
| MERCURY       | MERCURY            | 5                   | 77                       | 40                      | 0              | 4123            | F                   | 17-63                  |
| 2803          | STRNX5/83P3798     | 7                   | 77                       | 43                      | 90             | 3338            | G                   | 21-60                  |
| C.V.          |                    | 6.7                 | 0.7                      | 2.5                     | -              | 6.5             |                     | 12.2-1.8               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 45. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE          | SEEDLING<br>VIGOR** | DAYS TO<br>TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|-------------------|---------------------|--------------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2826          | LMNT*2/1403       | 5                   | 79                       | 39                      | 10             | 6131            | A                   | 43-68                  |
| MARS          | MARS              | 4                   | 79                       | 46                      | 85             | 6071            | A                   | 33-67                  |
| 2846          | SMARS/MARS//MARS  | 5                   | 80                       | 38                      | 0              | 5878            | AB                  | 33-66                  |
| 2842          | TTEPX2/LMNT//LMNT | 5                   | 79                       | 46                      | 40             | 5790            | AB                  | 24-64                  |
| 2832          | MERC//M401/NTAI   | 5                   | 79                       | 41                      | 55             | 5375            | ABC                 | 23-67                  |
| 2840          | CI11048/LEAH//... | 5                   | 79                       | 40                      | 60             | 5279            | ABCD                | 31-69                  |
| 2836          | GCHW/MARS         | 5                   | 80                       | 46                      | 30             | 5239            | ABCDE               | 27-64                  |
| 2839          | CI11048/LEAH//... | 6                   | 79                       | 40                      | 45             | 5238            | ABCDE               | 37-67                  |
| 2830          | MERCX2/MERC       | 5                   | 75                       | 44                      | 90             | 5144            | ABCDE               | 11-67                  |
| 2828          | MERCX2/MERC       | 4                   | 75                       | 45                      | 90             | 5092            | ABCDE               | 18-66                  |
| 2847          | 8203201/79-4046   | 6                   | 79                       | 35                      | 0              | 4992            | ABCDE               | 36-68                  |
| 2837          | CI11048/LEAH//... | 5                   | 80                       | 43                      | 40             | 4976            | ABCDE               | 34-68                  |
| 2838          | CI11048/LEAH//... | 5                   | 79                       | 43                      | 0              | 4813            | BCDE                | 44-66                  |
| 2848          | SMARS/MARS//MARS  | 5                   | 78                       | 39                      | 0              | 4804            | BCDE                | 41-64                  |
| 2827          | MERCX2/MERC       | 5                   | 75                       | 44                      | 90             | 4803            | BCDE                | 18-68                  |
| 2844          | MARS IP           | 4                   | 80                       | 43                      | 90             | 4705            | BCDE                | 34-65                  |
| 2829          | MERCX2/MERC       | 4                   | 75                       | 43                      | 90             | 4703            | BCDE                | 15-67                  |
| 2835          | CI11048/LEAH//... | 5                   | 78                       | 42                      | 45             | 4500            | CDEF                | 29-68                  |
| 2841          | NWBT/26041/MERC   | 5                   | 84                       | 42                      | 0              | 4375            | CDEF                | 35-69                  |
| MERCURY       | MERCURY           | 5                   | 78                       | 40                      | 0              | 4238            | CDEF                | 20-65                  |
| 2843          | MARS IP           | 4                   | 79                       | 43                      | 65             | 4237            | DEF                 | 30-65                  |
| 2831          | MERCX2/MERC       | 4                   | 75                       | 44                      | 90             | 4143            | DEF                 | 19-67                  |
| 2834          | CI11048/LEAH//... | 4                   | 80                       | 41                      | 80             | 4041            | EF                  | 42-64                  |
| 2845          | MARS IP           | 4                   | 78                       | 43                      | 80             | 3459            | FG                  | 25-61                  |
| 2833          | CI11048/LEAH//... | 6                   | 80                       | 49                      | 90             | 2499            | G                   | 21-62                  |
| C.V.          |                   | 9.8                 | 1.0                      | 3.0                     | -              | 10.3            |                     | 9.9-1.9                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

**Experiment:** Preliminary Yield Test (Entries 851-910)

**Location:** Rice Research Station

**Seeding Rate/Date:** 100 lb/A, May 16, 1990

**Planting Method:** Drill seeded

**Fertilization:** 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, May 15;  
60 lb N/A, June 6

**Plot Size:** 4.66 x 16 ft (74.5 ft<sup>2</sup>)

**Water Management:** Flushed, May 17; flooded, June 7; harvest drainage, Sept 6

**Herbicides:** Stam (propanil) 3 lb ai/A, June 6

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), June 27

**Harvest:** Sept 17

**Experimental Design:** Randomized complete block with two replications

**Comments:** This late planting was mainly of lines returned from the Puerto Rico winter nursery. Relatively low yields and milling was due to late planting and disease pressure; however, many yields were good compared to check entries (Tables 46 and 47).

TABLE 46. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE           | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|--------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2853          | MERC/RICO 1        | 5                   | 73                 | 40                      | 0              | 6224            | A                   | 58-73                  |
| 2863          | MERC/GCHW          | 5                   | 82                 | 39                      | 0              | 6168            | AB                  | 56-72                  |
| 2860          | CI11048/LEAH//...  | 4                   | 73                 | 35                      | 0              | 6001            | ABC                 | 44-70                  |
| 2861          | CI11048/LEAH//...  | 6                   | 78                 | 35                      | 0              | 5781            | ABCD                | 52-70                  |
| 2871          | 82CAY21/LMNT...    | 4                   | 80                 | 38                      | 0              | 5779            | ABCD                | 57-69                  |
| 2866          | 82CAY21/8001190//. | 5                   | 79                 | 31                      | 0              | 5778            | ABCD                | 49-71                  |
| 2852          | MERC/BRAZ          | 4                   | 74                 | 37                      | 0              | 5778            | ABCD                | 53-70                  |
| 2855          | NWBT/LMNT//...     | 5                   | 72                 | 34                      | 0              | 5744            | ABCDE               | 56-72                  |
| 2870          | 82CAY21/LMNT...    | 5                   | 80                 | 36                      | 0              | 5696            | ABCDE               | 61-69                  |
| 2858          | CI11048/LEAH//...  | 4                   | 73                 | 36                      | 0              | 5684            | ABCDE               | 29-71                  |
| LEMONT        | LEMONT             | 6                   | 77                 | 35                      | 0              | 5570            | ABCDE               | 46-70                  |
| 2859          | CI11048/LEAH//...  | 4                   | 74                 | 35                      | 0              | 5533            | ABCDEF              | 37-70                  |
| 2864          | MERC/GCHW          | 5                   | 82                 | 38                      | 0              | 5510            | ABCDEF              | 56-70                  |
| 2869          | 82CAY21/LMNT/3/..  | 5                   | 73                 | 34                      | 0              | 5469            | BCDEFG              | 59-70                  |
| 2865          | 80Y50/LBLE//...    | 5                   | 68                 | 37                      | 0              | 5390            | CDEFG               | 58-70                  |
| 2857          | CI11048/LEAH//...  | 5                   | 74                 | 35                      | 0              | 5332            | CDEFG               | 43-72                  |
| 2851          | MERC/BRAZ          | 5                   | 72                 | 37                      | 0              | 5258            | DEFGH               | 39-69                  |
| 2868          | 82CAY21/LMNT/3/..  | 5                   | 74                 | 36                      | 0              | 5210            | DEFGH               | 53-68                  |
| 2872          | 82CAY21/LMNT...    | 6                   | 81                 | 34                      | 0              | 5079            | DEFGH               | 52-69                  |
| 2867          | 82CAY21/8001190//. | 6                   | 80                 | 29                      | 0              | 5018            | EFGH                | 52-70                  |
| 2856          | NWBT/LMNT//...     | 4                   | 72                 | 32                      | 0              | 4831            | FGH                 | 52-67                  |
| MAYBELLE      | MAYBELLE           | 5                   | 64                 | 38                      | 0              | 4809            | FGH                 | 41-68                  |
| MERCURY       | MERCURY            | 4                   | 74                 | 36                      | 0              | 4764            | GH                  | 39-69                  |
| 2862          | CI11048/LEAH//...  | 5                   | 75                 | 33                      | 0              | 4609            | HI                  | 45-68                  |
| 2854          | NWBT/LMNT//...     | 5                   | 70                 | 32                      | 0              | 4110            | I                   | 55-68                  |
| C.V.          |                    | 11.5                | 1.1                | 3.9                     | -              | 5.6             |                     | 13.3-1.9               |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.



TABLE 47. AGRONOMIC PERFORMANCE OF 1990 PRELIMINARY YIELD TESTS, RICE RESEARCH STATION, CROWLEY, LA.

| 1990<br>ENTRY | PEDIGREE            | SEEDLING<br>VIGOR** | DAYS TO<br>HEADING | PLANT<br>HEIGHT<br>(IN) | LODGING<br>(%) | YIELD<br>(LB/A) | DUNCAN'S<br>TEST*** | MILLING %<br>(WHL-TOT) |
|---------------|---------------------|---------------------|--------------------|-------------------------|----------------|-----------------|---------------------|------------------------|
| 2890          | MERC/LMNT//MERC     | 4                   | 74                 | 39                      | 0              | 6713 A          |                     | 47-72                  |
| 2880          | BP87/9902/2*LMNT    | 5                   | 77                 | 33                      | 0              | 6286 AB         |                     | 56-71                  |
| 2889          | MERC/LMNT//MERC     | 5                   | 76                 | 37                      | 0              | 6218 ABC        |                     | 56-71                  |
| 2899          | LMNT//SMARS/NATO/.  | 4                   | 74                 | 37                      | 0              | 6164 ABCD       |                     | 43-72                  |
| 2877          | 82CAY21/LMNT...     | 4                   | 80                 | 36                      | 0              | 6127 ABCDE      |                     | 57-72                  |
| 2879          | BP87/9902/2*LMNT    | 5                   | 71                 | 34                      | 0              | 6092 ABCDE      |                     | 50-70                  |
| 2878          | BP87/9902/2*LMNY    | 5                   | 74                 | 36                      | 0              | 5964 ABCDEF     |                     | 43-71                  |
| 2902          | MERC//LMNT/MERC     | 5                   | 78                 | 35                      | 0              | 5924 ABCDEF     |                     | 60-69                  |
| LEMONT        | LEMONT              | 6                   | 77                 | 36                      | 0              | 5918 ABCDEF     |                     | 54-70                  |
| 2897          | LMNT/MERC//MERC     | 4                   | 72                 | 37                      | 0              | 5859 BCDEFG     |                     | 50-72                  |
| 2876          | 82CAY21/LMNT...     | 5                   | 80                 | 35                      | 0              | 5841 BCDEFG     |                     | 59-71                  |
| 2883          | L201/2*LMNT         | 5                   | 77                 | 34                      | 0              | 5833 BCDEFG     |                     | 52-69                  |
| 2895          | LMNT/MERC           | 4                   | 66                 | 40                      | 0              | 5817 BCDEFG     |                     | 40-70                  |
| 2888          | MERC/LMNT//MERC     | 5                   | 76                 | 38                      | 0              | 5781 BCDEFG     |                     | 60-72                  |
| 2891          | LMNT/SKBT//LEAH/.   | 5                   | 77                 | 37                      | 0              | 5761 BCDEFGH    |                     | 53-71                  |
| 2884          | L201/2*LMNT         | 5                   | 75                 | 33                      | 0              | 5697 BCDEFGH    |                     | 41-71                  |
| 2898          | LMNT//SMARS/NATO/.  | 5                   | 74                 | 36                      | 0              | 5674 BCDEFGH    |                     | 43-71                  |
| 2881          | BP87/9902/2*LMNT    | 5                   | 78                 | 32                      | 0              | 5573 BCDEFGHI   |                     | 52-73                  |
| 2901          | MERC//LMNT/MERC     | 4                   | 77                 | 35                      | 0              | 5557 BCDEFGHI   |                     | 58-69                  |
| 2885          | LBNTX2/82CAY21//... | 5                   | 77                 | 35                      | 0              | 5408 CDEFGHIJ   |                     | 55-71                  |
| 2907          | GCHW//8303116/LMNT  | 8                   | 97                 | 33                      | 0              | 5404 CDEFGHIJ   |                     | 46-67                  |
| 2906          | GCHW//8303116/LMNT  | 5                   | 83                 | 34                      | 0              | 5331 DEFGHIJ    |                     | 61-71                  |
| 2903          | MERC//LMNT/MERC     | 3                   | 77                 | 38                      | 0              | 5282 EFGHIJ     |                     | 57-66                  |
| 2905          | MERC//LMNT/MERC     | 4                   | 75                 | 35                      | 0              | 5180 FGHIJK     |                     | 31-71                  |
| 2896          | LMNT/MERC           | 4                   | 64                 | 38                      | 0              | 5030 GHIJK      |                     | 47-70                  |
| MERCURY       | MERCURY             | 4                   | 74                 | 36                      | 0              | 4933 HIJKL      |                     | 28-68                  |
| 2894          | LMNT/MERC           | 4                   | 77                 | 38                      | 0              | 4787 IJKL       |                     | 53-68                  |
| 2904          | MERC//LMNT/MERC     | 4                   | 75                 | 35                      | 0              | 4786 IJKL       |                     | 21-70                  |
| 2882          | L201/2*LMNT         | 6                   | 79                 | 32                      | 0              | 4762 IJKL       |                     | 51-69                  |
| 2886          | LMNT//SMARS/MARS    | 4                   | 76                 | 58                      | 0              | 4700 JKL        |                     | 38-71                  |
| 2892          | LMNT/MERC//MERC     | 4                   | 77                 | 33                      | 0              | 4634 JKL        |                     | 56-68                  |
| 2893          | LMNT/MERC//MERC     | 4                   | 75                 | 38                      | 0              | 4604 JKL        |                     | 58-67                  |
| MAYBELLE      | MAYBELLE            | 4                   | 64                 | 39                      | 0              | 4435 KL         |                     | 43-65                  |
| 2900          | MERC//LMNT/MERC     | 4                   | 75                 | 34                      | 0              | 4421 KL         |                     | 52-70                  |
| 2887          | MERC/LMNT//MERC     | 4                   | 75                 | 35                      | 0              | 4190 L          |                     | 45-69                  |
| C.V.          |                     | 10.3                | 1.9                | 13.1                    | -              | 6.4             |                     | 8.8-1.6                |

\* L - LONG GRAIN, M - MEDIUM GRAIN, S - SHORT, AND I - INTERMEDIATE.

\*\* SUBJECTIVE RATING 1 TO 9, WHERE 1 - EXCELLENT, 9 - POOR.

\*\*\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

## MULTIPLE GENERATION RICE BREEDING NURSERY<sup>1,2</sup>

S.D. Linscombe, F. Jodari, A.P. Fabacher, L.M. White, and L. Aviles

### INTRODUCTION

A winter nursery is an essential and integral feature of a modern rice breeding program. The nursery allows the production of additional generations of breeding material per years, thus decreasing the time required to develop new varieties. The winter nursery also permits an opportunity to practice disruptive selection in another environment and the growing of elite selections of germplasm not adapted to the Louisiana environment.

The agricultural experiment stations of Arkansas, Louisiana, Texas, and Puerto Rico have a cooperative agreement to operate a year around rice nursery on the Puerto Rico Experiment Station located at Lajas for the purpose of advancing and seed increase of breeding lines. This cooperative venture has made possible nursery facilities, equipment, and labor and is allowing these rice breeding programs to grow a large number of breeding lines to expedite the development and release of improved rice varieties for the southern United States.

### 1990-91 ACTIVITIES

Adverse weather conditions prevented planting the fall 1989 nursery until December 1. This nursery contained a total of 4500 rows, including 2500 rows of advanced lines from the breeding nursery and bulk plantings from 15 F<sub>1</sub> populations. Also included were large headrow increases of LA 2201 and LA 2207. This nursery was harvested in April 1990 and the seed returned to Crowley. The LA 2201 seed was used for a six-acre increase and this line has been released as the variety 'Lacassine.'

The fall 1990 nursery (3000 rows) was planted in September. It contained bulk plantings of 44 F<sub>2</sub> populations, small increases from 10 experimental lines, and a 600-headrow increase of LA 2214, an experimental semidwarf medium grain. The nursery was harvested in January 1991 and another nursery (4400 rows) was planted at this time. This nursery included an additional 1000 headrows of LA 2214 and 44 F<sub>3</sub> populations. In addition, 1000 rows of advanced generation breeding rows were included.

<sup>1</sup> Cooperative investigators, Louisiana Agricultural Experiment Station, Crowley, LA; University of Puerto Rico Agricultural Experiment Station, Lajas, PR; Texas Agricultural Experiment Station and USDA-ARS, Beaumont, TX; and Arkansas Agricultural Experiment Station, Stuttgart, AR.

<sup>2</sup> This research is supported in part by funding provided by rice producers through the Louisiana Rice Research Board.

## GRAIN FISSURING AND MILLING YIELDS OF CURRENT RICE VARIETIES AS AFFECTED BY HARVEST MOISTURE

F. Jodari and S.D. Linscombe

Milling characteristics of newly released rice varieties and advanced breeding lines are being continuously tested at the LSU Rice Research Station. This information is used for screening and selecting breeding lines with superior milling qualities. Grain fissuring, which is the primary cause of reduced head rice yields, is also being evaluated among breeding lines and new varieties. Previous studies have shown that a significant correlation exists between fissuring susceptibility and head rice yield potential. Developing a strong model between fissuring and head rice yield potential will allow milling yield evaluation of early generation breeding lines from fissuring data. One prerequisite to this model is that the milling yields of varieties be affected equally from fissuring. The objective of this study was to determine the relationships between the amount of fissured grain and head rice yield for each variety at decreasing harvest moistures.

Five entries were used in a randomized complete block test in 1990 using four replications. Varieties included 'Lemont,' 'Tebonnet,' and 'Leah.' Experimental lines were 2201 (released as Lacassine) and 2207. Entries were drill seeded at 100 lb/A rate. Each plot was 5" wide and 25" long. All agronomic practices used were similar to preliminary yield test described earlier for 1990. At maturity, a 3 to 4 square foot area of each plot was harvested for a milling and fissuring sample. Sampling was intended to start when grain moisture had reached 24%. Due to rapid drying conditions, however, in mid August 1990, first samples were taken at 21% grain moisture content. Subsequent samplings continued every 2 to 3 days until grain moisture decreased to about 12%.

Samples were threshed in the field and taken to the lab for harvest moisture measurements. After slowly drying the samples to 12% moisture, milling yields were determined using standard milling procedures. One hundred mature rough rice kernels were hand shelled at each harvest to determine the percentage of fissured grain. Regression and correlation analysis was carried out for varieties individually and combined.

Considerable differences were found among varieties in their correlations between harvest moisture and head rice. (Table 1). A high correlation of 0.92 for Leah indicates the sensitivity of this variety to harvest moisture. The head rice yield of the experimental line 2207, on the other hand, was weakly correlated with harvest moisture (0.45). Both Lemont and Tebonnet showed high correlation coefficients. The correlation values for harvest moisture and fissured grain for each variety are very similar to harvest moisture by head rice, with the exception of 2207. Very high correlations for fissured grain and head rice for Lemont, Leah and Tebonnet (-0.98, -0.94, -0.96) shows that fissured grains account for almost all of the reductions in head rice yield.

Table 1. Correlations between harvest moisture (HM), head rice yield (HR), and fissured grain (FG) among varieties. Rice Research Station, Crowley, LA. 1990

| Variety  | HM x HR | HM x FG | FG x HR |
|----------|---------|---------|---------|
| Lemont   | 0.79**  | -0.82** | -0.98** |
| 2201     | 0.65**  | -0.66** | -0.78** |
| 2207     | 0.45    | -0.77** | -0.68** |
| Leah     | 0.92**  | -0.91** | -0.94** |
| Tebonnet | 0.79**  | -0.86** | -0.96** |

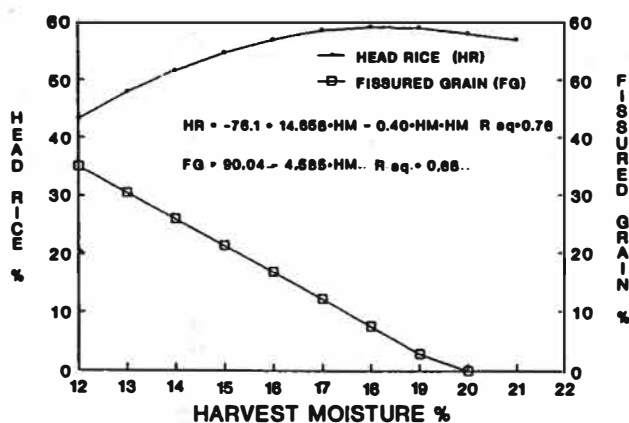
\*\* Significance probability of pearson correlation.

Relationships between harvest moisture, grain fissuring and head rice yield for each variety is shown in Figure 1. Head rice for Lemont, Leah and Tebonnet declined at harvest moistures of less than 17, 17, and 15%, respectively. Only a linear model was significant for 2201. The head rice reduction for 2201 was considerably less than the reductions in Lemont at lower harvest moisture. This trend is also shown with fissured grain model and the respective regression coefficients (-4.59 vs -3.23). No significant relation for head rice yield and harvest moisture was found for 2207. A regression coefficient of -1.72 for fissured grain and harvest moisture for 2207 shows the resistance of this line to fissuring and reduced head rice at low harvest moistures.

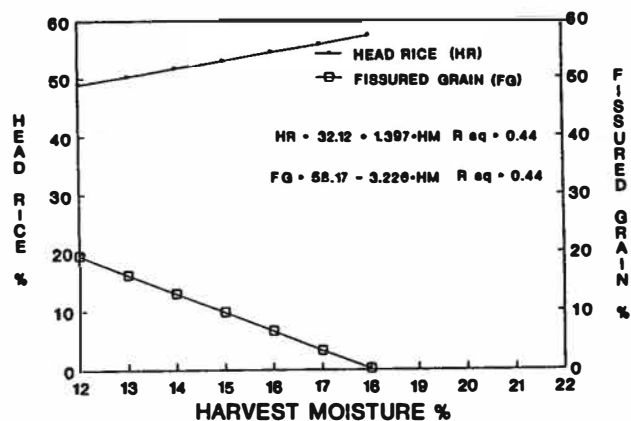
Figure 2 shows relationship between head rice yield and percent fissured grain for each variety. Covariance analysis showed no significant differences in the slope of regression lines among varieties. This is an indication that head rice yield reductions due to presence of fissured grains can be predicted regardless of the variety.

This study will continue in 1991. Additional variables including weather data, during the sampling period of 1990-91 will be included.

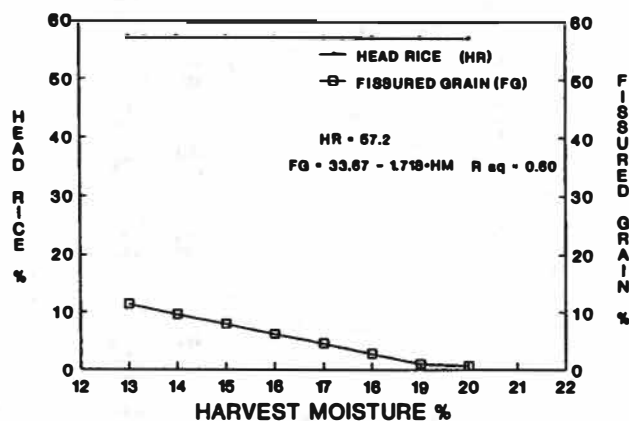
## LEMONT



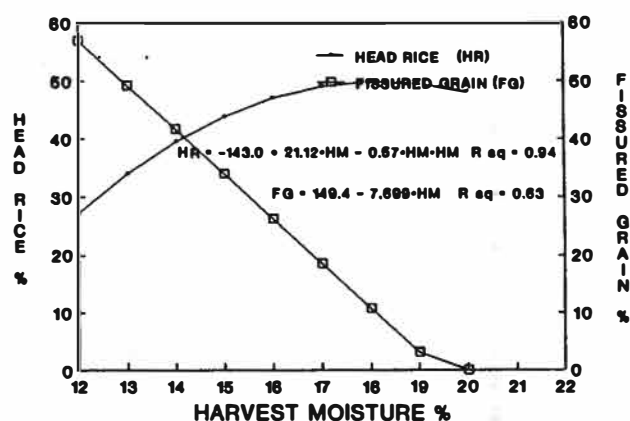
## 2201



## 2207



## LEAH



## TEBONNET

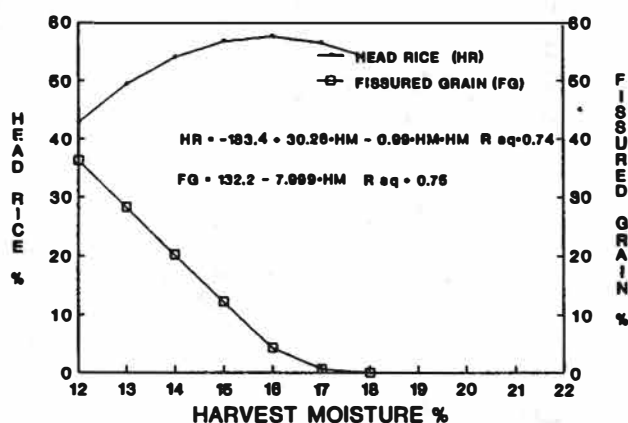


Figure 1. Relationship between harvest moisture, grain fissuring and head rice yields among rice varieties. 1990. Crowley, LA.

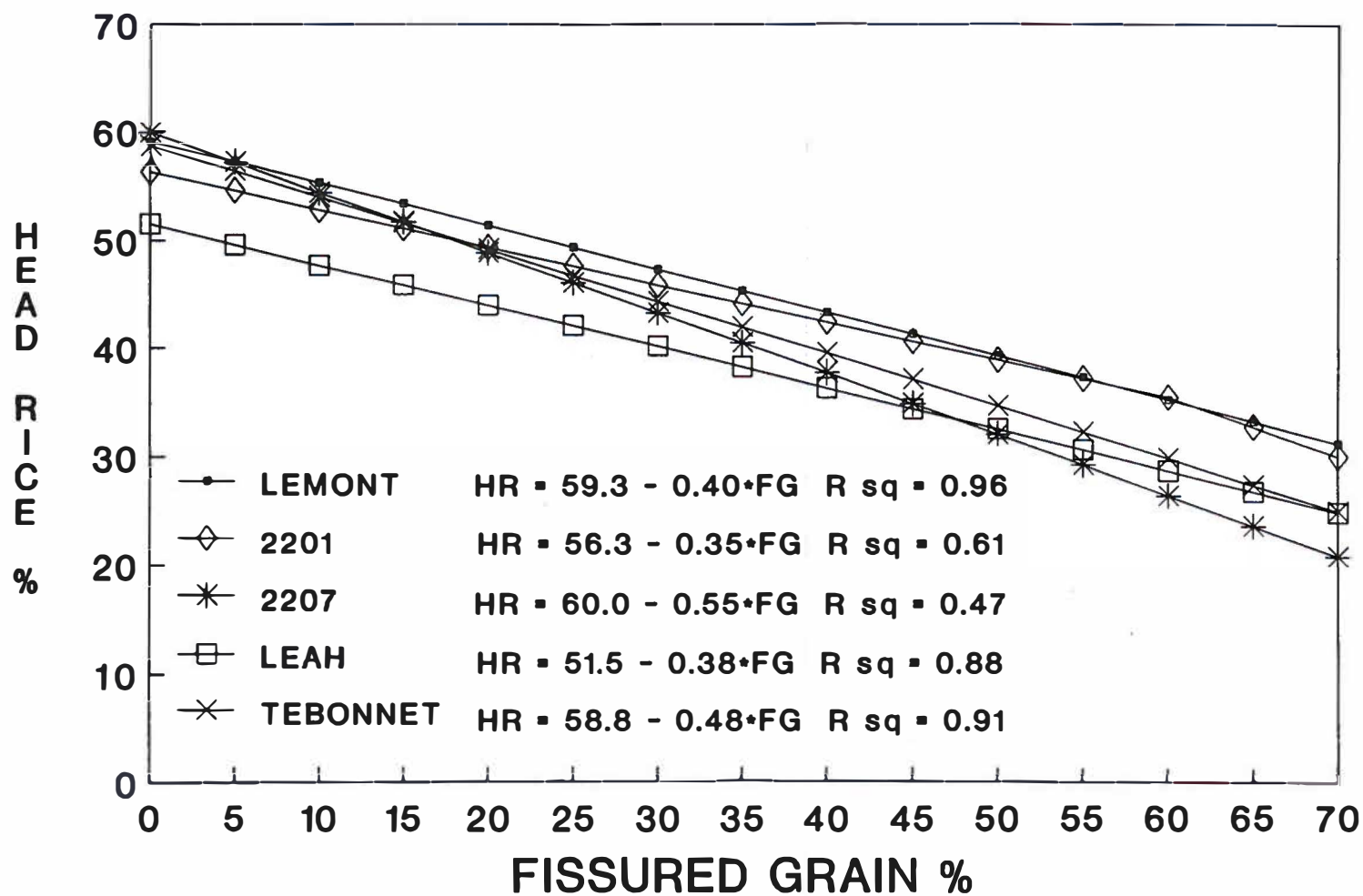


Figure 2. Relationship between head rice yield fissured grains for each variety. Crowley, LA. 1990.

## SPECIAL PURPOSE RICE BREEDING

F. Jodari and S.D. Linscombe

Use of certain special purpose rice varieties in the U.S. has increased considerably in recent years. These varieties include the aromatic, elongating, waxy, Toro-type, and some other less known wild types. The majority of the aromatic jasmine, elongating basmati, and waxy types are imported into the United States from other countries, and the volume of such imports is increasing rapidly every year. In 1980 the jasmine and basmati rice imports were less than 1000 metric tons. By 1990 these imports exceeded 130,000 tons. Consumption of aromatic rice increased from 0.15% of the U.S. food rice market in 1980 to 5.7% in 1988. It is clear that gourmet rice consumption in the U.S. and European countries is increasing. Use of aromatic and wild types of rice in quick-serve rice mixes is gaining more popularity as the consumers preference becomes more selective.

Potential exists for the Louisiana rice industry to obtain a sizeable portion of the special purpose rice market, both the domestic and the export markets. If adapted varieties are used and managed properly, well in excess of 100,000 acres will be required to produce and meet the domestic market alone. Development of adapted and higher yielding aromatic and elongating varieties are needed to make the domestic production prices competitive with the imported prices. Even though other types of special purpose varieties such as scented and non-scented waxy, red and purple bran and Kokaho rose types have a limited market, development of adapted varieties for these and other specialty types seem to be justified due to expected increasing demand in the future.

Since 1989, the breeding project at the LSU Rice Research Station has expanded and organized its research activities in developing improved special purpose rice varieties adapted to the Southern region. During the 1990 season, close to 55 crosses were made between special purpose and high yielding adapted varieties. Thirty  $F_1$  and 19  $F_2$  populations were grown and selections were made. Selections were also made from 2500 progeny rows. A total of 140 selections were made from 5200 anther cultured rows that had one elongating parent in their pedigree. Standardized cooking tests were used to screen for basmati type elongating lines. A number of promising aromatic, waxy, and red bran, elongating lines was advanced in the Puerto Rico winter nursery. Eight special purpose  $X_2$  populations were also grown in 1990 and several mutants were selected. Preliminary yield tests in 1990 included 16 special purpose entries from which 3 will be advanced to the uniform regional nursery in 1991.

The selected breeding and anther cultured lines have been screened and will be included in the preliminary yield trials for 1991. A number of world collection accessions has been screened, and new plant introductions will also be obtained to be used in crossing program.

TOLERANCE OF RICE VARIETIES AND EXPERIMENTAL LINES TO  
RICE HERBICIDES

D.E. Sanders, S.D. Linscombe and F. Jodari

Some of the newer rice herbicides have shown differential phytotoxicity on different rice genotypes. This study was conducted to provide information on which rice line/herbicide combinations may display sufficient phytotoxicity, delay in maturity and/or yield reduction to warrant non-recommendation on certain varieties.

Experiment: Herbicide Tolerance Study

Location: Rice Research Station, South Unit

Seeding Rate/Date: 100 lb/A, May 24, 1990

Planting Method: Drill seeded

Fertilization: 21-63-63 (1b/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, May 23; 90 lb N/A, June 11; 54 lb N/A, July 3

Plot Size: 4.66 x 12 ft (56 ft<sup>2</sup>)

Water Management: Flushed, May 25; flooded, June 17; harvest drainage, Sept 1

Treatments: Applied June 11

Arrosolo 4 qt/A (3.0 lb ai/A propanil + 3.0 lb ai/A molinate)  
Buctril + Stam 1.5 pt + 3 qt/A (.375 lb ai/A bromoxynil +  
3.0 lb ai/A propanil)  
Stam 3 qt/A (3.0 lb ai/A propanil)  
Rely + Stam 1.0 pt + 3 qt/A (.375 lb ai/A triclopyr +  
3.0 lb ai/A propanil)  
Facet 1.0 lb/A (.5 lb ai/A quinclorac)  
Whip 1.6 pt/A (.2 lb ai/A fenoxaprop)  
Poast 13 oz/A (.15 lb ai/A sethoxydim)  
Check

Insecticides: 0.6 ai lb/A Furadan (carbofuran), May 4

Harvest: Oct 3-4

Experimental Design: Split plot in randomized complete block design with three replications, herbicide treatments assigned to main plots and varieties (experimental lines) to subplots

Comments: Tables 1-8 contain yield and agronomic data for each herbicide x rice genotype combination. Some herbicides decreased yields overall when compared to the check.



TABLE 1. TOLERANCE OF RICE LINES - ARROSOLO. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE     | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|---------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| ARROSOLO 4 QT | RICO 1    | 80                        | 41                      | 8852                  | A                |
| ARROSOLO 4 QT | JASMINE   | 92                        | 40                      | 8570                  | AB               |
| ARROSOLO 4 QT | AR 1121   | 76                        | 42                      | 7819                  | ABC              |
| ARROSOLO 4 QT | URN72     | 76                        | 32                      | 7788                  | ABC              |
| ARROSOLO 4 QT | MERCURY   | 76                        | 34                      | 7636                  | BCD              |
| ARROSOLO 4 QT | LA2214    | 76                        | 36                      | 7400                  | CDE              |
| ARROSOLO 4 QT | AS 3058   | 75                        | 43                      | 7154                  | CDEF             |
| ARROSOLO 4 QT | MARS      | 77                        | 44                      | 7070                  | CDEF             |
| ARROSOLO 4 QT | ALAN      | 68                        | 40                      | 6837                  | CDEFG            |
| ARROSOLO 4 QT | LA2201    | 80                        | 32                      | 6802                  | CDEFG            |
| ARROSOLO 4 QT | LA2207    | 83                        | 35                      | 6798                  | CDEFG            |
| ARROSOLO 4 QT | KATY      | 82                        | 41                      | 6704                  | CDEFG            |
| ARROSOLO 4 QT | SKYBONNET | 78                        | 45                      | 6684                  | CDEFG            |
| ARROSOLO 4 QT | GULFMONT  | 79                        | 32                      | 6493                  | DEFGH            |
| ARROSOLO 4 QT | MILLIE    | 72                        | 42                      | 6470                  | DEFGH            |
| ARROSOLO 4 QT | MAYBELLE  | 67                        | 38                      | 6432                  | DEFGH            |
| ARROSOLO 4 QT | LA2215    | 77                        | 32                      | 6398                  | DEFGH            |
| ARROSOLO 4 QT | LEMONT    | 82                        | 32                      | 6298                  | EFGH             |
| ARROSOLO 4 QT | RT 7817   | 85                        | 29                      | 6103                  | FGH              |
| ARROSOLO 4 QT | URN6      | 71                        | 34                      | 5908                  | FGH              |
| ARROSOLO 4 QT | RT 4716   | 76                        | 33                      | 5791                  | GH               |
| ARROSOLO 4 QT | TEXMONT   | 69                        | 32                      | 5264                  | H                |
| ARROSOLO 4 QT | AS3510    | 57                        | 40                      | 3464                  | I                |
| C.V.          |           | 1.8                       | 3.9                     | 10.3                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 2. TOLERANCE OF RICE LINES - BUCTRIL + STAM. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE      | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|----------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| BUCTRIL + STAM | JASMINE   | 91                        | 38                      | 8752                  | A                |
| BUCTRIL + STAM | RICO 1    | 80                        | 38                      | 7915                  | AB               |
| BUCTRIL + STAM | LA2214    | 76                        | 35                      | 7599                  | BC               |
| BUCTRIL + STAM | AR 1121   | 76                        | 39                      | 7579                  | BC               |
| BUCTRIL + STAM | MARS      | 76                        | 43                      | 7392                  | BCD              |
| BUCTRIL + STAM | MERCURY   | 76                        | 34                      | 7296                  | BCDE             |
| BUCTRIL + STAM | LA2207    | 83                        | 34                      | 7123                  | BCDE             |
| BUCTRIL + STAM | KATY      | 80                        | 40                      | 6934                  | BCDEF            |
| BUCTRIL + STAM | MILLIE    | 71                        | 40                      | 6865                  | BCDEF            |
| BUCTRIL + STAM | AS 3058   | 75                        | 42                      | 6853                  | BCDEF            |
| BUCTRIL + STAM | ALAN      | 68                        | 40                      | 6813                  | BCDEF            |
| BUCTRIL + STAM | URN72     | 76                        | 33                      | 6615                  | CDEF             |
| BUCTRIL + STAM | SKYBONNET | 77                        | 44                      | 6480                  | CDEF             |
| BUCTRIL + STAM | LA2201    | 79                        | 30                      | 6417                  | CDEF             |
| BUCTRIL + STAM | URN6      | 70                        | 33                      | 6338                  | DEF              |
| BUCTRIL + STAM | GULFMONT  | 79                        | 32                      | 6336                  | DEF              |
| BUCTRIL + STAM | RT 7817   | 87                        | 29                      | 6274                  | DEF              |
| BUCTRIL + STAM | MAYBELLE  | 67                        | 36                      | 6232                  | DEF              |
| BUCTRIL + STAM | LEMONT    | 80                        | 31                      | 6218                  | DEF              |
| BUCTRIL + STAM | RT 4716   | 76                        | 33                      | 6160                  | EF               |
| BUCTRIL + STAM | LA2215    | 75                        | 30                      | 5823                  | FG               |
| BUCTRIL + STAM | TEXMONT   | 69                        | 32                      | 4965                  | G                |
| BUCTRIL + STAM | AS3510    | 57                        | 39                      | 3944                  | H                |
| C.V.           |           | 1.8                       | 3.9                     | 10.3                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 3. TOLERANCE OF RICE LINES - STAM. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|-----------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| STAM 3 QT | RICO 1    | 79                        | 39                      | 8645                  | A                |
| STAM 3 QT | JASMINE   | 90                        | 38                      | 7590                  | B                |
| STAM 3 QT | MARS      | 76                        | 42                      | 7300                  | BC               |
| STAM 3 QT | AR 1121   | 76                        | 39                      | 7293                  | BC               |
| STAM 3 QT | AS 3058   | 75                        | 42                      | 7118                  | BCD              |
| STAM 3 QT | KATY      | 77                        | 40                      | 7092                  | BCD              |
| STAM 3 QT | URN72     | 74                        | 31                      | 6968                  | BCDE             |
| STAM 3 QT | ALAN      | 68                        | 38                      | 6920                  | BCDE             |
| STAM 3 QT | LA2207    | 80                        | 33                      | 6767                  | BCDEF            |
| STAM 3 QT | MERCURY   | 75                        | 34                      | 6561                  | BCDEFG           |
| STAM 3 QT | MILLIE    | 69                        | 39                      | 6539                  | BCDEFG           |
| STAM 3 QT | LA2201    | 76                        | 31                      | 6532                  | BCDEFG           |
| STAM 3 QT | LEMONT    | 78                        | 31                      | 6357                  | CDEFGH           |
| STAM 3 QT | MAYBELLE  | 67                        | 37                      | 6341                  | CDEFGH           |
| STAM 3 QT | URN6      | 69                        | 31                      | 6246                  | CDEFGH           |
| STAM 3 QT | LA2214    | 75                        | 34                      | 6242                  | CDEFGH           |
| STAM 3 QT | SKYBONNET | 75                        | 40                      | 6129                  | CDEFGH           |
| STAM 3 QT | GULFMONT  | 76                        | 31                      | 6053                  | DEFGH            |
| STAM 3 QT | RT 4716   | 76                        | 32                      | 5816                  | EFGH             |
| STAM 3 QT | LA2215    | 74                        | 31                      | 5728                  | FGH              |
| STAM 3 QT | RT 7817   | 86                        | 28                      | 5476                  | GH               |
| STAM 3 QT | TEXMONT   | 68                        | 32                      | 5267                  | H                |
| STAM 3 QT | AS3510    | 57                        | 36                      | 3842                  | I                |
| C.V.      |           | 1.8                       | 3.9                     | 10.3                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 4. TOLERANCE OF RICE LINES - RELY + STAM. RICE RESEARCH STATION,  
CROWLEY, LA. 1990.

| HERBICIDE   | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|-------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| RELY + STAM | RICO 1    | 80                        | 39                      | 8819                  | A                |
| RELY + STAM | JASMINE   | 92                        | 39                      | 8655                  | A                |
| RELY + STAM | AR1121    | 77                        | 38                      | 7454                  | B                |
| RELY + STAM | MARS      | 78                        | 42                      | 6959                  | BC               |
| RELY + STAM | AS 3058   | 76                        | 40                      | 6932                  | BCD              |
| RELY + STAM | URN72     | 78                        | 32                      | 6899                  | BCD              |
| RELY + STAM | LA2207    | 85                        | 33                      | 6890                  | BCDE             |
| RELY + STAM | LA2214    | 76                        | 34                      | 6685                  | BCDEF            |
| RELY + STAM | KATY      | 81                        | 40                      | 6657                  | BCDEF            |
| RELY + STAM | MERCURY   | 76                        | 33                      | 6559                  | BCDEF            |
| RELY + STAM | ALAN      | 69                        | 37                      | 6455                  | BCDEF            |
| RELY + STAM | MAYBELLE  | 68                        | 37                      | 6363                  | BCDEF            |
| RELY + STAM | LA2201    | 81                        | 31                      | 6238                  | CDEF             |
| RELY + STAM | LA2215    | 78                        | 31                      | 6213                  | CDEF             |
| RELY + STAM | SKYBONNET | 81                        | 41                      | 6177                  | CDEF             |
| RELY + STAM | LEMONT    | 85                        | 30                      | 5830                  | CDEF             |
| RELY + STAM | V7817     | 88                        | 29                      | 5738                  | DEFG             |
| RELY + STAM | V4716     | 78                        | 33                      | 5676                  | EFG              |
| RELY + STAM | MILLIE    | 74                        | 38                      | 5560                  | FG               |
| RELY + STAM | URN6      | 72                        | 31                      | 5528                  | FG               |
| RELY + STAM | GULFMONT  | 81                        | 31                      | 5489                  | FG               |
| RELY + STAM | TEXMONT   | 69                        | 32                      | 4612                  | GH               |
| RELY + STAM | AS3510    | 58                        | 36                      | 3832                  | H                |
| C.V.        |           | 1.8                       | 3.9                     | 10.4                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE  
0.05 LEVEL.

TABLE 5. TOLERANCE OF RICE LINES - FACET. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE    | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|--------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| FACET 1.0 LB | RICO 1    | 80                        | 40                      | 8270                  | A                |
| FACET 1.0 LB | AR 1121   | 77                        | 38                      | 7440                  | AB               |
| FACET 1.0 LB | LA2214    | 76                        | 36                      | 6875                  | BC               |
| FACET 1.0 LB | ALAN      | 68                        | 39                      | 6534                  | BCD              |
| FACET 1.0 LB | LA2201    | 80                        | 32                      | 6526                  | BCDE             |
| FACET 1.0 LB | KATY      | 81                        | 39                      | 6521                  | BCDE             |
| FACET 1.0 LB | LA2207    | 83                        | 34                      | 6515                  | BCDE             |
| FACET 1.0 LB | MARS      | 78                        | 42                      | 6496                  | BCDE             |
| FACET 1.0 LB | URN72     | 76                        | 29                      | 6430                  | BCDE             |
| FACET 1.0 LB | JASMINE   | 91                        | 37                      | 6377                  | CDE              |
| FACET 1.0 LB | AS 3058   | 76                        | 40                      | 6364                  | CDE              |
| FACET 1.0 LB | SKYBONNET | 79                        | 41                      | 6353                  | CDE              |
| FACET 1.0 LB | GULFMONT  | 82                        | 33                      | 6179                  | CDEF             |
| FACET 1.0 LB | URN6      | 71                        | 31                      | 6168                  | CDEF             |
| FACET 1.0 LB | MILLIE    | 71                        | 39                      | 6096                  | CDEF             |
| FACET 1.0 LB | MERCURY   | 76                        | 33                      | 6071                  | CDEF             |
| FACET 1.0 LB | LEMONT    | 83                        | 31                      | 6042                  | CDEF             |
| FACET 1.0 LB | MAYBELLE  | 67                        | 35                      | 5895                  | CDEF             |
| FACET 1.0 LB | LA2215    | 77                        | 31                      | 5855                  | CDEF             |
| FACET 1.0 LB | RT 4716   | 76                        | 33                      | 5409                  | DEF              |
| FACET 1.0 LB | TEXMONT   | 69                        | 31                      | 5320                  | EF               |
| FACET 1.0 LB | RT 7817   | 89                        | 28                      | 5016                  | FG               |
| FACET 1.0 LB | AS3510    | 58                        | 37                      | 3903                  | G                |
| C.V.         |           | 1.8                       | 3.9                     | 10.3                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 6. TOLERANCE OF RICE LINES - WHIP. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE   | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|-------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| WHIP 1.6 PT | JASMINE   | 91                        | 38                      | 8202                  | A                |
| WHIP 1.6 PT | RICO 1    | 79                        | 38                      | 7635                  | AB               |
| WHIP 1.6 PT | AR 1121   | 76                        | 40                      | 6861                  | BC               |
| WHIP 1.6 PT | URN72     | 76                        | 30                      | 6346                  | CD               |
| WHIP 1.6 PT | ALAN      | 68                        | 40                      | 6293                  | CD               |
| WHIP 1.6 PT | LA2214    | 75                        | 35                      | 6221                  | CD               |
| WHIP 1.6 PT | LA2201    | 77                        | 31                      | 6213                  | CD               |
| WHIP 1.6 PT | AS 3058   | 75                        | 41                      | 6186                  | CD               |
| WHIP 1.6 PT | LA2207    | 81                        | 36                      | 6154                  | CD               |
| WHIP 1.6 PT | MERCURY   | 75                        | 34                      | 5949                  | CDE              |
| WHIP 1.6 PT | KATY      | 79                        | 41                      | 5925                  | CDE              |
| WHIP 1.6 PT | GULFMONT  | 77                        | 31                      | 5911                  | CDE              |
| WHIP 1.6 PT | MARS      | 76                        | 42                      | 5820                  | CDEF             |
| WHIP 1.6 PT | MILLIE    | 70                        | 40                      | 5811                  | CDEF             |
| WHIP 1.6 PT | MAYBELLE  | 68                        | 36                      | 5671                  | CDEF             |
| WHIP 1.6 PT | LEMONT    | 81                        | 32                      | 5661                  | CDEF             |
| WHIP 1.6 PT | LA2215    | 76                        | 31                      | 5550                  | DEF              |
| WHIP 1.6 PT | SKYBONNET | 77                        | 40                      | 5472                  | DEF              |
| WHIP 1.6 PT | URN6      | 70                        | 33                      | 5428                  | DEF              |
| WHIP 1.6 PT | TEXMONT   | 68                        | 33                      | 5172                  | DEF              |
| WHIP 1.6 PT | RT 4716   | 76                        | 32                      | 4888                  | EF               |
| WHIP 1.6 PT | RT 7817   | 88                        | 30                      | 4622                  | FG               |
| WHIP 1.6 PT | AS3510    | 58                        | 40                      | 3753                  | G                |
| C.V.        |           | 1.8                       | 3.9                     | 10.4                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 7. TOLERANCE OF RICE LINES - POAST. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE   | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|-------------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| POAST 13 OZ | RICO 1    | 80                        | 38                      | 7509                  | A                |
| POAST 13 OZ | AR 1121   | 76                        | 40                      | 6498                  | AB               |
| POAST 13 OZ | ALAN      | 68                        | 38                      | 6475                  | AB               |
| POAST 13 OZ | LA2201    | 77                        | 31                      | 6166                  | B                |
| POAST 13 OZ | LA2207    | 83                        | 33                      | 5983                  | B                |
| POAST 13 OZ | MERCURY   | 76                        | 34                      | 5976                  | B                |
| POAST 13 OZ | AS 3058   | 75                        | 42                      | 5879                  | BC               |
| POAST 13 OZ | JASMINE   | 91                        | 40                      | 5819                  | BC               |
| POAST 13 OZ | URN6      | 70                        | 31                      | 5813                  | BC               |
| POAST 13 OZ | KATY      | 79                        | 40                      | 5757                  | BCD              |
| POAST 13 OZ | MAYBELLE  | 67                        | 36                      | 5597                  | BCDE             |
| POAST 13 OZ | SKYBONNET | 76                        | 41                      | 5578                  | BCDE             |
| POAST 13 OZ | MARS      | 77                        | 43                      | 5573                  | BCDE             |
| POAST 13 OZ | LA2214    | 76                        | 34                      | 5566                  | BCDE             |
| POAST 13 OZ | MILLIE    | 72                        | 39                      | 5414                  | BCDE             |
| POAST 13 OZ | LEMONT    | 83                        | 30                      | 5324                  | BCDEF            |
| POAST 13 OZ | URN72     | 77                        | 31                      | 5299                  | CDEF             |
| POAST 13 OZ | LA2215    | 74                        | 31                      | 4771                  | CDEFG            |
| POAST 13 OZ | TEXMONT   | 69                        | 32                      | 4609                  | CDEFG            |
| POAST 13 OZ | RT 4716   | 76                        | 31                      | 4591                  | DEFG             |
| POAST 13 OZ | GULFMONT  | 77                        | 31                      | 4429                  | EFG              |
| POAST 13 OZ | RT 7817   | 87                        | 30                      | 4219                  | FG               |
| POAST 13 OZ | AS3510    | 58                        | 36                      | 3655                  | G                |
| C.V.        |           | 1.8                       | 3.9                     | 10.3                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 8. TOLERANCE OF RICE LINES - CHECK. RICE RESEARCH STATION, CROWLEY, LA. 1990.

| HERBICIDE | VARIETY   | DAYS TO<br>50%<br>HEADING | PLANT<br>HEIGHT<br>(IN) | YIELD<br>(LB/A @ 12%) | DUNCANS<br>TEST* |
|-----------|-----------|---------------------------|-------------------------|-----------------------|------------------|
| CHECK     | RICO 1    | 80                        | 40                      | 8095                  | A                |
| CHECK     | JASMINE   | 91                        | 38                      | 8032                  | A                |
| CHECK     | AR 1121   | 76                        | 40                      | 6929                  | B                |
| CHECK     | AS 3058   | 75                        | 42                      | 6716                  | BC               |
| CHECK     | MERCURY   | 75                        | 34                      | 6598                  | BCD              |
| CHECK     | LA2207    | 83                        | 35                      | 6588                  | BCD              |
| CHECK     | ALAN      | 69                        | 39                      | 6493                  | BCD              |
| CHECK     | MARS      | 76                        | 42                      | 6463                  | BCD              |
| CHECK     | LA2214    | 76                        | 35                      | 6387                  | BCD              |
| CHECK     | KATY      | 77                        | 41                      | 6319                  | BCD              |
| CHECK     | MILLIE    | 69                        | 38                      | 6207                  | BCDE             |
| CHECK     | LEMONT    | 79                        | 31                      | 6045                  | BCDEF            |
| CHECK     | GULFMONT  | 76                        | 32                      | 5820                  | BCDEF            |
| CHECK     | URN72     | 75                        | 30                      | 5740                  | CDEF             |
| CHECK     | URN6      | 70                        | 32                      | 5707                  | CDEF             |
| CHECK     | LA2201    | 76                        | 31                      | 5700                  | CDEF             |
| CHECK     | SKYBONNET | 76                        | 41                      | 5634                  | CDEF             |
| CHECK     | RT 4716   | 76                        | 32                      | 5527                  | CDEF             |
| CHECK     | MAYBELLE  | 67                        | 36                      | 5349                  | DEF              |
| CHECK     | LA2215    | 74                        | 32                      | 5024                  | EF               |
| CHECK     | TEXMONT   | 68                        | 31                      | 4845                  | G                |
| CHECK     | RT 7817   | 88                        | 29                      | 3908                  | G                |
| CHECK     | AS3510    | 56                        | 38                      | 3504                  | H                |
| C.V.      |           | 1.8                       | 3.9                     | 10.4                  |                  |

\* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.



## RELATIONSHIP OF MAIN CROP GROWTH PARAMETERS AND RATOONING ABILITY OF RICE CULTIVARS

D.B. Jones, S.D. Linscombe, P.K. Bollich, F. Jodari, A.P. Fabacher,  
R. Frey, R.J. Guidry, C.G. Gravot, and H.L. Hoffpauir

Ratoon, or second, cropping of rice is the practice of raising an additional crop of rice from the regrowth of the stubble of the harvested first crop. Although the process of ratooning is not well understood, it has been known for some time that rice cultivars vary in their ability to ratoon or produce regrowth from the remaining main crop straw. Therefore, the selection of a proper cultivar is an important part of producing a successful ratoon crop.

Although ratooning has been commercially practiced in the United States since the 1960's, little research has been performed on the ratoon crop. Over the past few years, several studies have investigated management practices for the ratoon crop. Yet even under optimum management, a cultivar that produces inferior ratoons will not produce a satisfactory ratoon yield. Therefore, there remains the need to genetically improve the ability of U.S. rice cultivars to produce ratoons. One of the first steps in this improvement process is the development of selection criteria for superior ratooning ability. Once a satisfactory criteria is determined, rice breeders will be able to screen large numbers of breeding lines for ratooning ability, which in turn should allow the development of rice cultivars with superior ratooning ability.

The objective of this study was to measure several agronomic traits in both the main and ratoon crops of several rice cultivars in an effort to identify main crop characters which might be used as a selection criteria for improved ratooning ability by rice breeders.

### MATERIALS AND METHODS

Eleven rice cultivars in each of two maturity groups were drill seeded at a rate of 112 kg/ha on 9 Apr 1990, at the Rice Research Station, Crowley, LA. Plots consisted of seven rows at a 18 cm spacing, 7.6 m in length. The mean emergence date for all cultivars was 23 Apr and all cultivars achieved adequate stands. Nitrogen fertility consisted of 78 kg N/ha as urea broadcast on 1 May, just prior to the addition of the permanent flood on 2 May, and a midseason topdress of 34 kg N/ha as ammonium sulfate at approximately the panicle initiation stage, which corresponded to 1 June for the very early group and 6 June for the early group. Weed control consisted of a single application of propanil and molinate (as Arrosolo) both at 2.9 a.i. kg/ha on 1 May, and a single application of Londax at 0.04 kg/ha on 7 May. Main crop plot harvest occurred on 3 and 17 Aug for the very early and early groups, respectively. Plots were all harvested at approximately 30 cm stubble height and the straw was removed by hand. The plots were fertilized with 72 kg/ha three days after main crop harvest and the permanent flood was applied at that time. Ratoon machine plot harvest occurred on 18 Oct and 15 Nov for the very early and early groups, respectively. The following whole plot data was collected during the growing season on the main crop: Seedling vigor/stand establishment as a visual rating; days from planting

to 50% heading as a visual rating; and plot combine grain yield and grain moisture content. Cultivars were also individually sub-sampled at heading and harvest in the following manner: sub-samples of three rows 0.5 m in length were obtained by cutting plants at the soil level. Samples were then taken to the lab and fresh weights were obtained. A sub-sub-sample of 25 plants were divided into panicles and stems + leaves and fresh weights of these parts were also obtained. All samples were then placed in a forced air dryer at 60C for 48 hrs after which dry weights were obtained. In addition, at harvest, all culms in the sub-sample were counted and the panicles of the sub-sub-sample were saved for later determination of grain number per panicle. Harvest sub-samples were taken when 10% of the plants in the stand had visible ratoon growth.

Data in the ratoon crop consisted of a visual rating of ratoon regrowth at one and two weeks after harvest for the very early maturity group and one, two, three and four weeks after harvest for the early maturity group; days from harvest to ratoon heading; a harvest sub- and sub-sub-sampling as in the main crop; and plot combine grain yields and moisture content.

The following main crop information was calculated from data obtained: plot grain yield at 12% moisture; fresh weight biomass at heading and harvest; dry weight biomass at heading and harvest; biomass moisture at heading and harvest; dry weight grain and straw yield at harvest; grain and straw moisture content at harvest; harvest index; panicles/sq m; grain number/sq m; 1000 grain weight; dry biomass weight gain from heading to harvest. Similar ratoon harvest information was calculated from the data obtained from the ratoon harvest sub- and sub-sub-sample.

The observed and calculated data from the main crop will then be correlated to ratoon data to determine if any main crop agronomic characters can be used to accurately predict ratoon regrowth and yield.

#### SUMMARY AND CONCLUSIONS

Agronomic traits of the main and ratoon crops of the two maturity groups are given in Tables 1 and 2. The ratoon plant heights of the of the very early and early maturity groups were 84 and 79% of the main crop plant heights, respectively. Days from main crop heading to 10% ratoon was 33 and 35 days for the very early and early maturity groups, respectively, while days from main crop heading to ratoon heading for the two maturity groups was 77 and 91 days, respectively. It is worthy to note that the mean number of days for the two groups for days from main crop heading to ratoon heading was nearly the same as days from planting to heading in the main crop, although there was some variation for this trait among cultivars within maturity groups. There were significant differences among cultivars within maturity groups for seedling vigor and ratoon rating. Ratoon ratings for the first two weeks after harvest indicated that ratoon growth was more rapid for the very early maturity group when compared to the early group. The degree of variation in ratooning ability of cultivars is quite apparent in the ratoon ratings, especially in ratoon ratings taken at two and three weeks after main crop harvest. This rating may have potential in selecting experimental lines with good ratooning ability and ratoon yields.

Yield and yield components of the main and ratoon crops of the two maturity groups are given in Tables 3 and 4. Main crop grain yields were higher for the early group, while ratoon crop yields were greater for the very early group. The very early group had approximately an 500 kg/ha combined crop yield advantage over the early group because of the higher ratoon crop yields. Although ratoon vegetative regrowth was very good in the early maturity group, ratoon yields were lower in this group due to cool temperatures during grain filling of the ratoon crop. Ratoon crop yield of the very early group was 46% of the main crop yield. The ratio of ratoon panicles to main crop panicles was 1.15 and 1.39 for the very early and early maturity groups, respectively, indicating again that early maturity cultivars, at least the ones investigated in this study, have good ratoon growth and yield potential if low temperatures at ratoon grain filling can be avoided. Harvest index, the ratio of grain yield to total biomass yield was nearly identical for the two maturity groups in the main crop, while it was lower for the early group in the ratoon crop, again because of low ratoon grain yields. In the very early group, where ratoon yields were not effected by low temperature, the mean ratoon harvest index was nearly the same as the main crop index. This would indicate that the ratoon crop partitions its growth as well as the main crop. In the past there has been some concern that ratoon crop partitioning may not be well balanced because of its reduced growth cycle.

Selected significant correlation coefficients between traits of the main crop, traits of the ratoon crop, and between traits of the main and ratoon crop for all cultivars included in the study are given in Table 3, some of which will be discussed below.

**Main Crop** - Yield was positively correlated with dry biomass at both heading and harvest, panicle dry weight and harvest index. This indicates, at least with the 22 cultivars studied, that cultivars developing greater biomass tend to have higher yields, and cultivars with higher harvest indices will have greater yield potential. Panicle dry weight was correlated with heavier culms and also was associated with improved harvest index. Unfortunately, another yield component, panicles/sq m was negatively associated to both panicle dry weight and culm dry weight, giving indication of yield component compensation.

**Ratoon Crop** - Ratoon yields were highly correlated with ratoon harvest index. Ratoon yields were also correlated to ratoon ratings from two to four weeks after harvest. This indicates that ratoon ratings from two to four weeks after harvest may be a reasonable indicator of ratoon yield potential. As with the main crop, ratoon panicle dry weight was also correlated with ratoon culm dry weight and ratoon harvest index, indicating that yield development in the ratoon may be very similar to that in the main crop. This is further substantiated by the negative correlation between ratoon panicle number/sq m and ratoon panicle and culm dry weights, again as in the main crop. All of the ratoon ratings taken at different times from harvest were correlated with each other, with the correlations between ratings taken at two, three and four weeks after harvest being the strongest.

**Main Crop vs Ratoon Crop - Correlations between main and ratoon characters** are important in determining which main crop characters, if any, may have potential in identifying experimental lines with superior ratooning ability. The only positive correlation between ratoon yield and a main crop character was with main crop seedling vigor. Thus it appears that seedling vigor may be associated with good ratooning ability. This should be verified in the future with a larger number of cultivars. Unfortunately, ratoon yield was negatively correlated with both main crop harvest index and grain yield. This probably results from the fact that cultivars that are efficient in partitioning photosynthates to grain yield in the main crop deplete carbohydrates that may be needed by the ratoons to develop and grow. This is further substantiated by the negative association between both main crop yield and harvest index and the four ratoon ratings. There is the possibility that variation for these associations may exist among cultivars, and that cultivars with both high main crop yields and harvest indices can be found that also have good ratooning ability. This also deserves further study in future years.

Although information from this study is preliminary, there appear to be some main crop traits that may have potential use for early generation selection of ratooning ability. Such traits will need to be easily rated to facilitate rapid collection of data, which is necessary in the evaluation of a large number of lines. In addition, a visual ratoon rating of vegetative regrowth from main crop stubble between two and four weeks after harvest appears to show promise as selection criteria, since it was well correlated with both ratoon yield and ratoon harvest index.

Table 1. Agronomic traits of main ratoon crops in very early maturity varieties. Rice Research Station, Crowley, LA. 1990.

| Variety   | <u>Plant Height</u> |        | <u>50% Heading</u>     |        | <u>10% Ratoon*</u> | <u>Seedling Vigor**</u> | <u>Ratoon Rating after Harvest***</u> |       |       |       |
|-----------|---------------------|--------|------------------------|--------|--------------------|-------------------------|---------------------------------------|-------|-------|-------|
|           | Main                | Ratoon | Main                   | Ratoon |                    |                         |                                       |       |       |       |
|           | -- cm --            |        | - Days from Planting - |        |                    |                         | 1 wk                                  | 2 wks | 3 wks | 4 wks |
| Alan      | 103                 | 94     | 78                     | 161    | 108                | 5.0                     | 3.5                                   | 7.5   | -     | -     |
| AS3510    | 114                 | 80     | 70                     | 132    | 99                 | 3.0                     | 8.5                                   | 7.0   | -     | -     |
| Bond      | 109                 | 96     | 79                     | 167    | 115                | 2.7                     | 1.0                                   | 2.7   | -     | -     |
| L202      | 93                  | 72     | 77                     | 147    | 113                | 4.2                     | 4.2                                   | 8.2   | -     | -     |
| Labelle   | 124                 | 113    | 77                     | 160    | 114                | 3.0                     | 3.2                                   | 7.7   | -     | -     |
| M201      | 81                  | 51     | 74                     | 136    | 103                | 4.0                     | 5.2                                   | 8.2   | -     | -     |
| Maybelle  | 92                  | 83     | 75                     | 157    | 108                | 4.2                     | 4.7                                   | 8.7   | -     | -     |
| S101      | 88                  | 77     | 72                     | 136    | 103                | 4.0                     | 6.5                                   | 8.0   | -     | -     |
| Skybonnet | 116                 | 101    | 86                     | 168    | 117                | 2.2                     | 1.2                                   | 4.7   | -     | -     |
| Tebonnet  | 125                 | 112    | 79                     | 164    | 115                | 3.5                     | 2.0                                   | 4.5   | -     | -     |
| Texmont   | 86                  | 76     | 79                     | 159    | 108                | 4.0                     | 4.5                                   | 8.7   | -     | -     |
| Mean      | 103                 | 87     | 76                     | 153    | 109                | 3.6                     | 4.0                                   | 6.9   | -     | -     |
| CV        | 4.3                 | 4.5    | 0.5                    | 0.8    | 0.7                | 13.5                    | 15.7                                  | 8.9   | -     | -     |

\* When 10% of the culms in the stand have at least one ratoon tiller.

\*\* 1 = poor stand/vigor; 5 = excellent stand/vigor.

\*\*\* A visual rating of vigor and ratoon density 0 = no regrowth, 10 = vigorous and dense regrowth.

Table 2. Agronomic traits of main and ratoon crops in early maturity varieties. Rice Research Station, Crowley, LA. 1990.

| Variety    | <u>Plant Height</u> |        | <u>50% Heading</u>     |        | <u>10% Ratoon*</u> | <u>Seedling Vigor**</u> | <u>Ratoon Rating after Harvest***</u> |       |       |       |
|------------|---------------------|--------|------------------------|--------|--------------------|-------------------------|---------------------------------------|-------|-------|-------|
|            | Main                | Ratoon | Main                   | Ratoon |                    |                         |                                       |       |       |       |
|            | -- cm --            |        | - Days from Planting - |        |                    |                         | 1 wk                                  | 2 wks | 3 wks | 4 wks |
| Gulfmont   | 84                  | 72     | 87                     | 183    | 129                | 2.7                     | 2.6                                   | 4.6   | 5.6   | 7.0   |
| Gui Chow   | 108                 | 73     | 97                     | 180    | -                  | 1.5                     | 0.5                                   | 1.5   | 1.7   | 1.5   |
| Jasmine 85 | 106                 | 76     | 97                     | 178    | -                  | 3.5                     | 2.0                                   | 5.2   | 5.5   | 8.2   |
| Katy       | 109                 | 88     | 87                     | 186    | 122                | 4.0                     | 6.0                                   | 6.7   | 8.5   | 9.2   |
| Lacassine  | 88                  | 80     | 85                     | 180    | 119                | 3.0                     | 5.5                                   | 6.5   | 8.2   | 8.5   |
| Lebonnet   | 119                 | 101    | 88                     | 183    | 121                | 2.0                     | 5.0                                   | 5.7   | 7.2   | 8.7   |
| Lemont     | 84                  | 72     | 88                     | 192    | 125                | 3.5                     | 3.7                                   | 5.7   | 7.7   | 9.2   |
| Mars       | 109                 | 90     | 89                     | 172    | 128                | 4.0                     | 3.0                                   | 5.0   | 7.2   | 9.2   |
| Mercury    | 86                  | 68     | 88                     | 162    | 113                | 3.5                     | 7.5                                   | 8.2   | 8.7   | 8.5   |
| Newbonnet  | 108                 | 83     | 89                     | 179    | 129                | 2.7                     | 2.7                                   | 5.0   | 5.7   | 7.5   |
| Rico 1     | 104                 | 77     | 89                     | 187    | 133                | 2.7                     | 0.2                                   | 2.5   | 3.5   | 5.2   |
| Mean       | 101                 | 80     | 89                     | 180    | 124                | 3.0                     | 3.5                                   | 5.1   | 6.3   | 7.5   |
| CV         | 2.8                 | 3.0    | 0.6                    | 1.0    | 0.8                | 15.8                    | 24.3                                  | 12.5  | 10.3  | 8.8   |

\* When 10% of the culms in the stand have at least one ratoon tiller.

\*\* 1 = poor stand/vigor; 5= excellent stand/vigor.

\*\*\* A visual rating of vigor and ratoon density 0 = no regrowth, 10 = vigorous and dense regrowth.

Table 3. Yield and yield components of main and ratoon crops in very early maturity varieties.  
Rice Research Station, Crowley, LA. 1990.

| Variety   | <u>Yield</u> |        |       | <u>Panicles</u>        |        | <u>Panicle Weight</u> |        | <u>Harvest Index</u> |        |
|-----------|--------------|--------|-------|------------------------|--------|-----------------------|--------|----------------------|--------|
|           | Main         | Ratoon | Total | Main                   | Ratoon | Main                  | Ratoon | Main                 | Ratoon |
|           | - Kg/ha -    |        |       | - No./m <sup>2</sup> - |        | - g/panicle -         |        |                      |        |
| Alan      | 7877         | 4201   | 12078 | 434                    | 644    | 1.83                  | 0.69   | 0.48                 | 0.44   |
| AS3510    | 6251         | 2296   | 8547  | 414                    | -      | 1.62                  | -      | 0.47                 | -      |
| Bond      | 7343         | 3015   | 10358 | 358                    | 385    | 2.02                  | 1.37   | 0.47                 | 0.46   |
| L202      | 7734         | 3249   | 10983 | 605                    | -      | 1.26                  | -      | 0.47                 | -      |
| Labelle   | 7056         | 3960   | 11016 | 402                    | 542    | 1.88                  | 1.00   | 0.44                 | 0.45   |
| M201      | 6254         | -      | 6254  | 507                    | -      | 1.41                  | -      | 0.46                 | -      |
| Maybelle  | 7985         | 4035   | 12020 | 466                    | 664    | 1.66                  | 0.85   | 0.51                 | 0.47   |
| S101      | 7682         | -      | 7682  | 629                    | -      | 1.30                  | -      | 0.52                 | -      |
| Skybonnet | 7449         | 3176   | 10625 | 420                    | 425    | 1.53                  | 1.22   | 0.41                 | 0.45   |
| Tebonnet  | 8197         | 3112   | 11309 | 388                    | 396    | 2.47                  | 1.17   | 0.54                 | 0.44   |
| Texmont   | 7297         | 3895   | 11192 | 527                    | 676    | 1.32                  | 0.69   | 0.51                 | 0.42   |
| Mean      | 7399         | 3434   | 10833 | 468                    | 536    | 1.72                  | 1.00   | 0.48                 | 0.45   |
| CV        | 5.7          | 8.7    | -     | 8.2                    | 12.2   | 8.5                   | 14.7   | 5.1                  | 4.0    |

Table 4. Yield and yield components of main and ratoon crops in early maturity varieties. Rice Research Station, Crowley, LA. 1990.

| Variety    | <u>Yield</u> |        |       | <u>Panicles</u>        |        | <u>Panicle Weight</u> |        | <u>Harvest Index</u> |        |
|------------|--------------|--------|-------|------------------------|--------|-----------------------|--------|----------------------|--------|
|            | Main         | Ratoon | Total | Main                   | Ratoon | Main                  | Ratoon | Main                 | Ratoon |
|            | - Kg/ha -    |        |       | - No./m <sup>2</sup> - |        | - g/panicle -         |        |                      |        |
| Gulfmont   | 7473         | 2519   | 9992  | 611                    | 939    | 1.30                  | 0.63   | 0.44                 | 0.43   |
| Gui Chow   | 10167        | 718    | 10885 | 482                    | -      | 2.69                  | -      | 0.53                 | -      |
| Jasmine 85 | 8560         | 3376   | 11936 | 465                    | 583    | 2.08                  | 0.82   | 0.45                 | 0.45   |
| Katy       | 7560         | 2111   | 9671  | 473                    | 661    | 1.85                  | 0.49   | 0.43                 | 0.27   |
| Lacassine  | 8379         | 2231   | 10610 | 445                    | 672    | 2.07                  | 0.73   | 0.52                 | 0.38   |
| Lebonnet   | 7479         | 1925   | 9404  | 422                    | 643    | 1.89                  | 0.53   | 0.43                 | 0.31   |
| Lemont     | 7982         | 1479   | 9461  | 517                    | 622    | 1.91                  | 0.57   | 0.51                 | 0.30   |
| Mars       | 8290         | 3834   | 12124 | 409                    | 480    | 2.50                  | 1.16   | 0.45                 | 0.49   |
| Mercury    | 5831         | 3215   | 9046  | 470                    | 703    | 1.55                  | 0.66   | 0.39                 | 0.44   |
| Newbonnet  | 7146         | 2428   | 9574  | 438                    | 734    | 2.23                  | 0.83   | 0.45                 | 0.41   |
| Rico 1     | 9073         | 1798   | 10871 | 449                    | 524    | 2.30                  | 0.93   | 0.52                 | 0.44   |
| Mean       | 8007         | 2326   | 10333 | 468                    | 649    | 2.05                  | 0.74   | 0.47                 | 0.39   |
| CV         | 6.1          | 15.5   | -     | 9.2                    | 11.3   | 11.4                  | 19.9   | 5.1                  | 11.6   |



Table 5. 1990 Ratton Phenology Correlation Coefficients\*

Main Crop

SV = PH(-0.34); CULMDW(-0.28)  
 PH = PMS(-0.61)  
 PMS = PANDW(-0.51); CULMDW(-0.60)  
 PANDW = CULMDW(0.70); HI(0.57)  
 YIELD = BMDWHD(0.48); BMDWHVST(0.46); PANDW(0.53); HI(0.70)

Ratoon Crop

RR1 = RR2(0.72); RR3(0.87); RR4(0.66)  
 RR2 = RR3(0.91); RR4(0.89)  
 RR3 = RR4(0.89)  
 RPMS = RR1(0.51); RR2(0.42); RPANDW(-0.70); RCULMDW(-0.70)  
 RPANDW = RR1(-0.59); RR2(-0.46); RCULMDW(0.61); RHI(0.68)  
 RYIELD = RR1(NS); RR2(0.57); RR3(0.48); RR4(0.59); RHI(0.71)

Main Crop vs Ratoon Crop

SV = RR1(0.34); RR2(0.59); RR3(0.52); RR4(0.59); RYLD(0.52);  
 RPMS(-0.55)  
 PH = RR1(-0.33); RR2(-0.41)  
 PMS = RPMS(0.62); RPANDW(-0.52); RCULMDW(-0.43)  
 PANDW = RR1(-0.74); RR2(-0.64); RR3(-0.53); RR4(-0.46);  
 RPMS(-0.35); RPANDW(0.38)  
 YIELD = RR1(-0.56); RR2(-0.55); RR3(-0.71); RR4(-0.62);  
 RYLD(-0.35)  
 HI = RR1(-0.49); RR2(-0.67); RR3(-0.45); RR4(-0.45); RYLD(-0.60);  
 RYIELD = SV(0.52); YIELD(-0.35); HI(-0.60)

\*See Appendix Table 1 for descriptions.

Appendix Table 1. Description of Character Used in Table 5.

| <u>CHARACTER</u> | <u>DESCRIPTION</u>                        |
|------------------|-------------------------------------------|
| BMDWHD           | Main crop biomass dry weight at heading   |
| BMDWHVST         | Main crop biomass dry weight at harvest   |
| CULMDW           | Main crop culm dry weight at harvest      |
| HI               | Main crop harvest index                   |
| PANDW            | Main crop panicle dry weight              |
| PH               | Main crop plant height                    |
| PMS              | Main crop panicle number per square meter |
| RCULMDW          | Ratoon culm dry weight at harvest         |
| RHI              | Ratoon harvest index                      |
| RPANDW           | Ratoon panicle dry weight                 |
| RPMS             | Ratoon panicle number per square meter    |
| RR1              | Ratoon rating 1                           |
| RR2              | Ratoon rating 2                           |
| RR3              | Ratoon rating 3                           |
| RR4              | Ratoon rating 4                           |
| RYIELD           | Ratoon grain yield                        |
| SV               | Main crop seedling vigor                  |
| YIELD            | Main crop grain yield                     |

## CEREAL CROPS BIOTECHNOLOGY RESEARCH

### RICE AND WHEAT IMPROVEMENT THROUGH BIOTECHNOLOGY<sup>1</sup>

T.P. Croughan, M.M. Meche, R.P. Regan, X.H. Wang,  
D.B. Trumps, S.A. Harrison, S.D. Linscombe, J.M. Jaynes,  
and S.S. Quisenberry.

Biotechnology offers a set of laboratory techniques applicable to the genetic improvement of crop plant species. These techniques involve the manipulation of plants at the cellular and subcellular level to produce new genetic variability, providing germplasm from which improved varieties may be developed. Complementary to established conventional techniques such as hybridization, mutation breeding, and the screening of world collections, biotechnology offers techniques for producing new mutants through tissue culture (somaclones), developing homozygous lines from segregating populations (anther culture), and introducing into plants DNA from unrelated species coding for specific new traits (genetic engineering). The focus of this project is the application of these techniques to the enhancement of rice and wheat germplasm for varietal development applications.

Tissue culture techniques, including the production of somaclones and anther culture-derived material, have successfully contributed to cereal crop improvement. In China, approximately 50 new varieties of rice and wheat have been developed through anther culture and somaclonal variation since 1975.

Genetic engineering of cereal crop species is progressing rapidly. Approximately three years ago rice was regenerated from protoplasts for the first time. Since then, several laboratories have successfully introduced foreign DNA into rice, including work conducted at the L.S.U. Rice Research Station. While progress with wheat and other small grains lags behind that achieved with rice, it is evident that genetic engineering of cereal crops for crop improvement objectives offers significant potential in the foreseeable future.

An objective of the biotechnology project is to help expedite the production of improved varieties for Louisiana's producers. Anther culture is utilized to produce genetically stabilized breeding lines in a few months, rather than the few years required to achieve this necessary stabilization using conventional breeding techniques. The Rice Station houses one of the largest anther culture programs in the world.

---

<sup>1</sup> This research supported in part by funds provided by Louisiana farmers through the Louisiana Rice Research Board and the Louisiana Soybean and Grain Research and Promotion Board.

Losses to red rice are estimated at \$50 million annually in U.S. rice production. Providing an effective method for controlling red rice in rice production would help alleviate these significant losses. Developing a herbicide-resistant rice variety would allow Louisiana growers to spray herbicides on the rice crop to effectively control red rice.

During 1990, nearly 800,000 anthers were plated from rice and wheat breeding lines. A total of 5,300 rows of rice tissue culture lines were planted and sprayed with herbicides to screen for herbicide resistance. Over 11,500 new anther culture-derived rice lines were planted in the field for evaluation. The breeding project selected 378 true-breeding lines from within this material for further testing. Approximately 170 yield plots were planted to evaluate rice tissue culture lines previously identified as promising. The seven highest yielding lines were provided to the breeding project for further evaluation. Approximately 6,000 new anther culture-derived plants were transplanted to the greenhouse. This material was derived from 34  $F_1$  crosses and 35  $F_2$  crosses. A total of 3,400 wheat somaclones were produced from the varieties Terral 101 and Coker 9766, 8625, and 9877. Approximately 50 different media combinations were tested to develop a medium suitable for anther culture of Louisiana wheat breeding lines.

# THE RELATIONSHIP BETWEEN HARVEST MOISTURE AND MILLING YIELD FOR COMMERCIAL AND EXPERIMENTAL RICE LINES

M.F. Miller, S.D. Linscombe, and F. Jodari

## INTRODUCTION

This project is conducted in cooperation with the rice breeding program at the Rice Research Station in Crowley, Louisiana. An experimental line that does not produce a high head yield has a small chance of being accepted as a commercial variety. There are several natural factors that may affect the head yield. The moisture of the grain at harvest time is one of them. High moisture will usually cause severe breakage of the kernels during the milling process. The severity will vary in different lines. Another factor is the natural drying process in which the grain begins to dry, is then re-wet by rain and dew, and is dried again by the sun and wind. This puts stress on the kernel causing it to fissure resulting in breakage during milling. This cycle may be repeated several times between the soft dough stage and harvest. Some varieties or lines may be able to withstand these changes better than others. In order to see what effect these conditions might have on milling yield, sampling was started at a much higher grain moisture than at which harvesting is usually started. Sampling was continued until grain moisture was lower than it would be in actual practice.

## MATERIALS AND METHODS

Experimental lines and/or commercial varieties to be tested were selected by the staff of the rice breeding project. Small samples were hand cut from experimental plots of the breeding program. This was usually done at 2- to 3-day intervals starting when the grain moisture was near 26.0 to 28.0%. Sampling was continued until the moisture had fallen to around 14.0 or 15.0%. The samples were threshed on a panicle thresher, cleaned and the grain moisture was taken. They were then dried to approximately 12.0% using a heated air drier. Grain temperature was not allowed to go above 105F. After drying the rough rice samples were sealed in pint glass jars and allowed to equilibrate for a period of time before processing. Shelling, milling and the removal of broken grains were done with laboratory equipment similar to that used by the USDA Grain Inspection Service. Standard USDA procedures were used to obtain milling yield data.

## RESULTS AND DISCUSSION

Three experimental lines, 201, 207, and 211 and two commercial varieties, Rico 1 and Mercury were tested. Rico 1 and Mercury are typical medium-grain types. The experimental lines are all long-grain types. Head yield for line 201 was fairly constant over a range of 15.0 to 24.0% harvest moisture. Line 207 head yield was lower overall but it remained about the same from 16.5 to 23.5%. The highest head yield for line 211 had a more narrow moisture range than any of the other lines, 17.0 to 19.0%. The head yield of Rico 1 was also fairly constant over a range of 16.5 to 25.5% harvest moisture. Head yield for Mercury were very similar.

## RICE FERTILIZATION AND CULTURAL MANAGEMENT<sup>1/</sup>

### EFFECT OF N RATE AND TIMING ON AGRONOMIC PERFORMANCE OF SELECTED RICE VARIETIES AND EXPERIMENTAL LINES IN LOUISIANA RICE PRODUCING AREAS

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

#### INTRODUCTION

Fertilizer nitrogen (N) is required on virtually all of the rice acreage in Louisiana for optimum production. Efficiency and uptake of applied N are influenced by factors such as placement, rate, and timing in relation to water management. Growing a suitable rice variety coupled with management practices that conserve applied N generally increase the chance of profitable rice production.

The placement and timing of fertilizer N are dependent upon the cultural system used. In Louisiana, rice is grown in water- and dry-seeded cultural systems. In the water-seeded, permanently flooded system, the optimum N rate should be placed 2 to 3 inches below the soil surface within 5 to 7 days of establishing the flood. In the dry-seeded system, the optimum N rate should be broadcast onto a dry soil surface prior to establishing the permanent flood. There is generally no advantage to applying multiple applications of fertilizer N in either cultural system provided there is precision in N application and placement and sound water management. Split applications may be desirable if the optimum N rate is not known, if the farmer is unfamiliar with a field, or if a variety is susceptible to lodging. When split applications are applied, it is important to apply an adequate amount of basal N to maintain the rice plant through tillering and into early reproductive growth. Generally, a split application consists of two-thirds of the estimated total N requirement applied preplant in water-seeded rice and preflood in dry-seeded rice, followed by a topdressing of the remaining one-third at either panicle initiation, panicle differentiation, or when deficiency symptoms appear.

Rice varieties may differ in their response to the amount and timing of applied N. Maximum or optimum yields of many varieties may occur over a wide range of N rates, depending on such factors as lodging, disease susceptibility, and inherent N utilization efficiency. Environmental influences, such as soil type, growing conditions, pest pressure, and weather, may affect varietal performance. Conducting field research in the major

---

<sup>1/</sup> This research supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

rice producing areas of Louisiana provides valuable information for developing fertilization and management strategies for new varieties.

The objectives of these variety evaluations are to  
1) determine yield potential and agronomic performance of new rice varieties and advanced experimental lines in different environments, and 2) determine the optimum N rate for each variety.

#### MATERIALS AND METHODS

Twenty-two rice varieties and/or advanced experimental lines were grouped by maturity for testing:

1. Very early: Tebonnet (TBNT), Maybelle (MBLE), Texmont (TXMT), Alan, Millie (MILL), 3006
3. Early: Lemont (LMNT), Katy, Mars, Mercury (MERC), Rico 1 (RICO), V4716, V7817, 2201, 2207, 2214, 1121, 3072, Jasmine 85 (JSMN), Della (DLA), 2215, 3049

Tebonnet is a tall variety developed in Arkansas. It has displayed high yield potential and is susceptible to lodging. Maybelle is a very early maturing long-grain variety developed in Texas, and was released in 1989. This variety matures approximately 8 to 10 days earlier than Tebonnet. Maybelle is short in stature, possesses good straw strength, and has excellent second crop potential. Texmont is a semidwarf long-grain variety that was developed in Texas and released in 1990. The variety has shown high yield potential and excellent ratooning ability, and matures earlier than Tebonnet. Alan and Millie are tall varieties developed in Arkansas and released in 1990. These varieties are more lodging resistant than Tebonnet and are earlier in maturity. Yield potential of these varieties also appears to be similar to that of Tebonnet.

The remaining entry in the very early group is an advanced experimental line. Line 3006 is a semidwarf long grain developed in Texas. In limited testing, this line has displayed good yield potential, ratooning ability, and is also earlier than Tebonnet.

The early group includes the Texas semidwarf variety Lemont. Lemont has consistently shown excellent yield potential, is resistant to lodging, and responds well to high levels of fertilizer N. The variety V7817 was developed by Ricetec and is a mid-season semidwarf long grain that is resistant to lodging, has very good yield potential, and responds to high levels of fertilizer N. This variety matures later than Lemont and is shorter in height. Katy was developed in Arkansas and was released in 1989. It is a tall long-grain variety that possesses good straw strength and stands well. Katy will lodge, however,



if over-fertilized. Its yield potential is somewhat less than that of Lemont.

Mars is a tall, early season, medium-grain variety with good yield potential that was developed in Arkansas. It is lodging susceptible, especially at high rates of N fertilization. Mercury is a semidwarf medium grain released from the breeding program in Louisiana in 1987. Straw strength of Mercury is similar to that of Mars but is more resistant to lodging at high N rates, due mainly to its shorter height. Yield potential of Mars and Mercury appear to be similar, with each displaying good second crop potential. Rico 1 is a tall mid-season medium grain released from the breeding program in Texas in 1987. It is susceptible to lodging, but appears to have higher yield potential than either Mars or Mercury. The variety V4716 is a short stature medium grain released from Ricetec in 1987. First and second crop yield potential appear to be similar to that of Mars and Mercury.

Jasmine 85 is a long-grain variety released from Texas in 1989. It is considered to be a special purpose rice, since it possesses aromatic properties and a low amylose content. Jasmine 85 has poor straw strength, is of medium height, and will lodge at high levels of N. Della is a tall, lodging-susceptible variety that also possesses aromatic characteristics. Its yield potential is low in comparison to other long-grain varieties.

Advanced experimental lines 2201 and 2207 were developed in the Louisiana breeding program. Both lines are long-grain semidwarfs that possess good lodging resistance and have displayed slightly higher yield potential in the first and second crops than Lemont. Height and maturity of line 2207 are similar to that of Lemont while 2201 appears to be 2 to 3 days earlier. Line 2214 is a semidwarf medium grain developed in Louisiana that has shown high yield potential in limited testing. The medium-grain entry, line 1121, was developed in Arkansas. Line 2215, an advanced experimental developed in Louisiana, is a semidwarf long grain with the aromatic characteristic of Della. Experimental lines 3072 and 3049 are semidwarf long grains developed in Texas. Both of these lines have yield potential similar to Lemont, while 3072 is a few days earlier. Line 3049 also possesses the aromatic characteristic of Della.

Varieties and advanced experimental lines were tested in five different locations, however, not all materials were included in each test. The aromatic varieties Della and Jasmine 85 were tested at the Rice Research Station in a separate variety trial. Also included in this experiment were the experimental lines 2215 and 3049. Lemont was included in this evaluation for comparison purposes. Experiments were water-seeded at all locations except East Carroll Parish. Entries were tested at four N rates ranging from 60 to 150 lb/A in 30 lb/A increments, with N being applied as single applications.



Fertilizer N was banded approximately 2 inches deep 1 to 2 days prior to flooding in the water-seeded experiments. In soils requiring P and K, approximately 60 lb/A  $P_2O_5$  and  $K_2O$  were also banded with N as ammonium sulfate. In drill-seeded experiments, basal N treatments were applied as a broadcast application prior to establishment of the permanent flood.

Water-seeded experiments were seeded at the rate of 150 lb/A with presoaked seed. After 3 to 4 days, the experiments were drained briefly to promote seedling anchorage. A permanent flood was established 2 to 4 days after drainage, never allowing the soil to dry. In drill-seeded experiments, varieties were seeded at 100 lb/A and flushed periodically until the permanent flood was established (4 to 5 weeks after planting).

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Days to 50% heading, plant height, lodging, grain moisture, grain yield, and milling yield were measured. Milling samples (5 ft<sup>2</sup>) were hand-harvested at 20 to 22% moisture for each entry at a 90 lb N/A rate only.

Second crop data were generated in the Vermilion Parish and Rice Research Station variety evaluations. Following main crop harvest, 75 lb N/A were broadcast into the dry stubble, and a shallow flood was established within 2 to 3 days after N application. Individual whole plots were combine-harvested at field maturity. Grain moisture and grain yield were determined.

Plant growth stages were determined for all varieties at each location for use in updating or establishing predictions in the DD50 Rice Management Program (Tables 14-18).

#### SUMMARY AND CONCLUSIONS

Field experiments were conducted at the Rice Research Station and at four off-station locations to determine N response and agronomic performance of commercial varieties and advanced experimental lines when grown in different environments. Agronomic data are shown in Tables 1-19. Results will be discussed by location.

The variety evaluations conducted at the Rice Research Station were water seeded. Seedling vigor was generally very good for the water-seeded, very-early long grain entries Maybelle, Alan, and Millie. Vigor of the other entries was less, especially that of Tebonnet. Stand establishment was very slow for Tebonnet, and plant population in the resulting stand was much lower than in the other entries. A N rate of 90 to 120 lb/A was required for optimum grain yields for all entries (Table 1). Sheath blight was severe in Maybelle, Texmont, and 3006 and probably decreased yield. Some ratoon loss due to sheath blight

occurred in some entries, although second crop yields were very good for all entries except Tebonnet, and total yields for Alan and 3006 were over 10,000 lb/A (Table 2).

Seedling vigor and rapid emergence were observed for entries Mars, Mercury, Katy, 2207, 2214, and 1121. Emergence was very slow for V7817. Lodging occurred in the entries Mars, Rico 1, and 2214 at N rates of 120 lb/A and above; however, the only significant yield reduction due to lodging occurred at 150 lb N/A in Rico 1. Grain yields were excellent for all of the medium-grain entries in this test (Table 3). Yield potential was reduced for the entries Lemont, 2201, 2207, 3072, and V7817 due to severe sheath blight. Second crop grain yields were not as high as those in the very early test and was probably due to more sheath blight pressure and higher main crop yields in the early test. The entries Mars, Mercury, 2207, 2214, and 1121 produced over 10,000 lb/A in total grain yield (Table 4).

Seedling vigor was fair to poor in the aromatic test, especially for the entry Jasmine 85. Lodging was severe for Della at rates of N above 60 lb/A, and moderate for Jasmine 85 at 150 lb N/A (Table 5). Yields of Lemont, 3049, and 2215 were decreased by sheath blight, while lodging decreased yield of Della. Jasmine 85 yielded over 9000 lb/A and Della under 5000 lb/A. Approximately 60 to 90 lb N/A were required for optimum grain yields. Second crop grain yields were not determined.

Variety tests in East Carroll Parish were drill seeded. Entries in the very early test emerged over an 8- to 12-day period. Stand establishment was somewhat slow and rapid growth of most entries did not occur until 7 days after N application and permanent flood establishment. Lodging occurred in Tebonnet and Alan at the higher rates of N but grain yields were not affected (Table 6). Large differences in maturity in this test resulted in severe bird damage in Maybelle and Texmont, the first entries to head. Grain yields of these two, especially Maybelle, were very poor. Overall yields of the very early entries at this location were much lower than those at the Rice Research Station or in Vermilion Parish.

Agronomic performance of the early group was much better than in the very early group. Lodging was significant in most medium-grain entries at high rates of N (Table 7), and caused yield decreases in Mars, Rico 1, and 1121. The amount of N required for optimum grain yields ranged from 90 to 150 lb/A and was dependent on variety and lodging susceptibility.

Variety tests in Vermilion Parish were water seeded. In the very early test excellent seedling vigor was observed for all entries except Tebonnet. Stand establishment was rapid and tillering for most entries was observed within 3 weeks of emergence. Disease problems have been severe at this location in previous years; however, there did not appear to be any

significant influence of disease on plant growth or grain yields in 1990. Most entries required N applications of 90 to 120 lb/A for optimum grain yields (Table 8), although good yields were obtained at lower N. Second crop grain yields were also good with all entries yielding a minimum of 2500 lb/A (Table 9). Total grain yields of Texmont, Maybelle, and Alan were approximately 10,000 lb/A.

Early season vigor and plant growth were also good in the early variety test. All medium-grain entries and the long-grain entries Katy, 2207, and 2201 emerged 4 days after planting. The only lodging observed was in Rico 1 at 150 lb N/A, causing a slight decrease in yield (Table 10). The N requirement ranged from 90 to 120 lb/A for most entries. Yields for most entries were above 6000 lb/A, except for V7817 and Katy. Second crop grain yields were generally good, ranging from 2000 to 3100 lb/A for the higher yielding entries (Table 11). Grain yields of Lemont, Katy, and 2201 were lower. Total grain yields of Rico 1 and 2214 were over 10,000 lb/A. Katy and V7817 yielded less than 7600 lb/A in both crops combined.

Agronomic data from the water-seeded test in Rapides Parish are presented in Table 12. Emergence through the water after seeding was generally good in this test. Early season growth was also good for most entries; however, the time required to reach days to 50% heading for these early entries was much longer than at the other locations. The only lodging observed was again in the entry Rico 1; however, yields continued to increase up to the highest rate of N. Many entries in this test required the maximum of 150 lb N/A for optimum grain yield, indicating less efficient utilization of fertilizer N than at other locations. Grain yields were also affected by bird damage and severe sheath blight, especially in the semidwarf long-grain entries such as Lemont, 2201, 2207, and V7817. The highest yielding entries at this location were Rico 1 and 2214 which yielded 8000 and 7600 lb/A, respectively.

Emergence and early-season growth was generally good for the early entries in Morehouse Parish. Stands were somewhat thin, however, until the advanced tillering stages. A significant amount of lodging occurred in Katy, Mars, Mercury, Rico 1, and 2214, especially when fertilized with more than 60 lb N/A (Table 13). Lodging did cause significant losses in grain yields at this location, since lodging began to occur after heading and continued up to harvest. Severe straighthead in V4716 and V7817 significantly decreased yields in these entries. All other entries yielded over 6400 lb/A.

Milling yields for all entries are presented by maturity and location in Table 14. DD50 growth stage information is presented by entry and location in Tables 15 through 19.

Experiment: Very early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.4; O.M.: 1.21%;  
extractable nutrients (mg/kg): P-64, Na-63,  
K-56, Ca-1283, Mg-198, Zn-0.49, S-5.71,  
As-0.67, Fe-83.17

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, 3006,  
150 lb/A

Planting Method/Date: Water-seeded, Mar 29

Fertilization: 60 lb/A P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O ppi; N source, ammonium  
sulfate; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: ALAN, Apr 4; MBLE, MILL, Apr 5; TXMT, 3006,  
Apr 6; TBNT, Apr 10

Water Management: Flooded, Mar 28; drained, Apr 2; reflooded,  
Apr 5; drained, Apr 21; reflooded, Apr 24;  
harvest drainage, July 10; second crop  
flooded, Aug 1; harvest drainage, Oct 16

Herbicides: 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), Apr 23; 0.9 oz ai/A Londax (bensulfuron-  
methyl), May 1; 0.6 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 17

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Main crop, July 31; second crop, Oct 16

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: MBLE, ALAN, and MILL displayed very good seedling  
vigor, while vigor of other entries was fair. There was  
heavy sheath blight pressure in 3006, MBLE, and TXMT. A N  
rate of 90 to 120 lb/A resulted in optimum grain yields for  
all entries (Table 1). Second crop grain yields were very  
good for all entries except TBNT (Table 2).

Table 1. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines.  
Rice Research Station, Crowley, LA. 1990.

| Variety     | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|--------------------|-----|-----|-----|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*    |     |     |     | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                 | 90  | 120 | 150 | 60                          | 90   | 120  | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |     |      |     |      | ----- (lb/A) ----- |     |     |     |                             |      |      |      |      |
| Tebonnet    | 75                  | 76 | 78   | 77  | 76   | 112          | 107 | 125  | 128 | 118  | 0/0                | 0/0 | 0/0 | 0/0 | 7414                        | 7596 | 7913 | 7760 | 7671 |
| Maybelle    | 68                  | 68 | 69   | 68  | 68   | 76           | 82  | 86   | 86  | 83   | 0/0                | 0/0 | 0/0 | 0/0 | 6139                        | 6537 | 6901 | 6483 | 6515 |
| Texmont     | 71                  | 71 | 73   | 73  | 72   | 72           | 75  | 80   | 81  | 77   | 0/0                | 0/0 | 0/0 | 0/0 | 6978                        | 7190 | 7310 | 7018 | 7124 |
| Alan        | 72                  | 73 | 74   | 75  | 74   | 76           | 84  | 91   | 93  | 86   | 0/0                | 0/0 | 0/0 | 0/0 | 7140                        | 7350 | 7336 | 6547 | 7093 |
| Millie      | 73                  | 73 | 75   | 76  | 74   | 89           | 86  | 93   | 96  | 91   | 0/0                | 0/0 | 0/0 | 0/0 | 6153                        | 6471 | 6655 | 6431 | 6427 |
| 3006        | 72                  | 73 | 74   | 75  | 74   | 65           | 69  | 73   | 78  | 71   | 0/0                | 0/0 | 0/0 | 0/0 | 7377                        | 7786 | 7957 | 8027 | 7787 |
| N           |                     |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
| Mean        | 72                  | 73 | 74   | 74  |      | 82           | 84  | 91   | 94  |      |                    |     |     |     | 6867                        | 7155 | 7345 | 7044 |      |
| C.V., %     |                     |    | 1.28 |     |      |              |     | 6.29 |     |      |                    |     |     |     |                             |      | 5.08 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |     | 8    |     |      |                    |     |     |     |                             |      | ns   |      |      |
| Variety     |                     |    | 1    |     |      |              |     | 5    |     |      |                    |     |     |     |                             |      | 340  |      |      |
| V within N  |                     |    | 2    |     |      |              |     | 10   |     |      |                    |     |     |     |                             |      | 679  |      |      |
| V across N  |                     |    | 2    |     |      |              |     | 13   |     |      |                    |     |     |     |                             |      | 794  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 2. Effect of N rate in main crop on grain yields of water-seeded very early rice varieties and advanced experimental lines.  
Rice Research Station, Crowley, LA. 1990.

| Variety           | Main crop<br>grain yield at 12% moisture |      |      |      |      | Second crop<br>grain yield at 12% moisture |      |      |      |      | Total<br>grain yield at 12% moisture |       |       |       |       |
|-------------------|------------------------------------------|------|------|------|------|--------------------------------------------|------|------|------|------|--------------------------------------|-------|-------|-------|-------|
|                   | 60                                       | 90   | 120  | 150  | Mean | 60                                         | 90   | 120  | 150  | Mean | 60                                   | 90    | 120   | 150   | Mean  |
| ------(lb/A)----- |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Tebonnet          | 7414                                     | 7596 | 7913 | 7760 | 7671 | 2108                                       | 2245 | 2085 | 1812 | 2063 | 9523                                 | 9841  | 9997  | 9572  | 9733  |
| Maybelle          | 6139                                     | 6537 | 6901 | 6483 | 6515 | 3196                                       | 3663 | 3388 | 3128 | 3343 | 9335                                 | 10200 | 10288 | 9611  | 9858  |
| Texmont           | 6978                                     | 7190 | 7310 | 7018 | 7124 | 2888                                       | 2787 | 2638 | 2225 | 2634 | 9866                                 | 9976  | 9948  | 9243  | 9758  |
| Alan              | 7140                                     | 7350 | 7336 | 6547 | 7093 | 3236                                       | 3399 | 3052 | 2946 | 3158 | 10377                                | 10749 | 10387 | 9493  | 10251 |
| Millie            | 6153                                     | 6471 | 6655 | 6431 | 6427 | 3107                                       | 2821 | 2916 | 2670 | 2879 | 9259                                 | 9292  | 9571  | 9102  | 9306  |
| 3006              | 7377                                     | 7786 | 7957 | 8027 | 7787 | 3121                                       | 3166 | 2873 | 2576 | 2934 | 10498                                | 10951 | 10830 | 10602 | 10720 |
| N                 |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Mean              | 6867                                     | 7155 | 7345 | 7044 |      | 2943                                       | 3013 | 2825 | 2560 |      | 9810                                 | 10168 | 10170 | 9604  |       |
| C.V., %           |                                          |      | 5.08 |      |      |                                            |      | 9.01 |      |      |                                      |       | 5.17  |       |       |
| LSD (0.01):       |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Nitrogen          |                                          |      | ns   |      |      |                                            |      | 329  |      |      |                                      |       | ns    |       |       |
| Variety           |                                          |      | 340  |      |      |                                            |      | 240  |      |      |                                      |       | 484   |       |       |
| V within N        |                                          |      | 679  |      |      |                                            |      | 181  |      |      |                                      |       | 967   |       |       |
| V across N        |                                          |      | 794  |      |      |                                            |      | 546  |      |      |                                      |       | 1177  |       |       |

Experiment: Early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.2; O.M.: 1.05%;  
extractable nutrients (mg/kg): P-40, Na-50,  
K-66, Ca-1059, Mg-190, Zn-0.59, S-4.93,  
As-0.88, Fe-69.40

Variety/Seeding Rate: LMNT, KATY, MARS, MERC, RICO, V4716,  
V7817, 2201, 2207, 2214, 1121, 3072,  
150 lb/A

Planting Method/Date: Water-seeded, Mar 30

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; N source, ammonium  
sulfate; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>).

Emergence Date: MARS, 1121, MERC, Apr 4; 2207, KATY, Apr 5;  
2214, Apr 7; RICO, Apr 8; 2201, LMNT, V4716,  
3072, Apr 9; V7817, Apr 11

Water Management: Flooded, Mar 28; drained, Apr 2; reflooded,  
Apr 5; drained, Apr 21; reflooded, Apr 24;  
harvest drainage, Aug 6; second crop flooded,  
Aug 10; harvest drainage, Oct 18

Herbicides: 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), Apr 23; 0.9 oz ai/A Londax (bensulfuron-  
methyl), May 1; 0.6 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 17

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Aug 6; second crop, Oct 29

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Mars, Merc, Katy, 2207, 2214, and 1121 displayed very  
good seedling vigor, while vigor of other entries was fair  
to poor. Lodging was severe for MARS and RICO at high  
rates of N (Table 3). Sheath blight was severe in the  
semidwarf long-grain entries and probably reduced grain  
yields in both the main and second crops (Table 4).



Table 3. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines.  
Rice Research Station, Crowley, LA. 1990.

| Variety     | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                    |     |      |      |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|--------------------|-----|------|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*    |     |      |      | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                 | 90  | 120  | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |     |      |     |      | ----- (lb/A) ----- |     |      |      |                             |      |      |      |      |
| Lemont      | 75                  | 76 | 79   | 78  | 77   | 70           | 76  | 79   | 81  | 77   | 0/0                | 0/0 | 0/0  | 0/0  | 7721                        | 7969 | 7939 | 7557 | 7796 |
| Katy        | 77                  | 79 | 80   | 81  | 79   | 89           | 96  | 103  | 105 | 98   | 0/0                | 0/0 | 0/0  | 0/0  | 6761                        | 7454 | 7553 | 7383 | 7288 |
| Mars        | 81                  | 82 | 83   | 83  | 82   | 93           | 103 | 107  | 110 | 103  | 0/0                | 0/0 | 2/1  | 22/3 | 7664                        | 8652 | 8398 | 7818 | 8133 |
| Mercury     | 79                  | 80 | 80   | 80  | 80   | 75           | 78  | 84   | 86  | 81   | 0/0                | 0/0 | 0/0  | 0/0  | 8104                        | 8547 | 8879 | 9074 | 8651 |
| Rico I      | 77                  | 79 | 80   | 81  | 79   | 88           | 95  | 99   | 98  | 95   | 0/0                | 0/0 | 15/1 | 77/4 | 8514                        | 8896 | 8523 | 7381 | 8329 |
| V4716       | 76                  | 77 | 77   | 77  | 77   | 74           | 78  | 81   | 85  | 80   | 0/0                | 0/0 | 0/0  | 0/0  | 7148                        | 8104 | 8326 | 8444 | 8005 |
| V7817       | 84                  | 84 | 84   | 85  | 84   | 78           | 80  | 81   | 83  | 81   | 0/0                | 0/0 | 0/0  | 0/0  | 7048                        | 7318 | 7305 | 7256 | 7232 |
| 2201        | 73                  | 74 | 75   | 75  | 74   | 72           | 76  | 80   | 81  | 77   | 0/0                | 0/0 | 0/0  | 0/0  | 7046                        | 7769 | 8064 | 7830 | 7677 |
| 2207        | 78                  | 79 | 79   | 80  | 79   | 70           | 76  | 78   | 82  | 76   | 0/0                | 0/0 | 0/0  | 0/0  | 7695                        | 8037 | 7882 | 7700 | 7829 |
| 2214        | 78                  | 78 | 79   | 80  | 79   | 74           | 78  | 80   | 83  | 79   | 0/0                | 0/0 | 0/0  | 20/1 | 8421                        | 9339 | 9456 | 9294 | 9127 |
| 1121        | 81                  | 82 | 82   | 82  | 82   | 85           | 91  | 98   | 100 | 94   | 0/0                | 0/0 | 0/0  | 0/0  | 7908                        | 8282 | 8559 | 8319 | 8267 |
| 3072        | 74                  | 75 | 75   | 75  | 75   | 71           | 78  | 82   | 82  | 78   | 0/0                | 0/0 | 0/0  | 0/0  | 7817                        | 8138 | 7754 | 7875 | 7896 |
| Mean        | 78                  | 79 | 80   | 80  |      | 78           | 84  | 88   | 90  |      |                    |     |      |      | 7654                        | 8209 | 8220 | 7994 |      |
| C.V., %     |                     |    | 0.79 |     |      |              |     | 2.56 |     |      |                    |     |      |      |                             |      | 4.37 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                    |     |      |      |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |     | 3    |     |      |                    |     |      |      |                             |      | 387  |      |      |
| Variety     |                     |    | 1    |     |      |              |     | 2    |     |      |                    |     |      |      |                             |      | 324  |      |      |
| V within N  |                     |    | 1    |     |      |              |     | 4    |     |      |                    |     |      |      |                             |      | 648  |      |      |
| V across N  |                     |    | 1    |     |      |              |     | 5    |     |      |                    |     |      |      |                             |      | 728  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.



Table 4. Effect of N rate in main crop on grain yields of water-seeded early rice varieties and advanced experimental lines.  
Rice Research Station, Crowley, LA. 1990.

| Variety           | Main crop<br>grain yield at 12% moisture |      |      |      |      | Second crop<br>grain yield at 12% moisture |      |       |      |      | Total<br>grain yield at 12% moisture |       |       |       |       |
|-------------------|------------------------------------------|------|------|------|------|--------------------------------------------|------|-------|------|------|--------------------------------------|-------|-------|-------|-------|
|                   | 60                                       | 90   | 120  | 150  | Mean | 60                                         | 90   | 120   | 150  | Mean | 60                                   | 90    | 120   | 150   | Mean  |
| ------(lb/A)----- |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |       |       |
| Lemont            | 7721                                     | 7969 | 7939 | 7557 | 7796 | 2079                                       | 1770 | 943   | 967  | 1440 | 9800                                 | 9738  | 8882  | 8524  | 9236  |
| Katy              | 6761                                     | 7454 | 7553 | 7383 | 7288 | 2308                                       | 2105 | 1670  | 1794 | 1969 | 9069                                 | 9358  | 9222  | 9177  | 9257  |
| Mars              | 7664                                     | 8652 | 8398 | 7818 | 8133 | 2522                                       | 2646 | 1878  | 1810 | 2214 | 10186                                | 11298 | 10276 | 9629  | 10347 |
| Mercury           | 8104                                     | 8547 | 8879 | 9074 | 8651 | 2434                                       | 2341 | 1931  | 2179 | 2221 | 10539                                | 10888 | 10809 | 11253 | 10872 |
| Rico 1            | 8514                                     | 8896 | 8523 | 7381 | 8329 | 1899                                       | 1235 | 634   | 673  | 1110 | 10413                                | 10132 | 9157  | 8055  | 9439  |
| V4716             | 7148                                     | 8104 | 8326 | 8444 | 8005 | 2263                                       | 2104 | 1720  | 1731 | 1954 | 9410                                 | 10208 | 10046 | 10175 | 9960  |
| V7817             | 7048                                     | 7318 | 7305 | 7256 | 7232 | 1454                                       | 1170 | 817   | 913  | 1088 | 8502                                 | 8487  | 8122  | 8169  | 8320  |
| 2201              | 7046                                     | 7769 | 8064 | 7830 | 7677 | 2524                                       | 2406 | 1520  | 920  | 1842 | 9571                                 | 10175 | 9583  | 8749  | 9520  |
| 2207              | 7695                                     | 8037 | 7882 | 7700 | 7829 | 2707                                       | 2652 | 1852  | 1784 | 2249 | 10402                                | 10689 | 9734  | 9484  | 10077 |
| 2214              | 8421                                     | 9339 | 9456 | 9294 | 9127 | 1599                                       | 1268 | 1067  | 1080 | 1254 | 10019                                | 10607 | 10523 | 10374 | 10381 |
| 1121              | 7908                                     | 8282 | 8559 | 8319 | 8267 | 2576                                       | 2355 | 2131  | 2055 | 2279 | 10484                                | 10637 | 10690 | 10374 | 10546 |
| 3072              | 7817                                     | 8138 | 7754 | 7875 | 7896 | 2900                                       | 2286 | 1536  | 1267 | 1997 | 10717                                | 10424 | 9290  | 9142  | 9893  |
| N                 |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |       |       |
| Mean              | 7654                                     | 8209 | 8220 | 7994 |      | 2273                                       | 2028 | 1475  | 1431 |      | 9926                                 | 10237 | 9695  | 9425  |       |
| C.V., %           |                                          |      | 4.37 |      |      |                                            |      | 17.95 |      |      |                                      |       | 5.44  |       |       |
| LSD (0.01):       |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |       |       |
| Nitrogen          |                                          |      | 387  |      |      |                                            |      | 675   |      |      |                                      |       | ns    |       |       |
| Variety           |                                          |      | 324  |      |      |                                            |      | 299   |      |      |                                      |       | 493   |       |       |
| V within N        |                                          |      | 648  |      |      |                                            |      | 599   |      |      |                                      |       | 988   |       |       |
| V across N        |                                          |      | 728  |      |      |                                            |      | 881   |      |      |                                      |       | 1305  |       |       |

Experiment: Aromatic variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.2; O.M.: 1.08%;  
extractable nutrients (mg/kg): P-56, Na-56,  
K-61, Ca-1165, Mg-202, Zn-0.94, S-5.70,  
As-0.05, Fe-80.66

Variety/Seeding Rate: LMNT, JSMN, DLLA, 2215, 3049, 150 lb/A

Planting Method/Date: Water-seeded, Mar 29

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; N source, ammonium  
sulfate

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: 2215, 3049, LMNT, Apr 6; DLLA, Apr 7; JSMN,  
Apr 10

Water Management: Flooded, Mar 28; drained, Apr 2; reflooded,  
Apr 5; drained, Apr 21; reflooded, Apr 24;  
harvest drainage, Aug 6

Herbicides: 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), Apr 23; 0.9 oz ai/A Londax (bensulfuron-  
methyl), May 1; 0.6 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 17

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Aug 6

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Seedling vigor was fair to poor. Lodging was severe  
for DLLA, especially at rates of N above 60 lb/A (Table 5).  
Sheath blight was severe in the semidwarf long-grain  
entries.

Table 5. Effect of N rate on agronomic performance of water-seeded aromatic rice varieties and advanced experimental lines.  
Rice Research Station, Crowley, LA. 1990.

|             | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                   |      |      |      |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|-------------------|------|------|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*   |      |      |      | Grain yield at 12% moisture |      |      |      |      |
| Variety     | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                | 90   | 120  | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ------(cm)-----     |    |      |     |      |              |     |      |     |      | ------(lb/A)----- |      |      |      |                             |      |      |      |      |
| Lemont      | 78                  | 79 | 82   | 83  | 81   | 69           | 76  | 78   | 79  | 76   | 0/0               | 0/0  | 0/0  | 0/0  | 7569                        | 8043 | 7702 | 6849 | 7541 |
| Jasmine 85  | 89                  | 90 | 90   | 92  | 90   | 95           | 99  | 100  | 104 | 100  | 0/0               | 0/0  | 2/1  | 17/2 | 8937                        | 9519 | 8892 | 8925 | 9068 |
| Della       | 83                  | 84 | 85   | 86  | 85   | 112          | 117 | 120  | 118 | 117  | 17/2              | 75/3 | 60/5 | 78/5 | 6154                        | 6168 | 3752 | 3476 | 4888 |
| 3049        | 77                  | 77 | 78   | 78  | 78   | 69           | 75  | 78   | 80  | 76   | 0/0               | 0/0  | 0/0  | 2/1  | 7028                        | 7643 | 7440 | 6953 | 7266 |
| 2215        | 74                  | 74 | 77   | 77  | 76   | 72           | 77  | 80   | 83  | 78   | 0/0               | 0/0  | 0/0  | 0/0  | 6463                        | 7130 | 6853 | 6847 | 6823 |
| N           |                     |    |      |     |      |              |     |      |     |      |                   |      |      |      |                             |      |      |      |      |
| Mean        | 80                  | 81 | 83   | 83  |      | 84           | 89  | 91   | 93  |      |                   |      |      |      | 7230                        | 7701 | 6928 | 6610 |      |
| C.V., %     |                     |    | 1.15 |     |      |              |     | 3.29 |     |      |                   |      |      |      |                             |      | 3.90 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                   |      |      |      |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |     | 2    |     |      |                   |      |      |      |                             |      | 394  |      |      |
| Variety     |                     |    | 1    |     |      |              |     | 3    |     |      |                   |      |      |      |                             |      | 263  |      |      |
| V within N  |                     |    | 2    |     |      |              |     | 6    |     |      |                   |      |      |      |                             |      | 527  |      |      |
| V across N  |                     |    | 2    |     |      |              |     | 5    |     |      |                   |      |      |      |                             |      | 612  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Very early variety x nitrogen trial

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.9; O.M.: 2.18%;  
extractable nutrients (mg/kg): P-148, Na-75,  
K-510, Ca-6141, Mg-1474, Zn-3.21, S-5.27,  
As-5.23, Fe-97.85

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, 3006,  
100 lb/A

Planting Method/Date: Drill-seeded, May 1

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: ALAN, May 13; MILL, May 14; MBLE, May 15; TXMT,  
May 16; TBNT, 3006, May 17

Water Management: Flushed, May 5, May 26, June 9; flooded, June  
14; harvest drainage, Aug 31

Herbicides: 5.0 lb ai/A Stam (propanil), May 23; 3.0 lb ai/A  
Ordram (molinate), June 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 22;  
0.25 lb ai/A Methyl (methyl parathion), Aug 17

Fungicides: 0.5 lb ai/A Benlate (benomyl), Aug 18

Harvest: Sep 27

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Emergence and stand establishment were slow. Lodging  
was severe for TBNT at high rates of N (Table 6). A N  
rate of 90 to 150 lb/A resulted in optimum grain yields.  
Grain yields were reduced for MBLE and TXMT due to bird  
depredation.

Table 6. Effect of N rate on agronomic performance of drill-seeded very early rice varieties and advanced experimental lines.  
 Buford Perry Farm, East Carroll Parish, LA. 1990.

|             | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |       |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|--------------------|------|------|------|-----------------------------|------|-------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*    |      |      |      | Grain yield at 12% moisture |      |       |      |      |
| Variety     | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                 | 90   | 120  | 150  | 60                          | 90   | 120   | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |     |      |     |      | ----- (lb/A) ----- |      |      |      |                             |      |       |      |      |
| Tebonnet    | 81                  | 84 | 85   | 86  | 84   | 113          | 116 | 120  | 123 | 118  | 0/0                | 12/2 | 22/4 | 55/5 | 5850                        | 4677 | 5736  | 6189 | 5613 |
| Maybelle    | 73                  | 75 | 74   | 76  | 75   | 77           | 82  | 84   | 88  | 83   | 0/0                | 0/0  | 0/0  | 0/0  | 2340                        | 2638 | 1905  | 4033 | 2729 |
| Texmont     | 76                  | 77 | 77   | 79  | 77   | 72           | 75  | 76   | 78  | 75   | 0/0                | 0/0  | 0/0  | 0/0  | 4300                        | 5293 | 4179  | 4654 | 4607 |
| Alan        | 76                  | 77 | 78   | 79  | 77   | 86           | 89  | 95   | 95  | 92   | 0/0                | 0/0  | 7/2  | 20/4 | 4959                        | 5030 | 6152  | 6297 | 5609 |
| Millie      | 80                  | 82 | 83   | 85  | 83   | 90           | 95  | 98   | 103 | 97   | 0/0                | 0/0  | 0/0  | 10/1 | 5229                        | 5435 | 5836  | 6146 | 5661 |
| 3006        | 76                  | 78 | 79   | 81  | 78   | 72           | 79  | 78   | 84  | 78   | 0/0                | 0/0  | 0/0  | 0/0  | 5777                        | 6304 | 6965  | 7289 | 6584 |
| N           |                     |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |       |      |      |
| Mean        | 77                  | 79 | 79   | 81  |      | 85           | 89  | 92   | 95  |      |                    |      |      |      | 4743                        | 4896 | 5129  | 5768 |      |
| C.V., %     |                     |    | 1.31 |     |      |              |     | 5.15 |     |      |                    |      |      |      |                             |      | 20.72 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |       |      |      |
| Nitrogen    |                     |    | 3    |     |      |              |     | 5    |     |      |                    |      |      |      |                             |      |       | ns   |      |
| Variety     |                     |    | 1    |     |      |              |     | 4    |     |      |                    |      |      |      |                             |      |       | 1000 |      |
| V within N  |                     |    | 2    |     |      |              |     | 9    |     |      |                    |      |      |      |                             |      |       | 2001 |      |
| V across N  |                     |    | 3    |     |      |              |     | 9    |     |      |                    |      |      |      |                             |      |       | 2858 |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Early variety x nitrogen trial

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.7; O.M.: 2.35%;  
extractable nutrients (mg/kg): P-151, Na-78,  
K-512, Ca-6328, Mg-1562, Zn-3.38, S-5.22,  
As-6.04, Fe-111.30

Variety/Seeding Rate: LMNT, KATY, MARS, MERC, RICO, V4716,  
V7817, 2201, 2207, 2214, 1121, 3072,  
100 lb/A

Planting Method/Date: Drill-seeded, May 1

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: 2207, May 14; KATY, MARS, V4716, 2214, 1121,  
May 15; LMNT, MERC, 2201, RICO, 3072, May 16;  
V7817, May 17

Water Management: Flushed, May 5, May 26, June 9; flooded, June  
14; harvest drainage, Aug 31

Herbicides: 5.0 lb ai/A Stam (propanil), May 23; 3.0 lb ai/A  
Ordram (molinate), June 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 22;  
0.25 lb ai/A Methyl (methyl parathion), Aug 17

Fungicides: 0.5 lb ai/A Benlate (benomyl), Aug 18

Harvest: Sep 27

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Emergence was slow for all entries. Stands in general  
were somewhat thin until after establishing the permanent  
flood. MARS, RICO, and 1121 lodged severely above 90 lb  
N/A (Table 7). A N rate of 90 to 150 lb/A resulted in  
optimum grain yields for all entries.

Table 7. Effect of N rate on agronomic performance of drill-seeded early rice varieties and advanced experimental lines.  
Buford Perry Farm, East Carroll Parish, LA. 1990.

| Variety     | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|--------------------|------|------|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*    |      |      |      | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                 | 90   | 120  | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |     |      |     |      | ----- (lb/A) ----- |      |      |      |                             |      |      |      |      |
| Lemont      | 87                  | 89 | 88   | 92  | 89   | 70           | 74  | 77   | 78  | 75   | 0/0                | 0/0  | 0/0  | 0/0  | 7043                        | 7371 | 7849 | 7828 | 7523 |
| Katy        | 86                  | 87 | 90   | 93  | 89   | 94           | 100 | 107  | 108 | 102  | 0/0                | 0/0  | 0/0  | 2/1  | 6426                        | 7475 | 7162 | 7036 | 7025 |
| Mars        | 81                  | 81 | 83   | 86  | 83   | 99           | 101 | 105  | 105 | 103  | 2/1                | 20/3 | 90/5 | 87/5 | 6882                        | 7531 | 6736 | 6254 | 6851 |
| Mercury     | 77                  | 78 | 80   | 82  | 79   | 82           | 90  | 88   | 88  | 87   | 0/0                | 2/1  | 20/3 | 47/4 | 6338                        | 7154 | 7381 | 7647 | 7130 |
| Rico 1      | 82                  | 83 | 84   | 89  | 84   | 86           | 95  | 96   | 100 | 94   | 0/0                | 0/0  | 32/4 | 65/4 | 8479                        | 9678 | 9382 | 8489 | 9007 |
| V4716       | 81                  | 81 | 83   | 84  | 82   | 74           | 78  | 77   | 86  | 79   | 0/0                | 0/0  | 0/0  | 0/0  | 5786                        | 6822 | 7140 | 7771 | 6880 |
| V7817       | 90                  | 90 | 91   | 92  | 91   | 69           | 73  | 74   | 76  | 73   | 0/0                | 0/0  | 0/0  | 0/0  | 5939                        | 6745 | 6780 | 6897 | 6590 |
| 2201        | 84                  | 88 | 89   | 91  | 88   | 72           | 76  | 77   | 83  | 77   | 0/0                | 0/0  | 0/0  | 0/0  | 7093                        | 7490 | 7607 | 8070 | 7565 |
| 2207        | 89                  | 93 | 93   | 95  | 93   | 79           | 86  | 84   | 92  | 85   | 0/0                | 0/0  | 0/0  | 0/0  | 6984                        | 7840 | 7996 | 8124 | 7736 |
| 2214        | 79                  | 80 | 81   | 83  | 81   | 77           | 83  | 85   | 87  | 83   | 0/0                | 0/0  | 0/0  | 17/3 | 7476                        | 8897 | 9346 | 8959 | 8669 |
| 1121        | 78                  | 80 | 81   | 84  | 81   | 86           | 98  | 100  | 100 | 96   | 0/0                | 5/1  | 45/3 | 80/5 | 6625                        | 7224 | 7153 | 6332 | 6834 |
| 3072        | 82                  | 84 | 86   | 88  | 85   | 72           | 77  | 81   | 84  | 79   | 0/0                | 0/0  | 0/0  | 0/0  | 6925                        | 8205 | 8337 | 8761 | 8057 |
| N           |                     |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |      |      |      |
| Mean        | 83                  | 85 | 86   | 88  |      | 80           | 86  | 88   | 91  |      |                    |      |      |      | 6833                        | 7703 | 7739 | 7681 |      |
| C.V., %     |                     |    | 1.69 |     |      |              |     | 3.38 |     |      |                    |      |      |      |                             |      | 5.37 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                    |      |      |      |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |     | 3    |     |      |                    |      |      |      |                             |      | 365  |      |      |
| Variety     |                     |    | 1    |     |      |              |     | 3    |     |      |                    |      |      |      |                             |      | 371  |      |      |
| V within N  |                     |    | 3    |     |      |              |     | 5    |     |      |                    |      |      |      |                             |      | 744  |      |      |
| V across N  |                     |    | 3    |     |      |              |     | 6    |     |      |                    |      |      |      |                             |      | 798  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Very early variety x nitrogen trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 6.4; O.M.: 1.14%;  
extractable nutrients (mg/kg): P-43, Na-34,  
K-52, Ca-846, Mg-224, Zn-2.18, S-12.14,  
As-0.00, Fe-58.92

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, 150 lb/A

Planting Method/Date: Water-seeded, Apr 19

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; N source, ammonium  
sulfate; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: ALAN, Apr 21; MBLE, TXMT, MILL, Apr 22; TBNT,  
Apr 24

Water Management: Flooded, Apr 18; drained, Apr 21; reflooded,  
Apr 24; harvest drainage, July 18; second crop  
flooded, Aug 11; harvest drainage, Oct 8

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl) + 3.0 lb  
ai/A Ordram (molinate), May 12

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 25

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 19; 0.5 lb  
ai/A Benlate (benomyl), July 11

Harvest: Aug 2; second crop, Oct 22

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Seedling vigor was very good for most entries. A N  
rate of 90 to 120 lb/A was required for optimum grain  
yields (Table 8). All entries produced excellent second  
crop grain yields (Table 9).



Table 8. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines.  
Errol Lounsberry Farm, Vermilion Parish, LA. 1990.

|             | N rate (lb/A)       |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|-----|------|-----|------|--------------------|-----|-----|-----|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |     |      |     |      | % Lodging/type*    |     |     |     | Grain yield at 12% moisture |      |      |      |      |
| Variety     | 60                  | 90 | 120  | 150 | Mean | 60           | 90  | 120  | 150 | Mean | 60                 | 90  | 120 | 150 | 60                          | 90   | 120  | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |     |      |     |      | ----- (lb/A) ----- |     |     |     |                             |      |      |      |      |
| Tebonnet    | 67                  | 68 | 71   | 72  | 70   | 105          | 114 | 126  | 131 | 119  | 0/0                | 0/0 | 0/0 | 0/0 | 6715                        | 7347 | 7238 | 7147 | 7112 |
| Maybelle    | 57                  | 57 | 58   | 60  | 58   | 73           | 80  | 89   | 95  | 84   | 0/0                | 0/0 | 0/0 | 0/0 | 5787                        | 6395 | 7041 | 6927 | 6537 |
| Texmont     | 63                  | 63 | 66   | 65  | 64   | 67           | 72  | 80   | 82  | 76   | 0/0                | 0/0 | 0/0 | 0/0 | 6122                        | 7153 | 7435 | 7602 | 7078 |
| Alan        | 61                  | 62 | 65   | 65  | 63   | 74           | 77  | 90   | 98  | 85   | 0/0                | 0/0 | 0/0 | 0/0 | 5929                        | 6754 | 7030 | 6968 | 6670 |
| Millie      | 62                  | 63 | 66   | 67  | 65   | 78           | 84  | 97   | 101 | 90   | 0/0                | 0/0 | 0/0 | 0/0 | 5168                        | 6275 | 6397 | 6616 | 6114 |
| N           |                     |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
| Mean        | 62                  | 63 | 65   | 66  |      | 80           | 85  | 97   | 102 |      |                    |     |     |     | 5944                        | 6785 | 7028 | 7052 |      |
| C.V., %     |                     |    | 1.79 |     |      |              |     | 2.80 |     |      |                    |     |     |     |                             |      | 5.32 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |     |      |     |      |                    |     |     |     |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |     | 6    |     |      |                    |     |     |     |                             |      | 417  |      |      |
| Variety     |                     |    | 1    |     |      |              |     | 2    |     |      |                    |     |     |     |                             |      | 338  |      |      |
| V within N  |                     |    | 2    |     |      |              |     | 5    |     |      |                    |     |     |     |                             |      | 676  |      |      |
| V across N  |                     |    | 2    |     |      |              |     | 8    |     |      |                    |     |     |     |                             |      | 732  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 9. Effect of N rate in main crop on grain yields of water-seeded very early rice varieties and advanced experimental lines.  
Errol Lounsberry Farm, Vermilion Parish, LA. 1990.

| Variety            | Main crop<br>grain yield at 12% moisture |      |      |      |      | Second crop<br>grain yield at 12% moisture |      |      |      |      | Total<br>grain yield at 12% moisture |       |       |       |       |
|--------------------|------------------------------------------|------|------|------|------|--------------------------------------------|------|------|------|------|--------------------------------------|-------|-------|-------|-------|
|                    | 60                                       | 90   | 120  | 150  | Mean | 60                                         | 90   | 120  | 150  | Mean | 60                                   | 90    | 120   | 150   | Mean  |
| ----- (lb/A) ----- |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Tebonnet           | 6715                                     | 7347 | 7238 | 7147 | 7112 | 2699                                       | 2725 | 2430 | 2164 | 2505 | 9414                                 | 10073 | 9668  | 9311  | 9616  |
| Maybelle           | 5787                                     | 6395 | 7041 | 6927 | 6537 | 3415                                       | 3484 | 3545 | 3372 | 3454 | 9202                                 | 9879  | 10586 | 10299 | 9992  |
| Texmont            | 6122                                     | 7153 | 7435 | 7602 | 7078 | 3063                                       | 3191 | 2949 | 3064 | 3067 | 9186                                 | 10345 | 10384 | 10666 | 10145 |
| Alan               | 5929                                     | 6754 | 7030 | 6968 | 6670 | 3373                                       | 3475 | 3228 | 3121 | 3299 | 9302                                 | 10229 | 10257 | 10089 | 9969  |
| Millie             | 5168                                     | 6275 | 6397 | 6616 | 6114 | 2796                                       | 2938 | 3091 | 2933 | 2940 | 7964                                 | 9213  | 9489  | 9549  | 9054  |
| N                  |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Mean               | 5944                                     | 6785 | 7028 | 7052 |      | 3069                                       | 3163 | 3049 | 2931 |      | 9014                                 | 9948  | 10077 | 9983  |       |
| C.V., %            |                                          |      | 5.32 |      |      |                                            |      | 7.23 |      |      |                                      |       | 4.55  |       |       |
| LSD (0.01):        |                                          |      |      |      |      |                                            |      |      |      |      |                                      |       |       |       |       |
| Nitrogen           |                                          |      | 417  |      |      |                                            |      | 221  |      |      |                                      |       | 410   |       |       |
| Variety            |                                          |      | 338  |      |      |                                            |      | 209  |      |      |                                      |       | 421   |       |       |
| V within N         |                                          |      | 676  |      |      |                                            |      | 419  |      |      |                                      |       | 843   |       |       |
| V across N         |                                          |      | 732  |      |      |                                            |      | 434  |      |      |                                      |       | 855   |       |       |

**Experiment:** Early variety x nitrogen trial

**Location:** Vermilion Parish, Errol Lounsberry Farm

**Soil Type/Analysis:** Crowley silt loam; pH: 6.1; O.M.: 1.08%;  
extractable nutrients (mg/kg): P-39, Na-41,  
K-60, Ca-829, Mg-220, Zn-2.16, S-13.60  
As-0.00, Fe-63.46

**Variety/Seeding Rate:** LMNT, KATY, MARS, MERC, RICO, V4716,  
V7817, 2201, 2207, 2214, 150 lb/A

**Planting Method/Date:** Water-seeded, Apr 19

**Fertilization:** 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; n source, ammonium  
sulfate; second crop, 75 lb N/A

**Plot Size:** 7 x 25 ft (175 ft<sup>2</sup>)

**Emergence Date:** 2207, MERC, Apr 21; MARS, KATY, RICO, V4716,  
2201, 2214, Apr 22; V7817, LMNT, Apr 23

**Water Management:** Flooded, Apr 18; drained, Apr 21; reflooded,  
Apr 24; harvest drainage, July 27; second crop  
flooded, Aug 11; harvest drainage, Oct 8

**Herbicides:** 0.9 oz ai/A Londax (bensulfuron-methyl) + 3.0 lb  
ai/A Ordram (molinate), May 12

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), May 25

**Fungicides:** 0.28 lb ai/A Tilt (propiconazol), June 19; 0.5 lb  
ai/A Benlate (benomyl), July 11

**Harvest:** Aug 8; second crop, Oct 23

**Experimental Design:** Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

**Comments:** Seedling vigor was very good for most entries. A N  
rate of 90 to 120 lb/A was required for optimum grain  
yields (Table 10). With the exception of LMNT, second crop  
grain yields were very good (Table 11).

Table 10. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines.  
Errol Lounsberry Farm, Vermilion Parish, LA. 1990.

| Variety     | N rate (lb/A)       |    |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|----|------|-----|------|-------------------|-----|-----|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |    |      |     |      | % Lodging/type*   |     |     |      | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90 | 120  | 150 | Mean | 60           | 90 | 120  | 150 | Mean | 60                | 90  | 120 | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ------(cm)-----     |    |      |     |      |              |    |      |     |      | ------(lb/A)----- |     |     |      |                             |      |      |      |      |
| Lemont      | 73                  | 74 | 75   | 76  | 75   | 73           | 79 | 75   | 79  | 76   | 0/0               | 0/0 | 0/0 | 0/0  | 6481                        | 7364 | 7249 | 6774 | 6967 |
| Katy        | 69                  | 71 | 73   | 75  | 72   | 90           | 97 | 96   | 104 | 97   | 0/0               | 0/0 | 0/0 | 0/0  | 5325                        | 6246 | 6132 | 5355 | 5765 |
| Mars        | 74                  | 74 | 75   | 76  | 75   | 92           | 97 | 94   | 106 | 97   | 0/0               | 0/0 | 0/0 | 0/0  | 6084                        | 7145 | 6938 | 6987 | 6789 |
| Mercury     | 73                  | 74 | 74   | 75  | 74   | 79           | 84 | 82   | 85  | 83   | 0/0               | 0/0 | 0/0 | 0/0  | 5789                        | 6702 | 6938 | 6838 | 6567 |
| Rico 1      | 76                  | 76 | 77   | 77  | 77   | 82           | 92 | 97   | 100 | 93   | 0/0               | 0/0 | 0/0 | 35/1 | 7039                        | 8146 | 8235 | 7767 | 7797 |
| V4716       | 74                  | 74 | 74   | 75  | 74   | 77           | 84 | 79   | 88  | 82   | 0/0               | 0/0 | 0/0 | 0/0  | 5475                        | 6356 | 6359 | 6632 | 6206 |
| V7817       | 83                  | 82 | 82   | 82  | 82   | 74           | 78 | 75   | 77  | 76   | 0/0               | 0/0 | 0/0 | 0/0  | 4793                        | 5699 | 5471 | 5572 | 5384 |
| 2201        | 70                  | 72 | 73   | 74  | 72   | 75           | 80 | 78   | 82  | 79   | 0/0               | 0/0 | 0/0 | 0/0  | 6616                        | 7510 | 8097 | 7898 | 7530 |
| 2207        | 71                  | 71 | 73   | 74  | 72   | 76           | 82 | 79   | 81  | 79   | 0/0               | 0/0 | 0/0 | 0/0  | 6173                        | 6978 | 7266 | 7047 | 6866 |
| 2214        | 74                  | 75 | 76   | 76  | 75   | 74           | 81 | 79   | 82  | 79   | 0/0               | 0/0 | 0/0 | 0/0  | 6464                        | 7064 | 7483 | 6710 | 6930 |
| N           |                     |    |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
| Mean        | 74                  | 74 | 75   | 76  |      | 79           | 86 | 84   | 88  |      |                   |     |     |      | 6024                        | 6921 | 7017 | 6758 |      |
| C.V., %     |                     |    | 1.18 |     |      |              |    | 3.26 |     |      |                   |     |     |      |                             |      | 4.53 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
| Nitrogen    |                     |    | 1    |     |      |              |    | 3    |     |      |                   |     |     |      |                             |      | 388  |      |      |
| Variety     |                     |    | 1    |     |      |              |    | 2    |     |      |                   |     |     |      |                             |      | 281  |      |      |
| V within N  |                     |    | 2    |     |      |              |    | 5    |     |      |                   |     |     |      |                             |      | 562  |      |      |
| V across N  |                     |    | 2    |     |      |              |    | 6    |     |      |                   |     |     |      |                             |      | 656  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 11. Effect of N rate in main crop on grain yields of water-seeded early rice varieties and advanced experimental lines.  
Errol Lounsberry Farm, Vermilion Parish, LA. 1990.

| Variety           | Main crop<br>grain yield at 12% moisture |      |      |      |      | Second crop<br>grain yield at 12% moisture |      |       |      |      | Total<br>grain yield at 12% moisture |       |       |      |       |
|-------------------|------------------------------------------|------|------|------|------|--------------------------------------------|------|-------|------|------|--------------------------------------|-------|-------|------|-------|
|                   | 60                                       | 90   | 120  | 150  | Mean | 60                                         | 90   | 120   | 150  | Mean | 60                                   | 90    | 120   | 150  | Mean  |
| ------(lb/A)----- |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |      |       |
| Lemont            | 6481                                     | 7364 | 7249 | 6774 | 6967 | 1844                                       | 1234 | 1291  | 1287 | 1414 | 8325                                 | 8598  | 8540  | 8061 | 8381  |
| Katy              | 5325                                     | 6246 | 6132 | 5355 | 5765 | 2081                                       | 1731 | 1931  | 1482 | 1806 | 7406                                 | 7978  | 8063  | 6837 | 7571  |
| Mars              | 6084                                     | 7145 | 6938 | 6986 | 6789 | 3180                                       | 3159 | 2795  | 2627 | 2940 | 9264                                 | 10304 | 9734  | 9613 | 9729  |
| Mercury           | 5789                                     | 6702 | 6938 | 6838 | 6567 | 2875                                       | 2826 | 2963  | 3075 | 2935 | 8664                                 | 9528  | 9901  | 9913 | 9502  |
| Rico 1            | 7039                                     | 8146 | 8235 | 7767 | 7797 | 2726                                       | 2305 | 2069  | 2072 | 2293 | 9764                                 | 10451 | 10304 | 9838 | 10089 |
| V4717             | 5475                                     | 6356 | 6359 | 6632 | 6206 | 2348                                       | 2162 | 2239  | 2140 | 2222 | 7823                                 | 8518  | 8599  | 8772 | 8428  |
| V7817             | 4793                                     | 5699 | 5471 | 5572 | 5384 | 2307                                       | 1891 | 1830  | 1772 | 1950 | 7100                                 | 7589  | 7300  | 7344 | 7333  |
| 2201              | 6616                                     | 7510 | 8097 | 7898 | 7530 | 2645                                       | 2009 | 2017  | 1415 | 2021 | 9261                                 | 9519  | 10114 | 9314 | 9552  |
| 2207              | 6173                                     | 6978 | 7266 | 7047 | 6866 | 2488                                       | 2370 | 2739  | 2513 | 2528 | 8661                                 | 9348  | 10006 | 9560 | 9394  |
| 2214              | 6464                                     | 7064 | 7483 | 6710 | 6930 | 3277                                       | 3063 | 3336  | 3064 | 3185 | 9740                                 | 10127 | 10819 | 9774 | 10115 |
| N                 |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |      |       |
| Mean              | 6024                                     | 6921 | 7017 | 6758 |      | 2577                                       | 2275 | 2321  | 2145 |      | 8601                                 | 9196  | 9338  | 8903 |       |
| C.V., %           |                                          |      | 4.53 |      |      |                                            |      | 13.21 |      |      |                                      |       | 4.94  |      |       |
| LSD (0.01):       |                                          |      |      |      |      |                                            |      |       |      |      |                                      |       |       |      |       |
| Nitrogen          |                                          |      | 388  |      |      |                                            |      | ns    |      |      |                                      |       | 587   |      |       |
| Variety           |                                          |      | 281  |      |      |                                            |      | 285   |      |      |                                      |       | 413   |      |       |
| V within N        |                                          |      | 562  |      |      |                                            |      | 571   |      |      |                                      |       | 827   |      |       |
| V across N        |                                          |      | 656  |      |      |                                            |      | 692   |      |      |                                      |       | 975   |      |       |

Experiment: Early variety x nitrogen trial

Location: Rapides Parish, Will Bollich Farm

Soil Type/Analysis: Moreland silty clay; pH: 6.8; O.M.: 2.61%;  
extractable nutrients (mg/kg): P-193, Na-29,  
K-288, Ca-3525, Mg-966, Zn-2.27, S-7.78,  
As-4.51, Fe-103.50

Variety/Seeding Rate: LMNT, KATY, MARS, MERC, RICO, V4716,  
V7817, 2201, 2207, 2214, 150 lb/A

Planting Method/Date: Water-seeded, Apr 27

Fertilization: N source, ammonium sulfate

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: MARS, MERC, 2207, Apr 29; 2214, KATY, V4716,  
Apr 30; RICO, LMNT, 2201, V7817, May 1

Water Management: Flooded, Apr 26; drained, Apr 29; flooded,  
May 1; harvest drainage, Aug 7

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), May 18;  
4.0 lb ai/A Ordram (molinate), June 2

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 2

Fungicides: 0.28 lb ai/A Tilt (propiconazole), June 25; 0.5 lb  
ai/A Benlate (benomyl), July 25

Harvest: Aug 22

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Stand establishment and early season growth was very  
good; however, the time required to reach days to 50%  
heading was much longer than normal (Table 12). Severe  
sheath blight appeared to have a significant influence on  
grain yields.

Table 12. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines.  
Will Bollich Farm, Rapides Parish, LA. 1990.

| Variety     | N rate (lb/A)       |     |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
|-------------|---------------------|-----|------|-----|------|--------------|----|------|-----|------|-------------------|-----|-----|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |     |      |     |      | Plant height |    |      |     |      | % Lodging/type*   |     |     |      | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90  | 120  | 150 | Mean | 60           | 90 | 120  | 150 | Mean | 60                | 90  | 120 | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ------(cm)-----     |     |      |     |      |              |    |      |     |      | ------(lb/A)----- |     |     |      |                             |      |      |      |      |
| Lemont      | 97                  | 99  | 100  | 102 | 100  | 70           | 75 | 80   | 76  | 75   | 0/0               | 0/0 | 0/0 | 0/0  | 5827                        | 6575 | 6324 | 6442 | 6292 |
| Katy        | 98                  | 100 | 103  | 103 | 101  | 93           | 96 | 106  | 108 | 101  | 0/0               | 0/0 | 0/0 | 0/0  | 5408                        | 5953 | 6466 | 6572 | 6100 |
| Mars        | 99                  | 100 | 101  | 102 | 100  | 92           | 94 | 109  | 110 | 101  | 0/0               | 0/0 | 0/0 | 0/0  | 5832                        | 6836 | 6892 | 7617 | 6794 |
| Mercury     | 97                  | 98  | 99   | 100 | 99   | 80           | 78 | 89   | 89  | 84   | 0/0               | 0/0 | 0/0 | 0/0  | 5637                        | 6943 | 7299 | 7520 | 6849 |
| Rico 1      | 98                  | 99  | 98   | 100 | 99   | 83           | 87 | 102  | 105 | 94   | 0/0               | 0/0 | 0/0 | 50/1 | 7448                        | 7955 | 8206 | 8668 | 8070 |
| V4716       | 93                  | 93  | 94   | 94  | 94   | 75           | 75 | 85   | 82  | 79   | 0/0               | 0/0 | 0/0 | 0/0  | 5921                        | 5875 | 6026 | 6021 | 5961 |
| V7817       | 105                 | 105 | 105  | 107 | 106  | 75           | 77 | 82   | 77  | 78   | 0/0               | 0/0 | 0/0 | 0/0  | 5695                        | 6141 | 6258 | 6473 | 6142 |
| 2201        | 93                  | 96  | 98   | 99  | 97   | 74           | 74 | 81   | 81  | 78   | 0/0               | 0/0 | 0/0 | 0/0  | 5706                        | 6701 | 6489 | 6896 | 6448 |
| 2207        | 97                  | 99  | 100  | 101 | 100  | 81           | 81 | 88   | 87  | 84   | 0/0               | 0/0 | 0/0 | 0/0  | 5799                        | 6797 | 6461 | 7020 | 6519 |
| 2214        | 94                  | 96  | 96   | 98  | 96   | 78           | 76 | 84   | 86  | 81   | 0/0               | 0/0 | 0/0 | 0/0  | 6564                        | 7376 | 8036 | 8548 | 7631 |
| N           |                     |     |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
| Mean        | 95                  | 99  | 99   | 101 |      | 80           | 81 | 91   | 90  |      |                   |     |     |      | 5984                        | 6715 | 6846 | 7178 |      |
| C.V., %     |                     |     | 8.19 |     |      |              |    | 3.34 |     |      |                   |     |     |      |                             |      | 4.92 |      |      |
| LSD (0.01): |                     |     |      |     |      |              |    |      |     |      |                   |     |     |      |                             |      |      |      |      |
| Nitrogen    |                     |     | 5    |     |      |              |    | 9    |     |      |                   |     |     |      |                             |      | 283  |      |      |
| Variety     |                     |     | 7    |     |      |              |    | 3    |     |      |                   |     |     |      |                             |      | 304  |      |      |
| V within N  |                     |     | 15   |     |      |              |    | 5    |     |      |                   |     |     |      |                             |      | 610  |      |      |
| V across N  |                     |     | 15   |     |      |              |    | 10   |     |      |                   |     |     |      |                             |      | 642  |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Early variety x nitrogen trial

Location: Morehouse Parish, Zaunbrecher Farm

Soil Type/Analysis: Hebert silty clay; pH: 5.9; O.M.: 2.66%;  
extractable nutrients (mg/kg): P-115, Na-  
115, K-331, Ca-2936, Mg-939, Zn-2.11, S-  
9.72, As-5.62, Fe-261.20

Variety/Seeding Rate: LMNT, KATY, MARS, MERC, RICO, V4716,  
V7817, 2201, 2207, 2214, 150 lb/A

Planting Method/Date: Water-seeded, May 9

Fertilization: N source, ammonium sulfate

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: 2207, May 14; 2214, KATY, May 15; RICO, 2201,  
MARS, MERC, V4716, May 16; V7817, LMNT, May 17

Water Management: Flooded, May 8; drained, May 13; flooded, May  
16; drained, May 23; flooded, May 26; harvest  
drainage, Aug 29

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran  
(bentazon), May 25; 0.9 oz ai/A Londax (bensulfuron-  
methyl), June 4; 0.6 oz ai/A Londax, June 21

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 15

Fungicides: 0.5 lb ai/A Benlate (benomyl), Aug 17

Harvest: Sep 19

Experimental Design: Split plot in a randomized complete block  
with four replications, N assigned to main  
plots and varieties to subplots

Comments: Stand establishment and early season growth were very  
good; however, stands were noticeably thin during early  
tillering. Lodging was significant for entries KATY, MARS,  
MERC, RICO, and 2214 at higher rates of fertilizer N (Table  
13). Grain yields were reduced in V4716 and V7817 due to  
straighthead.



Table 13. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines.  
Zaunbrecher Farm, Morehouse Parish, LA. 1990.

| Variety     | N rate (lb/A)       |    |      |     |      |              |    |      |     |      |                    |      |      |      |                             |      |      |      |      |
|-------------|---------------------|----|------|-----|------|--------------|----|------|-----|------|--------------------|------|------|------|-----------------------------|------|------|------|------|
|             | Days to 50% heading |    |      |     |      | Plant height |    |      |     |      | % Lodging/type*    |      |      |      | Grain yield at 12% moisture |      |      |      |      |
|             | 60                  | 90 | 120  | 150 | Mean | 60           | 90 | 120  | 150 | Mean | 60                 | 90   | 120  | 150  | 60                          | 90   | 120  | 150  | Mean |
|             | ----- (cm) -----    |    |      |     |      |              |    |      |     |      | ----- (lb/A) ----- |      |      |      |                             |      |      |      |      |
| Lemont      | 83                  | 84 | 87   | 88  | 86   | 66           | 69 | 75   | 73  | 71   | 0/0                | 0/0  | 0/0  | 0/0  | 8245                        | 8635 | 8765 | 8344 | 8497 |
| Katy        | 80                  | 79 | 82   | 83  | 81   | 92           | 97 | 101  | 102 | 98   | 2/1                | 27/2 | 52/4 | 67/5 | 7866                        | 8205 | 7536 | 6061 | 7417 |
| Mars        | 79                  | 79 | 82   | 83  | 81   | 95           | 99 | 98   | 101 | 98   | 47/4               | 80/5 | 85/5 | 80/5 | 7057                        | 6215 | 6354 | 6275 | 6475 |
| Mercury     | 76                  | 78 | 80   | 79  | 78   | 77           | 79 | 79   | 83  | 79   | 50/3               | 85/5 | 82/5 | 90/5 | 7419                        | 7984 | 8001 | 7486 | 7722 |
| Rico 1      | 80                  | 81 | 83   | 82  | 81   | 87           | 92 | 95   | 91  | 91   | 52/3               | 90/5 | 87/5 | 67/4 | 9228                        | 9263 | 8260 | 7710 | 8615 |
| V4716       | 77                  | 75 | 77   | 78  | 77   | 70           | 73 | 80   | 79  | 76   | 0/0                | 0/0  | 22/1 | 0/0  | 4467                        | 5141 | 6039 | 6266 | 5478 |
| V7817       | 88                  | 88 | 88   | 89  | 88   | 63           | 66 | 69   | 68  | 67   | 0/0                | 0/0  | 0/0  | 0/0  | 3536                        | 5527 | 6200 | 6515 | 5444 |
| 2201        | 82                  | 82 | 83   | 86  | 83   | 69           | 71 | 75   | 76  | 73   | 0/0                | 0/0  | 0/0  | 0/0  | 8343                        | 8988 | 8945 | 8721 | 8749 |
| 2207        | 81                  | 83 | 86   | 89  | 85   | 72           | 76 | 78   | 80  | 77   | 0/0                | 0/0  | 0/0  | 0/0  | 7810                        | 8277 | 8351 | 8400 | 8210 |
| 2214        | 78                  | 80 | 81   | 82  | 80   | 73           | 78 | 80   | 80  | 78   | 22/2               | 67/4 | 85/5 | 82/5 | 8276                        | 8719 | 8510 | 8131 | 8409 |
| N           |                     |    |      |     |      |              |    |      |     |      |                    |      |      |      |                             |      |      |      |      |
| Mean        | 80                  | 81 | 83   | 84  |      | 76           | 80 | 83   | 83  |      |                    |      |      |      | 7224                        | 7695 | 7696 | 7391 |      |
| C.V., %     |                     |    | 1.95 |     |      |              |    | 4.40 |     |      |                    |      |      |      |                             |      | 7.30 |      |      |
| LSD (0.01): |                     |    |      |     |      |              |    |      |     |      |                    |      |      |      |                             |      |      |      |      |
| Nitrogen    |                     |    | ns   |     |      |              |    | 2    |     |      |                    |      |      |      |                             |      | ns   |      |      |
| Variety     |                     |    | 1    |     |      |              |    | 3    |     |      |                    |      |      |      |                             |      | 507  |      |      |
| V within N  |                     |    | 3    |     |      |              |    | 7    |     |      |                    |      |      |      |                             |      | 1016 |      |      |
| V across N  |                     |    | 5    |     |      |              |    | 7    |     |      |                    |      |      |      |                             |      | 1170 |      |      |

\* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 14. Milling yields for very early and early rice varieties and advanced experimental lines. 1990.

| Entry             | Location*                    |                     |                  |                |                  |
|-------------------|------------------------------|---------------------|------------------|----------------|------------------|
|                   | Rice Research Station        | East Carroll Parish | Vermilion Parish | Rapides Parish | Morehouse Parish |
| <u>Very early</u> | -----(% head - % total)----- |                     |                  |                |                  |
| Tebonnet          | 62 - 71                      | 63 - 70             | 58 - 69          | -              | -                |
| Maybelle          | 53 - 70                      | 53 - 68             | 33 - 71          | -              | -                |
| Texmont           | 55 - 69                      | 58 - 70             | 41 - 71          | -              | -                |
| Alan              | 62 - 70                      | 62 - 71             | 56 - 70          | -              | -                |
| Millie            | 65 - 71                      | 63 - 72             | 60 - 71          | -              | -                |
| 3006              | 59 - 70                      | 56 - 71             | -                | -              | -                |
| <u>Early</u>      |                              |                     |                  |                |                  |
| Lemont            | 47 - 72                      | 59 - 72             | 57 - 72          | 50 - 71        | 60 - 71          |
| Katy              | 59 - 69                      | 63 - 69             | 48 - 68          | 51 - 68        | 65 - 69          |
| Mars              | 56 - 71                      | 67 - 69             | 67 - 71          | 57 - 70        | 67 - 70          |
| Mercury           | 51 - 72                      | 65 - 71             | 60 - 71          | 51 - 71        | 68 - 72          |
| Rico 1            | 60 - 71                      | 61 - 69             | 63 - 70          | 58 - 71        | 61 - 69          |
| V4716             | 63 - 72                      | 69 - 72             | 61 - 72          | 50 - 72        | 65 - 71          |
| V7817             | 59 - 69                      | 61 - 69             | 47 - 67          | 55 - 70        | 59 - 69          |
| 2201              | 48 - 71                      | 61 - 72             | 57 - 71          | 46 - 70        | 65 - 71          |
| 2207              | 63 - 71                      | 62 - 69             | 59 - 70          | 54 - 69        | 65 - 70          |
| 2214              | 63 - 72                      | 67 - 72             | 66 - 71          | 57 - 71        | 66 - 71          |
| 1121              | 52 - 70                      | 64 - 69             | -                | -              | -                |
| 3072              | 53 - 71                      | 62 - 72             | -                | -              | -                |
| Della             | 55 - 70                      | -                   | -                | -              | -                |
| 3049              | 43 - 72                      | -                   | -                | -              | -                |
| 2215              | 36 - 72                      | -                   | -                | -              | -                |
| Jasmine 85        | **                           |                     |                  |                |                  |

\* (-) indicates a variety or experimental line was not grown at that location.

\*\* Data not taken.

Table 15. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1990.

| Variety           | Emergence date | First tiller | Green ring | Panicle 2 mm | Date of 50% heading |
|-------------------|----------------|--------------|------------|--------------|---------------------|
| <u>Very Early</u> |                |              |            |              |                     |
| Tebonnet          | 4-10           | 5-03         | 5-22       | 5-27         | 6-25                |
| Maybelle          | 4-05           | 5-02         | 5-17       | 5-23         | 6-12                |
| Texmont           | 4-06           | 5-02         | 5-17       | 5-26         | 6-17                |
| Alan              | 4-04           | 5-01         | 5-18       | 5-26         | 6-16                |
| Millie            | 4-05           | 5-02         | 5-19       | 5-25         | 6-18                |
| 3006              | 4-06           | 5-02         | 5-21       | 5-27         | 6-19                |
| <u>Early</u>      |                |              |            |              |                     |
| Lemont            | 4-09           | 4-30         | 5-22       | 6-03         | 6-25                |
| Katy              | 4-05           | 4-30         | 5-26       | 6-07         | 6-23                |
| Mars              | 4-04           | 4-29         | 5-24       | 6-08         | 6-25                |
| Mercury           | 4-04           | 4-28         | 5-24       | 6-05         | 6-23                |
| Rico 1            | 4-08           | 5-02         | 5-28       | 6-07         | 6-26                |
| V4716             | 4-09           | 4-29         | 5-23       | 6-06         | 6-25                |
| V7817             | 4-11           | 5-04         | 5-28       | 6-11         | 7-04                |
| 2201              | 4-09           | 4-30         | 5-23       | 6-01         | 6-22                |
| 2207              | 4-05           | 4-28         | 5-21       | 6-01         | 6-23                |
| 2214              | 4-07           | 4-29         | 5-23       | 6-08         | 6-25                |
| 1121              | 4-04           | 5-02         | 5-28       | 6-08         | 6-25                |
| 3072              | 4-09           | 5-02         | 5-22       | 6-06         | 6-23                |
| <u>Aromatic</u>   |                |              |            |              |                     |
| Lemont            | 4-06           | 4-30         | 5-23       | 6-03         | 6-26                |
| Jasmine           | 4-10           | 4-30         | 5-28       | 6-13         | 7-09                |
| Della             | 4-07           | 5-02         | 5-24       | 6-10         | 6-30                |
| 3049              | 4-06           | 4-29         | 5-23       | 6-03         | 6-23                |
| 2215              | 4-06           | 4-29         | 5-22       | 6-03         | 6-21                |

Table 16. Growth stage information for the DD-50 Rice Management Program. Drill-seeded rice varieties and advanced experimental lines. Buford Perry Farm, East Carroll Parish, LA. 1990.

| Variety           | Emergence date | First tiller | Green ring | Panicle 2 mm | Date of 50% heading |
|-------------------|----------------|--------------|------------|--------------|---------------------|
| <u>Very Early</u> |                |              |            |              |                     |
| Tebonnet          | 5-17           | 6-09         | 7-10       | 7-20         | 8-09                |
| Maybelle          | 5-15           | 6-09         | 7-06       | 7-14         | 7-28                |
| Texmont           | 5-16           | 6-08         | 7-06       | 7-16         | 8-01                |
| Alan              | 5-13           | 6-08         | 7-09       | 7-15         | 7-29                |
| Millie            | 5-14           | 6-08         | 7-11       | 7-18         | 8-05                |
| 3006              | 5-17           | 6-08         | 7-10       | 7-15         | 8-03                |
| <u>Early</u>      |                |              |            |              |                     |
| Lemont            | 5-16           | 6-09         | 7-14       | 7-21         | 8-13                |
| Katy              | 5-15           | 6-08         | 7-13       | --*          | 8-12                |
| Mars              | 5-15           | 6-08         | 7-10       | --           | 8-06                |
| Mercury           | 5-16           | 6-08         | 7-12       | --           | 8-03                |
| Rico 1            | 5-16           | 6-09         | 7-14       | --           | 8-08                |
| V4716             | 5-15           | 6-09         | 7-08       | --           | 8-05                |
| V7817             | 5-17           | 6-09         | 7-14       | --           | 8-16                |
| 2201              | 5-16           | 6-09         | 7-13       | --           | 8-12                |
| 2207              | 5-14           | 6-08         | 7-07       | --           | 8-15                |
| 2214              | 5-15           | 6-08         | 7-08       | --           | 8-04                |
| 1121              | 5-15           | 6-08         | 7-08       | --           | 8-04                |
| 3072              | 5-16           | 6-08         | 7-09       | --           | 8-09                |

\* Data not taken.

Table 17. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1990.

| Variety           | Emergence<br>date | First<br>tiller | Green<br>ring | Panicle<br>2 mm | Date of 50%<br>heading |
|-------------------|-------------------|-----------------|---------------|-----------------|------------------------|
| <u>Very Early</u> |                   |                 |               |                 |                        |
| Tebonnet          | 4-24              | 5-12            | 5-30          | 6-09            | 7-03                   |
| Maybelle          | 4-22              | 5-11            | 5-27          | 6-02            | 6-20                   |
| Texmont           | 4-22              | 5-10            | 5-29          | 6-03            | 6-25                   |
| Alan              | 4-21              | 5-10            | 5-26          | 6-04            | 6-23                   |
| Millie            | 4-22              | 5-10            | 5-28          | 6-05            | 6-26                   |
| <u>Early</u>      |                   |                 |               |                 |                        |
| Lemont            | 4-23              | 5-11            | 6-01          | 6-11            | 7-07                   |
| Katy              | 4-22              | 5-10            | 6-02          | 6-18            | 7-03                   |
| Mars              | 4-22              | 5-09            | 6-02          | 6-12            | 7-06                   |
| Mercury           | 4-21              | 5-09            | 6-02          | 6-11            | 7-04                   |
| Rico 1            | 4-22              | 5-12            | 6-05          | 6-20            | 7-08                   |
| V4716             | 4-22              | 5-10            | 6-03          | 6-16            | 7-05                   |
| V7817             | 4-23              | 5-12            | 6-05          | 6-23            | 7-14                   |
| 2201              | 4-22              | 5-11            | 6-03          | 6-11            | 7-03                   |
| 2207              | 4-21              | 5-10            | 5-29          | 6-10            | 7-02                   |
| 2214              | 4-22              | 5-10            | 6-05          | 6-20            | 7-06                   |

Table 18. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1990.

| Variety      | Emergence date | First tiller | Green ring | Panicle 2 mm | Date of 50% heading |
|--------------|----------------|--------------|------------|--------------|---------------------|
| <u>Early</u> |                |              |            |              |                     |
| Lemont       | 5-01           | ---*         | 6-08       | 6-20         | 8-08                |
| Katy         | 4-30           | ---          | 6-12       | 6-19         | 8-09                |
| Mars         | 4-29           | ---          | 6-11       | 6-24         | 8-07                |
| Mercury      | 4-29           | ---          | 6-10       | 6-18         | 8-05                |
| Rico 1       | 5-01           | ---          | 6-15       | 6-25         | 8-08                |
| V4716        | 4-30           | ---          | 6-10       | 6-19         | 8-02                |
| V7817        | 5-01           | ---          | 6-14       | 6-26         | 8-14                |
| 2201         | 5-01           | ---          | 6-09       | 6-19         | 8-06                |
| 2207         | 5-06           | ---          | 6-07       | 6-20         | 8-07                |
| 2214         | 4-30           | ---          | 6-11       | 6-23         | 8-04                |

\* Data not taken.

Table 19. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Zaunbrecher Farm, Morehouse Parish, LA. 1990.

| Variety      | Emergence date | First tiller | Green ring | Panicle 2 mm | Date of 50% heading |
|--------------|----------------|--------------|------------|--------------|---------------------|
| <u>Early</u> |                |              |            |              |                     |
| Lemont       | 5-17           | 5-28         | 6-27       | 7-11         | 8-11                |
| Katy         | 5-15           | 5-26         | 6-24       | 7-11         | 8-04                |
| Mars         | 5-16           | 5-26         | 6-27       | 7-11         | 8-05                |
| Mercury      | 5-16           | 5-28         | 6-28       | 7-09         | 8-02                |
| Rico 1       | 5-16           | 5-28         | 6-30       | 7-10         | 8-05                |
| V4716        | 5-16           | 5-26         | 6-24       | 7-07         | 8-01                |
| V7817        | 5-17           | 5-28         | 6-30       | 7-13         | 8-13                |
| 2201         | 5-16           | 5-27         | 6-24       | 7-12         | 8-07                |
| 2207         | 5-14           | 5-24         | 6-21       | 7-07         | 8-07                |
| 2214         | 5-15           | 5-25         | 6-27       | 7-09         | 8-03                |

## EVALUATION OF COMMERCIAL VARIETIES, HYBRIDS, AND ADVANCED EXPERIMENTAL LINES FOR STRAIGHTHEAD

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

### INTRODUCTION

A straighthead evaluation nursery was established at the Rice Research Station, Crowley, LA, in 1988. Sixty-three entries were screened in 1990 for reaction to arsenic (As)-induced straighthead. Included in the nursery were 36 commercial varieties, both public and private, and 23, 3, and 1 advanced experimental lines from the rice varietal development programs of Louisiana, Texas, and Arkansas, respectively.

### MATERIALS AND METHODS

The nursery was established on a Crowley silt loam soil. Approximately 120 lb N/A and 60 lb/A  $P_2O_5$  and  $K_2O$  were banded 2 inches deep prior to planting. Arsenic as MSMA (monosodium salt of methylarsonic acid) was surface applied at the rate of 2 lb As/A, and the test area was flooded 1 day later. Presoaked seed of each entry was seeded at the rate of 150 lb/A. The test area was drained for 3 days to encourage seedling anchorage. A shallow, permanent flood was then established. Pest control (weeds, insects, disease) was practiced as necessary. Evaluations for straighthead reaction were made at maturity, with each entry being rated on a scale of 0 to 9, based on the estimated percentage of normal grain yield. A rating of 0 indicated that there was no damage or apparent symptoms present and was considered to be highly resistant. A rating of 9 indicated that no grain was produced due to severe damage and was considered to be highly susceptible. Results of the evaluation are shown in Table 1.



Experiment: Straighthead evaluation

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.7; O.M.: 0.88%;  
extractable nutrients (mg/kg): P-28, Na-124,  
K-92, Ca-1454, Mg-354, Zn-0.64, S-5.70,  
As-0.00, Fe-32.94

Variety/Seeding Rate: 63 entries, 150 lb/A

Planting Method/Date: Water-seeded, Apr 24

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  + 120 lb N/A ppi

Plot Size: 4 x 6 ft (24 ft<sup>2</sup>)

Emergence Date: Data not taken

Water Management: Flooded, Apr 24; drained, Apr 28; reflooded,  
May 1

Herbicides: 1.2 oz ai/A Londax (bensulfuron-methyl), May 16;  
3.0 lb ai/A Ordram (molinate), May 17

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 29

Harvest: Straighthead evaluation, Aug 20

Experimental Design: Completely randomized with 63 entries and  
2 replications

Comments: Straighthead reaction ranged from resistant to very  
susceptible, with most entries exhibiting some degree of  
susceptibility to straighthead.

Table 1. Straighthead evaluation for commercial rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1990.

| Entry      | Grain type* | Rating** |
|------------|-------------|----------|
| V7817      | L           | 7.5      |
| Toro 2     | L           | 7.5      |
| Jasmine    | L           | 7.5      |
| LA2218     | M           | 7.5      |
| Mars       | M           | 6.5      |
| V4716      | M           | 6.5      |
| LA2222     | L           | 6.5      |
| LA2211     | L           | 6.0      |
| A301       | L           | 6.0      |
| AR1211     | M           | 5.5      |
| Leah       | L           | 5.5      |
| LA2186     | L           | 5.5      |
| Skybonnet  | L           | 5.5      |
| AS 3058    | M           | 5.5      |
| Nortai     | M           | 5.0      |
| Della      | L           | 5.0      |
| Nato       | M           | 5.0      |
| AS 3510    | L           | 5.0      |
| Starbonnet | L           | 5.0      |
| LA2224     | M           | 4.5      |
| Tebonnet   | L           | 4.5      |
| Katy       | L           | 4.5      |
| Millie     | L           | 4.5      |
| LA2215     | L           | 4.5      |
| Mercury    | M           | 4.5      |
| LA2205     | L           | 4.0      |
| TX3072     | L           | 4.0      |
| Brazos     | M           | 4.0      |
| LA2212     | L           | 4.0      |
| LA2214     | M           | 3.5      |
| Lacassine  | L           | 3.5      |
| Texmont    | L           | 3.5      |
| L202       | L           | 3.5      |
| Lebonnet   | L           | 3.5      |
| M202       | M           | 3.0      |
| LA2203     | L           | 3.0      |
| LA2213     | L           | 3.0      |
| Bond       | L           | 3.0      |
| Alan       | L           | 3.0      |
| Saturn     | M           | 2.5      |
| TX3006     | L           | 2.5      |
| LA2219     | L           | 2.5      |
| LA2220     | L           | 2.5      |
| LA2204     | L           | 2.5      |
| Lemont     | L           | 2.5      |

Continued.

Table 1. Continued.

| Entry     | Grain type* | Rating** |
|-----------|-------------|----------|
| LA2202    | L           | 2.5      |
| LA2210    | L           | 2.5      |
| LA2223    | M           | 2.5      |
| RT7015    | L           | 2.5      |
| Bellemont | L           | 2.5      |
| LA2217    | L           | 2.5      |
| LA2207    | L           | 2.5      |
| Newbonnet | L           | 2.5      |
| LA2206    | L           | 2.0      |
| Maybelle  | L           | 2.0      |
| LA2216    | L           | 2.0      |
| LA2221    | L           | 2.0      |
| TX3049    | L           | 2.0      |
| LA2209    | L           | 2.0      |
| Rico 1    | M           | 2.0      |
| S101      | S           | 2.0      |
| Labelle   | L           | 1.5      |
| Gulfmont  | L           | 1.5      |

\* L = long grain, M = medium grain, S = short grain.

\*\* Rating based on a scale from 0 to 9, where 0 = resistant and 9 = highly susceptible.

# INFLUENCE OF POST-HEADING NITROGEN FERTILIZATION ON PERFORMANCE AND RATOON CROP GRAIN YIELDS OF TEBONNET, MAYBELLE, AND TEXMONT RICE

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

## INTRODUCTION

Rice farmers in southwest Louisiana have the opportunity to produce a ratoon, or second crop, for many of the rice varieties currently being grown. Previous research has shown that second crop grain yields can be increased if additional fertilizer nitrogen (N) is applied to the second crop upon completion of main crop harvest. Preliminary studies have also indicated that N applied in the main crop after the advanced stages of heading may have a positive influence on regrowth of the ratoon crop and resultant grain yield.

This study was initiated to determine the response of second crop grain yields of three very early rice varieties to variable rates and timings of N applied to the main crop.

## MATERIALS AND METHODS

A N rate of 120 lb/A as ammonium sulfate was banded approximately 2 inches deep with 60 lb/A  $P_2O_5$  and  $K_2O$  1 day prior to flooding the water-seeded experiment. Presoaked seed of each variety was seeded at the rate of 150 lb/A into a shallow flood. The rice was grown in a pinpoint flood culture. Approximately 60 lb N/A was applied at either 8 or 4 days prior to draining of the main crop and 4 or 8 days after draining. A similar set of treatments received an additional 60 lb N/A after harvest of the main crop and prior to permanently flooding the second crop. Either 60 or 120 lb N/A was also applied in the second crop in treatments where no N was applied at late heading in the main crop. The main crop was harvested, and grain yields were estimated for each variety. After completion of harvest, fertilizer N in the second crop treatments was surface-broadcast and a shallow flood was immediately established. The number of ratoon tillers was determined about 4 weeks after flooding.

Pest control (weeds, insects, disease) was practiced when necessary. Plant height, days to 50% heading, grain yield, and milling yield were estimated for each variety in the main crop. In the second crop, the number of ratoon tillers and days to 50% heading were determined. Individual whole plots were combine-harvested at field maturity and grain moisture and grain yield were measured.

## SUMMARY AND CONCLUSIONS

A study was conducted to determine the influence of N applied in the main crop at late heading on performance and second crop grain yields of three rice varieties at the Rice Research Station, Crowley, LA.

Main crop grain yields were not affected by the pre- and post-draining N applications (Table 1). There were also no differences in milling yield due to N application; however, head rice milling yields of Maybelle and Texmont were very low and were probably a reflection of severe sheath blight damage. Nitrogen application did influence other agronomic variables (Table 2). Tiller production increased when N was applied to the ratoon and to the main crop during late heading. Multiple applications of N did not increase tiller production over single applications of N in the second crop alone. Most of the second crop maturity differences were due to variety with Tebonnet reaching 50% heading 4 to 5 days later than Maybelle and Texmont. There was only a 2- to 3-day difference in maturity due to N application. Second crop grain yields were increased by 300 to 400 lb/A when an additional 60 lb N/A were applied to the second crop. Single applications of equivalent amounts of N in the second crop alone resulted in similar grain yields. As with tiller production, there does not appear to be any yield benefit from split applications of N in second crop rice.

Higher second crop grain yields can be realized if N is applied after harvest of the main crop. Additional research is needed to determine whether N applied pre- or post-drainage will result in economical second crop yield increases.

Experiment: Second crop variety x nitrogen study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.0; O.M.: 1.04%;  
extractable nutrients (mg/kg): P-38, Na-52,  
K-62, Ca-1030, Mg-203, Zn-0.63, S-6.85,  
As-0.00, Fe-75.30

Variety/Seeding Rate: TBNT, MBLE, TXMT, 150 lb/A

Planting Method/Date: Water-seeded, Mar 31

Fertilization: First planting, 60 lb/A  $P_2O_5$  and  $K_2O$  + 120 lb N/A  
(ammonium sulfate) ppi; second planting, variable  
rates (ammonium sulfate) and application timings

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: MBLE, Apr 8; TXMT, Apr 9; TBNT, Apr 10

Water Management: Flooded, Mar 29; drained, Apr 3; reflooded,  
Apr 6; drained, Apr 21; flooded, Apr 24;  
harvest drainage, July 10; second planting  
flooded, Aug 1; drained, Oct 2

Herbicides: 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), Apr 23; 0.9 oz ai/A Londax (bensulfuron-  
methyl), May 18; 0.6 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 17

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 20

Harvest: Main crop, July 30; second crop, Oct 15

Experimental Design: Split plot in a randomized complete block  
with four replications, varieties assigned  
to main plots and nitrogen to subplots.

Comments: Emergence and stand establishment of TBNT was slow due  
to cool temperatures and poor seedling vigor. Main crop  
grain yields of all varieties were over 7500 lb/A. Visual  
differences in regrowth in the second crop due to heading  
applications of N were quite obvious. Number of tillers  
tended to increase as rate of N increased (Table 1).

Table 1. Effect of N rate, timing, and split application on ratoon performance and second crop grain yields. Rice Research Station, Crowley, LA. 1990.

| Post-heading*<br>N application | Ratoon<br>N | Plant height     |      |      |           | Main crop grain<br>yields at 12% moisture |      |      |           | Milling yields                 |               |       |       |
|--------------------------------|-------------|------------------|------|------|-----------|-------------------------------------------|------|------|-----------|--------------------------------|---------------|-------|-------|
|                                |             | TBNT             | MBLE | TXMT | N<br>MEAN | TBNT                                      | MBLE | TXMT | N<br>Mean | TBNT                           | MBLE          | TXMT  | Mean  |
| ----- (lb/A) -----             |             | ----- (cm) ----- |      |      |           | ----- (lb/A) -----                        |      |      |           | ----- (% head - % total) ----- |               |       |       |
| 60 8d predrain                 | 0           | 131              | 91   | 79   | 100       | 7725                                      | 7514 | 7459 | 7566      | 59-71                          | 45-71         | 44-71 | 50-71 |
| 60 4d predrain                 | 0           | 129              | 89   | 79   | 99        | 8000                                      | 7376 | 7945 | 7774      | 60-71                          | 39-71         | 43-71 | 47-71 |
| 60 4d postdrain                | 0           | 130              | 87   | 79   | 99        | 7856                                      | 7300 | 7932 | 7696      | 61-71                          | 40-70         | 47-71 | 49-71 |
| 60 8d postdrain                | 0           | 128              | 89   | 80   | 99        | 7778                                      | 7615 | 7836 | 7743      | 59-70                          | 41-71         | 49-71 | 50-71 |
| 60 8d predrain                 | 60          | 130              | 91   | 79   | 100       | 7990                                      | 7549 | 7701 | 7747      | 60-71                          | 43-71         | 47-72 | 50-71 |
| 60 4d predrain                 | 60          | 129              | 87   | 80   | 99        | 8061                                      | 7551 | 7829 | 7813      | 59-71                          | 45-71         | 45-72 | 50-71 |
| 60 4d postdrain                | 60          | 127              | 87   | 79   | 98        | 7880                                      | 7530 | 7928 | 7779      | 60-71                          | 41-71         | 48-71 | 50-71 |
| 60 8d postdrain                | 60          | 130              | 91   | 81   | 101       | 7773                                      | 7757 | 7811 | 7780      | 55-70                          | 41-71         | 45-71 | 47-71 |
| 0                              | 60          | 127              | 88   | 79   | 98        | 7701                                      | 7819 | 8066 | 7862      | 54-71                          | 39-71         | 46-71 | 46-71 |
| 0                              | 120         | 128              | 88   | 81   | 99        | 8071                                      | 7575 | 8032 | 7893      | 57-71                          | 39-71         | 46-71 | 47-71 |
| Variety mean                   |             | 129              | 89   | 80   |           | 7883                                      | 7558 | 7854 |           | 58-71                          | 41-71         | 46-71 |       |
| C.V., %                        |             |                  | 2.86 |      |           |                                           | 4.13 |      |           |                                | (9.25 - 0.87) |       |       |
| LSD (0.01):                    |             |                  |      |      |           |                                           |      |      |           |                                |               |       |       |
| Variety                        |             |                  |      | 3    |           |                                           | ns   |      |           | 7                              | ns            |       |       |
| Nitrogen                       |             |                  |      | ns   |           |                                           | ns   |      |           | ns                             | ns            |       |       |
| Nitrogen within variety        |             |                  |      | 5    |           |                                           | ns   |      |           | ns                             | ns            |       |       |
| Nitrogen across variety        |             |                  |      | 6    |           |                                           | ns   |      |           | ns                             | ns            |       |       |

\* Nitrogen was applied post-heading at 8, 4, 4, and 8 days pre- and post-harvest drainage.  
Ratoon N was applied immediately after harvest and prior to flood application.

Table 2. Effect of N rate, timing, and split application on ratoon performance and second crop grain yields. Rice Research Station, Crowley, LA. 1990.

|                                |             | Tillers                            |      |       |      | Days to 50% heading**<br>in the second crop |      |      |      | Second crop grain<br>yields at 12% moisture |      |      |      | Total grain yields<br>at 12% moisture |       |       |       |
|--------------------------------|-------------|------------------------------------|------|-------|------|---------------------------------------------|------|------|------|---------------------------------------------|------|------|------|---------------------------------------|-------|-------|-------|
| Post-heading*<br>N application | Ratoon<br>N | N                                  |      |       |      | N                                           |      |      |      | N                                           |      |      |      | N                                     |       |       |       |
|                                |             | TBNT                               | MBLE | TXMT  | Mean | TBNT                                        | MBLE | TXMT | Mean | TBNT                                        | MBLE | TXMT | Mean | TBNT                                  | MBLE  | TXMT  | Mean  |
| ----- (lb/A) -----             |             | ----- (no/3ft <sup>2</sup> ) ----- |      |       |      |                                             |      |      |      | ----- (lb/A) -----                          |      |      |      | ----- (lb/A) -----                    |       |       |       |
| 60 8d predrain                 | 0           | 270                                | 445  | 319   | 345  | 42                                          | 36   | 37   | 38   | 1232                                        | 2215 | 1707 | 1718 | 8958                                  | 9729  | 9166  | 9284  |
| 60 4d predrain                 | 0           | 254                                | 445  | 376   | 358  | 42                                          | 35   | 37   | 38   | 1194                                        | 2383 | 1806 | 1795 | 9195                                  | 9759  | 9751  | 9569  |
| 60 4d postdrain                | 0           | 351                                | 450  | 385   | 395  | 41                                          | 34   | 36   | 37   | 1343                                        | 2368 | 1862 | 1858 | 9198                                  | 9668  | 9794  | 9553  |
| 60 8d postdrain                | 0           | 272                                | 457  | 421   | 383  | 41                                          | 36   | 37   | 38   | 1324                                        | 2546 | 2250 | 2040 | 9103                                  | 10160 | 10085 | 9783  |
| 60 8d predrain                 | 60          | 389                                | 493  | 578   | 487  | 40                                          | 35   | 38   | 38   | 1537                                        | 2898 | 2197 | 2211 | 9527                                  | 10447 | 9898  | 9958  |
| 60 4d predrain                 | 60          | 371                                | 477  | 425   | 424  | 40                                          | 36   | 37   | 38   | 1447                                        | 2802 | 2207 | 2152 | 9508                                  | 10352 | 10036 | 9965  |
| 60 4d postdrain                | 60          | 337                                | 423  | 400   | 387  | 40                                          | 35   | 36   | 37   | 1510                                        | 3037 | 2369 | 2305 | 9390                                  | 10567 | 10297 | 10085 |
| 60 8d postdrain                | 60          | 389                                | 475  | 436   | 433  | 41                                          | 36   | 37   | 38   | 1506                                        | 2959 | 2553 | 2339 | 9279                                  | 10715 | 10363 | 10119 |
| 0                              | 60          | 317                                | 452  | 439   | 403  | 42                                          | 38   | 39   | 40   | 1506                                        | 2792 | 2338 | 2212 | 9206                                  | 10611 | 10404 | 10074 |
| 0                              | 120         | 256                                | 495  | 571   | 441  | 41                                          | 39   | 39   | 40   | 1407                                        | 3061 | 2427 | 2299 | 9479                                  | 10636 | 10459 | 10191 |
| Variety mean                   |             | 321                                | 461  | 435   |      | 41                                          | 36   | 37   |      | 1401                                        | 2706 | 2171 |      | 9284                                  | 10265 | 10025 |       |
| C.V., %                        |             |                                    |      | 17.64 |      |                                             |      | 3.03 |      |                                             |      | 8.99 |      |                                       |       | 3.78  |       |
| LSD (0.01):                    |             |                                    |      |       |      |                                             |      |      |      |                                             |      |      |      |                                       |       |       |       |
| Variety                        |             |                                    |      | 140   |      |                                             |      | 2    |      |                                             |      | 271  |      |                                       |       | 920   |       |
| Nitrogen                       |             |                                    |      | 77    |      |                                             |      | 1    |      |                                             |      | 203  |      |                                       |       | 401   |       |
| Nitrogen within vary           |             |                                    |      | 133   |      |                                             |      | 2    |      |                                             |      | 351  |      |                                       |       | 696   |       |
| Nitrogen across vary           |             |                                    |      | 186   |      |                                             |      | 3    |      |                                             |      | 424  |      |                                       |       | 1116  |       |

\* Nitrogen was applied post-heading at 8, 4, 4, and 8 days pre- and post-harvest drainage. Ratoon N was applied immediately after harvest and prior to flood application.

\*\* Days to 50% heading in the second crop was calculated from establishment of the permanent flood in the ratoon.



# INFLUENCE OF SEEDING RATE ON PERFORMANCE AND GRAIN YIELD OF SELECTED RICE VARIETIES GROWN IN WATER-SEEDED AND DRY-SEEDED CULTURAL SYSTEMS

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

## INTRODUCTION

Stand establishment is a very critical initial step toward successful rice production. Poor establishment can result in greater weed competition and increased pressure from the rice water weevil. Excessively thick stands can result in increased disease pressure and plant lodging. In either of these situations, lower grain yields will probably occur.

Rice is planted in Louisiana in three ways. Rice is water-seeded with either dry or pre-sprouted seed, drill-seeded on 7- to 10-inch spacings, or broadcast dry. According to current information, regardless of the method of planting, the optimum plant stand is 15 to 20 plants per square foot, with a minimum of 6 to 8 and a maximum of 30.

The current recommendation for seeding rate for either water seeding or dry broadcasting is 100 to 150 lb/A, and 90 to 110 lb for drill seeding. The higher seeding rates are recommended when planting during cool weather conditions, especially when water seeding; in areas where bird depredation is a problem; when planting seed with a low germination percentage; where seedbed preparation is less than desirable; or in any situation where water management or water quality (such as salt water) is a problem.

Commercial rice varieties differ in seedling vigor and in their ability to tiller, and these factors can significantly influence stand establishment in either cultural system. The recommended varieties have changed considerably in recent years, especially with the development of the semidwarf plant type. The objective of this study is to determine the response of four of the more commonly grown rice varieties to seeding rate.

## MATERIALS AND METHODS

Four rice varieties were compared at variable seeding rates in water- and dry-seeded culture: Tebonnet (TBNT), a very early long grain; Mars and Mercury (MERC), early medium grains; and Lemont (LMNT), an early long grain. Seeding rates in the water-seeded study were 100, 125, and 150 lb/A, and 50, 75, and 100 lb/A in the drill-seeded study.

Each study was fertilized with 60 lb/A  $P_2O_5$  and  $K_2O$  preplant incorporated. Approximately 120 lb N/A were applied preplant incorporated in the water-seeded study and preflood in the drill-

seeded study. Water management typical of a water-seeded, pinpoint flood system and a drill-seeded system was followed.

Pest control (weeds, insects, disease) was practiced when necessary. Stand counts were determined at early tillering (4 to 5 weeks after emergence). Individual whole plots were combine-harvested at field maturity. Days to 50% heading, plant height, lodging, grain moisture, and grain yield were measured. Yield components were determined.

#### SUMMARY AND CONCLUSIONS

Seeding rate studies were conducted at the Rice Research Station to determine the influence of seeding rate on performance, grain yield, and yield components of Tebonnet, Mars, Mercury, and Lemont in water- and dry-seeded culture.

Stand densities increased with increasing seeding rate in the drill-seeded study as expected (Table 1). Stand densities for all varieties were similar at each seeding rate. Seeding rate had little influence on days to 50% heading or plant height. Seeding rate did have a slight effect on grain yield for the varieties Tebonnet, Lemont, and Mercury, with yields decreasing slightly as seeding rate increased. Yields of Tebonnet, Mercury, and Lemont decreased 600, 400, and 800 lb/A, respectively, from the lowest to highest rate. There was no response to rate for Mars. Yield components generally decreased as seeding rate increased (Table 2). Sheath blight was rather severe in 1990, and probably caused more reduction in grain yield at the higher seeding rates. Most of the differences in yield components were due to variety, with Mars and Tebonnet having the highest plant weight and highest percentage of filled grain. Mercury and Tebonnet produced the greatest number of sterile florets.

There was little response of stand density to increasing seeding rate in the water-seeded study. Average density for Tebonnet was much lower than that of the other varieties (Table 3). There was no significant influence of seeding rate on days to 50% heading, plant height, or grain yield in the water-seeded study. Seeding rate also had no significant influence on yield components (Table 4), although there were some differences among varieties.

This study has been conducted for 3 years at the Rice Research Station in Crowley, LA. Differences in grain yield due to variable seeding rate have generally been no larger than 10%, with both positive and negative differences being measured. Further statistical analyses will be performed to determine seasonal influence of variable seeding rate on grain yields of the four varieties tested; however, it appears that the currently recommended rates of seeding in water- and drill-seeded rice culture are accurate.

Experiment: Seeding rate x variety trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 5.8; O.M.: 1.14%;  
extractable nutrients (mg/kg): P-44, Na-54,  
K-76, Ca-1065, Mg-202, Zn-0.42, S-7.05,  
As-0.07, Fe-80.82

Variety/Seeding Rate: MARS, MERC, TBNT, LMNT; variable rate

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; 120 lb N/A, N source,  
ammonium sulfate

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: MARS, MERC, Apr 21; TBNT, Apr 22; LMNT, Apr 23

Water Management: Flushed, Apr 19, Apr 26, May 3, May 15;  
permanent flood, May 23; harvest drainage,  
Aug 6

Herbicides: 3.5 lb ai/A Arrosolo (molinate + propanil), May 7;  
3.75 lb ai/A Ordram (molinate), May 24;  
0.6 oz ai/A Londax (bensulfuron-methyl), May 30

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 12

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Aug 17

Experimental Design: Split plot in a randomized complete block  
with four replications, seeding rate  
assigned to main plots and varieties to  
subplots

Comments: Seeding rate had little influence on days to 50%  
heading or plant height (Table 1). Grain yields were  
decreased at the highest seeding rate and was probably due  
to increased disease.

Table 1. Effect of seeding rate (SR) on performance and grain yield of drill-seeded rice varieties.  
Rice Research Station, Crowley, LA. 1990.

| Seeding rate (lb/A) |                                 |    |     |      |                     |    |     |      |                  |     |     |      |                                |      |      |      |
|---------------------|---------------------------------|----|-----|------|---------------------|----|-----|------|------------------|-----|-----|------|--------------------------------|------|------|------|
| Variety             | Stand count                     |    |     |      | Days to 50% heading |    |     |      | Plant height     |     |     |      | Grain<br>yield at 12% moisture |      |      |      |
|                     | 50                              | 75 | 100 | Mean | 50                  | 75 | 100 | Mean | 50               | 75  | 100 | Mean | 50                             | 75   | 100  | Mean |
|                     | ---(plants/ft <sup>2</sup> )--- |    |     |      |                     |    |     |      | ----- (cm) ----- |     |     |      | ----- (lb/A) -----             |      |      |      |
| MARS                | 14                              | 20 | 24  | 19   | 80                  | 81 | 80  | 80   | 115              | 110 | 109 | 111  | 8556                           | 8376 | 8431 | 8455 |
| MERC                | 16                              | 24 | 27  | 22   | 80                  | 80 | 80  | 80   | 87               | 85  | 84  | 85   | 6236                           | 5964 | 5834 | 6012 |
| TBNT                | 15                              | 20 | 27  | 21   | 80                  | 79 | 78  | 79   | 134              | 132 | 130 | 132  | 7480                           | 7071 | 6815 | 7122 |
| LMNT                | 14                              | 17 | 24  | 18   | 86                  | 85 | 85  | 85   | 81               | 81  | 81  | 81   | 6782                           | 6559 | 5930 | 6424 |
| SR Mean             | 15                              | 20 | 26  |      | 81                  | 81 | 81  |      | 104              | 102 | 101 |      | 7264                           | 6992 | 6753 |      |
| C.V., %             | 10.46                           |    |     |      | 1.16                |    |     |      | 2.63             |     |     |      | 5.55                           |      |      |      |
| LSD (0.01):         |                                 |    |     |      |                     |    |     |      |                  |     |     |      |                                |      |      |      |
| Seed rate           | 3                               |    |     |      | 1                   |    |     |      | 3                |     |     |      | 474                            |      |      |      |
| Variety             | 2                               |    |     |      | 1                   |    |     |      | 3                |     |     |      | 440                            |      |      |      |
| V within SR         | 4                               |    |     |      | 2                   |    |     |      | 5                |     |     |      | 762                            |      |      |      |
| V across SR         | 5                               |    |     |      | 2                   |    |     |      | 5                |     |     |      | 821                            |      |      |      |

Table 2. Effect of seeding rate (SR) on yield components of drill-seeded rice varieties. Rice Research Station, Crowley, LA. 1990.

|             | Seeding rate (lb/A)             |     |     |      |                                 |     |     |      |                                    |     |     |      |                             |     |     |      |                              |    |     |      |              |    |     |      |                 |     |     |      |               |      |      |      |
|-------------|---------------------------------|-----|-----|------|---------------------------------|-----|-----|------|------------------------------------|-----|-----|------|-----------------------------|-----|-----|------|------------------------------|----|-----|------|--------------|----|-----|------|-----------------|-----|-----|------|---------------|------|------|------|
|             | Whole plant                     |     |     |      | Panicles                        |     |     |      | Panicle weight                     |     |     |      | Grain weight                |     |     |      | Panicle weight               |    |     |      | Grain weight |    |     |      | Sterile florets |     |     |      | Filled grains |      |      |      |
| Variety     | 50                              | 75  | 100 | Mean | 50                              | 75  | 100 | Mean | 50                                 | 75  | 100 | Mean | 50                          | 75  | 100 | Mean | 50                           | 75 | 100 | Mean | 50           | 75 | 100 | Mean | 50              | 75  | 100 | Mean |               |      |      |      |
|             | ----- (g/ft <sup>2</sup> ) ---- |     |     |      | --- (no/3 ft <sup>2</sup> ) --- |     |     |      | ----- (g/3 ft <sup>2</sup> ) ----- |     |     |      | ----- (g/20 panicles) ----- |     |     |      | ----- (no/20 panicles) ----- |    |     |      |              |    |     |      |                 |     |     |      |               |      |      |      |
| MARS        | 757                             | 694 | 683 | 711  | 136                             | 136 | 133 | 135  | 373                                | 348 | 339 | 353  | 344                         | 319 | 309 | 324  | 55                           | 54 | 56  | 55   | 51           | 49 | 50  | 50   | 365             | 397 | 501 | 421  | 2183          | 2078 | 2129 | 2130 |
| MERC        | 589                             | 552 | 573 | 571  | 136                             | 134 | 151 | 141  | 274                                | 255 | 262 | 264  | 239                         | 223 | 227 | 230  | 42                           | 35 | 34  | 37   | 36           | 30 | 29  | 32   | 724             | 744 | 774 | 747  | 1542          | 1286 | 1214 | 1347 |
| TBNT        | 735                             | 684 | 623 | 681  | 133                             | 136 | 138 | 136  | 338                                | 317 | 288 | 314  | 306                         | 282 | 254 | 281  | 51                           | 50 | 38  | 46   | 46           | 46 | 42  | 691  | 619             | 595 | 635 | 1994 | 1982          | 1485 | 1820 |      |
| LMNT        | 666                             | 585 | 550 | 600  | 161                             | 156 | 162 | 159  | 335                                | 277 | 267 | 293  | 308                         | 251 | 238 | 265  | 42                           | 39 | 35  | 39   | 38           | 35 | 31  | 35   | 273             | 299 | 348 | 307  | 1495          | 1419 | 1256 | 1390 |
| SR Mean     | 687                             | 629 | 607 |      | 141                             | 140 | 146 |      | 330                                | 299 | 289 |      | 299                         | 269 | 257 |      | 48                           | 44 | 41  |      | 43           | 40 | 36  |      | 514             | 515 | 555 |      | 1804          | 1691 | 1521 |      |
| C.V., %     | 10.88                           |     |     |      | 9.12                            |     |     |      | 12.44                              |     |     |      | 13.53                       |     |     |      | 13.17                        |    |     |      | 14.57        |    |     |      | 23.67           |     |     |      | 13.29         |      |      |      |
| LSD (0.05): |                                 |     |     |      |                                 |     |     |      |                                    |     |     |      |                             |     |     |      |                              |    |     |      |              |    |     |      |                 |     |     |      |               |      |      |      |
| SR          | 52                              |     |     |      | ns                              |     |     |      | 19                                 |     |     |      | 18                          |     |     |      | 4                            |    |     |      | 4            |    |     |      | 34              |     |     |      | 125           |      |      |      |
| V           | 58                              |     |     |      | 11                              |     |     |      | 32                                 |     |     |      | 31                          |     |     |      | 5                            |    |     |      | 5            |    |     |      | 105             |     |     |      | 186           |      |      |      |
| V within SR | 101                             |     |     |      | 19                              |     |     |      | 55                                 |     |     |      | 54                          |     |     |      | 8                            |    |     |      | 8            |    |     |      | 181             |     |     |      | 322           |      |      |      |
| V across SR | 176                             |     |     |      | ns                              |     |     |      | 50                                 |     |     |      | 48                          |     |     |      | 8                            |    |     |      | 8            |    |     |      | 153             |     |     |      | 299           |      |      |      |

Experiment: Seeding rate x variety trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 5.7; O.M.: 1.16%;  
extractable nutrients (mg/kg): P-47, Na-48,  
K-70, Ca-1039, Mg-202, Zn-0.44, S-7.24,  
As-0.00, Fe-97.63

Variety/Seeding Rate: MARS, MERC, TBNT, LMNT, variable rate

Planting Method/Date: Water-seeded, Mar 31

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; 120 lb N/A ppi, N  
source, ammonium sulfate

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: MERC, MARS, Apr 4; TBNT, LMNT, Apr 10

Water Management: Flooded, Mar 29; drained, Apr 3; reflooded,  
Apr 6; drained, Apr 21; reflooded Apr 24;  
harvest drainage, July 16

Herbicides: 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), Apr 23; 1.2 oz ai/A Londax (bensulfuron-  
methyl), May 1; 0.6 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 17

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Main crop, Aug 7

Experimental Design: Split plot in a randomized complete block  
with four replications, seeding rate  
assigned to main plots and varieties to  
subplots

Comments: Days to 50% heading, plant height, and grain yield  
were not influenced by seeding rate (Table 3).

Table 3. Effect of seeding rate (SR) on performance and grain yield of water-seeded rice varieties.  
Rice Research Station, Crowley, LA. 1990.

| Variety     | Seeding rate (lb/A)             |       |     |      |                     |      |     |      |                  |      |     |      | Grain                 |      |      |      |
|-------------|---------------------------------|-------|-----|------|---------------------|------|-----|------|------------------|------|-----|------|-----------------------|------|------|------|
|             | Stand count                     |       |     |      | Days to 50% heading |      |     |      | Plant height     |      |     |      | yield at 12% moisture |      |      |      |
|             | 100                             | 125   | 150 | Mean | 100                 | 125  | 150 | Mean | 100              | 125  | 150 | Mean | 100                   | 125  | 150  | Mean |
|             | ---(plants/ft <sup>2</sup> )--- |       |     |      |                     |      |     |      | ----- (cm) ----- |      |     |      | ----- (lb/A) -----    |      |      |      |
| MARS        | 14                              | 17    | 17  | 16   | 84                  | 84   | 84  | 84   | 113              | 112  | 112 | 112  | 8444                  | 8295 | 8067 | 8269 |
| MERC        | 20                              | 22    | 24  | 22   | 80                  | 80   | 80  | 80   | 91               | 90   | 90  | 90   | 8707                  | 8806 | 8553 | 8689 |
| TBNT        | 9                               | 9     | 11  | 9    | 81                  | 81   | 80  | 81   | 137              | 135  | 134 | 136  | 7693                  | 7530 | 7864 | 7696 |
| LMNT        | 19                              | 20    | 20  | 20   | 79                  | 79   | 79  | 79   | 86               | 86   | 85  | 86   | 8070                  | 7971 | 8316 | 8119 |
| SR Mean     | 15                              | 17    | 18  |      | 81                  | 81   | 81  |      | 107              | 106  | 105 |      | 8228                  | 8151 | 8200 |      |
| C.V., %     |                                 | 17.58 |     |      |                     | 0.73 |     |      |                  | 2.45 |     |      |                       | 4.38 |      |      |
| LSD (0.01): |                                 |       |     |      |                     |      |     |      |                  |      |     |      |                       |      |      |      |
| Seed rate   |                                 | ns    |     |      |                     | ns   |     |      |                  | ns   |     |      |                       | ns   |      |      |
| Variety     |                                 | 3     |     |      |                     | 1    |     |      |                  | 3    |     |      |                       | 406  |      |      |
| V within SR |                                 | 6     |     |      |                     | 1    |     |      |                  | 5    |     |      |                       | 704  |      |      |
| V across SR |                                 | 6     |     |      |                     | 1    |     |      |                  | 5    |     |      |                       | 643  |      |      |

Table 4. Effect of seeding rate (SR) on yield components of water-seeded rice varieties. Rice Research Station, Crowley, LA. 1990.

|             | Seeding rate (lb/A)              |     |     |      |                                 |     |     |      |                                    |     |     |      |                             |     |     |      |                              |     |     |      |              |     |     |      |                 |     |     |      |               |      |      |      |
|-------------|----------------------------------|-----|-----|------|---------------------------------|-----|-----|------|------------------------------------|-----|-----|------|-----------------------------|-----|-----|------|------------------------------|-----|-----|------|--------------|-----|-----|------|-----------------|-----|-----|------|---------------|------|------|------|
|             | Whole plant                      |     |     |      | Panicles                        |     |     |      | Panicle weight                     |     |     |      | Grain weight                |     |     |      | Panicle weight               |     |     |      | Grain weight |     |     |      | Sterile florets |     |     |      | Filled grains |      |      |      |
| Variety     | 100                              | 125 | 150 | Mean | 100                             | 125 | 150 | Mean | 100                                | 125 | 150 | Mean | 100                         | 125 | 150 | Mean | 100                          | 125 | 150 | Mean | 100          | 125 | 150 | Mean | 100             | 125 | 150 | Mean | 100           | 125  | 150  | Mean |
|             | ----- (g/ft <sup>2</sup> ) ----- |     |     |      | --- (no/3 ft <sup>2</sup> ) --- |     |     |      | ----- (g/3 ft <sup>2</sup> ) ----- |     |     |      | ----- (g/20 panicles) ----- |     |     |      | ----- (no/20 panicles) ----- |     |     |      |              |     |     |      |                 |     |     |      |               |      |      |      |
| MARS        | 664                              | 724 | 701 | 696  | 121                             | 146 | 143 | 137  | 333                                | 349 | 338 | 340  | 326                         | 328 | 318 | 324  | 60                           | 49  | 48  | 52   | 58           | 48  | 46  | 51   | 186             | 168 | 177 | 177  | 2408          | 2000 | 1905 | 2104 |
| MERC        | 672                              | 688 | 649 | 670  | 165                             | 169 | 172 | 169  | 351                                | 345 | 329 | 342  | 324                         | 321 | 304 | 316  | 44                           | 41  | 40  | 42   | 41           | 39  | 38  | 39   | 306             | 230 | 254 | 263  | 1705          | 1289 | 1282 | 1425 |
| TBNT        | 779                              | 768 | 721 | 756  | 131                             | 122 | 130 | 128  | 388                                | 384 | 360 | 377  | 348                         | 350 | 329 | 342  | 59                           | 68  | 58  | 62   | 53           | 63  | 53  | 56   | 679             | 692 | 558 | 643  | 2450          | 2916 | 2475 | 2614 |
| LMNT        | 656                              | 585 | 597 | 613  | 174                             | 168 | 178 | 173  | 337                                | 307 | 297 | 314  | 316                         | 288 | 280 | 295  | 42                           | 35  | 33  | 37   | 40           | 33  | 32  | 35   | 174             | 182 | 127 | 161  | 1559          | 1290 | 1207 | 1352 |
| SR Mean     | 693                              | 691 | 667 |      | 148                             | 151 | 156 |      | 352                                | 346 | 331 |      | 328                         | 322 | 308 |      | 51                           | 48  | 45  |      | 48           | 45  | 42  |      | 336             | 318 | 279 |      | 2030          | 1874 | 1718 |      |
| C.V., %     | 10.26                            |     |     |      | 11.37                           |     |     |      | 10.32                              |     |     |      | 10.26                       |     |     |      | 11.87                        |     |     |      | 12.23        |     |     |      | 31.77           |     |     |      | 13.67         |      |      |      |
| LSD (0.05): |                                  |     |     |      |                                 |     |     |      |                                    |     |     |      |                             |     |     |      |                              |     |     |      |              |     |     |      |                 |     |     |      |               |      |      |      |
| SR          | ns                               |     |     |      | ns                              |     |     |      | ns                                 |     |     |      | ns                          |     |     |      | ns                           |     |     |      | ns           |     |     |      | ns              |     |     |      | ns            |      |      |      |
| V           | 59                               |     |     |      | 14                              |     |     |      | 30                                 |     |     |      | 27                          |     |     |      | 5                            |     |     |      | 5            |     |     |      | 83              |     |     |      | 215           |      |      |      |
| V within SR | 102                              |     |     |      | 25                              |     |     |      | 52                                 |     |     |      | 47                          |     |     |      | 8                            |     |     |      | 8            |     |     |      | 143             |     |     |      | 372           |      |      |      |
| V across SR | 116                              |     |     |      | 27                              |     |     |      | 55                                 |     |     |      | 50                          |     |     |      | 9                            |     |     |      | 8            |     |     |      | 150             |     |     |      | 441           |      |      |      |



## NO-TILL AND STALE SEEDBED RICE PRODUCTION FOR LOUISIANA

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

### INTRODUCTION

Rice farmers in Louisiana typically prepare a seedbed prior to planting in a number of ways. Rice land is usually worked in late fall or early spring to some extent. Operations may include disking, field cultivation, and water or dry leveling. Preparing a seedbed by some conventional means destroys weeds and provides moisture, nutrients, and air to allow for plant root penetration.

The advantages of conventional seedbed preparation are obvious. There has been considerable interest in recent years, however, in utilizing no-tillage and stale seedbed planting practices in many crops. These techniques have been promoted to conserve moisture, reduce seedbed preparation costs, reduce soil erosion, and save time. Little attention has been given to adapting these tillage techniques to rice production.

A no-tillage system is the seeding of one crop into previous residue of another crop without disturbing the soil. A stale seedbed system requires some degree of early seedbed preparation, and then allowing a flush of weeds to develop prior to planting. In each of these systems, a herbicide treatment is used to control or kill existing vegetation at or before planting. The objective of this study is to determine the feasibility of producing rice using stale seedbed and no-tillage practices in the water- and dry-seeded rice cultural systems.

### MATERIALS AND METHODS

The fall-prepared stale seedbed treatment was disked twice, and vibra-shanked and conditioned with a roller harrow in early December. The spring-prepared seedbed was established in a similar manner 8 weeks before planting. The conventional seedbed was disked twice, and vibra-shanked and conditioned with a roller harrow as needed immediately before planting. Roundup was applied at the rate of 1.0 lb ai/A by air 3 weeks prior to seeding. Approximately 60 lb/A  $P_2O_5$  and  $K_2O$  in the drill-seeded study and 45 lb/A in the water-seeded study were banded with a no-till drill 1 to 2 inches deep. In the drill-seeded experiment, 20 lb N/A was also banded and the test area was planted. In the water-seeded experiment, 90 lb N/A was banded and the test area was flooded and planted. Pinpoint flood water management was practiced for the water-seeded study. The drill-seeded study was frequently flushed to encourage seedling emergence and stand establishment. The test area was fertilized with 90 lb N/A prior to establishment of a shallow, permanent flood (3rd to 4th leaf growth stage) approximately 2 weeks after

emergence. Each experiment was topdressed with 55 lb N/A at midseason (panicle initiation).

Pest control (weeds, insects, disease) was practiced when necessary. Stand density was determined at the 3- to 4-leaf growth stage (2 weeks after emergence). Individual whole plots were combine-harvested at field maturity. Grain moisture and grain yield were determined.

#### SUMMARY AND CONCLUSIONS

Fertilizer placement was generally more precise in all seedbeds in 1990 than in previous years. The John Deere 752 grain and fertilizer drill performed much better than the equipment used prior to 1990. The seedbed in the no-till treatment was very hard and compacted, however, placement of fertilizer was still uniform. Seed placement in the drill-seeded study was also more uniform than in previous years, and stand establishment was considerably improved.

The burndown herbicide (Roundup) did an excellent job in controlling existing vegetation in the no-till and stale seedbed treatments. Since herbicide application preceded planting by 3 weeks, burndown and collapse of vegetation were more complete and problems associated with stand establishment in previous years were eliminated. Weeds in the stale seedbed treatment included annual seedling grasses, dayflower, and some alligatorweed. Weeds in the no-till treatment consisted primarily of large winter annual broadleaves and alligatorweed. A lesser number of annual grasses and dayflower was present. One postemergence and one postflood herbicide application were required prior to establishment of the permanent flood for control of dayflower and annual grasses in the drill-seeded study, and for control of duck salad, dayflower, and annual grasses in the water-seeded study. Overall, weed control in 1990 was better than in previous years.

Decreased stand density was observed in the water-seeded study, especially in the no-till treatment, in previous years. This was probably due to difficulty in seedling root penetration and interference of the dead vegetation with seedling anchorage. There also appeared to be some influence of water quality on germination and emergence. Decomposition of the dying vegetation in the no-till and stale seedbed areas was possibly decreasing dissolved oxygen in the floodwater and inhibiting the germination process. The decomposition process was also providing a more favorable environment for the proliferation of fungal organisms which attack germinating rice seeds. No differences were observed in stand density among tillage treatments in 1990. Since burndown occurred 3 weeks prior to flooding or planting, a more favorable situation developed for stand establishment. In 1989, there were also maturity differences among tillage treatments, thought to be due to stand establishment problems.

There were no visual differences in maturity in 1990, and no measurements were taken. No differences were observed in grain yields in either the drill- or water-seeded experiment.

Results of this study indicate potential for utilizing stale and no-till seedbed techniques in Louisiana rice production. During the 4 years of this study, stand establishment appeared to be the limiting factor in no-till production, especially in a water-seeded cultural system. The amount of vegetation present at burndown and the length of time between burndown and initial flooding both influence stand establishment. Since permanent flooding is delayed until the rice is well established in a dry-planted system, there is probably less chance for poor water quality and decomposing vegetation to affect seedling anchorage or stand establishment.

Further investigations need to be conducted in order to identify varieties that are suitable for reduced tillage production. Alternative management practices for other inputs such as inorganic fertilizers and pesticides need to be evaluated. From an environmental standpoint, these alternative tillage practices for establishing a rice crop also need to be evaluated for their potential use in reducing soil erosion, conserving fertilizer nutrients, and improving water quality where floodwater release or natural runoff is a concern.

Experiment: Seedbed preparation alternatives

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 5.9; O.M.: 1.63%;  
extractable nutrients (mg/kg): P-69, Na-119,  
K-107, Ca-1747, Mg-485, Zn-1.26, S-9.08,  
As-0.00, Fe-121.2

Variety/Seeding Rate: LMNT, 110 lb/A

Planting Method/Date: Drill-seeded, May 21

Fertilization: 21 lb N/A + 63 lb/A  $P_2O_5$  and  $K_2O$  ppi; 90 lb N/A  
(urea) pf, June 15; 55 lb N/A topdress, July 3

Plot Size: 25 x 130 ft (3250 ft<sup>2</sup>)

Emergence Date: June 3

Water Management: Flushed, May 24, June 2, June 8; permanent  
flood, June 15; harvest drainage, Sep 4

Herbicides: 1.0 lb ai/A Roundup (glyphosate), May 1; 4.0 lb ai/A  
Stam (propanil), June 6; 4.0 lb ai/A Ordram  
(molinate), June 19

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 26

Fungicides: 0.5 lb ai/A Rovral (iprodione), July 23; 0.28 lb  
ai/A Tilt (propiconazol), Aug 1

Harvest: Sep 17

Experimental Design: Randomized complete block with four  
replications, four treatments

Comments: Stand establishment was uniform across seedbed  
treatments. Roundup gave good control of vegetation prior  
to planting. One application of Stam preflood plus an  
application of Ordram were required to control dayflower  
and annual grasses. Two applications of fungicide were  
made, and sheath blight pressure still had some influence  
on grain yields. Grain yields for all seedbed treatments  
were similar (Table 1).

Experiment: Seedbed preparation alternatives

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 6.0; O.M.: 1.59%;  
extractable nutrients (mg/kg): P-87, Na-86,  
K-112, Ca-1566, Mg-358, Zn-1.41, S-10.77,  
As-0.00, Fe-122.3

Variety/Seeding Rate: LMNT, 150 lb/A

Planting Method/Date: Water-seeded, May 24

Fertilization: 90 lb N/A + 45 lb/A P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O ppi; 55 lb N/A  
topdress, July 3

Plot Size: 25 x 130 ft (3250 ft<sup>2</sup>)

Emergence Date: May 29

Water Management: Flooded, May 23; drained, May 27; reflooded,  
May 30; harvest drainage, Sep 4

Herbicides: 1.0 lb ai/A Roundup (glyphosate), May 1; 1.2 oz ai/A  
Londax (bensulfuron-methyl), June 6; 4.0 lb ai/A  
Ordram (molinate), June 19

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 15

Fungicides: 0.5 lb ai/A Rovral (iprodione), July 23; 0.28 lb  
ai/A Tilt (propiconazol), Aug 1

Harvest: Sep 17

Experimental Design: Randomized complete block with four  
replications, four treatments

Comments: Stand establishment was good in all treatments.  
Roundup gave good control of vegetation prior to planting.  
One application of Stam preflood plus an application of  
Ordram were required to control dayflower, ducksalad, and  
annual grasses. Two applications of fungicide were made,  
and sheath blight pressure still had some influence on  
grain yields. Grain yields for all treatments were  
similar (Table 1).

Table 1. Influence of seedbed preparation on agronomic performance of water- and drill-seeded Lemont rice. Rice Research Station, South Unit, Crowley, LA. 1990.

| Cultural system | Seedbed preparation | Stand density             | Grain yield at 12% moisture |
|-----------------|---------------------|---------------------------|-----------------------------|
|                 |                     | (plants/ft <sup>2</sup> ) | (lb/A)                      |
| Water-seeded    | Conventional        | 15                        | 5851                        |
|                 | No-tillage          | 21                        | 5754                        |
|                 | Stale - fall        | 19                        | 5834                        |
|                 | Stale - spring      | 18                        | 6125                        |
|                 |                     |                           |                             |
| C.V., %         |                     | 14.8                      | 4.74                        |
| LSD (0.05)      |                     | ns                        | ns                          |
| Drill-seeded    | Conventional        | 24                        | 5828                        |
|                 | No-tillage          | 23                        | 5544                        |
|                 | Stale - fall        | 21                        | 5714                        |
|                 | Stale - spring      | 25                        | 5410                        |
|                 |                     |                           |                             |
| C.V., %         |                     | 9.1                       | 4.46                        |
| LSD (0.05)      |                     | ns                        | ns                          |

## NITROGEN MANAGEMENT IN FURROW-IRRIGATED LEMONT RICE

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

### INTRODUCTION

Rice produced in the United States is grown under flooded conditions. Attempts have been made to grow rice under upland conditions, using sprinkler irrigation to supplement rainfall to supply the water requirement for proper plant growth. Problems encountered included increased disease pressure, decreased weed control, and maintenance of fertilizer nitrogen (N).

Research was initiated in Missouri to evaluate the potential for growing rice under upland conditions using furrow irrigation. Many of the rice farmers also grow row crops and are familiar with traditional furrow irrigation for supplying supplemental water during periods of low rainfall. The objective of the research was to determine whether furrow irrigation could reduce the water requirement necessary for rice culture under flooded conditions. Preliminary results indicate a reduction in the traditional water requirement by 50%. Additional research is currently underway to address pest management and N fertilization in furrow-irrigated rice culture in Missouri. Arkansas has also initiated research to study the behavior of fertilizer N when introduced into the irrigation water.

Many rice farmers in Louisiana are also producing row crops such as cotton and soybeans, especially in the northeast section of the state, and emphasis on row crop irrigation to supplement rainfall is increasing. There appears to be some potential for farmers in these situations to use furrow irrigation to further diversify their farm operations. A study was initiated in 1988 to evaluate the potential for production of furrow-irrigated rice. The objective of the study was to investigate a number of N sources, N rates, and N timings to determine how N should be managed in upland rice culture.

### MATERIALS AND METHODS

Approximately 21 lb N/A and 60 lb/A  $P_2O_5$  and  $K_2O$  were preplant incorporated. Rows were formed with a 32-inch spacing, followed by conditioning with a roller harrow. Lemont rice was seeded at the rate of 110 lb/A with a no-till grain drill. Each flushing operation consisted of running irrigation water down the row middles until the seedbed was completely saturated. Nitrogen treatments were applied 2 weeks after rice emergence at the 3- to 4-leaf growth stage. This timing is comparable to a prelood (PF) application in a traditional dry-seeded cultural system. Three N sources were applied at different rates and timings. Urea, Super Urea (SU, a urea containing dicyandiamide manufactured by Agrico Chemical Company), and sulfur-coated urea



(SCU) were applied as a single PF application of 90, 120, or 150 lb/A, as a 2-way split with 2/3 PF and the remaining 1/3 at panicle initiation (PI), and as a 5-way split of 30 lb N/A at 7-day intervals beginning with a PF application.

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Plant height, grain moisture, and grain yield were measured. Water use was also estimated.

#### SUMMARY AND CONCLUSIONS

A field experiment was conducted at the South Unit of the Rice Research Station to evaluate the potential for growing rice under furrow-irrigated, upland conditions and to develop strategy for N management in such a system.

Unlike 1989 where slow early-season growth of the rice and the absence of a flood reduced the effectiveness of weed control, only one application of herbicide was required in 1990. In the 2 previous years of the study, either two or three applications were necessary. Closure of the rice canopy was much more rapid in 1990, eliminating additional weed pressure after treatment. The test area remained relatively weed-free for the remainder of the season.

Source of N had no influence on any of the agronomic characters measured. Grain yields were highest when N was applied at the rate of 90 lb/A, either as a single or split application, or when 150 lb/A were applied in increments of 30 lb/A at 7-day intervals. In the absence of a flood, multiple applications of a given amount of fertilizer N should be more available to the rice plant for a longer period of time than with single or split applications. The test area remained relatively wet during July and August due to rainfall, however, and efficiency of the pre-flood and 2-way split applications of N was increased. The higher rates of N (120 and 150) also increased the incidence of sheath blight, an indication of good early-season plant growth and efficient N utilization. In a dry season when weekly flushing is required, multiple applications of fertilizer N would probably be more appropriate than single or even 2-way applications.

A rough estimate of total water supplied in acre inches was determined. Approximately 20 inches of water were applied to the test area through furrow irrigation. An additional 13 inches of water were supplied through rainfall, resulting in 33 inches of total water supplied. Based on information generated at the Texas Research and Extension Center in 1988, a total of 42 inches of water were applied to a dry-seeded, flooded system. Runoff was determined to be 15 inches of water, resulting in a net water requirement of 27 inches. Runoff was not determined in this study. Based on total water applied through irrigation and



rainfall, the estimates for furrow-irrigated rice and flooded rice culture were similar.

Furrow-irrigated rice could have potential where water for flood irrigation is limited, since grain yields have been acceptable during the 3 years of this study. Studies initiated in Missouri regarding furrow irrigation addressed the concerns of water requirement in traditional dry-planted rice. These studies showed significant decreases in the amount of water required when furrow irrigation was used rather than flood management typical of dry-planted systems. Although water-use measurements were crude in this study, there does not appear to be any advantage in using furrow irrigation in southwest Louisiana. Without any advantage in water savings, the potential for this type of cultural system in Louisiana appears to be limited. The potential for weed and disease problems is much greater in this system due to the environmental conditions in Louisiana. Fertilization will also be a more expensive and higher risk input since N will need to be applied in multiple applications and with the addition of an inhibitor for stability and efficiency. With proper agronomic management, the traditional system is still the most efficient and economical means of producing rice in a dry-seeded cultural system.

Experiment: Nitrogen management for furrow-irrigated rice

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 6.0; O.M.: 1.49%;  
extractable nutrients (mg/kg): P-58, Na-106,  
K-116, Ca-1669, Mg-489, Zn-1.00, S-6.55,  
As-0.76, Fe-94.20

Variety/Seeding Rate: LMNT, 110 lb/A

Planting Method/Date: Drill-seeded, May 22

Fertilization: 20 lb N/A + 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; variable  
rates and timings of N preflood

Plot Size: 10 x 25 ft (250 ft<sup>2</sup>), 7.5-inch drill spacing

Emergence Date: June 3

Water Management: Furrow irrigated, May 24, June 2, June 8,  
June 18, Aug 30

Herbicides: 4.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Ronstar  
(oxadiazon), June 29

Insecticides: None

Fungicides: 0.28 lb ai/A Tilt (propiconazol), Aug 1

Harvest: Sep 17

Experimental Design: Split plot in a randomized complete block  
with three replications, N source assigned  
to main plots and rates to subplots

Comments: Stand establishment was slow, with good uniformity  
across the furrowed seedbed. Furrow irrigation was  
generally necessary once a week until mid-June. Rainfall  
supplied most of the water requirement during July and  
August. Severe sheath blight was observed at panicle  
initiation in some treatments, and had a significant  
influence on grain yield.

Table 1. Effect of N source, rate, and timing on agronomic performance of drill-seeded, furrow-irrigated Lemont rice. Rice Research Station, South Unit, Crowley, LA. 1990.

| Time of N*          |     |      | Plant height     |      |    |        | Grain yield at 12% moisture |      |      |        |
|---------------------|-----|------|------------------|------|----|--------|-----------------------------|------|------|--------|
| Total N             | PF  | PI   | Urea             | SCU  | SU | N Mean | Urea                        | SCU  | SU   | N Mean |
| ---(lb/A)---        |     |      | ----- (cm) ----- |      |    |        | ----- (lb/A) -----          |      |      |        |
| 90                  | 90  | --   | 63               | 66   | 69 | 66     | 3407                        | 4125 | 4046 | 3859   |
| 90                  | 60  | 30   | 65               | 65   | 68 | 66     | 4263                        | 4455 | 4306 | 4341   |
| 120                 | 120 | --   | 67               | 67   | 71 | 68     | 4221                        | 4227 | 4276 | 4242   |
| 120                 | 80  | 40   | 68               | 66   | 71 | 68     | 3965                        | 4503 | 3945 | 4138   |
| 150                 | 150 | --   | 73               | 65   | 68 | 69     | 4057                        | 4406 | 3781 | 4082   |
| 150                 | 100 | 50   | 71               | 72   | 67 | 70     | 3935                        | 4582 | 3636 | 4051   |
| 150                 | 30  | --** | 65               | 72   | 68 | 68     | 3867                        | 4689 | 4348 | 4301   |
| Source mean         |     |      | 67               | 68   | 69 |        | 3959                        | 4427 | 4048 |        |
| C.V., %             |     |      |                  | 4.36 |    |        |                             | 7.84 |      |        |
| LSD (0.05):         |     |      |                  |      |    |        |                             |      |      |        |
| Source              |     |      |                  |      | ns |        |                             |      | ns   |        |
| Split               |     |      |                  |      | ns |        |                             |      | 311  |        |
| Split within source |     |      |                  |      | ns |        |                             |      | 467  |        |
| Split across source |     |      |                  |      | ns |        |                             |      | 611  |        |

\* Time of N: PF = preflood; PI = panicle initiation.

\*\* Approximately 30 lb N/A was applied at 7-day intervals beginning with a PF application for a total of five applications.

## EVALUATION OF NBPT AS A UREASE INHIBITOR IN DRILL-SEEDED LEMONT RICE

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

### INTRODUCTION

Profitable rice production is greatly influenced by uptake and efficiency of fertilizer nitrogen (N). Nitrogen source, rate, time of application, placement, rice variety, water management, and environmental conditions influence efficiency of applied fertilizer N. Denitrification, volatilization, and leaching can lead to large losses of applied N and decreased grain yields with improper management of fertilizer N. In a dry-seeded cultural system, fertilizer N applied to a dry seedbed just prior to establishment of the permanent flood is efficiently utilized by the rice plant.

Proper application in relation to water management has a significant influence on retention and availability of applied N. Although efficiency is increased when an application of fertilizer N is made just prior to establishment of the permanent flood, it is often difficult for a farmer to flood a rice field within a short period of time. The longer fertilizer N is left on the soil surface without establishment of the permanent flood the greater the risk for losses due to nitrification-denitrification, urea hydrolysis, and ammonia volatilization. An inhibitor that delays urea hydrolysis by inhibiting the enzyme urease and reducing the potential for ammonia volatilization could improve efficiency of fertilizer N in dry-seeded rice.

The objectives of this preliminary investigation were to: 1) determine the influence of pre-flood and post-flood urea-N applications on drill-seeded Lemont rice and 2) evaluate the effectiveness of N-(n-butyl)thiophosphoric triamide (NBPT) in improving efficiency of urea-N by inhibiting urease.

### MATERIALS AND METHODS

The long-grain semidwarf variety Lemont was used in the study. Approximately 60 lb/A  $P_2O_5$  and  $K_2O$  were banded 2 inches deep, and Lemont was drill-seeded at the rate of 100 lb/A. The test area was flushed periodically for emergence and stand establishment. Urea-N with and without NBPT was surface broadcast at 3-day intervals beginning 9 days prior to permanently flooding, with the final application being made 6 days after establishment of the permanent flood for a total of six times of application. Rates of 60 and 120 lb N/A were applied for each material.

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at

field maturity. Days to 50% heading, plant height, grain moisture, and grain yield were determined.

#### SUMMARY AND CONCLUSIONS

A field experiment was conducted at the Rice Research Station to evaluate the effectiveness of NBPT as a urease inhibitor in drill-seeded rice.

An application of NBPT-amended urea had little influence on the performance of Lemont when compared to urea without the inhibitor (Table 1). Days to 50% heading and plant height were only slightly influenced while there was no significant influence on grain yield. Nitrogen rate had a significant effect on plant growth, increasing plant height and days to 50% heading with increasing N. There was no influence on grain yield, however, since severe sheath blight limited yield potential of Lemont when fertilized with 120 lb N/A. A rate of 120 lb N/A is considered to be optimum for the variety Lemont when grown on a Crowley silt loam soil, and grain yields should have been significantly higher at this rate of application. Timing of N application did have a significant influence on N efficiency and grain yields. Grain yields were highest when N was applied preflood, even when N application preceded flooding by 9 days. Yields were significantly lower when N applications were made after permanent flood establishment.

During late vegetative and early reproductive growth there appeared to be a significant influence of the NBPT-amended urea on growth of Lemont in the 1989 study. There was never any visual indication that the NBPT-amended urea performed any better than urea in 1990. Results of this 2-year study indicate that the inhibitor NBPT has little potential for improving efficiency of urea fertilizers in dry-seeded, flooded rice culture. Although there appeared to be improvement in N efficiency based on visual assessment in 1989, no differences were observed in 1990. There were no differences in grain yield either year between urea and NBPT-amended urea.

At the present time, proper cultural practices regarding N application and water management are still the best tools available to insure efficient utilization of fertilizer N for optimum grain yields. Timing of urea-N application in relation to water management significantly influences uptake and utilization. Efficiency of urea is definitely reduced when urea is applied postflood in seedling rice. Urea efficiency is also increased when the time between application and permanent flood establishment is 3 days or less. This study also indicates that while there is potential for urea-N loss when permanent flood establishment is delayed, efficiency of urea-N is still greater when an application is made up to 9 days preflood rather than making a postflood application.

Experiment: Urease inhibitor (NBPT) study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.08%;  
extractable nutrients (mg/kg): P-45, Na-56,  
K-75, Ca-1215, Mg-218, Zn-0.46, S-6.26,  
As-0.00, Fe-69.31

Variety/Seeding Rate: LMNT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; N source, urea with and  
without NBPT

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: Apr 23

Water Management: Flushed, Apr 19, Apr 26, May 3, May 15;  
flooded, May 23; harvest drainage, Aug 6

Herbicides: 3.5 lb ai/A Arrosolo (molinate + propanil), May 7;  
3.75 lb ai/A Ordram (molinate), May 24;  
0.6 oz ai/A Londax (bensulfuron-methyl), May 30

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 12

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 lb ai/A  
Benlate (benomyl), June 29

Harvest: Aug 17

Experimental Design: Randomized complete block with four  
replications, factorial arrangement of  
treatments

Comments: Response to applications of preflood N was observed  
within 5 days of application. Deficiency symptoms were  
observed 2 weeks after flooding at a N rate of 60 lb/A when  
applied 9 or 6 days prior to permanent flood. Onset of N  
deficiency was delayed at higher N and when the N was  
applied within 3 days of permanent flood. Postflood  
applications of either source resulted in significant N  
loss as evidenced by severe deficiency symptoms occurring 4  
weeks after permanent flood establishment. Yield potential  
of treatments receiving 120 lb N/A was reduced by severe  
sheath blight.

Table 1. Influence of nitrogen rate, time of application, and NBPT on agronomic performance of drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Source              | Rate   | Time of application | Days to 50% heading | Plant height | Grain yield |
|---------------------|--------|---------------------|---------------------|--------------|-------------|
|                     | (lb/A) |                     |                     | (cm)         | (lb/A)      |
| Urea                | 60     | 9 days pre          | 76                  | 69           | 6322        |
| Urea                | 60     | 6 days pre          | 77                  | 64           | 6214        |
| Urea                | 60     | 3 days pre          | 81                  | 73           | 6583        |
| Urea                | 60     | 0 days pre          | 81                  | 73           | 6841        |
| Urea                | 60     | 3 days post         | 78                  | 64           | 5910        |
| Urea                | 60     | 6 days post         | 79                  | 65           | 6028        |
| Urea                | 120    | 9 days pre          | 79                  | 74           | 6521        |
| Urea                | 120    | 6 days pre          | 79                  | 74           | 6684        |
| Urea                | 120    | 3 days pre          | 84                  | 79           | 6238        |
| Urea                | 120    | 0 days pre          | 86                  | 83           | 6675        |
| Urea                | 120    | 3 days post         | 79                  | 66           | 6274        |
| Urea                | 120    | 6 days post         | 79                  | 67           | 6009        |
| NBPT                | 60     | 9 days pre          | 76                  | 72           | 6431        |
| NBPT                | 60     | 6 days pre          | 80                  | 71           | 6464        |
| NBPT                | 60     | 3 days pre          | 82                  | 74           | 6574        |
| NBPT                | 60     | 0 days pre          | 83                  | 74           | 6901        |
| NBPT                | 60     | 3 days post         | 79                  | 64           | 5934        |
| NBPT                | 60     | 6 days post         | 79                  | 65           | 5665        |
| NBPT                | 120    | 9 days pre          | 81                  | 77           | 6570        |
| NBPT                | 120    | 6 days pre          | 83                  | 80           | 6296        |
| NBPT                | 120    | 3 days pre          | 86                  | 83           | 6472        |
| NBPT                | 120    | 0 days pre          | 86                  | 79           | 6282        |
| NBPT                | 120    | 3 days post         | 79                  | 66           | 6139        |
| NBPT                | 120    | 6 days post         | 79                  | 64           | 5877        |
| C.V.%               |        |                     | 1.16                | 2.82         | 5.12        |
| LSD (0.05)          |        |                     | 1                   | 3            | 457         |
| <u>Main effects</u> |        |                     |                     |              |             |
| Source:             |        |                     |                     |              |             |
| Urea                |        |                     | 80                  | 71           | 6358        |
| NBPT                |        |                     | 81                  | 72           | 6300        |
| LSD (0.05)          |        |                     | 1                   | 1            | ns          |
| N rate:             |        |                     |                     |              |             |
| 60                  |        |                     | 79                  | 69           | 6322        |
| 120                 |        |                     | 82                  | 74           | 6336        |
| LSD (0.05)          |        |                     | 1                   | 1            | ns          |
| Time:               |        |                     |                     |              |             |
| 9 days pre          |        |                     | 78                  | 73           | 6461        |
| 6 days pre          |        |                     | 80                  | 72           | 6414        |
| 3 days pre          |        |                     | 83                  | 77           | 6467        |
| 0 days pre          |        |                     | 84                  | 78           | 6675        |
| 3 days post         |        |                     | 79                  | 66           | 6064        |
| 6 days post         |        |                     | 79                  | 65           | 5895        |
| LSD (0.05)          |        |                     | 1                   | 2            | 228         |



# EVALUATION OF NBPT AS A UREASE INHIBITOR AND COATED CALCIUM CARBIDE AS A NITRIFICATION INHIBITOR IN DRILL-SEEDED LEMONT RICE

P.K. Bollich, A.R. Mosier, K. Bronson, W.J. Leonards, Jr.,  
and D.M. Walker

## INTRODUCTION

Profitable rice production is greatly influenced by uptake and efficiency of fertilizer nitrogen (N). Nitrogen source, rate, time of application, placement, rice variety, water management, and environmental conditions influence efficiency of applied fertilizer N. Denitrification, volatilization, and leaching can lead to large losses of applied N and decreased grain yields with improper management of fertilizer N. In a dry-seeded cultural system, fertilizer N applied to a dry seedbed just prior to establishment of the permanent flood is efficiently utilized by the rice plant.

Proper application in relation to water management can have a significant influence on retention and availability of applied N. Some estimates, however, place losses as high as 30-70% of the total mineral N. Inhibitors that delay urea hydrolysis by inhibiting the enzyme urease and reduce the potential for ammonia volatilization could improve efficiency of fertilizer N in dry-seeded rice. Conservation of N and increased uptake and efficiency could be improved with the use of inhibitors. One such inhibitor is N-(n-butyl)thiophosphoric triamide (NBPT) and has been shown to inhibit urease activity in rice systems. A new nitrification inhibitor, coated calcium carbide (CCC), shows promise in conserving N and increasing rice yield in transplanted rice. Losses of N from urease activity and the nitrification-denitrification mechanism can be quite significant in flooded rice culture. Reduction in N losses from either or both of these mechanisms would improve N retention in the soil, increase availability of N to the rice plant, and improve overall efficiency of fertilizer N.

The objective of this preliminary investigation was to evaluate the effectiveness of NBPT and CCC when used alone and in combination in improving efficiency of urea-N by inhibiting urease activity and nitrification.

## MATERIALS AND METHODS

The long-grain semidwarf variety Lemont was used in the study. Approximately 60 lb/A  $P_2O_5$  and  $K_2O$  were banded 2 inches deep, and Lemont was drill-seeded at the rate of 100 lb/A. The test area was flushed periodically for emergence and stand establishment. Urea-N with and without NBPT and CCC were broadcast prior to permanently flooding 4 weeks after emergence.



Rates of 60 and 120 lb N/A were applied for each material. Metal barriers were placed around all plots receiving CCC. Application rate of CCC was 18 kg  $\text{CaC}_2/\text{A}$ . The NBPT was applied at a rate of 0.33% (by weight of urea).

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Days to 50% heading, plant height, grain moisture, and grain yield were determined.

#### SUMMARY AND CONCLUSIONS

A field experiment was conducted at the Rice Research Station to evaluate the effectiveness of NBPT and CCC as urease and nitrification inhibitors, respectively, in drill-seeded rice.

An application of NBPT-amended urea had little influence on the performance of Lemont when compared to urea without the inhibitor (Table 1). There was no influence on days to 50% heading, plant height, or grain yield. Urea amended with CCC also had no influence on maturity, but did increase plant height and grain yield, especially at the higher rate of N. Urea plus both inhibitors behaved similarly, having no effect on maturity but increasing plant height and grain yield. The highest yielding treatment combinations included both NBPT and CCC.

A set of contrasts are also included in Table 1. These are specific statistical comparisons between urea, each individual inhibitor, a combination of the two inhibitors, and between inhibitors. There was no difference between urea and NBPT-amended urea in their effect on the agronomic variables. When CCC was applied with urea, however, plant height and grain yield were increased, indicating that more urea-N was available to the rice plant. Yields were also increased when both inhibitors were present. A comparison between inhibitors was significant, with yields being greater when CCC was applied. These comparisons suggest that the yield increases observed were due to CCC inhibiting nitrification while there was little influence of NBPT on urease activity.

This study indicates some potential for using CCC in flooded rice culture for N conservation. Since the test was flooded immediately after fertilizer N application, the potential loss of urea-N due to urease activity was minimized, and possibly limited the potential benefit of NBPT.

Experiment: Urease (NBPT) and nitrification (CCC) inhibitor study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.6; O.M.: 1.36%; extractable nutrients (mg/kg): P-58, Na-61, K-77, Ca-1448, Mg-196, Zn-0.46, S-6.36, As-0.00, Fe-63.47

Variety/Seeding Rate: LMNT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; N source, urea with and without NBPT and CCC

Plot Size: 7 x 25 ft (175 ft<sup>2</sup>)

Emergence Date: Apr 23

Water Management: Flushed, Apr 19, Apr 26, May 3, May 15; flooded, May 23; harvest drainage, Aug 6

Herbicides: 3.5 lb ai/A Arrosolo (molinate + propanil), May 7; 3.75 lb ai/A Ordram (molinate), May 24; 0.6 oz ai/A Londax (bensulfuron-methyl), May 30

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 12

Fungicides: 0.5 lb ai/A Rovral (iprodione), June 20; 0.5 ai/A Benlate (benomyl), June 29

Harvest: Aug 16

Experimental Design: Randomized complete block with four replications of eight treatments

Comments: Response to applications of preflood N was observed within 5 days of application. Deficiency symptoms were observed at midseason at the lower rate of N. Yield potential of treatments receiving 120 lb N/A was reduced by severe sheath blight.

Table 1. Influence of nitrogen rate and urease and nitrification inhibitors on agronomic performance of drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Source             | Rate   | Days to 50% heading | Plant height | Grain yield |
|--------------------|--------|---------------------|--------------|-------------|
|                    | (lb/A) |                     | (cm)         | (lb/A)      |
| Urea               | 60     | 81                  | 75           | 6671        |
| Urea               | 120    | 85                  | 79           | 6311        |
| Urea+NBPT          | 60     | 81                  | 73           | 6587        |
| Urea+NBPT          | 120    | 85                  | 82           | 6611        |
| Urea+CCC           | 60     | 80                  | 77           | 6837        |
| Urea+CCC           | 120    | 85                  | 84           | 7433        |
| Urea+NBPT+CCC      | 60     | 80                  | 76           | 7266        |
| Urea+NBPT+CCC      | 120    | 85                  | 83           | 7409        |
| C.V.%              |        | 1.01                | 2.90         | 5.99        |
| LSD (0.05)         |        | 2                   | 4            | 722         |
| <u>Contrasts:</u>  |        |                     |              |             |
| Urea vs NBPT       |        | ns                  | ns           | ns          |
| Urea vs CCC        |        | ns                  | *            | *           |
| Urea vs NBPT + CCC |        | ns                  | ns           | *           |
| NBPT vs CCC        |        | ns                  | ns           | *           |

\* Denotes significance at the 0.05 level of probability according to analysis of variance.

# AN EVALUATION OF THE POTENTIAL BENEFITS OF CURRENTLY RECOMMENDED BEST MANAGEMENT PRACTICES ON SUSTAINABILITY OF RICE PRODUCTION IN LOUISIANA

P.K. Bollich, W.J. Leonards, Jr., and D.M. Walker

## INTRODUCTION

The development and adaptation of advancing agricultural technology has allowed rice production to evolve into an intensively managed and highly productive system. Production increases can be attributed to the release of superior varieties, refinement in management technology, use of inorganic fertilizers, and pest control by chemical means.

The advancements that modern agriculture have made and the positive impact on worldwide food production are quite obvious. There is increasing concern, however, that many of the significant gains made by this highly productive agricultural machine has begun to adversely affect the environment. In recent years considerable interest has developed concerning the misuse or overuse of water, inorganic fertilizers, and chemical pesticides. Research initiatives have been re-directed to examine this issue more closely, and this has resulted in wide differences of opinion regarding the future thrusts of agriculture. The agricultural/environmental issue has resulted in the formulation of three basic philosophies: 1) the elimination of all inorganic fertilizers and man-made pesticides, relying solely on organic inputs, hand labor, and mechanical pest control, 2) the reduction in use of inorganic fertilizers and man-made pesticides and increased use of complementary organic amendments and mechanical pest control, and 3) the utilization of the best agricultural technology available for a high-input, high output production system. Although these philosophies are very different, each contend that the ultimate objective is to provide safe, nutritious food to feed the world's growing population and at the same time protect and maintain the environment.

A study was initiated at the Rice Research Station, Crowley, LA, in 1990 to evaluate the potential benefits of currently recommended agronomic practices in rice. No attempt was made to compare any of the philosophical differences previously mentioned. This study simply attempts to 1) estimate the contribution of inorganic fertilizers and chemical pesticides to rice production, and 2) assess the environmental impact of these inputs.

## MATERIALS AND METHODS

Approximately 21 lb N/A and 60 lb/A  $P_2O_5$  and  $K_2O$  were preplant incorporated in all treatments except the no fertilizer and no input treatments. Pesticides were applied to their

respective treatments as required throughout the season. The no input treatment received no pesticide applications. Lemont rice was seeded at the rate of 100 lb/A. Water samples were collected after each flushing for nutrient residue analysis. Approximately 135 lb N/A were applied preflood 3 weeks after emergence (3- to 4-leaf growth stage), and the plots were later topdressed with an additional 21 lb N/A. A shallow, permanent flood was maintained until harvest drainage. Water samples were collected during harvest drainage for analysis of nutrient and pesticide residues. Soil and rice plant grain and straw samples were collected at harvest for pesticide residue analysis.

Individual whole plots were combine-harvested at field maturity. Plant height, grain moisture, and grain yield were measured.

#### SUMMARY AND CONCLUSIONS

A field experiment was conducted at the Rice Research Station to estimate the impact of inorganic fertilizers and pesticides on rice production and on the environment.

Application of inorganic fertilizers and the use of herbicides had the most significant influence on grain yield (Table 1). Grain yield was increased over 60% when inorganic fertilizer was used. The use of herbicides contributed a 20% increase in grain yield. Yield was decreased over 500 lb/A when insecticides were not used, although the difference was not significant. The only insecticide required in this study was Furadan for the control of the rice water weevil larvae. There was very little disease development in this study, and although a fungicide was not required by the crop, an application was still made in order to monitor residue in the crop, the soil, and floodwater after application.

There was a difference in grain yield of over 4000 lb/A between best management and no input. The lower grain yield where no inputs were used can be largely attributed to crop competition with weeds and a lack of fertilizer N. Over time it is probable that yield decreases related to weed competition and inadequate nutrition would become larger.

Residue analysis for pesticides used in this study is shown in Table 2. This data represents residue in the floodwater at the time of harvest drainage. Analyses of rice grain, straw, and soil have not been completed. Residue was found for Basagran and Tilt at very low levels. No residue was detected for the other pesticides.

Analyses of floodwater samples taken after the first flush and at harvest drainage are shown in Tables 3 and 4. There were generally very small differences in the amount of nutrients contained in floodwater samples taken from best management and no

input treatments. These elements are naturally occurring and no difference in loss was expected. There was little indication that the fertilizer nutrients P, K, and Zn added to the best management plots were being released in the floodwater at a greater rate than in the no input treatment where these nutrients were not applied. There also does not appear to be much difference in nutrient loss from floodwater samples taken after the first flush or during harvest drainage.

Further studies are necessary to determine the impact of currently recommended rice production practices not only on the environment but also on the economic viability of current rice production systems. Decreases in recommended inputs may be feasible at certain times, especially if rice crops are carefully monitored. Overall blanket reductions of some of these inputs, however, could be detrimental to productive and economically viable rice production systems. The long-term effects of such changes need serious evaluation.

**Experiment:** Sustainable agriculture study

**Location:** Rice Research Station

**Soil Type/Analysis:** Crowley silt loam; pH: 6.9; O.M.: 1.23%;  
extractable nutrients (mg/kg): P-59, Na-96,  
K-93, Ca-1527, Mg-266, Zn-3.24, S-12.85,  
As-0.00, Fe-62.03

**Variety/Seeding Rate:** LMNT, 100 lb/A

**Planting Method/Date:** Drill-seeded, May 16

**Fertilization:** 60 lb/A  $P_2O_5$  and  $K_2O$  ppi; nitrogen source, urea  
preflood (155 lb N/A) + ammonium sulfate topdress  
(21 lb N/A)

**Plot Size:** 60 x 85 ft (5100 ft<sup>2</sup>)

**Emergence Date:** May 22

**Water Management:** Flushed, May 24, June 5; flooded, June 13;  
harvest drainage, Aug 27

**Herbicides:** 3.0 lb ai/A Stam (propanil) + 0.75 lb ai/A Basagran  
(bentazon), June 12; 3.75 lb ai/A Ordram (molinate),  
June 20; 1.0 oz ai/A Londax (bensulfuron-methyl),  
June 20

**Insecticides:** 0.6 lb ai/A Furadan (carbofuran), June 29

**Fungicides:** 0.28 lb ai/A Tilt (propiconazol), July 30

**Harvest:** Sep 14

**Experimental Design:** Randomized complete block with three  
replications of six treatments

**Comments:** Response to applications of preflood N was observed  
within 5 days of application. Deficiency symptoms were  
observed at mid-tillering where no N was applied. Moderate  
weed pressure was observed in the absence of herbicide  
application. Severe root pruning and reduced plant growth  
were observed where the rice water weevil was not  
controlled.

Table 1. Influence of recommended agronomic inputs on performance of drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Treatment               | Days to 50% heading | Plant height | Grain yield |
|-------------------------|---------------------|--------------|-------------|
|                         |                     | (cm)         | (lb/A)      |
| Best management         | 77                  | 76           | 6135        |
| No inorganic fertilizer | 76                  | 55           | 2391        |
| No herbicides           | 76                  | 77           | 4892        |
| No insecticides         | 77                  | 73           | 5591        |
| No fungicides           | 76                  | 78           | 6650        |
| No inputs               | 76                  | 53           | 2007        |
| C.V.%                   | 1.15                | 7.85         | 11.72       |
| LSD (0.05)              | ns                  | 10           | 983         |

Table 2. Rice field floodwater residue analysis for pesticides used in drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Pesticide          |            | Detection    |
|--------------------|------------|--------------|
| Common name        | Trade name |              |
| Bentazon           | Basagran   | 2.5 ppb      |
| Molinate           | Ordram     | ND @ 1.6 ppb |
| Propanil           | Stam       | ND @ 0.1 ppb |
| Carbofuran         | Furadan    | ND @ 2.2 ppb |
| Propiconazol       | Tilt       | 8.3 ppb      |
| Bensulfuron-methyl | Londax     | -----*       |

\* Analysis for this pesticide has not yet been determined.



Table 3. Analysis of water quality parameters of rice field floodwater from drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Element    | Best management    | No input | Difference* |
|------------|--------------------|----------|-------------|
|            | ----- (mg/L) ----- |          |             |
| Sodium     | 73.05              | 74.90    | -1.85       |
| Molybdenum | 0.00               | 0.00     | 0.00        |
| Magnesium  | 19.09              | 18.99    | 0.10        |
| Calcium    | 19.21              | 20.84    | -1.63       |
| Phosphorus | 0.023              | 0.00     | 0.023       |
| Potassium  | 3.806              | 3.961    | -0.155      |
| Aluminum   | 0.000              | 0.000    | 0.000       |
| Iron       | 0.003              | 0.000    | 0.003       |
| Zirconium  | 0.000              | 0.000    | 0.000       |
| Titanium   | 0.000              | 0.000    | 0.000       |
| Vanadium   | 0.001              | 0.002    | -0.001      |
| Antimony   | 0.046              | 0.035    | 0.011       |
| Zinc       | 0.025              | 0.024    | 0.001       |
| Cadmium    | 0.005              | 0.004    | 0.001       |
| Beryllium  | 0.000              | 0.000    | 0.000       |
| Barium     | 0.255              | 0.275    | -0.020      |
| Chromium   | 0.002              | 0.004    | -0.002      |
| Copper     | 0.010              | 0.012    | -0.002      |
| Nickel     | 0.006              | 0.000    | 0.006       |
| Manganese  | 0.001              | 0.000    | 0.001       |
| Lead       | 0.039              | 0.000    | 0.039       |
| Cobalt     | 0.000              | 0.000    | 0.000       |
| Sulfur     | 1.615              | 2.267    | -0.652      |
| Arsenic    | 0.000              | 0.000    | 0.000       |
| Silicon    | 17.68              | 17.33    | 0.35        |

\* These analyses correspond to floodwater samples taken when water was released during the initial flush (5-24-90).

Table 4. Analysis of water quality parameters of rice field floodwater from drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1990.

| Element            | Best management | No input | Difference* |
|--------------------|-----------------|----------|-------------|
| ----- (mg/L) ----- |                 |          |             |
| Sodium             | 94.02           | 94.84    | -0.82       |
| Molybdenum         | 0.03            | 0.01     | 0.01        |
| Magnesium          | 14.97           | 13.75    | 1.22        |
| Calcium            | 28.33           | 17.79    | 10.54       |
| Phosphorus         | 0.042           | 0.013    | 0.029       |
| Potassium          | 3.597           | 2.890    | 0.707       |
| Aluminum           | 0.000           | 0.000    | 0.000       |
| Iron               | 0.114           | 0.060    | 0.054       |
| Zirconium          | 0.000           | 0.000    | 0.000       |
| Titanium           | 0.003           | 0.001    | 0.002       |
| Vanadium           | 0.002           | 0.001    | 0.001       |
| Antimony           | 0.052           | 0.059    | -0.007      |
| Zinc               | 0.033           | 0.035    | -0.002      |
| Cadmium            | 0.004           | 0.006    | -0.002      |
| Beryllium          | 0.000           | 0.000    | 0.000       |
| Barium             | 0.435           | 0.469    | -0.034      |
| Chromium           | 0.002           | 0.002    | 0.000       |
| Copper             | 0.004           | 0.002    | 0.002       |
| Nickel             | 0.012           | 0.004    | 0.008       |
| Manganese          | 0.176           | 0.180    | -0.004      |
| Lead               | 0.077           | 0.017    | 0.060       |
| Cobalt             | 0.002           | 0.001    | 0.001       |
| Sulfur             | 1.004           | 0.724    | 0.280       |
| Arsenic            | 0.009           | 0.014    | -.005       |
| Silicon            | 13.03           | 16.94    | -3.91       |

\* These analyses correspond to floodwater samples taken when water was released during harvest drainage (8-27-90).

## FOUNDATION SEED RICE PROGRAM

Lawrence M. White, III

### INTRODUCTION

Foundation seed rice has been produced by the Rice Research Station for distribution to Louisiana farmers since 1949. The station's seed rice program was instituted in response to the critical shortage of pure planting stocks which existed during and after World War II. Since its inception, the program has made available to Louisiana growers over 103,000 cwt. of pedigreed stock of 23 rice varieties.

Concurrent with the distribution of pure seed by the Rice Research Station, there developed in Louisiana an industry comprised of independent seed dealers through whom farmers could conduct trade in registered and certified classes of pedigreed rice.

Foundation seed rice, the planting stock from which registered and certified seed are produced, is the farmers link with the work of the plant breeder. It is the product of hybridization and of successive generations of selection and testing to establish its value as crop seed and eventually as a commercial commodity. For this reason, foundation seed and the basic stocks from which it is produced, must be grown and conditioned in a manner which will insure that viability is maintained and that it be genetically pure and free from mechanical mixtures or contamination by noxious weeds.

Through the Rice Research Station's seed program, Louisiana farmers may obtain seed rice of improved varieties developed through the Louisiana Agricultural Experiment Station breeding program and of established commercial varieties originating either at Crowley or at research centers in neighboring states.

In order to fulfill the objectives of the seed program, the Rice Research Station utilizes the personnel, land, machinery, and other facilities needed to plant, harvest, condition, and store its annual seed rice crop. The production of breeder seed, planting stock for the foundation fields, and the maintenance of purity in commercial rice varieties are functions of the seed program. Breeder seed is sometimes grown within fields of foundation rice, or in a special nursery, set aside for propagating the Rice Research Station's seed stocks. The nursery also serves as a site for evaluating, purifying, and increasing selections from the Louisiana Agricultural Experiment Station breeding program which show promise as new varieties.

The distribution of pedigreed seed rice produced by the Rice Research Station is done according to a formula adopted by the Louisiana Seed Rice Growers Association. For each rice producing parish, the amount of seed allotted to an individual parish is determined by the percentage of the states total rice acreage grown in that parish during the previous crop year.

Personnel of the Louisiana Cooperative Extension Service in cooperation with parish committees of the Seed Rice Growers Association assist in the allocation of foundation seed rice. It is at the parish committee level that the allocation

of seed to individual growers is decided. The county agents receive applications for seed rice from growers and handle information and publicity for the pure seed program.

In this state, the official seed certifying agency for all crops is the Louisiana Department of Agriculture. The rules and regulations pertaining to the certification of agricultural seeds are part of the Louisiana Seed Law. They are formulated by the Louisiana Seed Commission and enforced by Agronomic Programs Division of the Louisiana Department of Agriculture. Personnel of the Agronomic Programs Division, operating from district offices conduct field inspections of growing rice and sampling of bagged rice for laboratory analyses which consist of purity determinations and germination tests.

### PRODUCTION PRACTICES

Each year, the Rice Research Station devotes approximately 80 acres of land to the production of foundation seed rice. In order to eliminate noxious weeds, especially red rice, which can disqualify rice from certification, the fields are fallowed for a 2-year period preceding planting. This also enables the fields to meet the crop history requirements specified in the seed rice regulations.

Following seedbed preparation, foundation fields are planted by means of a 16-runner grain drill. A basal application of fertilizer (20-60-60 lb/A of NPK) is made at the time of seeding. The breeder stock is planted at the rate of approximately 100 lb/A. The rice receives a preflood application of urea in which the rate of N may vary from 45 to 90 lb/A.

Seedling grasses and weeds are controlled by means of commercially available herbicides, applied by airplane. Similarly, aerial applications of insecticides are used to protect the fields from outbreaks of harmful insects.

Roguing of the rice fields for the removal of off-types, varietal mixtures, and noxious weeds, begins at the onset of heading and continues until the rice is harvested. During this interval, the headed rice is inspected by personnel of the Agronomic Programs Division to determine whether or not it meets minimum field standards of the certifying agency.

The rice is harvested with a conventional combine, and dried in the Rice Research Station's continuous flow drier to a moisture level of approximately 12%. During the storage period between drying and cleaning, the rice is treated with an insecticide in order to protect it from stored-grain insects.

Cleaning of foundation and breeder seed usually commences in late October and continues until late December. The rice first moves through an air-and-screen cleaner which removes chaff, straw, and other foreign material and grades the grain according to width and thickness.

It then flows through two sets of length grading machines which consist of rotating, indented metal cylinders. The first set of cylinders removes stemmy rice, grains which have very long awns of which are attached to portions of the panicle. The second set removes small grains and broken or dehulled kernels of rice.

In the final phase of cleaning, the rice moves through a machine which performs diameter grading of the grain by means of rapidly oscillating perforated screens. This machine is designed to separate medium-grain and/or red rice from long-grain rice. It is also capable of removing shrivelled and other slender kernels from medium-grain rice.

From the cleaning machines, foundation and breeder seed rice flow directly into a treater which applies a measured quantity of liquid fungicide for protection of young rice plants from seedling disease. The rice is bagged as it comes from the treater, assigned a lot number, and placed in storage in the Station's seed rice warehouse where it remains until the time that it is distributed to Louisiana farmers.

The field and laboratory purity standards for foundation seed rice are very strict with regard to varietal mixtures and noxious weeds. In all phases of production, therefore, great care must be exercised in order to prevent these impurities from contaminating the seed stocks. To that end, it is routine procedure at the Rice Research Station to partially disassemble all planting and harvesting equipment and to clean it thoroughly with water and/or compressed air before using it in the field. The drier and cleaning plant, including all elevators and other conveying equipment, are also subjected to meticulous cleaning and inspection before and after having been used in stubble fields. Therefore, tractors, plows, harrows, and land levelers are carefully washed before they enter land which is in a fallow cycle. These measures, together with the inspection and rouging which are done during the growing season, help to insure that foundation seed is genetically pure and free of mechanical mixtures and noxious weed seeds.

#### 1990 ACTIVITIES

Of the 2046 cwt. of foundation seed rice sold in March 1990, the varieties and quantities were as follows: Lemont, 1201 cwt.; Tebonnet, 445 cwt.; Rico I, 220 cwt.; and Mercury, 180 cwt.

The Rice Research Station's foundation seed crop in 1990 consisted of 23.27 acres of Lemont, 21.26 acres of Mars, 17.08 acres of Rico I, and 6.00 acres of LA 2201, an experimental long-grain variety, subsequently named 'Lacassine.'

Breeder seed was grown in 1990 as follows: Lemont, .75 acre; Mars, .80 acre; Rico I, .70 acre; Maybelle, .35 acre; Texmont, .25 acre; and Gulfmont, .15 acre.

Headrows of Lemont, Mars, Jasmine 85, and Rico I were also grown in 1990.

## BIRD MANAGEMENT IN RICE

### BLACKBIRD PREFERENCE FOR TWO RICE VARIETIES

S.D. Linscombe, E.A. Wilson, and G.A. Harper

Blackbird damage to maturing rice results in locally severe yield losses each year. The problem is particularly acute where rice is grown in close proximity to the coastal marshes of southwestern Louisiana.

Varietal test plots at Pine Island (Vermilion Parish) have sustained high bird pressure each year, and examination of these plots has revealed variability in the severity of blackbird damage among certain rice varieties. One possible explanation for this variability is that varieties are subject to variable amounts of bird pressure related to their maturation rates. Another possibility is that blackbirds feed preferentially on certain rice varieties because of some physical characteristics of the rice plant.

This test was conducted to examine a possible relationship between grain length and blackbird damage to maturing rice.

One long-grain variety (Lemont) and one medium-grain variety (Mercury) were selected for comparison. These varieties were chosen because of their similar plant heights and heading dates.

Plots of Mercury and Lemont that were planted as part of a commercial variety test were protected from blackbird damage by enclosing with 1-inch mesh plastic bird netting. Plots of Mercury and Lemont that were unprotected from blackbird damage were grown adjacent to the protected plots.

**Experiment:** Blackbird Preference Test

**Location:** Vermilion Parish, Bobby Trahan Farm

**Seeding Rate/Date:** 100 lb/A, Apr 12, 1990

**Planting Method:** Drill-seeded

**Fertilization:** 60-60-60 (lb/A N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) preplant incorporated, Apr 12;  
70 lb/N, May 14

**Plot Size:** 4.66 x 16 ft (74.5 ft<sup>2</sup>)

**Water Management:** Flushed, Apr 14; flooded, May 14; harvest drainage, Aug 5

**Herbicides:** Arrosolo, 3 lb ai/A (propanil and molinate), May 11

**Harvest:** Aug 17

**Comments:** Inside the enclosure (protected from bird damage), mean yield for Mercury and Lemont were similar (Table 1). In the unprotected area, differences in blackbird damage to Mercury and Lemont panicles were visible before harvest with Mercury receiving the greatest damage. Mean plot yield was less for Mercury than for Lemont, suggesting a possible blackbird preference for medium-grain varieties over long-grain varieties. These data were not statistically analyzed as this was a preliminary test to determine if any varietal selectivity by blackbird could be detected. This test will be expanded in 1991 to include several additional varieties and will be designed to facilitate statistical analysis.

Table 1. Mean yields of Mercury and Lemont rice grown inside a bird-proof enclosure and in an adjacent unprotected area.

| Variety | Yield (lb/A at 12%) |             |
|---------|---------------------|-------------|
|         | Protected           | Unprotected |
| Mercury | 3798                | 2876        |
| Lemont  | 4133                | 3918        |

## RICE PHYSIOLOGY

### INTRODUCTION

Plant growth regulators (PGRs) can have a tremendous effect on crop production because of their ability to alter plant growth and development. Therefore, studies of PGR modifications to plant growth and development which would improve rice production were conducted.

In preliminary greenhouse and small plot trials, emergence has been improved with PGR seed treatments which cause mesocotyl and coleoptile elongation. These structures are short in some semidwarf cultivars, and seeding more than 1 inch below the soil surface can result in poor stands. Small plot studies were continued in 1990. In addition, seedling height of semidwarf rice increases slowly resulting in poor seedling vigor. Seedling height was increased markedly in 1989, and studies to increase seedling height with PGRs were continued in 1990.

At present, PGRs have been identified which can modify internode elongation and research has shown modification of internode elongation can be beneficial. To date, research has shown PGRs can reduce plant stature by limiting internode elongation. In varieties susceptible to lodging because of tall stature, reductions in plant height by PGRs have been accomplished and have resulted in a greater tolerance of tall varieties to lodging. In addition, studies to modify internode elongation in rice have shown that PGRs can limit exertion of the panicle. Studies of this particular response to properly timed applications of PGRs have shown that seed production in red rice can be prevented. In that respect, PGRs offer the first control measures for established red rice in commercial rice production. Studies on preventing red rice seed production and studies on increasing lodging resistance were continued.

Some PGRs are reported to increase grain yield directly. Several of those materials were evaluated.

To address the objectives of emergence and seedling vigor improvement of semidwarf cultivars, stature reduction, red rice seed elimination, and yield enhancement, PGRs were tested for their effects on rice growth and development.



## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Seed Treatment and Rice Variety Screen

Location: Rice Research Station, Crowley, LA.

Variety: See Treatment

Seeding Rate: 100 lb/A

Planting Date: 2 May 90

Row Spacing: 7-inch (drill seeded)

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 2 May; urea (46% N) 200 lb/A (topdress), 21 May

Plot Size: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treated Area: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treatment(s): Formulation (rates):

Release (1 & 2 g ai/100 lb seed)

Timing: Seed Treatment

Variety (source):

Alan  
Gulfmont  
Lemont  
Maybelle  
Millie  
Tebonnet  
Texmont  
2201  
2207

Pertinent Rainfall: 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: N/A

Harvested Area: N/A

Exp. Design: Randomized complete block (4 replications)

Comments: This experiment was designed primarily to determine differences between experimental line/variatal response to gibberellic acid (GA) seed treatment. The large number of variatal entries and limited space required that each treatment be limited to one row. Plots were comprised of eight rows. Four varieties were included in each plot in row pairs with one row of untreated seed and one row of GA treated seed. Two varieties in each plot had one row which was a plot border. Also, short and tall stature varieties were adjacent in some plots. On interpretation, all data except for stand must take these facts into consideration. The statistical analysis performed is not valid and can only be used as a guideline for 'loose' comparisons of the means.

Most experimental lines/varieties were treated at the rate of 1 g/100 lb seed. A dry mixing process was employed. Some treated seed (wet procedure; 2 g/100 lb seed) were included for comparison.

In general, seedling stand was increased by GA seed treatment (Table 1). The range of responses was roughly 10% to 4 fold increases. Alan exhibited the lowest response with 9%. Untreated seed resulted in 19 plants/ft<sup>2</sup> and treated seed resulted in 20 plants/ft<sup>2</sup>. Texmont exhibited the highest response with a 5 fold increase. Untreated seed resulted in 3 plants/ft<sup>2</sup> and treated seed resulted in 16 plants/ft<sup>2</sup>. Tebonnet-Lot 1 had no response.

Panicle densities reflect the stand densities to a large degree (Table 1). Alan produced 39 and 47 panicles/ft<sup>2</sup> for untreated and treated seed, respectively. Texmont produced 11 and 49 panicles/ft<sup>2</sup>, respectively.

Mature plant height was unaffected by GA seed treatment (Table 1). The greatest difference was 5 cm and most differences were 2 cm or less.

Table 1. The effect of gibberellic acid seed treatment on seedling vigor and mature plant traits in experimental lines and varieties of rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1990.

| Experimental line/Variety | Gibberellic acid rate (g/100 lb seed) | Stand (plants/ft <sup>2</sup> ) | Panicle Density (pan./ft <sup>2</sup> ) | Mature Plant Height (cm) |
|---------------------------|---------------------------------------|---------------------------------|-----------------------------------------|--------------------------|
| Alan                      | 0                                     | 19bcd <sup>1</sup>              | 39def                                   | 99def                    |
|                           | 1                                     | 20bc                            | 47bc                                    | 100d                     |
| Tebonnet-Lot 1            | 0                                     | 13ef                            | 38hij                                   | 130a                     |
|                           | 1                                     | 14ef                            | 45cd                                    | 130ab                    |
| Lemont                    | 0                                     | 10f-i                           | 26h-k                                   | 84k                      |
|                           | 1                                     | 12efg                           | 37efg                                   | 86k                      |
| Maybelle-Lot 1            | 0                                     | 21b                             | 56a                                     | 92g-j                    |
|                           | 1                                     | 27a                             | 54ab                                    | 92g-j                    |
| Millie                    | 0                                     | 14ef                            | 32f-i                                   | 96d-g                    |
|                           | 1                                     | 19bcd                           | 51abc                                   | 100de                    |
| Lacassine                 | 0                                     | 9ghi                            | 30ghi                                   | 87jk                     |
|                           | 1                                     | 13ef                            | 34fgh                                   | 89h-k                    |
| 2207                      | 0                                     | 7ijk                            | 25ijk                                   | 95efg                    |
|                           | 1                                     | 11f-i                           | 48abc                                   | 93ghi                    |
| Gulfmont                  | 0                                     | 9ghi                            | 21jkl                                   | 88ijk                    |
|                           | 1                                     | 16de                            | 38d-g                                   | 94fgh                    |
| Tebonnet-Lot 2            | 0                                     | 11fgh                           | 38d-g                                   | 121c                     |
|                           | 2                                     | 20bcd                           | 51abc                                   | 125bc                    |
| Tebonnet-Lot 3            | 0                                     | 8hij                            | 19kl                                    | 126ab                    |
|                           | 2                                     | 20bcd                           | 45cde                                   | 131a                     |
| Maybelle-Lot 2            | 0                                     | 4jk                             | 16lm                                    | 88ijk                    |
|                           | 2                                     | 11fgh                           | 36fg                                    | 87jk                     |
| Texmont                   | 0                                     | 3k                              | 11m                                     | 86k                      |
|                           | 2                                     | 16cde                           | 49abc                                   | 89h-k                    |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Seeding Rate in Rice  
(Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: See Treatments

Planting Date: 2 May 90

Row Spacing: 7-inch (3-inch planting depth, drill seeded)

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 2 May; urea (46% N) 200 lb/A on designated plots, 21 May

Plot Size: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treated Area: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treatment(s): Formulation (conc.):

Release (2 g ai/100 lb seed)

Seeding Rate: 25, 50, 75, and 100 lb/A

Timing: Seed Treatment

Pertinent Rainfall: 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: 30 Aug

**Harvested Area:** 58.25 ft<sup>2</sup> - 2.33 x 22 ft

**Exp. Design:** Factorial (2x4), randomized complete block  
(4 replications)

**Comments:** In general, stand was increased by gibberellic acid (GA) seed treatment and seeding rate. On average, GA increased stand by 2 to 3 fold, and stand increased incrementally with each 25 lb/A increase in seeding rate leveling off at 75 lb/A.

At 9, 12, 14, 16, and 22 days after planting (DAP), seed treatment and seeding rate were interactive (Table 1). The main difference in response to GA occurred at seeding rates of 25 and 50 lb/A. Without GA there was no significant difference in stand. With GA there was. For example, without seed treatment at 22 DAP, stands were 2 and 3 plants/ft<sup>2</sup> at seeding rates of 25 and 50 lb/A, respectively. With seed treatments, stands were 5 and 9 plants/ft<sup>2</sup>, respectively. Regardless of seed treatment, seedling density was significantly lower at seeding rates of 25 and 50 lb/A compared to 75 and 100 lb/A.

Plant height was significantly affected by GA and seeding rate (Table 2). At 19 DAP, plant height was increased by GA and unaffected by seeding rate. Seedling height averaged 13.5 and 21.9 cm for untreated seed and GA treated seed, respectively. At 23 DAP, there were no consistent differences in plant height between seeding rates for untreated seed. Plant height increased continuously with incremental increases in seeding rate with GA. Plant heights were 14.2, 12.5, 15.2, and 14.4 cm for untreated seed and 22.6, 24.3, 25.5, and 26.3 cm for GA treated seed at seeding rates of 25, 50, 75, and 100 lb/A, respectively. At 30 DAP, seedling height was equivalent for all treatments. Seedling height ranged between 28.6 and 32.4 cm. Mature plant height was reduced an average of 1 cm by GA seed treatment. This may be attributed to denser stand with seed treatment.

Maturity was affected by seed treatment and seeding rate (Table 3). On average, GA treated seed resulted in 100% heading occurring 94 DAP compared to 96 DAP for untreated seed. Heading was delayed by low seeding rates. Heading occurred 97, 95, 94, and 93 DAP for the 25, 50, 75, and 100 lb/A seeding rates, respectively. A 1-day difference in heading was statistically significant.

Grain moisture, also an indicator of maturity, was lower for GA treated seed and at the higher seeding rates (Table 3). For untreated seed, grain moisture averaged 18.6% and GA treated seed averaged 17.8%. Grain moisture was 19.2, 18.2, 17.6, and 17.8% for seeding rates of 25, 50, 75, and 100 lb/A, respectively. These grain moisture differences were not significant.

Grain yield was significantly increased at low seeding rates by GA (Table 4). At a seeding rate of 25 lb/A, grain yields were 4277 and 5656 lb/A without and with GA, respectively. At the seeding rate of 50 lb/A, grain yields were 5305 and 6004 lb/A without and with GA, respectively. Gibberellic acid had no effect on grain yield at seeding rates of 75 and 100 lb/A. At the higher seeding rates, grain yields with or without GA ranged between 5956 and 6123 lb/A.

Like grain yield, panicle density was affected by seed treatment and seeding rate (Table 4). Gibberellic acid treated seed produced 30 panicles/ft<sup>2</sup> and untreated seed produced 23 panicles/ft<sup>2</sup>. Panicle densities were 24, 23, 30, and 30 panicles/ft<sup>2</sup> for seeding rates of 25, 50, 75, and 100 lb/A, respectively. These differences in panicle density, in part, are related to previously discussed differences in grain yield. Number of grains per panicle declined as panicle density increased. Individual grain weight was relatively unaffected.

Total milling yield was affected only slightly and whole milling yield was affected greatly by GA seed treatment and seeding rate (Table 5). Total milling yield ranged from 71.8 to 72.2%. Whole milling yield was decreased from 55.3 to 53.3% by GA seed treatment. Whole milling yields were 56.5, 55.0, 52.5, and 53.1% for seeding rates of 25, 50, 75, and 100 lb/A, respectively. The effects of GA seed treatment and seeding rate are related to grain moisture. Gibberellic acid seed treatment and high seeding rates had early maturity.

Table 1. The effect of seed treatment with gibberellic acid and seeding rate on seedling vigor of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic acid rate<br>(g/100 lb seed) | Seeding Rate<br>(lb/A) | Stand (plants/ft <sup>2</sup> ) |        |        |        |        |
|------------------------------------------|------------------------|---------------------------------|--------|--------|--------|--------|
|                                          |                        | 9 DAP <sup>1</sup>              | 12 DAP | 14 DAP | 16 DAP | 22 DAP |
| 0                                        | 25                     | 0d <sup>2</sup>                 | 1d     | 2e     | 2f     | 2f     |
|                                          | 50                     | 0d                              | 1d     | 3de    | 3ef    | 3ef    |
|                                          | 75                     | 0d                              | 5bcd   | 8bc    | 8cd    | 8cd    |
|                                          | 100                    | 0d                              | 4cd    | 5cd    | 7cd    | 7cd    |
| 2                                        | 25                     | 1c                              | 5bc    | 6cd    | 6de    | 5de    |
|                                          | 50                     | 2c                              | 8b     | 10b    | 10c    | 9c     |
|                                          | 75                     | 4b                              | 15a    | 16a    | 16b    | 14b    |
|                                          | 100                    | 6a                              | 17a    | 19a    | 20a    | 18a    |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of seed treatment with gibberellic acid and seeding rate on plant height of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic acid rate<br>(g/100 lb seed) | Seeding Rate<br>(lb/A) | Plant Height (cm)   |        |        |         |
|------------------------------------------|------------------------|---------------------|--------|--------|---------|
|                                          |                        | 19 DAP <sup>1</sup> | 23 DAP | 30 DAP | 126 DAP |
| 0                                        | 25                     | 12c <sup>2</sup>    | 14cd   | 29b    | 85ab    |
|                                          | 50                     | 12c                 | 12d    | 29b    | 86a     |
|                                          | 75                     | 16b                 | 15c    | 32a    | 84ab    |
|                                          | 100                    | 14bc                | 14cd   | 30ab   | 85ab    |
| 2                                        | 25                     | 21a                 | 23b    | 30ab   | 84ab    |
|                                          | 50                     | 23a                 | 24ab   | 30ab   | 84b     |
|                                          | 75                     | 22a                 | 26a    | 29b    | 83b     |
|                                          | 100                    | 21a                 | 26a    | 30ab   | 83b     |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).



Table 3. The effect of seed treatment with gibberellic acid and seeding rate on maturity of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic acid rate<br>(g/100 lb seed) | Seeding Rate<br>(lb/A) | 100% Heading<br>(DAP <sup>1</sup> ) | Grain Moisture<br>(%) |
|------------------------------------------|------------------------|-------------------------------------|-----------------------|
| 0                                        | 25                     | 98a <sup>2</sup>                    | 20.3a                 |
|                                          | 50                     | 97b                                 | 18.8ab                |
|                                          | 75                     | 95cd                                | 17.9b                 |
|                                          | 100                    | 94def                               | 17.5b                 |
| 2                                        | 25                     | 96bc                                | 18.1b                 |
|                                          | 50                     | 94de                                | 17.7b                 |
|                                          | 75                     | 93ef                                | 17.5b                 |
|                                          | 100                    | 93f                                 | 18.1b                 |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 4. The effect of seed treatment with gibberellic acid and seeding rate on grain yield of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic acid rate<br>(g/100 lb seed) | Seeding Rate<br>(lb/A) | Grain <sup>1</sup> Yield<br>(lb/A) | Panicle Density<br>(Pan./ft <sup>2</sup> ) | Seed Production<br>(Seed/pan.) | Single Seed Weight<br>(mg) |
|------------------------------------------|------------------------|------------------------------------|--------------------------------------------|--------------------------------|----------------------------|
| 0                                        | 25                     | 4277d <sup>2</sup>                 | 19cd                                       | 62ab                           | 27.0b                      |
|                                          | 50                     | 5305c                              | 18d                                        | 65a                            | 27.5a                      |
|                                          | 75                     | 5956ab                             | 31ab                                       | 48cd                           | 27.8a                      |
|                                          | 100                    | 6123a                              | 25bc                                       | 52bc                           | 27.8a                      |
| 2                                        | 25                     | 5656b                              | 29ab                                       | 49bcd                          | 27.6a                      |
|                                          | 50                     | 6004a                              | 28ab                                       | 47cd                           | 27.7a                      |
|                                          | 75                     | 6047a                              | 30ab                                       | 37d                            | 27.8a                      |
|                                          | 100                    | 6111a                              | 35a                                        | 38d                            | 27.8a                      |

<sup>1</sup> Adjusted to 12% grain moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).



Table 5. The effect of seed treatment with gibberellic acid and seeding rate on milling yield of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic<br>acid rate<br>(g/100 lb seed) | Seeding<br>Rate<br>(lb/A) | Milling Yield      |              |
|---------------------------------------------|---------------------------|--------------------|--------------|
|                                             |                           | Total<br>(%)       | Whole<br>(%) |
| 0                                           | 25                        | 71.6b <sup>1</sup> | 56.9a        |
|                                             | 50                        | 71.7ab             | 57.0a        |
|                                             | 75                        | 71.8ab             | 52.7cd       |
|                                             | 100                       | 72.0ab             | 54.6bc       |
| 2                                           | 25                        | 72.0ab             | 56.0ab       |
|                                             | 50                        | 72.4a              | 53.1cd       |
|                                             | 75                        | 72.2a              | 52.3d        |
|                                             | 100                       | 72.1ab             | 51.6d        |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Planting Depth in Rice  
(*Oryza sativa* 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7-inch

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A on designated plots, 24 May

Plot Size: 93.4 ft<sup>2</sup> - 4.67 x 20 ft

Treated Area: 93.4 ft<sup>2</sup> - 4.67 x 20 ft

Treatment(s): Formulation (rate): Release (1 & 2 g ai/A)  
Timing: Seed Treatment  
Planting Depth: 0.5 & 3 inches

Pertinent Rainfall: 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: 4 Sep

Harvested Area: 46.6 ft<sup>2</sup> - 2.33 x 20 ft

Exp. Design: Factorial (2x3), randomized complete block  
(4 replications)

Comments: The effects of planting depth and rate of

**Comments:** The effects of planting depth and rate of gibberellic acid (GA) seed treatment on emergence and stand were insignificant during the early stages of emergence (Table 1). At 7 days after planting (DAP), stand was 0 to 5 plants/ft<sup>2</sup> across treatments and the differences observed were not significant. At 8 DAP, shallow seeded treatments averaged 6 plants/ft<sup>2</sup> compared to 2 plants/ft<sup>2</sup> in the deep seed treatments. Gibberellic acid seed treatment averaged 6 plants/ft<sup>2</sup> and the control averaged 1 plant/ft<sup>2</sup>. These differences were significant.

The effects of planting depth and rate of GA seed treatment on emergence and stand were interactive from 11 to 21 DAP (Table 1). In general, this interaction was due to significant increases in stand with GA seed treatment at the deep seeding depth but not at the shallow seeding depth. For example, at 13 DAP, stand in the 3-inch planting depth treatments stand was 8, 24, and 21 plants/ft<sup>2</sup> for the control and 1 and 2 g ai/A rates of GA seed treatment. At the shallow planting depth, stands were 26, 27, and 28 plants/ft<sup>2</sup>. During this same period, there were no effects on stand by rate of GA seed treatment at either planting depth.

Seedling height was affected differently by seeding depth and rate of GA seed treatment during the period 18 to 29 DAP (Table 2). At 18 DAP, plant height averaged 23.1 and 21.0 cm at the shallow and deep planting depths, respectively. The difference was significant. On average, incremental increases of 1 and 2 g ai/A of GA seed treatment increased plant height from 16.5 cm to 22.2 and 27.5 cm, respectively. Each increase was significantly higher than the previous increase. At 22 DAP, the effects of planting depth and rate of GA seed treatment were interactive. In the deep seeded treatments, rate of GA seed treatment had a quadratic effect on plant height. Seedling heights were 14.9, 24.0, and 28.9 cm for the control and 1 and 2 g ai/A rates, respectively. At 29 DAP, the only effect on seedling height was planting depth. The average plant height for the deep seeded treatments was 32.2 cm compared to 37.2 cm for the shallow seeded treatments. This relationship held during the period 18 to 29 DAP and was also evident at maturity. Mature plant heights were 86 and 90 cm, respectively.

Heading was not significantly affected by seeding depth or rate of GA seed treatment (Table 3). Deep seeded treatments had an average heading date of 88 days after planting (DAP). Heading for each of the three rates of GA seed treatment was 89 DAP.

At maturity, grain yield was affected by seeding depth and rate of GA seed treatment and grain moisture was affected by seeding depth (Table 3). Grain yield was reduced significantly by deep seeding depth and the high rate of GA seed treatment. Grain yield averaged 7058 lb/A at the deep seeding depth and 7556 lb/A at the shallow seeding depth. Without GA seed treatment, grain

yield averaged 7386 lb/A, and with 1 and 2 g ai/A of GA seed treatment, grain yields were 7395 and 7140 lb/A, respectively. Grain moisture was less than 1% lower when seeding depth was shallow, averaging 11.1% compared to 11.9% when seeding depth was deep.

Panicle density was not significantly affected by planting depth or rate of GA seed treatment (Table 3). Panicle density averaged 33 panicles/ft<sup>2</sup> for both deep and shallow seeded rice. For the 0, 1, and 2 g ai/A rates of GA seed treatment, panicle densities were 29, 24, and 26 panicles/ft<sup>2</sup>, respectively. In contrast, single grain weight was significantly higher at the 3-inch planting depth averaging 27.5 mg compared to 27.0 mg at the 0.5-inch planting depth (Table 4).

Whole milling yield was significantly affected by seeding depth. Whole milling yield was 35.2% for deep seeded rice compared to 23.2% for shallow seeded rice. For the three rates of GA seed treatment, whole milling yield averaged between 31.0 and 32.1%. Total milling yield averaged between 71.7 and 71.9%.

Table 1. The effect of seed treatment with gibberellic acid and planting deep on emergence and stand of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Planting<br>Depth<br>(in.) | Gibberellic<br>acid rate<br>(g/100 lb<br>seed) | Stand (plants/ft <sup>2</sup> ) |       |        |        |        |        |
|----------------------------|------------------------------------------------|---------------------------------|-------|--------|--------|--------|--------|
|                            |                                                | 7 DAP <sup>1</sup>              | 8 DAP | 11 DAP | 13 DAP | 15 DAP | 21 DAP |
| .5                         | 0                                              | 1a <sup>2</sup>                 | 2bc   | 22bc   | 26ab   | 28a    | 28a    |
|                            | 1                                              | 7a                              | 8ab   | 25ab   | 27a    | 30a    | 27a    |
|                            | 2                                              | 6a                              | 9a    | 27a    | 28a    | 29a    | 26a    |
| 3                          | 0                                              | 0a                              | 0c    | 5d     | 8d     | 10c    | 9c     |
|                            | 1                                              | 3a                              | 4abc  | 22bc   | 24bc   | 24b    | 23b    |
|                            | 2                                              | 2a                              | 3abc  | 20c    | 21c    | 21b    | 20b    |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of seed treatment with gibberellic acid and planting deep on seedling height of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Planting<br>Depth<br>(in.) | Gibberellic<br>acid rate<br>(g/100 lb<br>seed) | Plant Height (mm)   |        |        |         |
|----------------------------|------------------------------------------------|---------------------|--------|--------|---------|
|                            |                                                | 18 DAP <sup>1</sup> | 22 DAP | 29 DAP | 124 DAP |
| .5                         | 0                                              | 186c <sup>2</sup>   | 208c   | 366a   | 910a    |
|                            | 1                                              | 233b                | 244b   | 378a   | 900a    |
|                            | 2                                              | 284a                | 289a   | 372a   | 890ab   |
| 3                          | 0                                              | 143d                | 149d   | 328b   | 870bc   |
|                            | 1                                              | 220b                | 240b   | 316b   | 850c    |
|                            | 2                                              | 267a                | 289a   | 324a   | 860c    |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of seed treatment with gibberellic acid and planting deep on mature development of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Planting Depth (in.) | Gibberellic acid rate (g/100 lb seed) | 100% Heading (DAP <sup>1</sup> ) | Grain Moisture (%) | Grain <sup>1</sup> Yield (lb/A) | Panicle Density (pan./ft <sup>2</sup> ) | Single Seed Weight (mg) |
|----------------------|---------------------------------------|----------------------------------|--------------------|---------------------------------|-----------------------------------------|-------------------------|
| .5                   | 0                                     | 88a <sup>2</sup>                 | 11.0b              | 7593ab                          | 30ab                                    | 26.9b                   |
|                      | 1                                     | 88a                              | 11.1b              | 7733a                           | 36ab                                    | 27.1b                   |
|                      | 2                                     | 88a                              | 11.2b              | 7341bc                          | 34ab                                    | 26.9b                   |
| 3                    | 0                                     | 90a                              | 12.1a              | 7180cd                          | 28b                                     | 27.5a                   |
|                      | 1                                     | 90a                              | 11.8a              | 7056cd                          | 33ab                                    | 27.4a                   |
|                      | 2                                     | 90a                              | 11.7a              | 6940d                           | 38a                                     | 27.5a                   |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 4. The effect of seed treatment with gibberellic acid and planting deep on milling yield of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Planting Depth (in.) | Gibberellic acid rate (g/100 lb seed) | Milling Yield      |           |
|----------------------|---------------------------------------|--------------------|-----------|
|                      |                                       | Total (%)          | Whole (%) |
| .5                   | 0                                     | 71.8a <sup>1</sup> | 26.6c     |
|                      | 1                                     | 71.8a              | 28.9bc    |
|                      | 2                                     | 71.6a              | 29.1bc    |
| 3                    | 0                                     | 71.7a              | 37.5a     |
|                      | 1                                     | 71.6a              | 35.4a     |
|                      | 2                                     | 72.2a              | 32.8ab    |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Seed Treatment and Foliar Application in Dry Broadcast Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: Dry broadcast

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A, 23 May

Plot Size: 125 ft<sup>2</sup> - 5 x 25 ft

Treated Area: 125 ft<sup>2</sup> - 5 x 25 ft

Treatment(s): Seed Treatment

Formulation (rate): Release (2 g ai/100 lb seed)

Timing: Seed Treatment

### Foliar Treatment

Formulation (rate): Ryzup (1 & 2 g ai/A)

Timing: 2- to 3-leaf stage, 23 May

Pertinent Rainfall: 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

**Harvest Date:** 7 Sep

**Harvested Area:** 125 ft<sup>2</sup> - 5 x 25 ft

**Exp. Design:** Factorial (2x3), randomized complete block  
(4 replications)

**Comments:** Emergence was evaluated between 11 and 21 days after planting (DAP). Significant effects from gibberellic acid (GA) seed treatment occurred 11 DAP (Table 1). Gibberellic acid seed treatment resulted in 19 plants/ft<sup>2</sup> compared to 16 plants/ft<sup>2</sup> in the control. After 13 DAP, there was no effect on emergence. Stands ranged from 21 to 24 plants/ft<sup>2</sup>.

The effects of GA seed treatment and foliar GA alone and GA seed treatment followed by foliar GA on seedling height were documented at 18, 22, 25, and 29 DAP (2 days before foliar GA application and 2, 5, and 9 days after foliar GA application). Seedling heights were significantly increased by GA seed treatment alone (Table 2). No other treatment or treatment combinations increased seedling height. Seedlings were taller at 18 and 22 DAP. Plant heights were 15.8 and 19.3 cm at 18 DAP and 19.3 and 20.3 cm at 22 DAP for the control and seed treatment, respectively. Although seedling height was increased between 1 and 1.5 cm at 25 and 29 DAP by foliar GA, the difference was not significant.

Mature plant height, grain yield and moisture, panicle density, single grain weight, and milling yield were not significantly affected by GA seed treatment, foliar GA, or GA seed treatment followed by foliar GA (Tables 3 and 4). Mature plant height was 86 to 87 cm. Grain yield was 8298 to 8733 lb/A. A late harvest resulted in grain moisture of 12.9 to 13.2%. Panicle density averaged 41 panicles/ft<sup>2</sup> for each GA treatment. Single grain weight varied less than 1 mg. Total milling yield ranged from 71.7 to 71.9% and whole milling yield ranged from 15.9 to 17.7%.



Table 1. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on emergence and stand of broadcast seeded rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic Acid<br>Rate                |                 | Stand (plants/ft <sup>2</sup> ) |        |        |        |
|-----------------------------------------|-----------------|---------------------------------|--------|--------|--------|
| Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) | 11 DAP <sup>1</sup>             | 13 DAP | 15 DAP | 21 DAP |
| 0                                       | 0               | 14b <sup>2</sup>                | 19a    | 21a    | 21a    |
|                                         | 1               | 16ab                            | 23a    | 25a    | 25a    |
|                                         | 2               | 18ab                            | 23a    | 27a    | 25a    |
| 2                                       | 0               | 17ab                            | 20a    | 22a    | 21a    |
|                                         | 1               | 19ab                            | 23a    | 25a    | 23a    |
|                                         | 2               | 20a                             | 20a    | 23a    | 21a    |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on seedling height of broadcast seeded rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic Acid<br>Rate                |                 | Plant Height (mm)   |                    |       |       |
|-----------------------------------------|-----------------|---------------------|--------------------|-------|-------|
| Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) | 18 DAP <sup>1</sup> | 2 DAT <sup>2</sup> | 5 DAT | 9 DAT |
| 0                                       | 0               | 162bc <sup>3</sup>  | 193a               | 244ab | 339ab |
|                                         | 1               | 158c                | 193a               | 239ab | 347ab |
|                                         | 2               | 155c                | 195a               | 244ab | 356a  |
| 2                                       | 0               | 193a                | 194a               | 225b  | 323b  |
|                                         | 1               | 184ab               | 209a               | 251a  | 332ab |
|                                         | 2               | 202a                | 205a               | 243ab | 335ab |

<sup>1</sup> Days after planting.

<sup>2</sup> Days after foliar treatment.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on mature development of broadcast seeded rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic Acid<br>Rate                |                 | Mature<br>Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>1</sup><br>Yield<br>(lb/A) | Panicle<br>Density<br>(pan./ft <sup>2</sup> ) | Single<br>Grain<br>Weight<br>(mg) |
|-----------------------------------------|-----------------|-----------------------------------|--------------------------|---------------------------------------|-----------------------------------------------|-----------------------------------|
| Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) |                                   |                          |                                       |                                               |                                   |
| 0                                       | 0               | 87a <sup>2</sup>                  | 12.9a                    | 8692a                                 | 39a                                           | 26.1a                             |
|                                         | 1               | 87a                               | 13.1a                    | 8633a                                 | 41a                                           | 25.7ab                            |
|                                         | 2               | 87a                               | 12.9a                    | 8652a                                 | 24a                                           | 25.9ab                            |
| 2                                       | 0               | 86a                               | 13.2a                    | 8298a                                 | 43a                                           | 25.7ab                            |
|                                         | 1               | 86a                               | 13.2a                    | 8756a                                 | 42a                                           | 25.6b                             |
|                                         | 2               | 87a                               | 13.1a                    | 8733a                                 | 40a                                           | 25.7ab                            |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 4. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on milling yield of broadcast seeded rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Gibberellic Acid<br>Rate                |                 | Milling Yield      |              |
|-----------------------------------------|-----------------|--------------------|--------------|
| Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) | Total<br>(%)       | Whole<br>(%) |
| 0                                       | 0               | 71.8a <sup>1</sup> | 17.4a        |
|                                         | 1               | 71.9a              | 16.8ab       |
|                                         | 2               | 71.8a              | 16.5b        |
| 2                                       | 0               | 71.9a              | 17.7a        |
|                                         | 1               | 71.7a              | 17.5a        |
|                                         | 2               | 71.8a              | 15.9b        |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Seed Treatment and Foliar Application in Semidwarf and Tall Long-Grain Rice (Oryza sativa 'LEMONT' and 'TEBONNET')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont and Tebonnet

Seeding Rate: 100 lb/A

Planting Date: 2 May 90

Row Spacing: 7-inch (3-inch planting depth, drill seeded)

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 2 May; urea (46% N) 200 lb/A on designated plots, 21 May

Plot Size: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treated Area: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treatment(s): Seed Treatment  
Formulation (rate):  
Release (1 g ai/100 lb seed)

Foliar Treatment  
Formulation (rate): Ryzup (2 g ai/A)  
Timing: 2- to 3-leaf stage (23 May)

Pertinent Rainfall: 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May  
Permanent Flood: 25 May  
Harvest Date: 30 Aug  
Harvested Area: 58.25 ft<sup>2</sup> - 2.33 x 22 ft  
Exp. Design: Factorial (2x2x2), randomized complete block  
(4 replications)

Comments: Emergence was evaluated between 9 and 22 days after planting (DAP) (Table 1). Only at 9 DAP was stand dependent on gibberellic acid (GA) and independent of variety. On average, GA seed treatment produced stands of 3 plants/ft<sup>2</sup> compared to no stand without GA seed treatment. From 12 to 22 DAP, differences in varietal response to GA seed treatment were evident. Lemont had a 3 fold increase in stand from GA seed treatment and Tebonnet had slightly less than a 2 fold increase. Data collected 22 DAP is representative of the effect. Untreated Lemont averaged 6 plants/ft<sup>2</sup> compared to 18 plants/ft<sup>2</sup> for Lemont treated with GA seed treatment. Untreated Tebonnet averaged 11 plants/ft<sup>2</sup> compared to 18 plants/ft<sup>2</sup> for Tebonnet treated with GA seed treatment.

The effects of GA seed treatment and GA foliar alone and GA seed treatment followed by GA foliar on seedling height was documented at 19, 23, 26, and 30 DAP (2 days before GA foliar application and 2, 5, and 9 days after GA foliar application) (Table 2). On all but the last observation date, the effect of GA seed treatment on plant height was dependent on variety. At 19 and 23 DAP, GA seed treatment increased seedling height an average of 7 cm in Lemont compared to 3 cm in Tebonnet. At 26 DAP, the increase in Lemont averaged 3 cm compared to no increase in Tebonnet. On the last observation date, the effect of GA seed treatment and variety on plant height was independent. Gibberellic acid seed treatment resulted in a slightly shorter seedling, in general, and Tebonnet seedlings were taller than Lemont seedlings. Plant heights average 31.7 and 33.4 cm with and without GA seed treatment, and plant heights average 31.7 and 33.4 cm with and without GA seed treatment, and plant heights averaged 34 and 31.1 cm for Tebonnet and Lemont. Gibberellic acid foliar had no effect on plant height for the 9-day period following application. Plants were water-stressed at the time of GA foliar application and this may have affected GA penetration into the rice.

Maturity, mature plant height, grain yield and moisture and panicle density were significantly affected by GA seed treatment and variety (Table 3). On average, Tebonnet headed 91 DAP, was

124 cm tall at maturity, and had a grain yield of 7011 lb/A. In comparison, Lemont headed 94 DAP, was 85 cm tall at maturity, and had a grain yield of 6070 lb/A. These varietal differences were statistically significant. On average, GA seed treatment hastened maturity by 1 day, lowered grain moisture at harvest by 0.4% and increased panicle density by 25%.

These seed treatment effects were statistically significant. In practical terms, the most significant mature plant trait affected by GA seed treatment was panicle density.

Total milling yield was relatively constant, and whole milling yield varied in response to GA seed treatment depending on variety (Table 4). Total milling yield averaged between 70.9 and 71.1% across varieties, rate of GA seed treatment, and rate of GA foliar. Whole milling yield of Lemont was decreased significantly by GA seed treatment. Without GA seed treatment, whole milling yield of Lemont averaged 42.4%. With GA seed treatment, whole milling yield of Lemont averaged 34.5%. Whole milling yield of Tebonnet was unaffected by GA seed treatment. Without GA seed treatment, whole milling yield of Tebonnet averaged 51.5%. With GA seed treatment, whole milling yield of Tebonnet averaged 49.8%.

Table 1. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on emergence and stand of semidwarf and tall stature rice (*Oryza sativa* 'LEMONT' and 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Gibberellic Acid<br>Rate                |                 | Stand (plants/ft <sup>2</sup> ) |        |        |        |        |
|----------|-----------------------------------------|-----------------|---------------------------------|--------|--------|--------|--------|
|          | Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) |                                 |        |        |        |        |
|          |                                         |                 | 9 DAP <sup>1</sup>              | 12 DAP | 14 DAP | 16 DAP | 22 DAP |
| Lemont   | 0                                       | 0               | 0d <sup>2</sup>                 | 4ck    | 6d     | 7d     | 7cd    |
|          |                                         | 2               | 0d                              | 3d     | 5d     | 6d     | 6d     |
|          | 1                                       | 0               | 4a                              | 19a    | 21a    | 22a    | 20a    |
|          |                                         | 2               | 3ab                             | 16ab   | 18ab   | 19ab   | 17a    |
| Tebonnet | 0                                       | 0               | 0cd                             | 8c     | 10c    | 12c    | 11bc   |
|          |                                         | 2               | 0cd                             | 8c     | 11c    | 12c    | 11b    |
|          | 1                                       | 0               | 2abc                            | 16ab   | 18ab   | 20ab   | 19a    |
|          |                                         | 2               | 2bcd                            | 13b    | 15b    | 17b    | 16b    |

1 Days after planting.

2 Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on seedling height of semidwarf and tall stature rice (*Oryza sativa* 'LEMONT' and 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Gibberellic Acid Rate          |              | Plant Height (mm)   |                    |       |       |
|----------|--------------------------------|--------------|---------------------|--------------------|-------|-------|
|          | Seed Treatment (g/100 lb seed) | Foliar (g/A) | 19 DAP <sup>1</sup> | 2 DAT <sup>2</sup> | 5 DAT | 9 DAT |
|          |                                |              |                     |                    |       |       |
| Lemont   | 0                              | 0            | 136d <sup>3</sup>   | 144d               | 199b  | 317b  |
|          |                                | 2            | 133d                | 139d               | 199b  | 315b  |
|          | 1                              | 0            | 217a                | 219a               | 234a  | 301b  |
|          |                                | 2            | 205ab               | 219a               | 228a  | 312b  |
| Tebonnet | 0                              | 0            | 167c                | 178bc              | 227a  | 351a  |
|          |                                | 2            | 163c                | 173c               | 232a  | 355a  |
|          | 1                              | 0            | 194b                | 190bc              | 233a  | 327b  |
|          |                                | 2            | 205ab               | 197ab              | 238a  | 328b  |

<sup>1</sup> Days after planting.

<sup>2</sup> Days after foliar treatment.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on mature development of semidwarf and tall stature rice (*Oryza sativa* 'LEMONT' and 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Gibberellic Acid<br>Rate                |                 | Mature<br>Plant<br>Height<br>(cm) | 100%<br>Heading<br>(DAP <sup>2</sup> ) | Grain<br>Moisture<br>(%) | Grain <sup>1</sup><br>Yield<br>(lb/A) | Panicle<br>Density<br>(pan./ft <sup>2</sup> ) |
|----------|-----------------------------------------|-----------------|-----------------------------------|----------------------------------------|--------------------------|---------------------------------------|-----------------------------------------------|
|          | Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) |                                   |                                        |                          |                                       |                                               |
|          |                                         |                 |                                   |                                        |                          |                                       |                                               |
| Lemont   | 0                                       | 0               | 86b <sup>3</sup>                  | 96a                                    | 13.0ab                   | 6011c                                 | 27cd                                          |
|          |                                         | 2               | 85b                               | 95a                                    | 13.0ab                   | 5987c                                 | 23d                                           |
|          | 1                                       | 0               | 85b                               | 93b                                    | 12.5b                    | 5889c                                 | 37a                                           |
|          |                                         | 2               | 85b                               | 93b                                    | 12.6b                    | 6392bc                                | 36ab                                          |
| Tebonnet | 0                                       | 0               | 124a                              | 92bc                                   | 13.1ab                   | 7091ab                                | 29bcd                                         |
|          |                                         | 2               | 124a                              | 92bc                                   | 13.3a                    | 7158a                                 | 31abc                                         |
|          | 1                                       | 0               | 125a                              | 91c                                    | 12.9ab                   | 6857ab                                | 32abc                                         |
|          |                                         | 2               | 124a                              | 91c                                    | 12.7ab                   | 6939ab                                | 34abc                                         |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Days after planting.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).



Table 4. The effect of seed treatment with gibberellic acid followed by postemergence application of gibberellic acid on milling yield of semidwarf and tall stature rice (*Oryza sativa* 'LEMONT' and 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Gibberellic Acid<br>Rate                |                 | Milling Yield       |       |
|----------|-----------------------------------------|-----------------|---------------------|-------|
|          | Seed<br>Treatment<br>(g/100 lb<br>seed) | Foliar<br>(g/A) | Total               | Whole |
|          |                                         |                 | (%)                 | (%)   |
| Lemont   | 0                                       | 0               | 71.1ab <sup>1</sup> | 42.9b |
|          |                                         | 2               | 71.2ab              | 41.8b |
|          | 1                                       | 0               | 71.1ab              | 35.5c |
|          |                                         | 2               | 71.0ab              | 33.5c |
| Tebonnet | 0                                       | 0               | 70.6b               | 50.1a |
|          |                                         | 2               | 71.5a               | 53.0a |
|          | 1                                       | 0               | 70.8ab              | 49.7a |
|          |                                         | 2               | 70.7ab              | 49.8a |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: ABG-3125 and Seedling Vigor in Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7-inch

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A, 23 May

Plot Size: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treated Area: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treatment(s): Granular Treatments

Formulations: ABG-3125B  
ABG-3125D  
ABG-3125E

Rates: 10 and 100 lb formulated material/A

Timing: Preplant surface, 3 May

Pertinent Rainfall: 5 May-0.27 inches; 8 May-2.55 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: 6 Sep

Harvested Area: 58.25 ft<sup>2</sup> - 2.33 x 25 ft

**Exp. Design:** Randomized complete block (4 replications)

**Comments:** Emergence was evaluated between 8 and 21 days after planting (DAP) (Table 1). Significant effects of formulations and rates of ABG-3125 occurred 8 and 11 DAP. After 13 DAP there was no effect on emergence.

By 8 DAP, emergence was beginning with 10% emergence noted. Stands of rice ranged between 0 and 3 plants/ft<sup>2</sup> for all treatments. At the rate of 100 lb/A, both the ABG-3125B and ABG-3125D formulations produced significantly higher stands than the control. Stand with ABG-3125B at the rate of 10 lb/A was lower than the control. Results of this nature are highly variable (CV=45.9%) and difficult to understand, especially when treatment differences are small.

At 11 DAP, ABG-3125D and ABG-3125E at the rate of 100 lb/A had significantly higher stands than the control. Stands were 23, 21, and 19 plants/ft<sup>2</sup>, respectively. The other formulations of ABG-3125 resulted in stands which were not significantly different from the control, and at later dates, there were no significant differences in stand between any of the treatments and the control.

The effects of ABG-3125 formulation and rate on plant height following emergence were documented at 18 and 21 DAP (7 and 10 days after emergence). Seedling heights varied by 10 mm or less on both dates, and the differences between treatments and the control were not significant (Table 2).

Mature plant height, grain yield, and moisture and panicle density were not significantly affected by formulation or rate of ABG-3125 (Table 3). Mature plant height ranged between 88 and 89 cm for all treatments. Grain yield ranged between 5517 and 5802 lb/A. The highest yield was the result of ABG-3125D applied at 100 lb/A and the lowest yield was the result of ABG-3125D applied at 10 lb/A. The untreated control had a yield of 5668 lb/A. Similar results for panicle density were noted. The highest panicle density (41 panicles/ft<sup>2</sup>) occurred at the high rate of ABG-3125D and the lowest panicle density (35 panicles/ft<sup>2</sup>) occurred at the low rate of ABG-3125D. A cursory evaluation of the data leaves the impression that in this study, in general, panicle density and grain yield were related. Lastly, grain moisture was low as the result of late harvest and ranged between 11.3 and 11.5%.

Milling yield was relatively unaffected by ABG-3125 (Table 4). Total milling yield ranged between 71.8 and 72.5%, and whole milling yield ranged between 22.8 and 25.2%. In general, whole milling yield was low because grain moisture at harvest was low.

Table 1. The effect of experimental plant growth regulator formulation on emergence and stand of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment       | Rate<br>(lb/A) | Stand (plants/ft <sup>2</sup> ) |        |        |        |        |
|-----------------|----------------|---------------------------------|--------|--------|--------|--------|
|                 |                | 8 DAP <sup>1</sup>              | 11 DAP | 13 DAP | 15 DAP | 21 DAP |
| Untreated Check |                | 1bc <sup>2</sup>                | 17c    | 20ab   | 23a    | 22a    |
| ABG-3125B       | 10             | 0c                              | 17c    | 19b    | 23a    | 22a    |
| ABG-3125B       | 100            | 2a                              | 18c    | 19b    | 22a    | 22a    |
| ABG-3125D       | 10             | 2ab                             | 17c    | 21ab   | 24a    | 23a    |
| ABG-3125D       | 100            | 3a                              | 23a    | 22ab   | 25a    | 24a    |
| ABG-3125E       | 10             | 1c                              | 19bc   | 22ab   | 24a    | 23a    |
| ABG-3125E       | 100            | 2ab                             | 21ab   | 23a    | 25a    | 24a    |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of experimental plant growth regulator formulation on seedling height of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment       | Rate<br>(lb/A) | Plant Height (mm)   |        |
|-----------------|----------------|---------------------|--------|
|                 |                | 18 DAP <sup>1</sup> | 22 DAP |
| Untreated Check |                | 170a <sup>2</sup>   | 200a   |
| ABG-3125B       | 10             | 170a                | 203a   |
| ABG-3125B       | 100            | 165a                | 202a   |
| ABG-3125D       | 10             | 175a                | 206a   |
| ABG-3125D       | 100            | 172a                | 206a   |
| ABG-3125E       | 10             | 174a                | 206a   |
| ABG-3125E       | 100            | 164a                | 208a   |

<sup>1</sup> Days after planting.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of experimental plant growth regulator formulation on mature development of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment       | Rate<br>(lb/A) | Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>1</sup><br>Yield<br>(lb/A) | Panicle<br>Density<br>(Pan./ft <sup>2</sup> ) |
|-----------------|----------------|-------------------------|--------------------------|---------------------------------------|-----------------------------------------------|
| Untreated Check |                | 89a <sup>2</sup>        | 11.4a                    | 5668a                                 | 38ab                                          |
| ABG-3125B       | 10             | 88a                     | 11.3a                    | 5570a                                 | 39ab                                          |
| ABG-3125B       | 100            | 88a                     | 11.3a                    | 5520a                                 | 37ab                                          |
| ABG-3125D       | 10             | 88a                     | 11.5a                    | 5517a                                 | 35b                                           |
| ABG-3125D       | 100            | 89a                     | 11.4a                    | 5802a                                 | 41a                                           |
| ABG-3125E       | 10             | 89a                     | 11.5a                    | 5683a                                 | 38ab                                          |
| ABG-3125E       | 100            | 88a                     | 11.5a                    | 5663a                                 | 38ab                                          |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 4. The effect of experimental plant growth regulator formulation on milling of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment       | Rate<br>(lb/A) | Plant<br>Height<br>(cm) | Milling<br>Total<br>(%) | Yield<br>Whole<br>(%) |
|-----------------|----------------|-------------------------|-------------------------|-----------------------|
| Untreated Check |                | 89a <sup>1</sup>        | 72.2ab                  | 23.1a                 |
| ABG-3125B       | 10             | 88a                     | 72.5a                   | 23.3a                 |
| ABG-3125B       | 100            | 88a                     | 72.4ab                  | 22.8a                 |
| ABG-3125D       | 10             | 88a                     | 71.8b                   | 23.2a                 |
| ABG-3125D       | 100            | 89a                     | 72.2ab                  | 23.7a                 |
| ABG-3125E       | 10             | 89a                     | 72.4ab                  | 25.2a                 |
| ABG-3125E       | 100            | 88a                     | 72.3ab                  | 24.1a                 |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Varietal Response to Foliar Gibberellic Acid in Rice (*Oryza sativa* L.)

Location: Rice Research Station, Crowley, LA.

Variety: See Treatment

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7-inch (drill seeded)

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A (topdress), 23 May

Plot Size: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treated Area: 116.75 ft<sup>2</sup> - 4.67 x 25 ft

Treatment(s): Formulation (rate): Ryzup (2 g ai/A)

Timing: Foliar treatment (2- to 3-leaf stage, 23 May)

Variety:

|            |          |
|------------|----------|
| Alan       | Millie   |
| Gulfmont   | Rico     |
| Jasmine 85 | Rosemont |
| Lacassine  | Tebonnet |
| Lemont     | Texmont  |
| Mars       | 2207     |
| Maybelle   | 2215     |
| Mercury    | 3072     |

Pertinent Rainfall: None

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: N/A

Harvested Area: N/A

Exp. Design: Randomized complete block (4 replications)

Comments: Eight row plots contained eight varieties with one variety per row. Duplicated plots were planted in each replicate. Of the duplicates, one plot was treated with gibberellic acid (GA). The other plot was untreated. At 8 days after treatment plant height was measured.

Of the 16 varieties tested, Texmont and the experimental line LA2215 had a significant height increase of approximately 3 cm as the result of GA application (Table 1). The seedling height of untreated Texmont was 31.4 cm compared to 34.5 cm for the treated Texmont. LA2215 had seedling heights of 28.7 and 31.6 cm for treated and untreated plants, respectively.

In general, the response to GA was low. This may be related to the dry, droughty conditions which occurred during the seedling stages. Also, the rate of 2 g ai/A may have been too low under these conditions.

Table 1. The effect (8 days after treatment) of gibberellic acid postemergence on seedling vigor of varieties and experimental lines of rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1990.

| Variety/<br>Experimental line | Gibberellic<br>acid rate<br>(g ai/A) | Seedling<br>Height<br>(mm) |
|-------------------------------|--------------------------------------|----------------------------|
| <u>Long Grain Varieties</u>   |                                      |                            |
| Alan                          | 0                                    | 353c-f <sup>1</sup>        |
|                               | 2                                    | 372bc                      |
| Gulfmont                      | 0                                    | 313ijk                     |
|                               | 2                                    | 345d-g                     |
| Jasmine 85                    | 0                                    | 363b-3                     |
|                               | 2                                    | 383b                       |
| Millie                        | 0                                    | 362b-e                     |
|                               | 2                                    | 371bc                      |
| Lacassine                     | 0                                    | 279m                       |
|                               | 2                                    | 288lm                      |
| Lemont                        | 0                                    | 308jkl                     |
|                               | 2                                    | 305jkl                     |
| Maybelle                      | 0                                    | 348c-f                     |
|                               | 2                                    | 367bcd                     |
| Rosemont                      | 0                                    | 306jkl                     |
|                               | 2                                    | 325g-j                     |
| Tebonnet                      | 0                                    | 318h-k                     |
|                               | 2                                    | 319h-k                     |
| Texmont                       | 0                                    | 314ijk                     |
|                               | 2                                    | 345d-g                     |
| <u>Medium Grain Varieties</u> |                                      |                            |
| Mars                          | 0                                    | 423a                       |
|                               | 2                                    | 425a                       |
| Mercury                       | 0                                    | 353c-f                     |
|                               | 2                                    | 367bcd                     |
| Rico                          | 0                                    | 332f-i                     |
|                               | 2                                    | 340e-h                     |

Continued.



Table 1. Continued.

| Variety/<br>Experimental line | Gibberellic<br>acid rate<br>(g ai/A) | Seedling<br>Height<br>(mm) |
|-------------------------------|--------------------------------------|----------------------------|
| <u>Experimental Lines</u>     |                                      |                            |
| LA2207                        | 0                                    | 349c-f                     |
|                               | 2                                    | 361b-e                     |
| LA2215                        | 0                                    | 287lm                      |
|                               | 2                                    | 316ijk                     |
| TX3072                        | 0                                    | 299klm                     |
|                               | 2                                    | 306jkl                     |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Ratoon Cropping in Rice (*Oryza sativa* 'TEBONNET')

Location: Rice Research Station, Crowley, LA.

Variety: Tebonnet

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7-inch

Fertilizer: First crop: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A topdress, 24 May; Second crop: urea (46% N) 100 lb/A topdress, 24 Aug

Plot Size: 437.5 ft<sup>2</sup> - 8.75 x 50 ft

Treated Area: 437.5 ft<sup>2</sup> - 8.75 x 50 ft

Treatment(s): Formulation (rates): Ryzup (3 and 5 g ai/A)

Timing: 3 days after 100% heading of first crop, 24 July; 2 weeks after first crop harvest, 7 Sept.; panicle initiation in ratoon crop, 17 Sept

Pertinent Rainfall: 24 July-0.62 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: 7 Sept

Harvested Area: 160.42 ft<sup>2</sup> - 8.75 x 50 ft

Exp. Design: Factorial (3x3), randomized complete block (4 replications)

Comments: Gibberellic acid (GA) applied after heading to the first crop significantly decreased productivity of the first crop (Table 1). On average, grain yield was reduced 600 to 700 lb/A and whole milling yield was reduced 1.7 to 2.6% by 3 and 5 g ai/A of GA. Mature plant height and maturity as expressed by grain moisture were unaffected.

For the ratoon crop portion of the study, each plot was divided into halves lengthwise. In one half, the straw from the first crop deposited behind the combine was left undisturbed on the stubble which remained (straw half). In the other half, the straw was removed from the stubble (no straw half).

Of the plant height measurements made, only mature plant height of the ratoon crop was significantly affected by time of application (Tables 2, 3, and 4). In the no straw half, plant height was increased an average of 2 to 3 cm by GA application to the ratoon crop.

Grain moisture values are artificial and an evaluation of treatments on ratoon crop maturity is not valid. Grain moisture exceeded the limits of the moisture meter. Grain was dried by forced air heater for 2 days at 40C before grain was weighed and grain moisture determined.

Ratoon crop grain yield was significantly increased by GA. Grain yield taken from the straw half had in excess of a 100 lb/A advantage (Table 2). The increase in yield was an average across the three application times and the 3 oz/A rate. Grain yield taken from the no straw half was increased 300 lb/A by Ryzup application following heading of the first crop (Table 3). The increase was consistent for the 3 and 5 oz/A rates. Combining the yields from the straw and no straw halves, results were similar to results from the no straw half. Grain yield was increased 200 to 300 lb/A (Table 4).

Total yield based on the combined yields of the first and ratoon crops was unaffected by GA (Table 4). The yield losses in the first crop due to GA applied following heading were compensated by yield increases in the ratoon crop.

Table 1. The effect of gibberellic acid applied after heading and harvest on first crop productivity of rice (*Oryza sativa* 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Timing<br>(DAP) <sup>1</sup> | Gibberellic<br>Acid<br>(g/A) | Mature<br>Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>2</sup><br>Yield<br>(lb/A) | Milling<br>Total<br>(%) | Yield<br>Whole<br>(%) |
|------------------------------|------------------------------|-----------------------------------|--------------------------|---------------------------------------|-------------------------|-----------------------|
| 82                           | 0                            | 139a <sup>3</sup>                 | 20.1ab                   | 7441a                                 | 71.7a                   | 60.7a                 |
|                              | 3                            | 138a                              | 20.4ab                   | 6756c                                 | 71.1ab                  | 59.0bc                |
|                              | 5                            | 138a                              | 20.4ab                   | 6881bc                                | 70.9b                   | 58.1c                 |
| 127                          | 0                            | 139a                              | 19.9b                    | 7276ab                                | 71.1ab                  | 60.1ab                |
|                              | 3                            | 137a                              | 20.4ab                   | 7396ab                                | 71.3ab                  | 60.5a                 |
|                              | 5                            | 139a                              | 20.6a                    | 7416a                                 | 71.1ab                  | 60.2ab                |
| 137                          | 0                            | 139a                              | 19.9b                    | 7312ab                                | 71.1ab                  | 59.8ab                |
|                              | 3                            | 138a                              | 20.3ab                   | 7619a                                 | 71.6ab                  | 60.9a                 |
|                              | 5                            | 138a                              | 19.9b                    | 7347ab                                | 71.5ab                  | 60.8a                 |

<sup>1</sup> Days after planting. 82=4 days after heading of first crop. 137=2 weeks after harvest of first crop. 137=panicle initiation of second crop.

<sup>2</sup> Adjusted to 12% grain moisture.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of gibberellic acid applied to the first and second crop on second crop productivity of rice (*Oryza sativa* 'TEBONNET'). First crop straw was not removed. Rice Research Station, Crowley, LA. 1990.

| Timing<br>(DAP) <sup>1</sup> | Gibberellic<br>Acid<br>(g/A) | Mature<br>Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>2</sup><br>Yield<br>(lb/A) |
|------------------------------|------------------------------|-----------------------------------|--------------------------|---------------------------------------|
| 82                           | 0                            | 91a <sup>3</sup>                  | 14.8ab                   | 1125b                                 |
|                              | 3                            | 93a                               | 16.0ab                   | 1440a                                 |
|                              | 5                            | 90a                               | 19.3a                    | 1248ab                                |
| 127                          | 0                            | 93a                               | 18.3ab                   | 1194b                                 |
|                              | 3                            | 94a                               | 14.6ab                   | 1181b                                 |
|                              | 5                            | 94a                               | 13.2b                    | 1092b                                 |
| 137                          | 0                            | 93a                               | 14.9ab                   | 1145b                                 |
|                              | 3                            | 93a                               | 14.8ab                   | 1212b                                 |
|                              | 5                            | 92a                               | 17.4ab                   | 1097b                                 |

<sup>1</sup> Days after planting (See Table 1).

<sup>2</sup> Adjusted to 12% grain moisture.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of gibberellic acid applied to the first and second crop on second crop productivity of rice (*Oryza sativa* 'TEBONNET'). First crop straw was removed. Rice Research Station, Crowley, LA. 1990.

| Timing<br>(DAP) <sup>1</sup> | Gibberellic<br>Acid<br>(g/A) | Mature<br>Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>2</sup><br>Yield<br>(lb/A) |
|------------------------------|------------------------------|-----------------------------------|--------------------------|---------------------------------------|
| 82                           | 0                            | 91b <sup>3</sup>                  | 18.9a                    | 1142c                                 |
|                              | 3                            | 93ab                              | 16.3a                    | 1473a                                 |
|                              | 5                            | 91ab                              | 16.3a                    | 1494a                                 |
| 127                          | 0                            | 94ab                              | 16.5a                    | 1238bc                                |
|                              | 3                            | 96ab                              | 17.1a                    | 1272bc                                |
|                              | 5                            | 95ab                              | 18.8a                    | 1244bc                                |
| 137                          | 0                            | 93ab                              | 15.3a                    | 1243bc                                |
|                              | 3                            | 96a                               | 13.7a                    | 1419ab                                |
|                              | 5                            | 95ab                              | 14.8a                    | 1265bc                                |

<sup>1</sup> Days after planting (See Table 1).

<sup>2</sup> Adjusted to 12% grain moisture.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 4. The effect of gibberellic acid applied to the first and second crop on second crop and total (first+second) crop productivity of rice (*Oryza sativa* 'TEBONNET'). Results averaged across straw management. Rice Research Station, Crowley, LA. 1990.

| Timing<br>(DAP) <sup>1</sup> | Gibberellic<br>Acid<br>(g/A) | Early <sup>2</sup><br>Ratoon<br>Plant<br>Height<br>(cm) | Mature<br>Plant<br>Height<br>(cm) | Grain<br>Moisture<br>(%) | Grain <sup>3</sup><br>Yield<br>(lb/A) | Total <sup>3</sup><br>Grain<br>Yield<br>(lb/A) |
|------------------------------|------------------------------|---------------------------------------------------------|-----------------------------------|--------------------------|---------------------------------------|------------------------------------------------|
| 82                           | 0                            | 87ab <sup>4</sup>                                       | 91ab                              | 17.0a                    | 1133d                                 | 8574ab                                         |
|                              | 3                            | 87ab                                                    | 93ab                              | 16.1a                    | 1457a                                 | 8213b                                          |
|                              | 5                            | 88ab                                                    | 91b                               | 17.7a                    | 1371ab                                | 8252b                                          |
| 127                          | 0                            | 84b                                                     | 94ab                              | 17.4a                    | 1216bcd                               | 8493ab                                         |
|                              | 3                            | 88ab                                                    | 95ab                              | 15.9a                    | 1227bcd                               | 8623ab                                         |
|                              | 5                            | 86b                                                     | 95ab                              | 16.4a                    | 1168cd                                | 8584ab                                         |
| 137                          | 0                            | 88ab                                                    | 93ab                              | 15.1a                    | 1194cd                                | 8506ab                                         |
|                              | 3                            | 91a                                                     | 95a                               | 14.3a                    | 1316abc                               | 8934a                                          |
|                              | 5                            | 87ab                                                    | 94ab                              | 16.4a                    | 1181cd                                | 8528ab                                         |

<sup>1</sup> Days after planting (See Table 1).

<sup>2</sup> Extended leaf length.

<sup>3</sup> Adjusted to 12% grain moisture.

<sup>4</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## SEEDLING VIGOR STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment: Foliar Gibberellic Acid and Postemergence  
Herbicide Compatibility in Rice (Oryza sativa  
'LEMONT')

Location: Rice Research Station, Crowley, LA

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 16 May 90

Row Spacing: 7 inch

Fertilizer: 20-10-10 at 400 lb/A (topdress), 18 June

Plot Size: 131.25 ft<sup>2</sup> - 5.25 (9 rows) x 25 ft

Treated Area: 131.25 ft<sup>2</sup> - 5.25 (9 rows) x 25 ft

Treatment(s): Formulation (rate):

### Gibberellic Acid

RyzUp (1 g ai/A)

### Herbicides

Arrosolo (6 lb ai/A)

Basagran (0.75 lb ai/A)

Bolero (3 lb ai/A)

Facet (0.5 lb ai/A)

Stam 80 EDF + Crop Oil Conc.

(4 lb ai/A + 1 pt/A)

Stam M4 (4 lb/ai/A)

Riverside Propanil 60 DF (4 lb ai/A)

Wham EZ (4 lb ai/A)

Timing: 3- to 4-leaf stage, 7 June

For a "weed free" RyzUp treatment, Arrosolo was applied on 13 June following a RyzUp alone treatment on 7 June.

Pertinent Rainfall: None

Permanent Flood: 21 June

Harvest Date: 20 Sept



Harvested Area: 52.26 ft<sup>2</sup> - 2.33 x 22 ft

Exp. Design: Randomized complete block (4 replications)

Comments: Seedling height. Seedling height following applications of post emergence herbicides and RyzUp was monitored between 1 and 22 days after treatment (DAT). Major differences in plant height were observed between 3 and 14 DAT.

Initially, RyzUp in combination with Stam M4, Terra, Arrosolo, and Stam M4 + Basagran significantly increased seedling height compared to the untreated check (Table 1). In the herbicide treatments with RyzUp at 3 DAT, seedling heights ranged between 19.2 and 20.5 cm. In comparison, seedling heights of the untreated check (16.9 cm) and treatments which were not significantly different from the check ranged between 16.4 and 18.3 cm.

At 7 DAT, RyzUp alone and most herbicides alone had no significant effect on seedling height (Table 1). Seedling heights of the untreated check, RyzUp, herbicides, and herbicide combinations ranged between 18.2 and 19.9 cm with two exceptions. Seedling heights were 20.4 and 20.5 cm for Wham EZ and Arrosolo. These plant heights were significantly higher than the untreated check (18.2 cm).

At 7 DAT, seedling height was increased significantly when RyzUp and herbicides were combined (Table 1). The exceptions were Facet and Wham EZ. On average, RyzUp mixed with Arrosolo, Stam 80 EDF + COC, Stam M4, Riverside Propanil 60 DF, Stam M4 + Basagran, and Stam M4 + Bolero increased seedling height by 6.8 cm compared to RyzUp and the respective herbicides alone.

At 7 DAT, differences in response of seedling height to RyzUp and herbicide combinations in mixture were noted (Table 1). Greater increases in seedling height occurred when RyzUp was in mixture with Arrosolo or Stam M4 compared to mixtures with Riverside Propanil 60 DF and Stam 80 EDF + COC. The increase in seedling heights for mixture with Arrosolo or Stam M4 averaged 8.1 cm compared to 5.4 and 3.5 cm for mixture with Riverside Propanil 60 DF and Stam 80 EDF + COC, respectively. Each of these increases was significantly different from the other.

Results at 11 and 14 DAT were similar to those at 7 DAT (Table 1). The main difference was the relative magnitude of the increase in seedling height between RyzUp and herbicides alone and their mixtures. At 11 DAT, the most responsive mixtures of RyzUp with Arrosolo or Stam M4 increased seedling height an average of 10.4 cm. Mixture with Riverside Propanil 60 DF and Stam 80 EDF + COC were the same with an average increase of 6.4 cm. At 14 DAT, the most responsive mixtures of RyzUp with Arrosolo or Stam M4 increased seedling height an average of 11.4 cm. Mixture with Riverside Propanil 60 DF and Stam 80 EDF + COC were the same with an average increase of 6.4 cm. One other difference occurred at 14

DAT. Plant height was significantly higher with Wham EZ + RyzUp compared to Wham EZ alone. The increase in seedling height was 5.5 cm.

By 22 DAT, there were relatively few differences in seedling height (Table 1). There were no significant differences in plant height between herbicide alone and herbicide + RyzUp with one exception. RyzUp + Stam M4 + Basagran when compared with Stam M4 + Basagran had seedlings which were 2 cm shorter. Other herbicides and herbicide combinations when compared with their respective RyzUp mixture had less than 1 cm difference in plant height. Compared to the untreated check, seedling height was lowered significantly by Stam M4 + RyzUp, Facet alone, Facet + RyzUp, and Stam + Bolero + RyzUp. The reductions in plant height averaged 4.6 cm.

Rice tolerance. Herbicidal activity was evaluated at 8 and 14 DAT. Rice had good to excellent tolerance to most of the treatments (Table 2). At 8 DAT, rice exhibited no injury from Facet and Wham EZ. Slight injury was caused by Arrosolo, Stam 80 EDF + COC, Riverside Propanil 60 DF, Stam M4, and Stam M4 + Basagran. Stam M4 + Bolero caused moderate injury to the rice. RyzUp had no significant effect on tolerance to the herbicides. By 14 DAT, rice tolerance had increased in general. Rice exhibited no injury from Arrosolo, Facet, Riverside Propanil 60 DF, Stam 80 EDF + COC, and Stam M4 + Basagran. Slight injury was caused by Wham EZ alone and Stam M4 and Stam M4 + Bolero alone and in mixture with RyzUp. In addition, RyzUp decreased the tolerance of rice to Arrosolo, Riverside Propanil 60 DF, and Stam M4 + Basagran.

Weed control. Weeds were separated into two categories. Junglerice (*Echinochola colonum*) and sprangletop (*Leptochloa panicoides*) were the primary grass species of weed. The other predominant weed species were rice flatsedge (*Cyperus iria*), and yellow nutsedge (*Cyperus esculentus*). Each category of weeds was rated separately, and in general, there was better control of the grass species than the sedges.

Grass control. Grass control ratings taken 8 and 14 DAT showed differences in activity between herbicides and in the effect of RyzUp on the activity of a given herbicide (Table 2). Grass control, in general, was good to excellent. At both 8 and 14 DAT, excellent grass control was obtained with Arrosolo, Stam 80 EDF + COC and Stam + Bolero, either alone or in mixture with RyzUp. The same occurred with Riverside Propanil 60 DF, Stam M4, and Stam M4 + Basagran in mixture with RyzUp. Good control was noted with Wham EZ alone. At 8 DAT, Stam M4 provided excellent grass control, and RyzUp significantly improved control from good to excellent for Riverside Propanil 60 DF and Wham EZ. At 14 DAT, control had increased from good to excellent with Riverside Propanil 60 DF. Control had decreased from excellent to good with Stam M4, Stam M4 + Basagran, and Wham EZ + RyzUp.

Grass control with Facet was questionable at 8 and 14 DAT. Both grass species were yellow and purple in appearance without necrosis. At harvest, sprangletop was evenly distributed and mature. A weed control rating was not made at harvest.

Sedge control. Sedge control ranged from poor to good (Table 2). At 8 DAT, control was good with Riverside Propanil 60 DF and Stam 80 EDF + COC in mixture with RyzUp and all herbicide treatments containing Stam M4 or Arrosolo. Control was moderate with Wham EZ, Wham EZ + RyzUp, Riverside Propanil 60 DF, and Stam 80 EDF + COC. Control was poor with Facet and Facet + RyzUp. Control ratings were relatively consistent through 14 DAT with only two exceptions. By 14 DAT, control ratings for Stam M4 and Riverside Propanil 60 DF + RyzUp decreased to moderate.

Mature plant height. Mature plant height was reduced by weed competition (Table 3). No weed control from the absence of herbicide resulted in an average plant height for rice of 56 cm. Poor weed control with Facet resulted in an average plant height of 70 cm. With good to excellent weed control, plant height ranged from 72 to 78 cm. This included the weed-free check. Plant height was highest with Stam M4 + Bolero. RyzUp had no significant effect on mature plant height.

Grain moisture. Grain moisture varied slightly, ranging from 15.8 to 18.8% (Table 3). Grain moisture tended to be higher when weed control was poor. This was the result of the presence of weedy matter in the grain. The weedy matter was higher in moisture than the rice grain. Facet with RyzUp had a significant effect on grain moisture. Poor weed control with Facet resulted in a grain moisture of 18.6%. With Facet + RyzUp weed control was still poor, yet grain moisture was 16.6%.

Grain yield. Differences in grain yield occurred, and treatments in general segregated into four yield categories (Table 3). Yields in the first category ranged from 4246 to 4893 lb/A. This category included six herbicide and RyzUp combinations. They were Arrosolo and Stam + Bolero alone and Arrosolo, Riverside Propanil DF 60, Stam M4, and Stam M4 + Bolero in combination with RyzUp. Yields in the second category ranged from 3762 to 3899 lb/A. This category included Stam 80 EDF + COC and Stam + Basagran alone and in combination with RyzUp. Yields in the third category ranged from 3126 to 3424 lb/A. This category included Riverside Propanil 60 DF alone and in combination with RyzUp, Stam M4 and Wham EZ. Yields in the fourth category ranged from 1318 to 1473 lb/A and included Facet alone and in combination with RyzUp. In the absence of herbicide grain yields were 372 and 390 lb/A without and with RyzUp, respectively. In the weed-free check, grain yields were 3944 and 4460 lb/A without and with RyzUp, respectively.

Differences in grain yield were mostly related to degree of weed control. In the first category of herbicide and RyzUp combinations, grass control was excellent and sedge control was good. In the second category, grass control was mostly excellent and sedge control ranged from moderate to good. In the third category, grass control ranged from excellent to good and sedge control was mostly moderate. In the fourth category, grass and sedge control were poor.

In this study, Arrosolo and Stam M4 + Bolero performed consistently well compared to the other herbicides with regard to weed control and grain yield. RyzUp had no effect on this performance. In contrast, the performance of Riverside Propanil 60 DF and Stam M4 was made equivalent to Arrosolo and Stam M4 + Bolero with the addition of RyzUp.

Table 1. The effect of gibberellic acid and post emergence herbicide mixtures on seedling height of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment                   | Plant Height (mm)  |        |       |        |        |        |
|-----------------------------|--------------------|--------|-------|--------|--------|--------|
|                             | 1 DAT <sup>1</sup> | 3 DAT  | 7 DAT | 11 DAT | 14 DAT | 22 DAT |
| Untreated Check             | 148ab <sup>2</sup> | 169cd  | 182e  | 196e   | 203e   | 423abc |
| Unweedy Check <sup>3</sup>  | 146ab              | 165cd  | 184e  | 200de  | 206e   | 380d   |
| Weedy GA <sup>4</sup> Check | 157a               | 172cd  | 297de | 219cde | 226de  | 451a   |
| Unweedy GA Check            | 139b               | 175bcd | 190de | 226e   | 251cd  | 388cd  |
| Facet                       | 153ab              | 173cd  | 190de | 203cde | 209e   | 367d   |
| Facet+GA                    | 160a               | 183bc  | 191de | 214cde | 227de  | 376d   |
| Wham EZ                     | 148ab              | 171cd  | 204d  | 203cde | 215e   | 400bcd |
| Wham EZ+GA                  | 155a               | 176bcd | 206d  | 225cd  | 270bc  | 394bcd |
| Stam 80 EDF+COC             | 155a               | 168cd  | 194de | 207cde | 219e   | 397bcd |
| Stam 80 EDF+COC+GA          | 155a               | 182bcd | 229c  | 268b   | 269bc  | 392cd  |
| Riverside Propanil          | 159a               | 179bcd | 297de | 212cde | 218e   | 403bcd |
| Riverside Propanil+GA       | 156a               | 192ab  | 251b  | 280b   | 292b   | 389cd  |
| Arrosolo                    | 150ab              | 175bcd | 203d  | 218cde | 231de  | 404bcd |
| Arrosolo+GA                 | 153ab              | 203a   | 284a  | 316a   | 330a   | 389cd  |
| Stam M4                     | 150ab              | 165cd  | 193de | 209cde | 227de  | 389cd  |
| Stam M4+GA                  | 159a               | 205a   | 272a  | 323a   | 342a   | 380d   |
| Stam M4+Basagran            | 147ab              | 164d   | 197de | 213cde | 209e   | 430ab  |
| Stam M4+Basagran+GA         | 153ab              | 202a   | 287a  | 327a   | 345a   | 390cd  |
| Stam M4+Bolero              | 154a               | 170cd  | 199de | 217cde | 224de  | 391cd  |
| Stam M4+Bolero+GA           | 156a               | 179bcd | 272a  | 307a   | 332a   | 385d   |

<sup>1</sup> Days after treatment.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>3</sup> Arrosolo applied 6 days after other treatments to control weeds.

<sup>4</sup> Gibberellic acid formulated as RyzUp.

Table 2. The effect of gibberellic acid and post emergence herbicide mixtures on seedling injury of rice (*Oryza sativa* 'LEMONT') and weed control. Rice Research Station, Crowley, LA. 1990.

| Treatment                   | Rice Injury        |        | Grass Control |        | Sedge Control |        |
|-----------------------------|--------------------|--------|---------------|--------|---------------|--------|
|                             | 8 DAT <sup>1</sup> | 14 DAT | 8 DAT         | 14 DAT | 8 DAT         | 14 DAT |
| Untreated Check             | 5a <sup>2</sup>    | 5a     | 1c            | 1c     | 1d            | 1f     |
| Unweedy Check <sup>3</sup>  | 4bc                | 4bcd   | 5a            | 5a     | 3bc           | 4a     |
| Weedy GA <sup>4</sup> Check | 5a                 | 5a     | 1c            | 1c     | 1d            | 1f     |
| Unweedy GA Check            | 4bc                | 4bcd   | 5a            | 5a     | 3bc           | 4a     |
| Facet                       | 5a                 | 5a     | -             | -      | 1d            | 1f     |
| Facet+GA                    | 5a                 | 5a     | -             | -      | 1d            | 1f     |
| Wham EZ                     | 5a                 | 4bc    | 4ab           | 4ab    | 3c            | 3de    |
| Wham EZ+GA                  | 5a                 | 5ab    | 5ab           | 4b     | 3c            | 3e     |
| Stam 80 EDF+COC             | 4b                 | 5a     | 5ab           | 5a     | 3bc           | 3cde   |
| Stam 80 EDF+COC+GA          | 4b                 | 5abc   | 5a            | 5a     | 4ab           | 4ab    |
| Riverside Propanil          | 4b                 | 5ab    | 4b            | 5ab    | 3bc           | 3de    |
| Riverside Propanil+GA       | 4b                 | 4bcd   | 5a            | 5a     | 4ab           | 3bcd   |
| Arrosolo                    | 4b                 | 5a     | 5a            | 5a     | 4a            | 4a     |
| Arrosolo+GA                 | 4b                 | 4d     | 5a            | 5a     | 4a            | 4ab    |
| Stam M4                     | 4b                 | 4bcd   | 5ab           | 4ab    | 4ab           | 3bcd   |
| Stam M4+GA                  | 4cd                | 4bcd   | 5a            | 5a     | 4a            | 4ab    |
| Stam M4+Basagran            | 4b                 | 5abc   | 5ab           | 4ab    | 4ab           | 4abc   |
| Stam M4+Basagran+GA         | 4b                 | 4bcd   | 5ab           | 5ab    | 4a            | 4ab    |
| Stam M4+Bolero              | 3d                 | 4cd    | 5a            | 5a     | 4a            | 4a     |
| Stam M4+Bolero+GA           | 3d                 | 4cd    | 5a            | 5a     | 4ab           | 4ab    |

<sup>1</sup> Days after treatment.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>3</sup> Arrosolo applied 6 days after other treatments to control weeds.

<sup>4</sup> Gibberellic acid formulated as RyzUp.

Table 3. The effect of gibberellic acid and post emergence herbicide mixtures on mature development of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment                   | Plant Height (cm) | Grain Moisture (%) | Grain <sup>1</sup> Yield (lb/A) |
|-----------------------------|-------------------|--------------------|---------------------------------|
| Untreated Check             | 57g <sup>2</sup>  | 17.5a-d            | 372g                            |
| Unweedy Check <sup>3</sup>  | 74cd              | 16.4cde            | 3944b-e                         |
| Weedy GA <sup>4</sup> Check | 55g               | 18.8a              | 390g                            |
| Unweedy GA Check            | 74cd              | 17.2b-e            | 4460ab                          |
| Facet                       | 69f               | 18.6ab             | 1318f                           |
| Facet+GA                    | 70ef              | 16.6cde            | 1473f                           |
| Wham EZ                     | 74cd              | 17.3bcd            | 3397de                          |
| Wham EZ+GA                  | 73d               | 17.5a-d            | 3313e                           |
| Stam 80 EDF+COC             | 75bcd             | 16.5cde            | 3762b-e                         |
| Stam 80 EDF+COC+GA          | 73d               | 16.2de             | 3899b-e                         |
| Riverside Propanil          | 72de              | 15.8e              | 3126e                           |
| Riverside Propanil+GA       | 74d               | 17.0cde            | 4246a-d                         |
| Arrosolo                    | 77ab              | 16.5cde            | 4491ab                          |
| Arrosolo+GA                 | 75bcd             | 16.1de             | 4291abc                         |
| Stam M4                     | 74d               | 16.4cde            | 3429cde                         |
| Stam M4+GA                  | 75bcd             | 16.9cde            | 4393ab                          |
| Stam M4+Basagran            | 75bcd             | 16.8cde            | 3881b-e                         |
| Stam M4+Basagran+GA         | 74cd              | 16.5cde            | 3885b-e                         |
| Stam M4+Bolero              | 78a               | 17.7abc            | 4339ab                          |
| Stam M4+Bolero+GA           | 77abc             | 16.6cde            | 4893a                           |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>3</sup> Arrosolo applied 6 days after other treatments to control weeds.

<sup>4</sup> Gibberellic acid formulated as RyzUp.



## RED RICE STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment: Herbicides and Plant Growth Regulators for Red Rice (Oryza sativa L.) Control and Seedhead Suppression in Rice (Oryza sativa 'MAYBELLE')

Location: Rice Research Station, Crowley, LA.

Variety: Maybelle

Seeding Rate: 250 lb/A

Planting Date: 20 Apr 90

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 18 Apr; seed were kept moist for 24 hr following draining before sowing

Fertilizer: 7-21-21 at 1.2% zinc at 300 lb/A and urea (46% N) at 200 lb/A on 18 Apr

Plot Size: 742 ft<sup>2</sup> - 7 x 106 ft

Treated Area: 742 ft<sup>2</sup> - 7 x 106 ft

Treatment(s): Herbicides

Bolero - 4 lb thiobencarb/A, preplant surface, 18 Apr

Ordram - 4 lb molinate/A, preplant incorporated, 18 Apr

Whip - 0.15 lb fenoxaprop-ethyl/A, 5-leaf stage, 29 May

Roundup - Roundup (glyphosate):water (1:2), ropewick application, red rice headed, 20 July

### Plant Growth Regulators

Embark - 0.25 lb mefluidide/A at late boot, 18 and 20 June

Royal MH SG - 1.5 lb maleic hydrazide/A at dough stage, 17 July

Sprayer: CO<sub>2</sub>-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 20 June, 0.05 inches



**Herbicide(s):** Propanil (3 lb ai/A) by airplane, 11 May  
 Londax (1 oz ai/A) by airplane, 22 May  
 2,4-D (0.5 lb ai/A) by hand-held sprayer, 6 June

**Insecticide(s):** Furadan (0.5 lb ai/A) by airplane, 31 May

**Fungicide(s):** None

**Emergence:** 20 Apr (seeded germinated seed)

**Permanent Flood:** 24 Apr

**Harvest Date:** 27 and 30 July

**Harvested Area:** Reps 1 & 3 - 651 ft<sup>2</sup> - 7 x 93 ft, 30 July  
 Reps 2 & 4 - 742 ft<sup>2</sup> - 7 x 106 ft, 27 July

**Exp. Design:** Factorial (3x5), randomized complete block  
 (4 replications)

**Water Management:** Flooded (1 to 2 inches), 20 Apr for seeding;  
 drained, 22 Apr; and permanent flood (3 to 4 inches), 24 Apr; drained for harvest, 23 Aug

**Comments:** Stand of red rice was affected by preplant herbicides, and panicle density of red rice was affected by both preplant herbicides and seedhead suppressants (Table 1). Preplant herbicides reduced red rice stand from 10 to 0 plants/m<sup>2</sup>. In the absence of preplant herbicide, red rice panicle density was significantly reduced by fenoxaprop-ethyl from 23 to 15 panicles/m<sup>2</sup>, and was further reduced significantly by mefluidide, maleic hydrazide and glyphosate to 8, 4, and 4 panicles/m<sup>2</sup>, respectively.

Stand of Maybelle was increased by molinate, and mefluidide suppressed panicles of Maybelle (Table 1). Stands were 660, 599, and 584 plants/m<sup>2</sup> with molinate, thiobencarb and without preplant herbicide, respectively. Panicle suppression with mefluidide was 264 panicles/m<sup>2</sup> and less than 34 panicles/m<sup>2</sup> with other treatments.

Maturity was delayed and grain yield was reduced by some treatment combinations (Table 2). With thiobencarb, maleic hydrazide delayed maturity as reflected in a 4 to 5% higher grain moisture than fenoxaprop-ethyl and mefluidide. With molinate, fenoxaprop-ethyl increased grain moisture as much as 8%. In the absence of preplant herbicide, mefluidide reduced grain yield between 600 to 1000 lb/A. With thiobencarb, fenoxaprop-ethyl and mefluidide reduced grain yield between 700 and 900 lb/A. With molinate, mefluidide reduced grain yield by 800 lb/A.

Table 1. The effect of herbicides and plant growth regulators on stand and panicle production of red rice (*Oryza sativa* L.) and panicle production of rice (*Oryza sativa* 'MAYBELLE'). Rice Research Station. Crowley, LA. 1990.

| Preplant Treatment | Postflood Treatment | Red Rice                          |                                              | Maybelle                                     |                                                  |
|--------------------|---------------------|-----------------------------------|----------------------------------------------|----------------------------------------------|--------------------------------------------------|
|                    |                     | Stand<br>(plants/m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) | Suppressed<br>Panicles<br>(pan./m <sup>2</sup> ) |
|                    | -                   | 15a <sup>1</sup>                  | 23a                                          | 581b                                         | 3c                                               |
|                    | Whip                | 9bc                               | 15b                                          | 600ab                                        | 0c                                               |
|                    | Embark              | 10bc                              | 8c                                           | 525b                                         | 180b                                             |
|                    | Royal MH            | 10b                               | 4cd                                          | 635ab                                        | 0c                                               |
|                    | Roundup             | 5c                                | 4cd                                          | 581b                                         | 0c                                               |
| Bolero             | -                   | 1d                                | 1d                                           | 643ab                                        | 0c                                               |
|                    | Whip                | 0d                                | 0d                                           | 554b                                         | 100bc                                            |
|                    | Embark              | 1d                                | 0d                                           | 608ab                                        | 309a                                             |
|                    | Royal MH            | 1d                                | 0d                                           | 560b                                         | 0c                                               |
|                    | Roundup             | 1d                                | 0d                                           | 630ab                                        | 0c                                               |
| Ordram             | -                   | 0d                                | 0d                                           | 619ab                                        | 0c                                               |
|                    | Whip                | 0d                                | 0d                                           | 742a                                         | 3c                                               |
|                    | Embark              | 1d                                | 1d                                           | 662ab                                        | 301a                                             |
|                    | Royal MH            | 0d                                | 0d                                           | 598ab                                        | 0c                                               |
|                    | Roundup             | 0d                                | 0d                                           | 678ab                                        | 0c                                               |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of herbicides and plant growth regulators on rough rice production and quality of rice (*Oryza sativa* 'MAYBELLE'). Rice Research Station, Crowley, LA. 1990.

| Preplant Treatment | Postflood Treatment | Grain Moisture (%)   | Grain Yield (lb/A) | Red Rice Content (%) |
|--------------------|---------------------|----------------------|--------------------|----------------------|
| -                  | -                   | 30.9c-f <sup>1</sup> | 6886bc             | 1.37a                |
|                    | Whip                | 31.7c-f              | 7148abc            | 0.49b                |
|                    | Embark              | 29.5ef               | 6126d              | 0.45b                |
|                    | Royal MH            | 28.6ef               | 6740bc             | 0.38b                |
|                    | Roundup             | 30.7c-f              | 6899bc             | 0.47b                |
| Bolero             | -                   | 34.2bcd              | 7348ab             | 0.20b                |
|                    | Whip                | 32.5cde              | 6868bc             | 0.11b                |
|                    | Embark              | 31.6c-f              | 6646c              | 0.11b                |
|                    | Royal MH            | 36.5ab               | 7562a              | 0.13b                |
|                    | Roundup             | 34.4bc               | 7373ab             | 0.17b                |
| Ordram             | -                   | 29.4ef               | 6945bc             | 0.19b                |
|                    | Whip                | 38.6a                | 7095abc            | 0.21b                |
|                    | Embark              | 27.9f                | 5583e              | 0.11b                |
|                    | Royal MH            | 30.3def              | 7072abc            | 0.13b                |
|                    | Roundup             | 30.9c-f              | 7392ab             | 0.14b                |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## RED RICE STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Plant Growth Regulators for Red Rice (Oryza sativa L.) Panicle Suppression in Very Early Season Rice (Oryza sativa 'ALAN,' 'AS3510,' 'MAYBELLE,' 'TEBONNET')

Location: Rice Research Station, Crowley, LA

Variety: See treatments

Seeding Rate: 250 lb/A

Planting Date: 25 Apr 90

Row Spacing: Water-seeded: seed were soaked in water for beginning on 23 Apr; seed were kept moist for 24 hr following draining before sowing

Fertilizer: 7-21-21 at 1.2% zinc at 300 lb/A and urea (46% N) at 200 lb/A on 23 Apr

Plot Size: 595 ft<sup>2</sup> - 7 x 85 ft

Treated Area: 595 ft<sup>2</sup> - 7 x 85 ft

Treatment(s): Varieties

Alan, AS3510, Maybelle, and Tebonnet

### Plant Growth Regulators

Embark - 0.25 lb mefluidide/A at late boot and dough stage

Alan - 26 June and 17 July  
AS3510 - 29 June and 20 July  
Maybelle - 22 June and 13 July  
Tebonnet - 2 and 25 July

Royal MH SG - 1.5 lb maleic hydrazide/A at dough stage

Alan - 13 July  
AS3510 - 5 July  
Maybelle - 9 July  
Tebonnet - 25 July

Sprayer: CO2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

**Pertinent Rainfall:** No significant rainfall within 24 hours following foliar treatments

**Herbicide(s):** Stam M4 (3 lb ai/A) by airplane on 11 May  
Londax (1 oz ai/A) by airplane on 22 May

**Insecticide(s):** Furadan (0.5 lb ai/A) by airplane on 31 May

**Fungicide(s):** None

**Emergence:** 25 Apr (seeded germinated seed)

**Permanent Flood:** 30 Apr

**Harvest Date:** Alan - (31 July)  
AS3510 - (25 July)  
Maybelle - (31 July)  
Tebonnet - (14 Aug)

**Harvested Area:** 595 ft<sup>2</sup> - .7 x 85 ft

**Experimental Design:** Split plot (variety=main plots, plant growth regulator=subplots), randomized complete block (4 replications)

**Water Management:** Flooded (1 to 2 inches) on 25 April for seeding; drained on 27 April and permanent flood (3 to 4 inches) on 30 April; drained for harvest on 2 August

**Comments:** Red rice population and rice panicle production were affected by variety (Table 1).<sup>2</sup> There was significantly less red rice with Alan (32 plants/m<sup>2</sup>) compared to AS3510 (45 plants/m<sup>2</sup>). Panicle density of Maybelle and Alan averaged 65 and 59 panicles/ft<sup>2</sup>, respectively, compared to 33 and 37 panicles/ft<sup>2</sup> for Tebonnet and AS3510, respectively.

Red rice panicle production and suppression of rice panicles were affected by plant growth regulator (Table 1). The effect was dependent on variety. For Alan and AS3510, maleic hydrazide reduced red panicle production significantly by greater than 90%. For Maybelle and Tebonnet, maleic hydrazide and mefluidide reduced red rice panicle production significantly by an average 80 and 70%, respectively. The application of mefluidide significantly suppressed rice panicles in Alan, Maybelle and Tebonnet by one-third to one-half. There was no effect on AS3510.

There were differences in lodging and grain production due mainly to variety (Table 2). Lodging was affected by the plant growth regulator. Lodging was higher in AS3510 and Tebonnet compared to Alan and Maybelle by greater than 30%. In general, there was 10 to 20% less lodging when mefluidide was applied. Grain moisture was directly related to varietal maturity. AS3510 was the earliest maturing variety followed by Maybelle, Alan and Tebonnet. Grain

moistures averaged 20.9, 22.2, 23.2 and 25.2%, respectively. Alan and Maybelle averaged above 5000 lb/A in grain yield compared to less than 4000 lb/A for AS3510 and Tebonnet. This may be related to lodging which was greater in AS3510 and Tebonnet.

Plant growth regulators had varying effects on milling yield depending on the variety of rice (Table 2). Maleic hydrazide significantly increased total and whole millings in Alan by 2%. Similar effects occurred with mefluidide in Maybelle. Milling yields for AS3510 and Tebonnet were unaffected by plant growth regulator treatment.

Red rice in the grain and milled rice was less than 4 and 2%, respectively, in Alan, AS3510 and Maybelle (Table 3). The application of maleic hydrazide and mefluidide reduced red rice content 20 and 10% in rough and milled rice, respectively.

Table 1. The effect of seedhead suppressants on red rice (*Oryza sativa* L.) growth and development in very early season rice (*Oryza sativa* 'ALAN,' 'AS3510,' 'MAYBELLE' 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Seedhead Suppressant  | Red Rice                       |                                        | Rice                                   |                                                   |
|----------|-----------------------|--------------------------------|----------------------------------------|----------------------------------------|---------------------------------------------------|
|          |                       | Stand (plants/m <sup>2</sup> ) | Panicle Density (pan./m <sup>2</sup> ) | Panicle Density (pan./m <sup>2</sup> ) | Suppressed Panicle Density (pan./m <sup>2</sup> ) |
| Alan     | -                     | 31b <sup>1</sup>               | 42bcd                                  | 56b                                    | 0c                                                |
|          | Embark <sup>2</sup>   | 34ab                           | 29b-e                                  | 58b                                    | 18b                                               |
|          | Royal MH <sup>3</sup> | 30b                            | 1e                                     | 63ab                                   | 0c                                                |
| AS3510   | -                     | 40ab                           | 45bc                                   | 42c                                    | 0c                                                |
|          | Embark                | 51a                            | 20cde                                  | 35c                                    | 0c                                                |
|          | Royal MH              | 45ab                           | 4e                                     | 35c                                    | 0c                                                |
| Maybelle | -                     | 31b                            | 53b                                    | 58b                                    | 0c                                                |
|          | Embark                | 43ab                           | 13de                                   | 62ab                                   | 31a                                               |
|          | Royal MH              | 46ab                           | 4e                                     | 75a                                    | 0c                                                |
| Tebonnet | -                     | 41ab                           | 131a                                   | 30c                                    | 0c                                                |
|          | Embark                | 36ab                           | 50bc                                   | 37c                                    | 15b                                               |
|          | Royal MH              | 36ab                           | 47bc                                   | 33c                                    | 1c                                                |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>2</sup> Rate = 0.25 lb ai/A.

<sup>3</sup> Rate = 1.5 lb ai/A.

Table 2. The effect of seedhead suppressants for red rice (*Oryza sativa*) control on the mature development of very early season rice (*Oryza sativa* 'ALAN,' 'AS3510,' 'MAYBELLE' 'TEBONNET'). Rice Research Station. Crowley, LA. 1990.

| Variety  | Seedhead Suppressant  | Lodging (%)     | Grain Moisture (%) | Grain Yield <sup>1</sup> (lb/A) | Milling Yield |           |
|----------|-----------------------|-----------------|--------------------|---------------------------------|---------------|-----------|
|          |                       |                 |                    |                                 | Total (%)     | Whole (%) |
| Alan     | -                     | 0c <sup>2</sup> | 23.8bc             | 5275a                           | 67.3cde       | 57.4c     |
|          | Embark <sup>3</sup>   | 0c              | 23.3bcd            | 5213a                           | 69.4ab        | 60.1abc   |
|          | Royal MH <sup>4</sup> | 0c              | 22.5cde            | 5037ab                          | 69.6a         | 60.8a     |
| AS3510   | -                     | 50a             | 21.6def            | 3064d                           | 63.1gh        | 49.4ef    |
|          | Embark                | 38ab            | 20.9ef             | 3384cd                          | 62.4h         | 48.3f     |
|          | Royal MH              | 50a             | 20.1f              | 3301d                           | 63.5gh        | 49.9ef    |
| Maybelle | -                     | 29ab            | 22.8cde            | 5140a                           | 67.7bcd       | 57.8bc    |
|          | Embark                | 0c              | 21.3def            | 4850ab                          | 70.2a         | 60.3ab    |
|          | Royal MH              | 0c              | 22.4cde            | 5220a                           | 68.5abc       | 58.0abc   |
| Tebonnet | -                     | 50a             | 25.2ab             | 4221bc                          | 65.6ef        | 54.1d     |
|          | Embark                | 20b             | 24.2bc             | 3767cd                          | 66.6de        | 53.4d     |
|          | Royal MH              | 45a             | 26.3a              | 3032d                           | 64.4fg        | 51.4de    |

<sup>1</sup> Adjusted to 12% grain moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>3</sup> Rate - 0.25 lb ai/A.

<sup>4</sup> Rate - 1.5 lb ai/A.



Table 3. The effect of seedhead suppressants for red rice (*Oryza sativa* L.) control on the presence of red rice in rough and milled rice in very early season rice (*Oryza sativa* 'ALAN,' 'AS3510,' 'MAYBELLE' 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Variety  | Seedhead Suppressant  | Red Rice Content (%) |             |
|----------|-----------------------|----------------------|-------------|
|          |                       | Rough Rice           | Milled Rice |
| Alan     | -                     | 3.4c <sup>1</sup>    | 0.2c        |
|          | Embark <sup>2</sup>   | 2.2c                 | 0.0c        |
|          | Royal MH <sup>3</sup> | 0.1c                 | 0.0c        |
| AS3510   | -                     | 0.5c                 | 0.1c        |
|          | Embark                | 0.3c                 | 0.2c        |
|          | Royal MH              | 0.1c                 | 0.1c        |
| Maybelle | -                     | 3.0c                 | 0.7c        |
|          | Embark                | 2.2c                 | 0.8c        |
|          | Royal MH              | 1.1c                 | 1.3c        |
| Tebonnet | -                     | 43.6a                | 27.8a       |
|          | Embark                | 25.7b                | 15.1b       |
|          | Royal MH              | 23.6b                | 10.9b       |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

<sup>2</sup> Rate = 0.25 lb ai/A.

<sup>3</sup> Rate = 1.5 lb ai/A.

## RED RICE STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Plant Growth Regulator Seed Treatment and Postemergence Herbicide Application for Control of Red Rice (Oryza sativa L.) in Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA

Variety: Lemont

Seeding Rate: 250 lb/A

Planting Date: 25 Apr 90

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 23 Apr; seed were kept moist for 24 hr following draining before sowing

Fertilizer: 7-21-21 at 1.2% zinc at 300 lb/A and urea (46% N) at 200 lb/A on 23 Apr

Plot Size: 595 ft<sup>2</sup> - 7 x 85 ft

Treated Area: 595 ft<sup>2</sup> - 7 x 85 ft

Treatment(s): Seed Treatment

Formulation (rates):

Release (100 ppm gibberellic acid, mg/kg seed)

AC94377 (1000 ppm phthalimide, mg/kg seed)

### Foliar Treatment

Formulation (rates):

Whip (0.15 fenoxaprop-ethyl/A)

Timing: 5 leaf stage (21 May)

Sprayer: CO<sub>2</sub>-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No significant rainfall within 24 hours following foliar treatments

**Herbicide(s):** Stam M4 (3 lb ai/A) by airplane, 11 May  
Londax (1 oz ai/A) by airplane, 22 May

**Insecticide(s):** Furadan (0.5 lb ai/A) by airplane, 31 May

**Fungicide(s):** None

**Emergence:** 25 Apr (seeded germinated seed)

**Permanent Flood:** 30 Apr

**Harvest Date:** Rep 1 & 3, 22 Aug; Rep 2 & 4, 23 Aug

**Harvested Area:** 595 ft<sup>2</sup> - 7 x 85 ft

**Exp. Design:** Factorial (2x3), randomized complete block  
(4 replications)

**Water Management:** Flooded (1 to 2 inches), 25 Apr for seeding;  
drained, 27 Apr; and permanent flood (3 to 4  
inches), 30 Apr; drained for harvest, 2 Aug

**Comments:** Fenoxaprop-ethyl reduced red rice stand by one-third and panicle density by one-half (Table 1). Lemont was unaffected by treatments.

As a result of the reduction in red rice from the postemergence application of fenoxaprop-ethyl, grain yield was increased 600 lb/A and red rice content of the rough rice was reduced 24% (Table 2). Grain moisture was unaffected by treatments and ranged between 21 and 22%.

The presence of red rice in the harvested grain reduced grain quality (Table 3). Whole milling yield was increased from 38.1% to 41.5% through red rice control with fenoxaprop-ethyl. Total milling yield was unaffected by treatments.

Table 1. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on stand and panicle production of red rice (*Oryza sativa* L.) and rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | Lemont                            |                                              | Red Rice                          |                                              |
|----------------------|-------------------|-----------------------------------|----------------------------------------------|-----------------------------------|----------------------------------------------|
|                      |                   | Stand<br>(plants/m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) | Stand<br>(plants/m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) |
| 0                    | -                 | 321a <sup>1</sup>                 | 405a                                         | 72a                               | 175a                                         |
|                      | Gibberellic acid  | 378a                              | 572a                                         | 48b                               | 149a                                         |
|                      | Phthalimide       | 308a                              | 448a                                         | 69a                               | 182a                                         |
| .15                  | -                 | 335a                              | 583a                                         | 41b                               | 75b                                          |
|                      | Gibberellic acid  | 308a                              | 540a                                         | 40b                               | 98b                                          |
|                      | Phthalimide       | 305a                              | 534a                                         | 38b                               | 84b                                          |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on rough rice production and quality of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | Grain<br>Moisture<br>(%) | Grain<br>Yield<br>(lb/A) | Red Rice<br>Content<br>(%) |
|----------------------|-------------------|--------------------------|--------------------------|----------------------------|
| 0                    | -                 | 21.4ab <sup>1</sup>      | 4617b                    | 49.7a                      |
|                      | Gibberellic acid  | 21.2ab                   | 4744b                    | 45.9a                      |
|                      | Phthalimide       | 22.6a                    | 4761b                    | 50.0a                      |
| .15                  | -                 | 21.0ab                   | 5568a                    | 19.9b                      |
|                      | Release           | 20.9b                    | 5186ab                   | 18.2b                      |
|                      | AC94377           | 21.4ab                   | 5220ab                   | 35.2a                      |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 3. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on grain quality of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | Milling Yield      |              | Red Rice<br>Content<br>(%) |
|----------------------|-------------------|--------------------|--------------|----------------------------|
|                      |                   | Total<br>(%)       | Whole<br>(%) |                            |
| 0                    | -                 | 56.9a <sup>1</sup> | 37.4c        | 40.7a                      |
|                      | Gibberellic acid  | 57.2a              | 38.3bc       | 40.1a                      |
|                      | Phthalimide       | 57.5a              | 38.7bc       | 42.3a                      |
| .15                  | -                 | 58.7a              | 41.7ab       | 11.9b                      |
|                      | Gibberellic acid  | 58.0a              | 42.4a        | 15.4b                      |
|                      | Phthalimide       | 56.9a              | 40.5abc      | 25.5ab                     |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## RED RICE STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Plant Growth Regulator Seed Treatment and Postemergence Herbicide Application for Control of Red Rice (Oryza sativa L.) in Rice (Oryza sativa 'TEBONNET')

Location: Rice Research Station, Crowley, LA.

Variety: Tebonnet

Seeding Rate: 250 lb/A

Planting Date: 20 Apr 90

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 18 Apr; seed were kept moist for 24 hr following draining before sowing

Fertilizer: 7-21-21 at 1.2% zinc at 300 lb/A and urea (46% N) at 200 lb/A on 18 Apr

Plot Size: 742 ft<sup>2</sup> - 7 x 106 ft

Treated Area: 742 ft<sup>2</sup> - 7 x 106 ft

Treatment(s): Seed Treatment

Formulation (rates):

Release (100 ppm gibberellic acid, mg/kg seed)

AC94377 (1000 ppm phthalimide, mg/kg seed)

### Foliar Treatment

Formulation (rates):

Whip (0.15 fenoxaprop-ethyl/A)

Timing: 5 leaf stage (17 May)

Sprayer: CO<sub>2</sub>-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: None

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 11 May  
Londax (1 oz ai/A) by airplane, 22 May  
2,4-D (0.5 lb ai/A) by hand-held sprayer,  
6 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 31 May

Fungicide(s): None

Emergence: 20 Apr (seeded germinated seed)

Permanent Flood: 24 Apr

Harvest Date: 23 Aug

Harvested Area: 651 ft<sup>2</sup> - 7 x 93 ft

Exp. Design: Factorial (2x3), randomized complete block  
(4 replications)

Water Management: Flooded (1 to 2 inches), 20 Apr for seeding;  
drained, 22 Apr; and permanent flood (3 to 4  
inches), 24 Apr; drained for harvest, 23 Aug

Comments: Seed treatment with plant growth regulators increased the tolerance of Tebonnet to fenoxaprop-ethyl (Table 1). Panicle density was increased by one-fourth. There was no effect of treatments on stand of Tebonnet or stand and panicle density of red rice.

Grain moisture, grain yield, and red rice content of rough rice was unaffected by treatments (Table 2). Grain moisture ranged between 20.2 and 21.9%. Grain yield ranged between 4765 and 5144 lb/A. And red rice content ranged between 22.6 and 30.3%.

Milling yield and red rice content of milled rice was unaffected by treatments (Table 3). Total milling yield ranged between 69.5 and 70.4% and whole milling yield ranged between 51.9 and 55.5%. Red rice content ranged between 17.9 and 23.9%.

Table 1. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on stand and panicle production of red rice (*Oryza sativa* L.) and rice (*Oryza sativa* 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | Tebonnet                          |                                              | Red Rice                          |                                              |
|----------------------|-------------------|-----------------------------------|----------------------------------------------|-----------------------------------|----------------------------------------------|
|                      |                   | Stand<br>(plants/m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) | Stand<br>(plants/m <sup>2</sup> ) | Panicle<br>Density<br>(pan./m <sup>2</sup> ) |
| 0                    | -                 | 108a <sup>1</sup>                 | 464a                                         | 30a                               | 136a                                         |
|                      | Gibberellic acid  | 131a                              | 356ab                                        | 29a                               | 137a                                         |
|                      | Phthalimide       | 191a                              | 364ab                                        | 35a                               | 137a                                         |
| .15                  | -                 | 149a                              | 329b                                         | 20a                               | 92a                                          |
|                      | Gibberellic acid  | 208a                              | 399ab                                        | 32a                               | 136a                                         |
|                      | Phthalimide       | 189a                              | 402ab                                        | 21a                               | 106a                                         |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

Table 2. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on rough rice production and quality of rice (*Oryza sativa* 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | Grain<br>Moisture<br>(%) | Grain<br>Yield<br>(lb/A) | Red Rice<br>Content<br>(%) |
|----------------------|-------------------|--------------------------|--------------------------|----------------------------|
| 0                    | -                 | 20.6a <sup>1</sup>       | 5058a                    | 28.9a                      |
|                      | Gibberellic acid  | 20.2a                    | 4995a                    | 29.2a                      |
|                      | Phthalimide       | 20.6a                    | 4991a                    | 30.3a                      |
| .15                  | -                 | 21.9a                    | 4982a                    | 22.6a                      |
|                      | Gibberellic acid  | 21.0a                    | 4765a                    | 26.9a                      |
|                      | Phthalimide       | 21.7a                    | 5144a                    | 26.4a                      |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).



Table 3. The effect of fenoxaprop-ethyl and seed treatment with plant growth regulators on grain quality of rice (*Oryza sativa* 'TEBONNET'). Rice Research Station, Crowley, LA. 1990.

| Fenoxaprop<br>(lb/A) | Seed<br>Treatment | <u>Milling Yield</u> |              | Red Rice<br>Content<br>(%) |
|----------------------|-------------------|----------------------|--------------|----------------------------|
|                      |                   | Total<br>(%)         | Whole<br>(%) |                            |
| 0                    | -                 | 69.5a <sup>1</sup>   | 53.4a        | 23.9a                      |
|                      | Gibberellic acid  | 69.6a                | 52.1a        | 19.1a                      |
|                      | Phthalimide       | 69.5a                | 51.9a        | 21.1a                      |
| .15                  | -                 | 70.4a                | 55.5a        | 17.9a                      |
|                      | Gibberellic acid  | 70.1a                | 53.3a        | 18.1a                      |
|                      | Phthalimide       | 69.5a                | 54.9a        | 19.1a                      |

<sup>1</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: AC-94377 and Yield Enhancement in Rice  
(*Oryza sativa* 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7-inch

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A, 23 May

Plot Size: 218.75 ft<sup>2</sup> - 8.75 x 25 ft

Treated Area: 218.75 ft<sup>2</sup> - 8.75 x 25 ft

Treatment(s): Foliar Treatment

Formulation (rates): AC-94377 (0.669, 1.339,  
and 1.785 lb/A)

Surfactant: CS7 (0.25%)

Timing: Panicle differentiation,  
2 July; Late boot, 19  
July; Heading, 24 July

Pertinent Rainfall: 24 July-0.62 inches

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May

Permanent Flood: 25 May

Harvest Date: 6 Sep

Harvested Area: 218.75 ft<sup>2</sup> - 8.75 x 25 ft

**Exp. Design:** Factorial (3x4), randomized complete block (6 replications)

**Comments:** Grain yield, grain moisture, panicle density, grain per panicle and single grain weight of rice were unaffected by time and rate of application of AC-94377 (Table 1). Applications of AC-94377 during the reproductive phase ranging from panicle initiation (PI) to heading consistently averaged about 7500 lb/A independent of rate of AC-94377. Due to a late harvest, grain moisture averaged 12.8%. Panicle density averaged 34 to 36 panicles/ft<sup>2</sup> for applications during the reproductive phase. Average differences in single seed weight and grains/panicle were 0.2 mg and 2 grains, respectively.

Although not significant, grain yield tended to decrease as the rate of AC-94377 increased (Table 1). Grain yields averaged 7646, 7607, 7517, and 7480 lb/A for the control and 0.669, 1.339, and 1.785 lb/A rates of AC-94377, respectively. A more critical evaluation of this data using regression analyses would be necessary to determine the significance of this trend. Grain moisture and panicle density, grain per panicle and single grain weight were not significantly affected by AC-94377 rate and did not exhibit any trend as noted for grain yield.

Table 1. The effect of phthalimide on mature development of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Timing<br>(DAP <sup>1</sup> ) | Rate<br>(lb ai/A) | Grain <sup>2</sup><br>Yield<br>(lb/A) | Grain<br>Moisture<br>(%) | Panicle<br>Density<br>(pan./ft <sup>2</sup> ) | Single<br>Grain<br>Weight<br>(mg) | Panicle<br>Grain<br>Density<br>(grain/pan.) |
|-------------------------------|-------------------|---------------------------------------|--------------------------|-----------------------------------------------|-----------------------------------|---------------------------------------------|
| 60                            | 0                 | 7611ab <sup>3</sup>                   | 12.8b                    | 34a                                           | 25.4ab                            | 80a                                         |
|                               | .669              | 7588ab                                | 12.8ab                   | 33a                                           | 25.1ab                            | 82a                                         |
|                               | 1.339             | 7259b                                 | 12.8ab                   | 33a                                           | 25.2ab                            | 82a                                         |
|                               | 1.785             | 7434ab                                | 12.8ab                   | 37a                                           | 25.1b                             | 82a                                         |
| 79                            | 0                 | 7535ab                                | 12.9ab                   | 36a                                           | 25.5a                             | 80a                                         |
|                               | .669              | 7597ab                                | 12.8b                    | 35a                                           | 25.2ab                            | 81a                                         |
|                               | 1.339             | 7841a                                 | 13.1a                    | 35a                                           | 25.4ab                            | 83a                                         |
|                               | 1.785             | 7551ab                                | 12.9ab                   | 36a                                           | 25.4ab                            | 79a                                         |
| 84                            | 0                 | 7793a                                 | 12.8ab                   | 35a                                           | 25.3ab                            | 80a                                         |
|                               | .669              | 7637ab                                | 12.8ab                   | 37a                                           | 25.3ab                            | 83a                                         |
|                               | 1.339             | 7451ab                                | 12.8ab                   | 34a                                           | 25.6a                             | 76a                                         |
|                               | 1.785             | 7456ab                                | 12.8b                    | 39a                                           | 25.2ab                            | 79a                                         |

<sup>1</sup> Days after planting. 60-panicle differentiation, 79-late boot, 84-heading (20 to 50% panicle exsertion).

<sup>2</sup> Adjusted to 12% moisture.

<sup>3</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Ceres 211 and Water-Seeded Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 200 lb/A

Planting Date: 9 May 90

Row Spacing: Water-seeded: See treatments

Fertilizer: 7-21-21 at 300 lb/A; urea (46% N) preplant incorporated on 3 May

Plot Size: 125 ft<sup>2</sup> - 5 x 25 ft

Treated Area: 125 ft<sup>2</sup> - 5 x 25 ft

Treatment(s): Formulation (rate): Ceres 211 (20 and 40 g chitosan/A

Viscosity: 10, 20, 50, and 100 cps

Seed Treatment: Dry seed (F-X-X-1 series, F-X-X-2 series, and F-CONTROL-S) soaked in water. Dry seed (F-20-D and F-CONTROL-D) not soaked. Dry seed (F-20-S-3) soaked in Ceres 211 solution.

Soak Procedure: Seed were soaked for 24 hr beginning on 26 Apr: seed were kept moist for 24 hr following draining and before sowing.

Pertinent Rainfall: None

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 9 May

Permanent Flood: 14 May

Harvest Date: 6 Sep

Harvested Area: 125 ft<sup>2</sup> - 5 x 25 ft

Exp. Design: Randomized complete block (4 replications)

Comments: The results in general show Ceres 211 had no significant effect on grain yield (Table 1). The effect was the same whether seed was soaked before sowing or seed was sown dry.

Several Ceres 211 treatments had numerically higher grain yields than the corresponding control. For example, F-100-S-1 yielded 7502 lb/A compared to F-CONTROL-S which yielded 7290 lb/A. This was a yield increase of 212 lb/A. Treatments that yielded higher than the control may need to be investigated further.

Table 1. The effect of Cere 211 on grain yield in rice (*Oryza sativa* 'LEMONT'). Rice Research Station. Crowley, LA. 1990.

| Treatment   | Grain Moisture (%) | Grain Yield <sup>1</sup> (lb/A) |
|-------------|--------------------|---------------------------------|
| F-Control-S | 11.9b <sup>2</sup> | 7290a                           |
| F-10-S-1    | 12.3ab             | 7268a                           |
| F-10-S-2    | 12.3ab             | 7312a                           |
| F-20-S-1    | 12.3ab             | 7193a                           |
| F-20-S-2    | 12.2ab             | 7253a                           |
| F-20-S-3    | 12.6a              | 7459a                           |
| F-50-S-1    | 12.4ab             | 7365a                           |
| F-50-S-2    | 12.5a              | 7443a                           |
| F-100-S-1   | 12.5a              | 7502a                           |
| F-100-S-2   | 12.2ab             | 7484a                           |
| F-Control-D | 12.3ab             | 7569a                           |
| F-20-D      | 12.5a              | 7413a                           |

<sup>1</sup> Adjusted to 12% grain moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: An Experimental Plant Growth Regulator and Yield Enhancement in Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA.

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 3 May 90

Row Spacing: 7 in

Fertilizer: 7-21-21 at 300 lb/A preplant incorporated, 3 May; urea (46% N) 200 lb/A, 23 May

Plot Size: 131.25 ft<sup>2</sup> - 8.75 x 15 ft

Treated Area: 131.25 ft<sup>2</sup> - 8.75 x 15 ft

Treatment(s): Formulation(s) (rate):

Experimental PRG (4 and 6 oz/A)  
Crop Booster + (2 qt/A)  
Ryzup (0.95 oz/A)

Surfactant: Activate Plus (0.25%)

Timing: 3- to 5-leaf stage (29 May)

Pertinent Rainfall: No significant rainfall within 24 hours following foliar treatments

Herbicide(s): Stam M4 (3 lb ai/A) by airplane, 24 May  
Ordram (3 lb ai/A) by airplane, 31 May  
Londax (1.0 oz ai/A) by airplane, 6 June  
Bolero (4.0 lb ai/A) by airplane, 12 June

Insecticide(s): Furadan (0.5 lb ai/A) by airplane, 4 June

Fungicide(s): Rovral (0.5 lb ai/A) by airplane, 12 July

Emergence: 10 May



Permanent Flood: 25 May

Harvest Date: 6 Sep

Harvested Area: 131.25 ft<sup>2</sup> 8.75 x 15 ft

Experimental Design: Randomized complete block (4 replications)

Comments: There was no significant effect on grain yield by any of the treatments (Table 1). Grain yields ranged from 8368 lb/A to 8576 lb/A. The untreated control had a grain yield of 8505 lb/A. No visual effects on rice growth were noted following application of the treatments with the exception of a slight height increase caused by Ryzup.

Table 1. The effect of an experimental plant growth regulator and additives on the productivity of rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1990.

| Treatment                                                        | Grain Moisture (%) | Grain Yield <sup>1</sup> (lb/A) |
|------------------------------------------------------------------|--------------------|---------------------------------|
| Check                                                            | 12.8a <sup>2</sup> | 8505a                           |
| Experimental PGR (6 oz/A) +<br>Activate Plus                     | 12.8a              | 8576a                           |
| Experimental PGR (4 oz/A) +<br>Activate Plus + Crop Booster Plus | 12.8a              | 8368a                           |
| Gibberellic Acid (1 oz/A)                                        | 12.7a              | 8425a                           |

<sup>1</sup> Adjusted to 12% moisture.

<sup>2</sup> Means in the same column followed by the same letter do not significantly differ (Duncan's multiple range test, P=.05).

## RICE WEED CONTROL STUDIES

J. B. Baker, R. T. Dunand, T. J. Downey, and D. J. Pantone

### INTRODUCTION

The objective of these studies is the development of weed control practices that are effective, economically sound and environmentally safe. Towards this objective, new products, as well as new ways of using old products, are investigated for efficacy and crop tolerance in drill-seeded rice.

### MATERIALS AND METHODS

Most of these studies were conducted at the main unit of the Rice Research Station in a field with a heavy infestation of weeds. The soil is a Crowley silt loam.

The field was plowed in the fall of 1989 to incorporate weed seeds and again in early spring to destroy winter vegetation. Final seedbed preparation involved disking, spring-tooth harrowing and cultimulching. Drill-seeded tests were planted with a grain drill planting 9 rows at 7 inch spacing. The variety Lemont was used in all tests except the variety tolerance studies. The drill was adjusted to plant 100 lb/A at a depth of 1/4 to 3/4 inch. Following planting the field was flush irrigated as needed to establish a stand. In most cases the rice was fertilized with 400 lb/A of a 20-10-10 analysis fertilizer just prior to flooding. In some cases the field was fertilized following flooding. Plot size was generally 9 drill rows wide and 25 feet long with 1 1/2 foot alleys separating the plots.

In water-seeded tests, seedbed preparation was the same as in drill-seeded tests. The test area was flooded after levee construction, seeded with presprouted rice at a rate equivalent to 125 lb/A dry seed and drained to aid in stand establishment. The flood was reestablished when the seedlings were established and kept flooded until shortly before harvest. Specific details on water management, fertilization and other production practices are given in the results section.

Plots were harvested by using a plot combine to cut 4 drill rows from the center of each plot or by hand cutting a 9 sq ft area from each plot and threshing. Yield data were converted to hundred-weights per acre (cwt/A) at 12% moisture.

---

<sup>1/</sup> This research was supported in part by funds provided by rice farmers through the Louisiana Rice Research Board.

In most cases, weed control and rice injury were evaluated by visual ratings using the following scales:

Rice tolerance:

- 1 - very severe injury with greater than 90% stand reduction.
- 2 - severe injury with 70-90% stand reduction.
- 3 - moderate injury, primarily leaf burning and/or stunting.
- 4 - slight injury, primarily leaf burning.
- 5 - no detectable injury.

Weed control:

- 1 - poor control, less than 10%.
- 2 - slight control, 10-30%.
- 3 - moderate control, 30-70%.
- 4 - good control, 70-90%.
- 5 - excellent control, 90-100%.

Data were subjected to analysis of variance, and, where appropriate, mean comparisons were made using Duncan's multiple range technique. Plot design is given in the results section.

Information on chemicals tested is presented in Table 13. In listing herbicide treatments, the following conventions are used: the plus sign (+) indicates a tank mixture of products, the slash (/) indicates sequential application of the products, and the colon (:) indicates the herbicides are premixed in one formulation.

Weed identification is given in Table 14.

## RESULTS AND DISCUSSION

### Advanced Herbicide Comparison Test

The treatments, ratings, yields and test information are presented in Table 1. The test design was a randomized complete block with four replications. The principal weeds, in order of severity, were junglerice, yellow nutsedge, and texasweed.

The standard postemergence propanil did not perform exceptionally well. This was probably due to the unusually dry weather conditions at the time of treatment. While there were some herbicide treatments that gave better junglerice control, quinclorac preplant incorporated or delayed preemergence were the only single herbicide treatments with superior junglerice control. Mixtures giving superior control contained propanil or quinclorac, or were sequential applications containing these herbicides. Only molinate preplant incorporated, propanil early postemergence, and quinclorac + bromoxynil early postemergence gave poorer junglerice control. The latter suggests an antagonistic interaction between quinclorac and bromoxynil, since quinclorac alone gave excellent control.

Only two treatments gave better control of yellow nutsedge than the propanil standard, and both of these were sequential applications of propanil, alone or in combination with thiobencarb. Many treatments gave poorer control than propanil, and this lack of control was reflected in the yields.

Table 1. Advanced herbicide comparison test.<sup>1/</sup> Rice Research Station, Crowley, La. 1990.

| Herbicide                                                     | Rate                      | Time of treatment | Rice tolerance<br>6/19 | Weed Control Ratings <sup>2/</sup> |        |        |        |        | Yield<br>(cwt/A) |
|---------------------------------------------------------------|---------------------------|-------------------|------------------------|------------------------------------|--------|--------|--------|--------|------------------|
|                                                               |                           |                   |                        | ECHCO                              |        | CYPES  |        | CNPPA  |                  |
|                                                               |                           |                   |                        | 6/19                               | 7/30   | 6/19   | 7/30   | 7/30   |                  |
|                                                               | (lb ai/A)                 |                   |                        |                                    |        |        |        |        |                  |
| Untreated check                                               | -                         | -                 | 5.0                    | 1.0 f                              | 1.5 g  | 1.0 g  | 1.0 h  | 1.0 h  | 12.2 m           |
| Molinate                                                      | 4.0                       | PPI               | 5.0                    | 2.3 ef                             | 2.3 fg | 3.0abc | 1.5 gh | 1.0 h  | 25.7 i           |
| Molinate +<br>quinclorac                                      | 4.0<br>.375               | PPI               | 4.8                    | 3.5a-e                             | 4.0bcd | 2.8 bc | 2.3efg | 1.5fgh | 28.0 h           |
| Quinclorac                                                    | .375                      | PPI               | 4.8                    | 4.5ab                              | 5.0a   | 1.0 g  | 1.0 h  | 4.0a-d | 18.9 j           |
| Thiobencarb                                                   | 4.0                       | DelPre            | 5.0                    | 2.5 de                             | 4.0bcd | 1.3 fg | 1.0 h  | 1.0 h  | 17.6 jk          |
| Thiobencarb +<br>quinclorac                                   | 4.0<br>.375               | DelPre            | 5.0                    | 4.5ab                              | 4.8ab  | 1.3 fg | 1.0 h  | 1.0 h  | 19.1 j           |
| Thiobencarb /<br>propanil                                     | 4.0<br>3.0                | DelPre<br>EPost   | 5.0                    | 3.3b-e                             | 4.0bcd | 2.0 de | 1.5 gh | 2.0e-h | 25.2 i           |
| Quinclorac                                                    | .375                      | DelPre            | 5.0                    | 4.0a-d                             | 5.0a   | 1.0 g  | 1.0 h  | 1.3 gh | 19.3 j           |
| Quinclorac +<br>BAS864 (pt/A)                                 | .375<br>3.0               | EPost             | 5.0                    | 3.8a-e                             | 4.8ab  | 1.0 g  | 1.0 h  | 1.5 gh | 15.2 l           |
| Quinclorac +<br>BAS864 (pt/A) /<br>fenoxyprop +<br>COC (pt/A) | .375<br>3.0<br>.15<br>1.7 | EPost<br>LPost    | -                      | -                                  | 5.0a   | -      | 1.0 h  | 3.0c-f | 15.7 kl          |

Table 1. (Continued).

| Herbicide                                                     | Rate<br>(lb ai/A)         | Time of<br>treatment | Rice<br>tolerance<br>6/19 | Weed Control Ratings <sup>2/</sup> |        |        |        |        | Yield<br>(cwt/A) |
|---------------------------------------------------------------|---------------------------|----------------------|---------------------------|------------------------------------|--------|--------|--------|--------|------------------|
|                                                               |                           |                      |                           | ECHCO                              |        | CYPES  |        | CNPPA  |                  |
|                                                               |                           |                      |                           | 6/19                               | 7/30   | 6/19   | 7/30   | 7/30   |                  |
| Quinclorac +<br>BAS864 (pt/A) /<br>sethoxydim +<br>COC (pt/A) | .375<br>3.0<br>.15<br>1.7 | EPost<br>LPost       | -<br>-                    | -<br>-                             | 5.0a   | -<br>- | 1.0 h  | 1.3 gh | 17.9 jk          |
| Thiobencarb +<br>propanil                                     | 3.0<br>3.0                | EPost                | 5.0                       | 4.5ab                              | 4.5abc | 2.5 cd | 2.5 ef | 1.3 gh | 30.1fgh          |
| Thiobencarb +<br>propanil /<br>thiobencarb +<br>propanil      | 3.0<br>3.0<br>3.0<br>3.0  | EPost<br>LPost       | -<br>-                    | -<br>-                             | 5.0a   | -<br>- | 4.5a   | 5.0a   | 41.6 b           |
| Thiobencarb +<br>quinclorac /<br>thiobencarb +<br>propanil    | 3.0<br>.375<br>3.0<br>3.0 | EPost<br>LPost       | -<br>-                    | -<br>-                             | 5.0a   | -<br>- | 2.8def | 4.5abc | 31.6efg          |
| Propanil                                                      | 3.0                       | EPost                | 5.0                       | 2.5def                             | 3.0 ef | 1.5efg | 2.0 fg | 2.0e-h | 24.0 i           |
| Propanil /<br>propanil                                        | 3.0<br>3.0                | EPost<br>Post        | 4.8                       | 5.0a                               | 5.0a   | 3.3ab  | 4.5a   | 5.0a   | 42.4 b           |
| Propanil                                                      | 3.0                       | Post                 | 5.0                       | 4.3abc                             | 4.0bcd | 2.8 bc | 3.5bcd | 3.8a-d | 32.7 de          |
| Propanil                                                      | 4.0                       | LPost                | -                         | -                                  | 3.5 de | -      | 3.0cde | 2.8d-g | 28.5 h           |

Table 1. (Continued).

| Herbicide                  | Rate<br>(lb ai/A) | Time of<br>treatment | Rice<br>tolerance<br>6/19 | Weed Control Ratings <sup>2/</sup> |        |        |        |        | Yield<br>(cwt/A) |
|----------------------------|-------------------|----------------------|---------------------------|------------------------------------|--------|--------|--------|--------|------------------|
|                            |                   |                      |                           | ECHCO                              |        | CYPES  |        | CNPPA  |                  |
|                            |                   |                      |                           | 6/19                               | 7/30   | 6/19   | 7/30   | 7/30   |                  |
| Propanil +<br>triclopyr    | 3.0<br>.375       | LPost                | -                         | -                                  | 3.3 de | -      | 3.8abc | 5.0a   | 45.1a            |
| Propanil +<br>bentazon     | 3.0<br>.75        | LPost                | -                         | -                                  | 3.8cde | -      | 3.8abc | 3.3b-e | 34.5 d           |
| Molinate:propanil          | 3.0:3.0           | EPost                | 5.0                       | 4.0a-d                             | 4.5abc | 1.8 ef | 2.0 fg | 1.5fgh | 29.5 gh          |
| Molinate:propanil          | 3.0:3.0           | Post                 | 4.8                       | 5.0a                               | 5.0a   | 3.5a   | 3.5bcd | 5.0a   | 38.0 c           |
| Molinate:propanil          | 3.0:3.0           | LPost                | -                         | -                                  | 5.0a   | -      | 4.3ab  | 4.8ab  | 41.6 b           |
| Propanil +<br>bromoxynil   | 3.0<br>.25        | LPost                | -                         | -                                  | 3.8cde | -      | 3.0cde | 5.0a   | 32.4def          |
| Quinclorac +<br>bromoxynil | .375<br>.25       | EPost                | 5.0                       | 2.5 de                             | 3.0 ef | 1.0 g  | 1.0 h  | 5.0a   | 15.0 l           |

<sup>1/</sup> Final seedbed prepared 5/15/90, and preplant treatments (PPI) applied 5/16/90. Rice drill seeded on 5/16/90, and flushed on 5/17/90. Delayed preemergence (DelPre) treatments applied 5/21/90. Flushed on 5/22/90, and rice emerged on 5/26/90. Early postemergence (EPost) treatments applied 5/31/90, postemergence treatments (Post) applied on 6/7/90, and late postemergence treatments (LPost) applied on 6/14/90. Fertilizer (400 lb/A 20-10-10) was applied on 6/18/90, and the test was flooded on 6/21/90.

<sup>2/</sup> Means in a column followed by the same letter are not statistically different at alpha = .05. Weed code names identified in Table 14.

The infestation of texasweed was not extremely heavy, but it may have contributed to reduced yields. This is supported by the fact that the tank mixture of propanil + triclopyr applied late postemergence gave the highest yield in the test, although it did not give better control of the junglerice or yellow nutsedge than propanil alone applied at the same time, but it did give better control of texasweed. At the same time, the propanil + bromoxynil applied late postemergence has similar weed control ratings but did not yield as well, although better than propanil alone at this time. Although quinclorac preplant incorporated gave good control of texasweed, other times of application were not effective.

In summary, to reach maximum yield potential it is essential that a weed control program control all weeds.

#### Postflood Granular Herbicide Test

One of the problems that occurs in many parts of the state is that of spray drift onto nontarget sites. One way to address this problem would be to develop a weed control program that did not depend upon sprays. Granular molinate is the only postemergence, nonspray herbicide currently used in Louisiana rice fields. This herbicide gives satisfactory control of the barnyardgrasses and sedges but is weak on most other weeds. Previous studies have indicated that molinate impregnated on fertilizer was also effective and that granular thiobencarb or thiobencarb impregnated fertilizer would give satisfactory control of small barnyardgrasses and ducksalad but poor control of other weeds. In this test we continue evaluation of these materials plus new granular formulations or preparations.

The treatments, data and additional test information are presented in Table 2. Commercial formulation of thiobencarb (Bolero 10G) and molinate (Ordram 15G) and an experimental formulation of thiobencarb:bensulfuron (Wolf 7:.17G) were used. The other materials were prepared as follows: thiobencarb:fertilizer was prepared by spraying Bolero 8EC onto 7-21-21 analysis fertilizer to get an impregnated mixture equivalent to 4 lb ai thiobencarb on 250 lb 7-21-21 fertilizer; molinate:bensulfuron was prepared by spraying an aqueous slurry of Londax 60DF onto Ordram 15G to get a granular preparation with .1 lb bensulfuron on 27 lb Ordram 15G; and granular bensulfuron was prepared by spraying an aqueous slurry of Londax 60DF onto blank granules to get a preparation with .17 lb bensulfuron on 100 lb of granules. When the granular formulations were applied, blank granules were added to certain treatments so that the weight of granules per plot was the same in all cases. This was done to facilitate the calibration of the granule applicator.

There was a heavy infestation of junglerice, yellow nutsedge and texasweed in the test, and ducksalad infested the levee ditches of the plots, making it possible to rate efficacy of these weeds. The rice was water seeded into individually leveed plots and drained. The flood was delayed to allow weed development that would have been suppressed by early flooding. The mixtures of molinate or thiobencarb with bensulfuron gave the best control. The thiobencarb:bensulfuron mixture had lower junglerice control ratings that seemed to be due to poor granule distribution. This also occurred in the other thiobencarb treatments, suggesting a more critical need for uniform granule distribution with these materials than with the molinate containing



Table 2. Postflood granular herbicide test.<sup>1/</sup> Rice Research Station, Crowley, La., 1990.

| Herbicide <sup>3/</sup>     | Rate<br>(lb ai/A) | Lemont<br>tolerance | Weed Control Ratings <sup>2/</sup> |        |       |       | Yield<br>(cwt/A) |
|-----------------------------|-------------------|---------------------|------------------------------------|--------|-------|-------|------------------|
|                             |                   |                     | ECHCO                              | CNPPA  | CYPES | HETLI |                  |
| Thiobencarb:<br>fertilizer  | 4.0               | 5.0                 | 4.5 b                              | 1.0 c  | 1.0 c | 4.5a  | 37.3 bc          |
| Thiobencarb                 | 4.0               | 5.0                 | 4.5 b                              | 1.5 bc | 1.5 b | 4.8a  | 49.3 b           |
| Thiobencarb:<br>bensulfuron | 4.0<br>0.1        | 5.0                 | 3.9 c                              | 5.0a   | 5.0a  | 5.0a  | 68.4a            |
| Molinate                    | 4.0               | 5.0                 | 5.0a                               | 2.0 b  | 5.0a  | 1.0 b | 65.0a            |
| Molinate:<br>bensulfuron    | 4.0<br>0.1        | 5.0                 | 5.0a                               | 5.0a   | 5.0a  | 5.0a  | 72.6a            |
| Bensulfuron                 | 0.1               | 5.0                 | 2.3 d                              | 5.0a   | 4.8a  | 5.0a  | 25.2 c           |
| Untreated                   | -                 | 5.0                 | 1.0 e                              | 1.0 c  | 1.0 c | 1.0 b | 0.0 d            |

<sup>1/</sup> Seedbed prepared on 5/2 and levees built on 5/3. Rice water seeded and drained on 5/9. Plots flushed on 5/17 and fertilized with 400 lb/A of 21-0-0 on 5/22/90. Plots flooded and herbicides applied on 5/23/90. Plots not treated with herbicide-impregnated fertilizer received the same rate of fertilization at this time (250 lb/A 7-21-21). Rated 7/5/90 and harvested 8/30/90.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05. Weed code names identified in Table 14.

<sup>3/</sup> Description of formulations is presented in text of report.

materials. None of the treatments with single herbicides performed as well as the two herbicide mixtures. In those treatments where junglerice or yellow nutsedge were not controlled, the yields were reduced significantly. Neither the texasweed nor the ducksalad seemed to be causing significant yield reduction.

In summary, the granular formulations of molinate:bensulfuron and thiobencarb:bensulfuron are very promising alternatives to spray formulations. Additional work needs to be done to adjust the bensulfuron rate downward and to obtain efficacy data on other weeds.

#### Propanil Formulation Test

In recent years, new formulations of propanil have been developed. This test was conducted to compare efficacy of these formulations at the use-rate and the 1/2 use-rate at two times of treatment.

Treatments, ratings, yields and other test information are presented in Table 3. The experimental design was randomized complete block with four replications. Under the drought stress conditions of this test, none of the herbicides performed well. In only a few instances were there significant differences between ratings when comparing formulations at the same rate and time of application.

In summary, if these results are repeatable in further testing, factors other than efficacy will be more important when deciding which formulation to use. Among these are cost per pound of active material and ease of application.

#### Triclopyr Efficacy Test

Triclopyr has been evaluated for weed control in rice as a possible substitute for the phenoxy herbicides. This study examines the efficacy of triclopyr at the use-rate and 1/2 use-rate at two times of application - postemergence and at midseason. It was also evaluated as a tank mix with propanil postemergence and as a sequential midseason treatment following postemergence propanil. Propanil and 2,4-D were included as herbicide standards in addition to an untreated check. Since the presence of grasses and sedges would complicate the evaluation of the effect of broadleaf weed control on yield, the whole test was treated with a postflood application of Ordram 15G that controlled the junglerice and yellow nutsedge infestation without reducing the broadleaf infestation.

Treatments, data and other test information are presented in Table 4. The design of the test was a randomized complete block with four replications. Although early season rice tolerance ratings indicated significant differences between various treatments, late season crop tolerance ratings failed to show these differences, indicating crop recovery. Analysis of yield data showed only three treatments significantly lower than the propanil standard - the untreated check, the use-rate of triclopyr postemergence and the use-rate of triclopyr at midseason. Only two treatments yielded significantly higher than the untreated check - propanil postemergence and propanil postemergence followed by the use-rate of triclopyr at midseason. The data would suggest that the use-rate of triclopyr postemergence reduced the yield, whereas

Table 3. Propanil formulation test.<sup>1/</sup> Rice Research Station, Crowley, La.  
1990.

A. Rice tolerance ratings.

| Formulation   | Early Postemergence |             | Postemergence |             |
|---------------|---------------------|-------------|---------------|-------------|
|               | 1.5 lb ai/A         | 3.0 lb ai/A | 2.0 lb ai/A   | 4.0 lb ai/A |
| 4 EC          | 5.0                 | 5.0         | 5.0           | 4.8         |
| 4 F           | 5.0                 | 5.0         | 5.0           | 5.0         |
| 4 F + COC     | 5.0                 | 5.0         | 5.0           | 5.0         |
| 4 F (V-085-6) | 5.0                 | 5.0         | 5.0           | 5.0         |
| 60 DF         | 5.0                 | 5.0         | 5.0           | 5.0         |
| 80 WG + COC   | 5.0                 | 5.0         | 5.0           | 4.8         |
| Untreated     | -----               | 5.0         | -----         | -----       |

B. Junglerice control ratings.<sup>2/</sup>

| Formulation   | Early Postemergence |             | Postemergence |             |
|---------------|---------------------|-------------|---------------|-------------|
|               | 1.5 lb ai/A         | 3.0 lb ai/A | 2.0 lb ai/A   | 4.0 lb ai/A |
| 4 EC          | 2.3def              | 2.3def      | 1.8e-h        | 3.3abc      |
| 4 F           | 1.0 h               | 2.5cde      | 2.0d-g        | 3.8a        |
| 4 F + COC     | 1.0 h               | 1.5fgh      | 2.5cde        | 4.0a        |
| 4 F (V-085-6) | 1.0 h               | 1.5fgh      | 2.8bcd        | 3.8a        |
| 60 DF         | 1.3 gh              | 1.8e-h      | 2.8bcd        | 3.5ab       |
| 80 WG + COC   | 1.3 gh              | 1.5fgh      | 2.3def        | 4.0a        |
| Untreated     | -----               | 1.0 h       | -----         | -----       |

C. Texasweed control ratings.<sup>2/</sup>

| Formulation   | Early Postemergence |             | Postemergence |             |
|---------------|---------------------|-------------|---------------|-------------|
|               | 1.5 lb ai/A         | 3.0 lb ai/A | 2.0 lb ai/A   | 4.0 lb ai/A |
| 4 EC          | 1.0 e               | 1.0 e       | 2.0 de        | 4.8ab       |
| 4 F           | 1.0 e               | 1.3 de      | 2.3 de        | 4.5ab       |
| 4 F + COC     | 1.0 e               | 1.3 de      | 3.5 bc        | 4.3ab       |
| 4 F (V-085-6) | 1.3 de              | 1.0 e       | 2.5 cd        | 5.0a        |
| 60 DF         | 1.0 e               | 1.3 de      | 4.0ab         | 5.0a        |
| 80 WG + COC   | 1.0 e               | 1.0 e       | 2.5 cd        | 5.0a        |
| Untreated     | -----               | 1.0 h       | -----         | -----       |

Table 3. (Continued).

D. Yellow nutsedge control ratings.<sup>2/</sup>

| Formulation   | Early Postemergence |             | Postemergence |             |
|---------------|---------------------|-------------|---------------|-------------|
|               | 1.5 lb ai/A         | 3.0 lb ai/A | 2.0 lb ai/A   | 4.0 lb ai/A |
| 4 EC          | 1.0 d               | 1.3 cd      | 1.8bcd        | 3.5a        |
| 4 F           | 1.0 d               | 1.8bcd      | 2.0 bc        | 3.5a        |
| 4 F + COC     | 1.0 d               | 1.0 d       | 2.0 bc        | 3.8a        |
| 4 F (V-085-6) | 1.3 cd              | 1.3 cd      | 2.0 bc        | 3.5a        |
| 60 DF         | 1.0 d               | 1.3 cd      | 2.3 b         | 3.5a        |
| 80 WG + COC   | 1.0 d               | 1.3 cd      | 2.5 b         | 4.0a        |
| Untreated     | -----               | 1.0 d       | -----         | -----       |

E. Lemont yield (cwt/A).<sup>2/</sup>

| Formulation   | Early Postemergence |             | Postemergence |             |
|---------------|---------------------|-------------|---------------|-------------|
|               | 1.5 lb ai/A         | 3.0 lb ai/A | 2.0 lb ai/A   | 4.0 lb ai/A |
| 4 EC          | 11.5 d-j            | 12.8 d-i    | 15.8 d-h      | 30.2ab      |
| 4 F           | 5.1 ij              | 13.2 d-i    | 19.7 c-f      | 32.3a       |
| 4 F + COC     | 9.7 f-j             | 10.1 e-j    | 21.4 bcd      | 27.8abc     |
| 4 F (V-085-6) | 8.5 g-j             | 11.9 d-j    | 20.7 b-e      | 29.1abc     |
| 60 DF         | 17.2 d-g            | 12.1 d-i    | 21.3 bcd      | 32.6a       |
| 80 WG + COC   | 5.6 hij             | 13.2 d-i    | 20.2 b-f      | 38.0a       |
| Untreated     | -----               | 1.5 j       | -----         | -----       |

<sup>1/</sup> Final seedbed prepared 5/15/90, and rice drill seeded and flushed on 5/17/90. Early postemergence treatments applied 5/31/90, and postemergence treatments applied 6/7/90. Crop oil concentrate was used at the rate of 0.5 pints/A with the 4F formulation and at the rate of 2.0 pints/A with the 80WG formulation. Test flooded on 6/21/90. Rice tolerance ratings made on 6/19/90, and weed control ratings made on 7/30/90.

<sup>2/</sup> Means followed by the same letter are not significantly different at alpha = .05.

Table 4. Triclopyr efficacy test.<sup>1/</sup> Rice Research Station, Crowley, La., 1990.

| Herbicide <sup>3/</sup>     | Rate      | Time of treatment | Rice tolerance <sup>2/</sup> | Weed Control Ratings <sup>2/</sup> |       |       | Yield <sup>2/</sup> |
|-----------------------------|-----------|-------------------|------------------------------|------------------------------------|-------|-------|---------------------|
|                             |           |                   |                              | CNPPA                              | SESEX | ECLAL |                     |
|                             | (lb ai/A) |                   |                              |                                    |       |       | (cwt/A)             |
| Propanil                    | 3.0       | Post              | 5.0 (5.0a )                  | 4.0a                               | 4.0a  | 4.0a  | 55.1a               |
| Triclopyr + X-77            | .19       | Post              | 4.7 (4.5ab )                 | 4.8a                               | 5.0a  | 5.0a  | 51.4abc             |
| Triclopyr + X-77            | .38       | Post              | 4.0 (3.8 c)                  | 5.0a                               | 5.0a  | 5.0a  | 44.0 c              |
| Triclopyr + propanil        | .38 + 3.0 | Post              | 4.0 (5.0a )                  | 4.8a                               | 5.0a  | 5.0a  | 50.1abc             |
| Propanil / triclopyr + X-77 | 3.0 / .38 | Post / MS         | 4.3 (5.0a )                  | 4.0a                               | 4.0a  | 4.0a  | 52.2ab              |
| Triclopyr + X-77            | .19       | MS                | 4.0 (3.8 c)                  | 5.0a                               | 5.0a  | 5.0a  | 49.4abc             |
| Triclopyr + X-77            | .38       | MS                | 4.3 (4.3abc)                 | 5.0a                               | 5.0a  | 5.0a  | 45.4 bc             |
| 2,4-D OS-amine              | 1.0       | MS                | 4.3 (4.0 bc)                 | 5.0a                               | 5.0a  | 5.0a  | 50.3abc             |
| Untreated                   | -         | -                 | 4.7 (3.8 c)                  | 1.8 b                              | 1.0 b | 1.0 b | 44.5 bc             |

<sup>1/</sup> Drill seeded 5/16/90. Flushed on 5/17/90, 5/22/90 and 6/5/90. Rice emerged on 5/26/90, and postemergence (Post) treatments applied on 6/7/90. Test flooded, treated with granular molinate at the rate of 4 lb ai/A, and fertilized (400 lb/A of 20-10-10) on 6/11/90. Midseason (MS) treatments applied 7/9/90.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05. Weed codes identified in Table 14. Ratings in parenthesis taken 7/5/90. Other ratings taken 8/1/90.

<sup>3/</sup> X-77 used at a concentration of .25% v/v.

delaying its use until midseason also resulted in a yield reduction due to weed competition. The tank mixture of triclopyr with propanil seems to be less injurious, since it is not significantly different from propanil or triclopyr alone. Since the 1/2 use-rate gave satisfactory weed control at both times of treatment, it may be a better rate than the use-rate.

In summary, the use-rate of triclopyr postemergence may be injurious to rice, and it may be desirable to use a lower rate or only apply it as a tank mix with propanil.

#### Quinclorac Efficacy on Alligatorweed

Alligatorweed is troublesome in many rice fields that are water-seeded with a minimum of dry tillage prior to flooding. It is especially severe in fields that have recently been in crawfish production. Although 2,4-D can be used to suppress alligatorweed in rice fields, it cannot be used early in the growing season because of low rice tolerance at that time. Quinclorac is an experimental herbicide that is safe to use on rice early in the season, and it has shown some activity on alligatorweed. This test was designed to evaluate quinclorac efficacy on alligatorweed when applied at various times after seeding and draining the field, but prior to flooding. Since alligatorweed is vegetatively propagated, the effect of the size of the plants on response to alligatorweed was also evaluated.

This test was established in a rice field on the farm of Bill Fabacher in Acadia Parish. The field had previously been in crawfish production and had a heavy infestation of alligatorweed. The field had been sprayed with glyphosate to kill existing vegetation, flooded and worked in the water for final seedbed preparation. It was then seeded and drained. At the time the experiment was established the rice had shoots about 1-2 inches long. Five alligatorweed plants of three sizes were marked with colored flags in each plot. The sizes were: small = 2-4 inches, medium = 6-10 inches, and large = 10-15 inches. All plants were actively growing at the time of establishment of the test, although the lower leaves had apparently been killed by the glyphosate treatment.

The times of treatment, ratings and other test information are presented in Table 5. The test design was a randomized complete block with four replications. Efficacy ratings were taken at two times. The first time, each flagged plant was examined, and its condition rated. A rating of 1 indicated no effect of the herbicide, 2 indicated the plant was affected but apparently recovering, 3 indicated the plant was severely injured but possibly recovering, 4 indicated the plant was severely injured but apparently dying, and 5 indicated the plant was apparently dead. The second rating was an overall evaluation of alligatorweed control in the plot using the normal weed control rating system. Although there were significant differences among the first ratings due to times of application and the plant sizes, there was no significant interaction. None of the treatments gave good control. The ratings would suggest that medium size plants were more tolerant than the larger plants, but the difference may be due to the fact that each size was rated by a different individual, resulting in this small but significant difference. The general trend seems to be that the earlier sprays were more effective.

Table 5. Efficacy of quinclorac on alligatorweed.<sup>1/</sup> Fabacher Farm, Acadia Parish, 1990.

| Date of treatment          | Alligatorweed Control Ratings |        |       |                       |                         |
|----------------------------|-------------------------------|--------|-------|-----------------------|-------------------------|
|                            | 5/18/90                       |        |       |                       | 6/1/90                  |
|                            | Small                         | Medium | Large | Average <sup>2/</sup> | All sizes <sup>2/</sup> |
| 4/30/90                    | 3.55                          | 3.15   | 3.65  | 3.45a                 | 3.50 bc                 |
| 5/2/90                     | 3.05                          | 2.75   | 3.20  | 3.00ab                | 3.50 bc                 |
| 5/4/90                     | 2.80                          | 2.70   | 3.50  | 3.00ab                | 3.75 bc                 |
| 5/7/90                     | 2.25                          | 2.15   | 2.75  | 2.38 c                | 3.00 c                  |
| 5/9/90                     | 3.20                          | 2.30   | 3.35  | 2.95ab                | 4.00 b                  |
| 5/11/90                    | 3.07                          | 2.53   | 2.93  | 2.84 b                | 5.00a                   |
| Untreated                  | 1.40                          | 1.45   | 1.40  | 1.45 d                | 1.00 d                  |
| Size average <sup>3/</sup> | 2.75mn                        | 2.43n  | 2.99m |                       |                         |

<sup>1/</sup> Just before seedbed preparation the field was treated with glyphosate for control of existing vegetation, including alligatorweed. The field was flooded and worked in the water for the final seedbed preparation. On 4/19/90 the field was water seeded and subsequently drained for seedling establishment. Quinclorac at the rate of .5 lb ai/A was applied at the times indicated, and the field was flooded following the last treatment.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05.

<sup>3/</sup> Means in a row followed by the same letter are not significantly different at alpha = .05.



In the second ratings, it seems there may be a reversal of effect with the earliest sprays being the least effective. This may indicate that the plants were recovering. At this second rating, the earliest treated plants may have recovered while the latest treated plants were still in a stunted condition. Or this may be due to the combined effect of time of treatment and time of flood, i.e. earlier treated plants had time to recover before flooding, whereas the latest treated plants were kept suppressed by the flood. Later in the season a final observation of the test on July 20, 1990 found alligatorweed growing vigorously in all plots, although the severity of the infestation had been reduced in the treated plots. It would seem that a degree of suppression was all that was obtained. Water management may play a critical role in the efficacy of quinclorac, and more careful evaluation of the effect of time of flooding should be done with individually leveed plots so that the plants can all be sprayed at the same time and flooded at various times following spraying.

In summary, quinclorac does show activity on alligatorweed, but its effectiveness may depend on water management following flooding. Evaluation of alligatorweed control is very difficult because of the plants inherent ability to regenerate from the axillary buds. Plants which appear to be dead may be likely to regenerate later. Late season control ratings are the most reliable.

#### Preplant 2,4-D in Water-seeded Rice

Since alligatorweed is vegetatively propagated, it should be possible to prevent it from being a problem in rice fields by controlling it before the field is planted. This can be done quite effectively by thorough land preparation well in advance of water seeding, but in many water-planted fields there is only a minimum of tillage that is done prior to flooding the field. Often the field is worked in the water for final seedbed preparation, and this only serves to transplant the alligatorweed.

Since 2,4-D is quite effective on alligatorweed, a preplant treatment when the alligatorweed is actively growing should reduce its occurrence in the rice. However, since young rice is quite sensitive to 2,4-D, it is important to determine if there are any residual effects on stand establishment. This test was established to collect such data. Following final seedbed preparation, the test area was flush irrigated, and the first treatments applied. The use-rate and 2X use-rate were applied at three different times prior to seeding. In order to maximize any residual effect of the 2,4-D treatments, the seedbed was not reworked prior to water seeding. At the time of seeding, the seedbed was heavily infested with weeds, and the test area was sprayed with glufosinate to burn back this vegetation. The plots were split to permit collection of two types of data. On one end of each plot 50 presprouted seed were placed in a hardware enclosure in order to collect data on stand establishment. On the other end of the plots rice was solid seeded in the conventional water seeding fashion in order to collect yield data.

The treatments, data and other information on the test are presented in Table 6. The test was a randomized complete block design with four replications. There were no significant differences in stand establishment, and the significant differences among treatment yields are probably due to problems encountered in controlling weeds in the test. The low stand



Table 6. Preplant 2,4-D in water-seeded rice.<sup>1/</sup> Rice Research Station, Crowley, La., 1990.

| Time of<br>treatment<br>(weeks before<br>planting) | Rate<br>(lb ai/A) | Lemont<br>stand<br>(%) | Lemont<br>yield <sup>2/</sup><br>(cwt/A) |
|----------------------------------------------------|-------------------|------------------------|------------------------------------------|
| 1                                                  | 1.0               | 30.6                   | 47.6a                                    |
| 1                                                  | 2.0               | 30.0                   | 44.6ab                                   |
| 2                                                  | 1.0               | 43.0                   | 44.8ab                                   |
| 2                                                  | 2.0               | 38.6                   | 45.2a                                    |
| 4                                                  | 1.0               | 35.0                   | 39.8 c                                   |
| 4                                                  | 2.0               | 36.6                   | 40.8 bc                                  |
| Untreated                                          | -                 | 35.0                   | 45.4a                                    |

<sup>1/</sup> Seedbed prepared 5/3/90 and flushed on 5/4/90. Four week preplant treatments applied 5/4/90. Two week preplant treatments applied 5/18/90. One week preplant treatments applied 5/25/90. Test area oversprayed with glufosinate (0.5 lb ai/A) on 5/30/90, and then flooded for seeding, seeded and drained on 6/1/90. The test was flushed on 6/5/90 and flooded on 6/11/90. It was drained on 6/18/90, treated with molinate:propanil (3:3 lb ai/A) and fertilized (375 lb/A 20-10-10) on 6/21/90, and reflooded on 6/22/90. Stand counts were taken on 7/7/90.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05.

establishment percentages are not uncommon in water-seeded rice. There was a heavy infestation of junglerice, yellow nutsedge, and texasweed in the test. Neither the preplant glufosinate nor the postemergence treatment with molinate:propanil gave complete control. There may have been an effect of the preplant 2,4-D treatments on the severity of the weed problems in the test that is reflected in the yield data. The initial 2,4-D treatments were applied before any weeds came up, but later treatments were postemergence to the weeds. This may account for the lower yields in the treatments applied four weeks before seeding.

In summary, there appears to be no harmful effects from preplant 2,4-D applied as late as one week before planting. This supports previous observations on this practice.

#### V-53482 Efficacy Test

V-53482 is an experimental herbicide that showed promise as a preemergence or delayed preemergence treatment in 1989. This test was to evaluate its efficacy at rates lower than the anticipated use-rate. Its utility as a supplement to the standard propanil treatment was also examined.

Treatments, data, and test information are presented in Table 7. The test design was a randomized complete block with four replications. The only treatment that gave statistically significant crop injury was the highest rate of V-53482 followed by propanil. This injury was leaf burn, and the plants apparently outgrew the injury and yielded well.

Junglerice control by V-53482 was obviously affected by the rate of treatment but not by the time of treatment. Other weed control ratings did not seem to be affected by rate or time of treatment. The high level of control of amazon sprangletop suggests that it is very sensitive to V-53482, but this may be a reflection of the lack of control of junglerice that suppressed the amazon sprangletop. If it is this active, it would be a good supplement to quinclorac since it gives poor control of amazon sprangletop. The high rate of V-53482 applied delayed preemergence followed by propanil gave better amazon sprangletop control than propanil alone. This was the only combination that was better than V-53482.

Yield data reflect weed control. Without propanil, the yields were depressed greatly. In the propanil treated plots, the treatments containing the high rate of V-53482 had significantly lower yields than propanil alone, suggesting crop injury at this rate.

In summary, at the rates and times tested in 1990 the efficacy of V-53482 was inadequate with the possible exception of amazon sprangletop. Yield data in this test indicated that the high rate tested may have caused reduced yield. Only in the absence of weeds can this be evaluated properly, since in this case it may be an interaction between V-53482 and propanil.

#### Drill-seeded Herbicide Screening Test

There is continuing interest in the possibility of using the postemergence grass herbicides in rice. This test was conducted to evaluate one experimental grass herbicide and to compare its efficacy with two other

Table 7. V-53482 efficacy test.<sup>1/</sup> Rice Research Station, Crowley, La., 1990.

| Herbicide        | Rate<br>(oz ai/A) | Time of<br>treatment | Rice <sup>2/</sup><br>tolerance | Weed Control Ratings <sup>2/</sup> |       |        |        | YIELD<br>(cwt/A) |
|------------------|-------------------|----------------------|---------------------------------|------------------------------------|-------|--------|--------|------------------|
|                  |                   |                      |                                 | ECHCO                              | LFPPA | CYPES  | CNPPA  |                  |
| V-53482          | 0.5               | Pre                  | 5.0a                            | 1.8 de                             | 4.0a  | 1.0 d  | 2.0 c  | 11.4 fg          |
| V-53482          | 1.0               | Pre                  | 5.0a                            | 2.8 c                              | 3.3a  | 1.3 d  | 1.8 c  | 9.1 g            |
| V-53482          | 2.0               | Pre                  | 5.0a                            | 3.8 b                              | 4.3a  | 1.0 d  | 2.5 bc | 16.0efg          |
| V-53482          | 0.5               | DelPre               | 5.0a                            | 1.0 e                              | 3.3a  | 1.0 d  | 2.0 c  | 7.9 gh           |
| V-53482          | 1.0               | DelPre               | 5.0a                            | 2.5 cd                             | 3.3a  | 1.3 d  | 1.8 c  | 9.2 g            |
| V-53482          | 2.0               | DelPre               | 5.0a                            | 4.0ab                              | 4.3a  | 1.0 d  | 2.0 c  | 18.7def          |
| Untreated        | -                 | -                    | 5.0a                            | 1.0 e                              | 1.0 b | 1.0 d  | 2.0 c  | 0.0 h            |
| V-53482/propanil | 0.5/48            | Pre/Post             | 4.5ab                           | 4.3ab                              | 5.0a  | 5.0a   | 5.0a   | 34.8a            |
| V-53482/propanil | 1.0/48            | Pre/Post             | 4.5ab                           | 4.5ab                              | 5.0a  | 4.8a   | 4.8a   | 34.8ab           |
| V-53482/propanil | 2.0/48            | Pre/Post             | 5.0a                            | 4.5ab                              | 4.0a  | 3.0 bc | 4.5ab  | 26.0bcd          |
| V-53482/propanil | 0.5/48            | DelPre/Post          | 5.0a                            | 4.0ab                              | 5.0a  | 4.5a   | 4.3ab  | 33.6ab           |
| V-53482/propanil | 1.0/48            | DelPre/Post          | 4.5ab                           | 4.0ab                              | 5.0a  | 4.0ab  | 5.0a   | 35.7a            |
| V-53482/propanil | 2.0/48            | DelPre/Post          | 4.3 b                           | 5.0a                               | 5.0a  | 4.8a   | 5.0a   | 31.9abc          |
| Propanil         | 48                | Post                 | 5.0a                            | 3.8 b                              | 3.5a  | 4.0ab  | 3.3abc | 23.9cde          |

<sup>1/</sup> Final seedbed prepared 5/15/90, and rice drill seeded on 5/16/90. Preplant treatments (Pre) applied and test flushed on 5/17/90. Delayed preemergence treatments (DelPre) applied 5/21/90. Rice emerged on 5/26/90, and postemergence treatments (Post) applied 6/7/90. The test was oversprayed with bentazon (1 lb ai/A) for yellow nutsedge control on 6/15/90 and flooded on 6/21/90. Rice tolerance ratings presented were taken on 6/19/90 and weed control ratings on 8/9/90.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05. Weed codes identified in Table 14.

herbicides of this type. Propanil and molinate:propanil were included as herbicides standards.

Treatments, ratings and other test information are presented in Table 8. The experimental design was a randomized complete block with four replications. The high rate of HOE-46360 was among the best treatments in controlling junglerice. It was equivalent to the use-rate of fenoxypyr. As expected, these grass herbicides were ineffective on the yellow nutsedge and broadleaf weeds in the test.

In summary, the .125 lb ai/A rate of HOE-46360 gave junglerice control equivalent to that of the .15 lb ai/A of fenoxypyr.

#### Cultivar Tolerance Tests

In standard weed control tests, the effect of herbicides on rice itself is often masked by the effect of weed control. Therefore it is important that the response of rice to herbicides in the absence of weeds be evaluated. Since herbicides in rice will most likely be applied by airplane, there is the possibility that higher than the use-rate may be applied when flagging is not carefully done or flying conditions are less than desirable. Therefore, it is important that the tolerance of rice to higher than use-rates be determined.

In these studies, four herbicides that may be registered for use in rice were evaluated on the three major varieties grown in Louisiana at this time. These tests were split-plot designs with four replications. The varieties were the main plots and the herbicide treatments were the subplots. Since there were significant differences in the yield of the varieties, in addition to a split-plot analysis, the data for each variety were analyzed separately.

Tolerance to quinclorac. Treatments, yield data and other test information are presented in Table 9. The data for each variety are presented separately. In the split-plot analysis there was a significant difference between variety yields but no significant interaction between herbicide treatments and varieties. There were no significant herbicide treatment effects in any variety. Quinclorac was very safe at the rates and times tested on all three varieties.

Tolerance to bromoxynil. Treatments, yield data and other test information are presented in Table 10. In the split-plot analysis, there was a significant variety effect, a significant time of treatment effect, and a possible interaction ( $F > .05$  &  $< .10$ ) between cultivar and time of treatment and between rate and time of treatment. Analysis of individual varieties revealed that there were no significant herbicide effects in Lemont and Tebonnet, but there were in the case of Mars. The midseason treatments had lower yields with the high rate applied at midseason being significantly lower than the untreated check. This would suggest that, in order to minimize adverse effects, bromoxynil should be used at midseason only as a salvage treatment and only with careful flagging and perfect flying conditions.

Tolerance to triclopyr. Treatments, yield data and other test information are presented in Table 11. In the split-plot analysis of the yield data there was a significant variety effect, a significant rate effect and a significant rate by time of application effect. When yield data for each variety,

Table 8. Drill-seeded, herbicide screening trial.<sup>1/</sup> Rice Research Station, Crowley, La., 1990.

| Herbicide <sup>3/</sup> | Rate<br>(lb ai/A) | Rice<br>tolerance | Weed Control Ratings <sup>2/</sup> |       |       |
|-------------------------|-------------------|-------------------|------------------------------------|-------|-------|
|                         |                   |                   | ECHCO                              | CYPES | BRDLF |
| HOE-46360               | .031              | 5.0               | 2.0 cd(1.5 c)                      | 1.0 b | 1.0 b |
| HOE-46360               | .063              | 5.0               | 2.0 cd(3.0 b )                     | 1.0 b | 1.0 b |
| HOE-46360               | .125              | 4.5               | 4.3a (4.0ab )                      | 2.0 b | 2.0ab |
| Sethoxydim              | .05               | 5.0               | 1.5 d(1.0 c)                       | 1.0 b | 1.0 b |
| Sethoxydim              | .10               | 5.0               | 1.0 d(1.0 c)                       | 1.0 b | 1.0 b |
| Fenoxyp-ethyl           | .075              | 5.0               | 1.3 d(1.0 c)                       | 1.0 b | 1.0 b |
| Fenoxyp-ethyl           | .15               | 4.8               | 3.3abc(1.0 c)                      | 1.0 b | 1.0 b |
| Propanil                | 4.0               | 5.0               | 2.5bcd(3.0 b )                     | 2.5ab | 3.0a  |
| Molinate:propanil       | 3.0:3.0           | 4.8               | 3.8ab (5.0a )                      | 4.0a  | 3.8a  |
| Untreated               | -                 | 5.0               | 1.3 d(1.0 c)                       | 1.0 b | 1.0 b |

<sup>1/</sup> Final seedbed prepared 5/15/90, rice drill seeded on 5/16/90, and flushed on 5/17/90. Herbicide treatments applied on 6/14/90, and the test oversprayed with bentazon (1 lb ai/A) on 6/15/90. Fertilizer (400 lb/A 20-10-10) was applied on 6/18/90, and the test flooded on 6/21/90.

<sup>2/</sup> Means in a column followed by the same letter are not significantly different at alpha = .05. Ratings in parenthesis taken 7/5/90. Other ratings taken 7/30/90. Weed code names identified in Table 14.

<sup>3/</sup> All treatments applied late postemergence to simulate a salvage treatment.

Table 9. Varietal tolerance to quinclorac.<sup>1/</sup> Rice Research Station, Crowley, La. 1990.

A. Lemont yield.<sup>2/</sup>

| Herbicide rate | DelPre    | EPost             | Post      |
|----------------|-----------|-------------------|-----------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - | - - - - - |
| .5             | 29.4      | 23.9              | 29.4      |
| 1.0            | 27.2      | 25.8              | 27.0      |
| Untreated      | - - - - - | 23.7 - - - - -    | - - - - - |

B. Mars yield.<sup>2/</sup>

| Herbicide rate | DelPre    | EPost             | Post      |
|----------------|-----------|-------------------|-----------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - | - - - - - |
| .5             | 34.9      | 34.3              | 31.7      |
| 1.0            | 35.3      | 32.7              | 34.1      |
| Untreated      | - - - - - | 34.2 - - - - -    | - - - - - |

C. Tebonnet yield.<sup>2/</sup>

| Herbicide rate | DelPre    | EPost             | Post      |
|----------------|-----------|-------------------|-----------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - | - - - - - |
| .5             | 34.3      | 32.1              | 32.4      |
| 1.0            | 29.7      | 33.9              | 31.3      |
| Untreated      | - - - - - | 29.2 - - - - -    | - - - - - |

<sup>1/</sup> Final seedbed prepared 5/20/90, and rice drill seeded on 5/21/90. Test flushed on 5/25/90, and delayed preemergence (DelPre) treatments applied 5/30/90. Rice emerged on 6/2/90, and test flushed on 6/5/90. Early postemergence (EPost) treatments applied 6/8/90, and postemergence (Post) treatments applied 6/14/90. Test oversprayed with molinate:propanil (3:3 lb ai/A) on 6/12/90, fertilized (250 lb/A 20-10-10) on 6/18/90, and flooded on 6/22/90.

<sup>2/</sup> No significant difference between treatment means.

Table 10. Varietal tolerance to bromoxynil.<sup>1/</sup> Rice Research Station, Crowley, La. 1990.

A. Lemont yield.<sup>2/</sup>

| Herbicide rate | EPost     | Post              | MS   |
|----------------|-----------|-------------------|------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - |      |
| .25            | 25.5      | 20.1              | 22.6 |
| .5             | 24.9      | 27.5              | 22.6 |
| Untreated      | - - - - - | 22.4 - - - - -    |      |

B. Mars yield.<sup>3/</sup>

| Herbicide rate | EPost     | Post              | MS     |
|----------------|-----------|-------------------|--------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - |        |
| .25            | 32.0a     | 35.1a             | 30.9ab |
| .5             | 32.5a     | 35.3a             | 27.0 b |
| Untreated      | - - - - - | 33.6a - - - - -   |        |

C. Tebonnet yield.<sup>2/</sup>

| Herbicide rate | EPost     | Post              | MS   |
|----------------|-----------|-------------------|------|
| (lb ai/A)      | - - - - - | (cwt/A) - - - - - |      |
| .25            | 25.0      | 27.1              | 27.6 |
| .5             | 28.5      | 28.2              | 26.5 |
| Untreated      | - - - - - | 23.8 - - - - -    |      |

<sup>1/</sup> Final seedbed prepared 5/20/90, and rice drill seeded on 5/21/90. Test flushed on 5/25/90, and rice emerged on 6/2/90. Test flushed on 6/5/90, and early postemergence (EPost) treatments applied 6/8/90. Postemergence (Post) treatments applied on 6/14/90. Test oversprayed with molinate:propanil (3:3 lb ai/A) on 6/12/90, fertilized (250 lb/A 20-10-10) on 6/18/90, and flooded on 6/22/90. Midseason (MS) treatments applied 7/17/90.

<sup>2/</sup> No significant difference between treatment means.

<sup>3/</sup> Treatment means followed by the same letter are not significantly different at alpha = .05.

Table 11. Varietal tolerance to triclopyr.<sup>1/</sup> Rice Research Station, Crowley, La. 1990.

A. Lemont yield.<sup>2/</sup>

| Herbicide rate | EPost     | Post              | MS   |
|----------------|-----------|-------------------|------|
| (1b ai/A)      | - - - - - | (cwt/A) - - - - - |      |
| .375           | 23.4      | 21.5              | 16.7 |
| .75            | 12.5      | 17.1              | 21.8 |
| Untreated      | - - - - - | 17.7 - - - - -    |      |

B. Mars yield.<sup>2/</sup>

| Herbicide rate | EPost     | Post              | MS   |
|----------------|-----------|-------------------|------|
| (1b ai/A)      | - - - - - | (cwt/A) - - - - - |      |
| .375           | 34.9      | 34.4              | 31.3 |
| .75            | 28.5      | 26.7              | 28.8 |
| Untreated      | - - - - - | 31.6 - - - - -    |      |

C. Tebonnet yield.<sup>2/</sup>

| Herbicide rate | EPost     | Post              | MS   |
|----------------|-----------|-------------------|------|
| (1b ai/A)      | - - - - - | (cwt/A) - - - - - |      |
| .375           | 32.3      | 30.0              | 26.0 |
| .75            | 29.3      | 27.5              | 26.6 |
| Untreated      | - - - - - | 29.6 - - - - -    |      |

<sup>1/</sup> Final seedbed prepared 5/20/90, and rice drill seeded on 5/21/90. Test flushed on 5/25/90, and rice emerged on 6/2/90. Test flushed on 6/5/90, and early postemergence (EPost) treatments applied 6/8/90. Postemergence (Post) treatments applied on 6/14/90. Test oversprayed with molinate:propanil (3:3 lb ai/A) on 6/12/90, fertilized (250 lb/A 20-10-10) on 6/18/90, and flooded on 6/22/90. Midseason (MS) treatments applied 7/17/90.

<sup>2/</sup> No significant difference between treatment means.



including the untreated check, were analyzed, there was no significant differences due to treatment in any variety. However, if the yields for each variety, with the exclusion of the untreated check, were analyzed as a factorial, there were some significant treatment effects. In the case of Lemont, there was a significant rate by time of treatment effect which is probably due to the fact that there was a much greater difference between the X and 2X use-rates at the early postemergence time of treatment than at other times. In the case of Mars, there was a significant rate effect with the 2X use-rate yields being lower than the X use-rate yields at all times of treatment. In the case of Tebonnet, there was a significant time of treatment effect with the midseason treatment yields being significantly lower than the early postemergence treatments.

In conclusion, the complex results with the triclopyr treatments sends up a red flag. Overall, it appears that great care needs to be taken in application of this herbicide to prevent an excessive rate. In some varieties there is the further complication of a time of treatment effect with the safest time of treatment across all varieties apparently being postemergence.

Tolerance to V-53482. Treatments, yield data and other test information are presented in Table 12. In the split-plot analysis of the yield data, there was a significant variety effect, a significant rate effect and a significant variety by time of application effect.

When yield data for each variety, including the untreated check, were analyzed, there were significant differences due to treatment only in the case of Mars. In this case the 2X use-rate yields were significantly reduced at the delayed preemergence and early postemergence times of treatment.

If the untreated check is omitted, and the yield data analyzed as a factorial there were differences between the response of varieties. With Lemont, there was no significant rate or time of treatment effects, although there was a suggestion of significance of rate. With Mars, there were significant rate and time of treatment effects and a suggestion of a significant interaction. The 2X use-rate was more injurious than the X use-rate, and the delayed preemergence and early postemergence treatment yields were lower than the preemergence treatment yields. The 2X use-rate seemed to be more injurious at the early postemergence time of treatment. In the case of Tebonnet, there was a significant rate effect, with the higher rate being most injurious.

In summary, the results suggest that only in the case is of Mars is there a significant yield reduction, and this does not occur with the preemergence treatments. Although the 2X use-rate yields in other varieties were lower than the use-rate yields, they were not significantly lower. This type of test needs to be repeated in future years and at other locations to verify the repeatability of these results.

Table 12. Varietal tolerance to V-53482.<sup>1/</sup> Rice Research Station, Crowley, La. 1990.

| A. Lemont yield. <sup>2/</sup> |           |                   |       |
|--------------------------------|-----------|-------------------|-------|
| Herbicide rate                 | Pre       | DelPre            | EPost |
| (oz ai/A)                      | - - - - - | (cwt/A) - - - - - |       |
| 1.0                            | 27.1      | 28.9              | 28.7  |
| 2.0                            | 25.2      | 26.3              | 24.9  |
| Untreated                      | - - - - - | 25.5 - - - - -    |       |

| B. Mars yield. <sup>3/</sup> |           |                   |        |
|------------------------------|-----------|-------------------|--------|
| Herbicide rate               | Pre       | DelPre            | EPost  |
| (oz ai/A)                    | - - - - - | (cwt/A) - - - - - |        |
| 1.0                          | 32.2a     | 31.3a             | 28.2a  |
| 2.0                          | 30.7a     | 22.7 b            | 21.1 b |
| Untreated                    | - - - - - | 32.0a - - - - -   |        |

| C. Tebonnet yield. <sup>2/</sup> |           |                   |       |
|----------------------------------|-----------|-------------------|-------|
| Herbicide rate                   | Pre       | DelPre            | EPost |
| (oz ai/A)                        | - - - - - | (cwt/A) - - - - - |       |
| 1.0                              | 28.2      | 28.9              | 28.9  |
| 2.0                              | 25.0      | 24.0              | 26.6  |
| Untreated                        | - - - - - | 28.8 - - - - -    |       |

<sup>1/</sup> Final seedbed prepared 5/20/90, and rice drill seeded on 5/21/90. Preemergence (Pre) treatments applied 5/22/90, test flushed on 5/25/90, and delayed preemergence (DelPre) treatments applied 5/30/90. Rice emerged on 6/2/90, test flushed on 6/5/90, and early postemergence (EPost) treatments applied 6/8/90. Test oversprayed with molinate:propanil (3:3 lb ai/A) on 6/12/90, fertilized (250 lb/A 20-10-10) on 6/18/90, and flooded on 6/22/90.

<sup>2/</sup> No significant difference between treatment means.

<sup>3/</sup> Treatment means followed by the same letter are not significantly different at alpha = .05.

Table 13. Herbicides tested in these studies at the Rice Research Station, Crowley, LA. 1990.

| Name or code<br>no. used in<br>report | Formulation | Chemical nature of<br>active ingredient                                                   | Manufacturer    |
|---------------------------------------|-------------|-------------------------------------------------------------------------------------------|-----------------|
| BAS-684                               |             | experimental surfactant                                                                   | BASF            |
| bensulfuron                           | 60DF        | methyl-2-[[[4,6-dimethoxypyrimidin-2-yl)amino]<br>carbonly]amino]sulfonly)methyl]benzoate | DuPont          |
| bentazon                              | 4SL         | 3-(1-methylethyl)-1H-2,1,3,-benzothiadiazine-<br>4-(3H)-one 2,2-dioxide, sodium salt      | BASF            |
| bromoxynil                            | 2EC         | 3,5-dibromo-4-hydroxybenzonitrile                                                         | Rhone-Poulenc   |
| COC                                   |             | Crop oil concentrate                                                                      | Various         |
| 2,4-D OS-amine                        | 3.6EC       | 2,4-dichlorophenoxyacetic acid, N-oley1-<br>1,3-propylenediamine salt                     | Fermenta        |
| fenoxaprop                            | 1EC         | (±)-2-[4-[(6-chloro-2-benzoxazolyl)oxy]<br>phenoxy]propanoic acid, ethyl ester            | Hoechst-Roussel |
| glufosinate                           | 1.67L       | ammonium-DL-homoanalin-4yl(methyl)phosphinate                                             | Hoechst-Roussel |
| glyphosate                            | 3SL         | N-phosphonomethylglysine, isopropylamine salt                                             | Monsanto        |
| HOE 46360                             | .625EC      | chemistry not released                                                                    | Hoechst-Roussel |
| molinate                              | 8EC & 15G   | S-ethyl hexahydro-1H-azepine-1-carbothioate                                               | ICI             |
| molinate:propanil                     | 3:3EC       | premix of molinate and propanil                                                           | ICI             |
| propanil                              | 4EC         | N-(3,4-dichlorophenyl)propionamide                                                        | Rohm & Haas     |
| "                                     | 4F          | "                                                                                         | Cedar           |
| "                                     | 60DF        | "                                                                                         | Terra           |
| "                                     | 80WG        | "                                                                                         | Rohm & Haas     |
| quinclorac                            | 50WP        | 3,7-dichloro-8-quinolinecarboxylic acid                                                   | BASF            |

Table 13. (Continued)

| Name or code<br>no. used in<br>report | Formulation | Chemical nature of<br>active ingredient                                           | Manufacturer    |
|---------------------------------------|-------------|-----------------------------------------------------------------------------------|-----------------|
| sethoxydim                            | 1.5EC       | 2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)<br>propyl]-3-hydroxy-2-cyclohexen-1-one | BASF            |
| thiobencarb                           | 8EC         | <u>S</u> -[4-chlorophenyl)methyl]diethylcarbamothioate                            | Valent          |
| thiobencarb:bensulfuron               | 7:.17G      | premix of thiobencarb and bensulfuron                                             | Kumiai          |
| triclopyr                             | 3EC         | [(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid,<br>triethylamine salt             | Hoechst-Roussel |
| V-085-6                               | 4F          | N-(3,4-dichlorophenyl)propionamide                                                | Cedar           |
| V-53482                               | 50DG        | chemistry not released at this time                                               | Valent          |

Table 14. Weeds rated in herbicide test conducted at the Rice Research Station, Crowley, LA. 1990.

| Abbreviation<br>used in tables | Common name                | Scientific name                    |
|--------------------------------|----------------------------|------------------------------------|
| ALRPH                          | alligatorweed              | <u>Alternanthera philoxeroides</u> |
| BRDLF                          | mixture of broadleaf weeds |                                    |
| CNPPA                          | texasweed                  | <u>Caperonia palustris</u>         |
| CYPES                          | yellow nutsedge            | <u>Cyperus esculentus</u>          |
| ECHCO                          | junglerice                 | <u>Echinochloa colona</u>          |
| ECLAL                          | eclipta                    | <u>Eclipta prostrata</u>           |
| HETLI                          | ducksalad                  | <u>Heteranthera limosa</u>         |
| LEFPA                          | amazon sprangletop         | <u>Leptichloa panicoides</u>       |
| SESEX                          | hemp sesbania              | <u>Sesbania extaltata</u>          |

## CHEMICAL CONTROL OF RED RICE IN RICE<sup>1/</sup>

J.B. Baker, R.T. Dunand, P.K. Bollich, D.J. Pantone, and T.J. Downey

### INTRODUCTION

In addition to crop rotation with red rice control in the rotation crop, fallow planting, planting red rice free seed and using clean equipment, the use of herbicides and growth regulators in the production of rice should prevent the production of red rice seed that may either reduce the quality of the harvested crop or reinfest the soil, or both. In cases of extremely heavy red rice infestations, control of red rice will also increase the yield of the cultivar. The objective of this research is to identify those herbicides and growth regulators that can be used in the rice crop to control red rice or prevent the production of viable red rice seed and to incorporate these into the cultural practices that are being used by today's rice farmers.

### MATERIALS AND METHODS

A field at the South Unit of the LSU Rice Research Station that has a heavy infestation of red rice was the site of this research. The field was land-levelled in the spring of 1989, and red rice allowed to grow in order to maintain a high level of red rice seed in the soil. The field was plowed in the fall to incorporate the red rice seed into the soil. In the spring of 1990 the field was worked to prepare the seedbed and reworked, as needed, prior to seeding.

In most tests, levees were built and the field flooded for seeding as quickly as possible. In the case of the stale seedbed test, flooding for seeding was delayed for about a month after seedbed preparation, a fresh seedbed was prepared in certain plots to serve as a control and the herbicide treatments were applied prior to flooding for seeding. In all cases except the herbicide screening test, presprouted Lemont was sown at a rate equivalent to 125 lb/A dry seed. These tests were then drained and reflooded 5-7 days later. Tests were fertilized by broadcasting 500 lb/A of 20-10-10 analysis fertilizer over the flooded plots. Modification of these practices were part of the experiment in some cases and are described in the results section.

Preplant incorporated treatments were applied as sprays and incorporated as quickly as possible with a front-tined garden rototiller. Preplant surface treatments were applied as sprays prior to flooding for planting or as granular formulations broadcast into the flooded plots. Sprays were applied in a volume of 15 gal/A with a four-nozzel boom equipped with 80015 flat fan nozzels, spraying at a pressure of 35 psi and a ground speed of 2.5 MPH. In some cases, puddling of the seedbed was accomplished by lightly smoothing the soil with a garden rake after flooding for seeding. In the preplant granular test the treated areas were isolated by surrounding them with an aluminum-flashing cylinder ca. 2.6 feet in diameter with an enclosed area of 5.1 sq ft.

---

<sup>1/</sup> This research was supported in part by funds provided by rice farmers through the Louisiana Rice Research Board.

Red rice control evaluations were made by counting the number of red rice plants in an area about 1 month after seeding or the number of red rice panicles in a hand-harvested subsample at maturity. In the herbicide screening trial and the stale seedbed test, visual ratings of control were made using the following scale:

- 1 - 0-10% control
- 2 - 10-30% control
- 3 - 30-70% control
- 4 - 70-90% control
- 5 - 90-100% control.

Where appropriate, an analysis of variance was performed on the data, and a multiple range test used to identify treatment differences.

## RESULTS AND DISCUSSION

### Grooved Seedbed Test

Some rice farmers are grooving the seedbed prior to flooding for water seeding in order to minimize the problem of seedling drift that occurs in water-seeded rice. This test was established to determine the impact of this practice on the performance of preplant herbicides in controlling red rice in a water-seeded system using presprouted rice and a brief postseeding drainage period.

Data on red rice infestation and Lemont yield are presented in Table 1. Red rice infestation was measured by counting the number of red rice panicles in a square yard area in each plot at harvest. This measurement is more realistic than counting the number of red rice plants, since the number of red rice panicles will more accurately reflect the potential for producing red rice seed that may affect the grade or reinfest the soil. There was no significant difference between the grooved and nongrooved seedbeds, but there were significant differences between the preplant herbicide treatments. The untreated control plots had a significantly higher red rice panicle density than the plots receiving preplant herbicide treatments. There was no significant difference between the preplant herbicides.

Lemont yield reflected the level of red rice control obtained. There was no significant difference between the yields of the grooved and nongrooved seedbeds, but there were significant differences between the preplant treatments. The yields from untreated plots were significantly lower than those treated with the preplant herbicides. Although the analysis of the yield data indicate there was a significant difference between thiobencarb applied prior to grooving and the mixture of thiobencarb and quinclorac applied after grooving, this is probably not true since there were some plots in the thiobencarb prior to grooving treatment which were abnormally low, indicating the effect of some uncontrolled factors rather than the treatment.

In conclusion, grooving the seedbed has no significant effect on the performance of the recommended preplant herbicide treatments. The preplant treatments reduced red rice panicle production significantly and increased Lemont yield significantly.

Table 1. Grooved seedbed test.<sup>1/</sup> Rice Research Station, Crowley, LA, 1990.

A. Red rice panicle density at harvest.

| Herbicide                                 | Rate      | Grooved | Rough                    | Average <sup>5/</sup> |
|-------------------------------------------|-----------|---------|--------------------------|-----------------------|
|                                           | (lb ai/A) | - - -   | (panicles / sq yd) - - - |                       |
| Untreated                                 | -         | 258.5   | 321.8                    | 290.1 b               |
| Molinate <sup>2/</sup>                    | 4         | 73.3    | 52.0                     | 62.6 a                |
| Thiobencarb <sup>3/</sup>                 | 4         | 141.3   | 103.8                    | 122.5 a               |
| Thiobencarb <sup>4/</sup>                 | 4         | 142.0   | 93.3                     | 117.6 a               |
| Thiobencarb +<br>quinclorac <sup>4/</sup> | 4 +.5     | 93.0    | 87.5                     | 90.3 a                |
| Average                                   |           | 141.6   | 131.7                    |                       |

B. Lemont yield.

| Herbicide                                 | Rate      | Grooved   | Rough               | Average <sup>5/</sup> |
|-------------------------------------------|-----------|-----------|---------------------|-----------------------|
|                                           | (lb ai/A) | - - - - - | (cwt / A) - - - - - |                       |
| Untreated                                 | -         | 16.9      | 13.0                | 15.1 a                |
| Molinate <sup>2/</sup>                    | 4         | 42.3      | 46.7                | 44.5 bc               |
| Thiobencarb <sup>3/</sup>                 | 4         | 28.6      | 43.3                | 35.9 b                |
| Thiobencarb <sup>4/</sup>                 | 4         | 40.7      | 44.9                | 42.8 bc               |
| Thiobencarb +<br>quinclorac <sup>4/</sup> | 4 +.5     | 47.0      | 46.3                | 46.6 c                |
| Average                                   |           | 35.1      | 38.9                |                       |

<sup>1/</sup> Final seedbed prepared 4/22/90. Preplant treatments applied and seedbed grooved 4/24/90. Flooded 4/25/90 and seeded 4/26/90. Drained 4/26/90 and reflooded 5/2/90. Fertilized 5/22/90.

<sup>2/</sup> Preplant incorporated before grooving.

<sup>3/</sup> Preplant surface before grooving.

<sup>4/</sup> Preplant surface after grooving.

<sup>5/</sup> Means followed by the same letter are not significantly different at alpha = .05



### Ropewick glyphosate test

In short-statured cultivars such as Lemont it is possible to take advantage of the height differential between the cultivar and red rice to apply glyphosate to the red rice with a ropewick applicator. These studies were conducted to collect data on the impact of this type of treatment on red rice seed production and cultivar yield.

Treatment information and data are presented in Table 2. In this test one pass or two passes in opposite directions were compared to checks that did not receive a ropewick treatment. These treatments were superimposed on three preplant treatments in a split-block design. The ropewick treatments were applied following emergence of the red rice panicles but prior to pollination. Data were collected at maturity from a square yard sample from each plot. The number of red rice panicles in the sample was determined, and the Lemont yield was estimated by threshing the Lemont panicles in the sample. Further information on the red rice was obtained by taking a five-panicle subsample from each sample area and determining the number of florets per panicle, the percentage of these that was filled, the weight of the filled florets, and the percentage germination of the filled florets. From these measurements, the number of viable red rice seed produced per square foot was calculated.

As might be expected, there was no significant effect of the ropewick treatments on the number of red rice panicles per square yard nor the panicle size, since these parameters were established prior to ropewick treatment. The preplant herbicides reduced the red rice panicle density but did not influence panicle size. There was a significant reduction in the percentage of filled florets in the ropewick treated plots, but no significant differences between the number of passes nor the preplant treatments. Filled floret weight was reduced significantly by the ropewick treatment, and the plots without preplant herbicide had a significantly lower filled floret weight, reflecting the effect of the extremely high red rice panicle density in these plots. The viability of the filled red rice seed, as indicated by percentage germination, was significantly lower in the ropewick treated plots. Analysis of the red rice seed production indicated a significant interaction between the preplant treatments and the ropewick treatments. Calculation of an LSD for ropewick means within a preplant treatment was used to indicate where significant differences were. This indicated that viable red rice seed production in the no-ropewick treatment within the no preplant herbicide check was significantly higher than in those receiving ropewick treatment. Using this LSD, no differences were detected between the ropewick treatments within either of the preplant herbicide treatments. There may be significant differences within these preplant treatments which could be detected by separate analysis of the data for the ropewick treatments within each preplant treatment that are not detected by the large LSD that results from the extremely deviations that occur in the no-preplant herbicide check.

Lemont yield reflected the red rice control obtained with the preplant treatments, but the ropewick treatments did not influence Lemont yield.

In summary, in fields of short-statured cultivars, ropewick application of glyphosate after red rice panicle emergence and before pollination will reduce the percentage of filled red rice florets and the viability of filled florets. This will lead to improved grade of the harvested cultivar and to a lower reinfestation of the soil with viable red rice seed.

Table 2. Ropewick application of glyphosate.<sup>1/</sup> Rice Research Station, Crowley, LA, 1990.

A. Effect on red rice panicle density.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment                   |          |       |                       |
|-------------------------------------|--------------------------------------|----------|-------|-----------------------|
|                                     | 1 Pass                               | 2 Passes | None  | Average <sup>3/</sup> |
|                                     | - - - - - panicles / sq yd - - - - - |          |       |                       |
| None                                | 256.5                                | 239.8    | 293.8 | 263.3 c               |
| Molinate                            | 57.0                                 | 29.8     | 51.3  | 46.0 a                |
| Thiobencarb                         | 80.5                                 | 80.5     | 103.8 | 88.3 b                |
| Average                             | 131.3                                | 116.7    | 149.6 |                       |

B. Effect on red rice panicle size.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment                    |          |      |         |
|-------------------------------------|---------------------------------------|----------|------|---------|
|                                     | 1 Pass                                | 2 Passes | None | Average |
|                                     | - - - - - florets / panicle - - - - - |          |      |         |
| None                                | 52.6                                  | 59.4     | 59.8 | 57.2    |
| Molinate                            | 64.6                                  | 66.2     | 66.4 | 65.7    |
| Thiobencarb                         | 61.2                                  | 66.9     | 61.3 | 63.1    |
| Average                             | 59.4                                  | 64.1     | 62.5 |         |

<sup>1/</sup> Final seedbed prepared 4/22/90. Preplant treatments applied and seedbed grooved 4/24/90. Flooded 5/25/90 and seeded 4/26/90. Drained 4/26/90 and reflooded 5/2/90. Fertilized 5/22/90. Ropewick treatment applied 7/26/1990.

<sup>2/</sup> Molinate preplant incorporated at 4 lb ai/A and thiobencarb preplant surface at 4 lb ai/A.

<sup>3/</sup> Means within a column followed by the same letter are not significantly different at alpha = .05.

Table 2 (continued). Ropewick application of glyphosate.<sup>1/</sup>

C. Percentage of red rice florets filled.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment  |          |        |         |
|-------------------------------------|---------------------|----------|--------|---------|
|                                     | 1 Pass              | 2 Passes | None   | Average |
|                                     | ----- percent ----- |          |        |         |
| None                                | 22.2                | 8.6      | 66.5   | 32.4    |
| Molinate                            | 18.3                | 13.7     | 52.4   | 28.1    |
| Thiobencarb                         | 30.6                | 24.6     | 57.7   | 37.2    |
| Average <sup>4/</sup>               | 23.7 a              | 15.6 a   | 58.8 b |         |

D. Red rice filled floret weight.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment |          |        |                       |
|-------------------------------------|--------------------|----------|--------|-----------------------|
|                                     | 1 Pass             | 2 Passes | None   | Average <sup>3/</sup> |
|                                     | ----- mg -----     |          |        |                       |
| None                                | 22.4               | 18.1     | 26.6   | 22.3 a                |
| Molinate                            | 22.1               | 23.3     | 26.2   | 23.8 b                |
| Thiobencarb                         | 22.9               | 23.0     | 25.6   | 23.8 b                |
| Average <sup>4/</sup>               | 22.4 a             | 21.5 a   | 26.1 b |                       |

<sup>1/</sup> Final seedbed prepared 4/22/90. Preplant treatments applied and seedbed grooved 4/24/90. Flooded 5/25/90 and seeded 4/26/90. Drained 4/26/90 and reflooded 5/2/90. Fertilized 5/22/90. Ropewick treatment applied 7/26/90.

<sup>2/</sup> Molinate preplant incorporated at 4 lb ai/A and thiobencarb preplant surface at 4 lb ai/A.

<sup>3/</sup> Means within a column followed by the same letter are not significantly different at alpha = .05.

<sup>4/</sup> Means within a row followed by the same letter are not significantly different at alpha = .05.

Table 2 (Continued). Ropewick application of glyphosate.<sup>1/</sup>

E. Percentage germination of red rice filled florets.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment          |          |        |         |
|-------------------------------------|-----------------------------|----------|--------|---------|
|                                     | 1 Pass                      | 2 Passes | None   | Average |
|                                     | - - - - - percent - - - - - |          |        |         |
| None                                | 58.0                        | 6.7      | 93.5   | 52.8    |
| Molinate                            | 39.0                        | 45.3     | 84.5   | 56.3    |
| Thiobencarb                         | 62.0                        | 39.5     | 87.0   | 62.8    |
| Average <sup>4/</sup>               | 53.0 a                      | 30.5 a   | 88.3 b |         |

F. Viable red rice seed production.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment <sup>4/</sup>        |          |          |         |
|-------------------------------------|-----------------------------------------|----------|----------|---------|
|                                     | 1 Pass                                  | 2 Passes | None     | Average |
|                                     | - - - - - viable seed / sq ft - - - - - |          |          |         |
| None                                | 219.9 m                                 | 11.4 m   | 1200.3 n | 477.3   |
| Molinate                            | 21.2 m                                  | 9.3 m    | 168.1 m  | 66.2    |
| Thiobencarb                         | 118.4 m                                 | 56.7 m   | 345.4 m  | 173.5   |
| Average                             | 119.8                                   | 25.8     | 571.3    |         |

<sup>1/</sup> Final seedbed prepared 4/22/90. Preplant treatments applied and seedbed grooved 4/24/90. Flooded 5/25/90 and seeded 4/26/90. Drained 4/26/90 and reflooded 5/2/90. Fertilized 5/22/90. Ropewick treatment applied 7/26/90.

<sup>2/</sup> Molinate preplant incorporated at 4 lb ai/A and thiobencarb preplant surface at 4 lb ai/A.

<sup>3/</sup> Means within a column followed by the same letter are not significantly different at alpha = .05.

<sup>4/</sup> Means within a row followed by the same letter are not significantly different at alpha = .05.

Table 2 (Continued). Ropewick application of glyphosate.<sup>1/</sup>

G. Lemont yield.

| Preplant<br>herbicide <sup>2/</sup> | Ropewick treatment  |          |      |                       |
|-------------------------------------|---------------------|----------|------|-----------------------|
|                                     | 1 Pass              | 2 Passes | None | Average <sup>3/</sup> |
|                                     | ----- cwt / A ----- |          |      |                       |
| None                                | 15.9                | 15.6     | 15.7 | 15.8 a                |
| Molinate                            | 47.7                | 50.4     | 46.7 | 48.3 b                |
| Thiobencarb                         | 45.1                | 32.3     | 43.3 | 40.2 b                |
| Average                             | 36.2                | 32.8     | 35.2 |                       |

1/ Final seedbed prepared 4/22/90. Preplant treatments applied and seedbed grooved 4/24/90. Flooded 5/25/90 and seeded 4/26/90. Drained 4/26/90 and reflooded 5/2/90. Fertilized 5/22/90. Ropewick treatment applied 7/26/90.

2/ Molinate preplant incorporated at 4 lb ai/A and thiobencarb preplant surface at 4 lb ai/A.

3/ Means within a column followed by the same letter are not significantly different at alpha = .05.

### Preplant granular thiobencarb test

At the present time, thiobencarb is recommended as a preplant surface spray prior to flooding the field for water-seeding with presprouted seed followed by a brief drainage period to allow root development by the young seedling. This practice does not fit into the practice of preparing the seedbed by puddling. In this test, the application of granular thiobencarb into the flooded seedbed was investigated. Treatments and data are presented in Table 3. Two rates of thiobencarb were applied into the flooded seedbed in three ways. In one case the seedbed was left rough and not puddled, with the granular thiobencarb being applied immediately after the seedbed was flooded for seeding. In the next case the granular thiobencarb was applied immediately after the seedbed was puddled. In the third case the granular thiobencarb was applied four days after puddling. Granular molinate applied immediately after puddling was included as a standard treatment. There were two untreated checks, one with a rough seedbed and one with a puddled seedbed.

Data were collected on the red rice stand and on the Lemont stand. Due to problems associated with an oil well adjacent to the first test site, the test was repeated. Data on red rice stand from both tests and on Lemont stand in the second test are presented in Table 3. In the first test, the red rice stands in plots treated with thiobencarb immediately after flooding for seeding were not significantly different from the molinate check and were significantly lower than the untreated checks. The delayed application did not control red rice quite as well. In the second test the thiobencarb did not perform as well. Only the molinate check and the high rate of thiobencarb applied into the puddled seedbed showed significantly lower red rice stand than the puddled check, and only the molinate check was significantly lower than the nonpuddled check. The poorer results in the second test may be due to problems with water management following seeding or to the presence of some established red rice plants in the seedbed at planting. Lemont stand was not affected by the treatments. Ducksalad was controlled very well by the thiobencarb treatments but not by the molinate.

In summary, the use of granular thiobencarb applied into the flooded seedbed for red rice control deserves further investigation as an alternative method of preplant application. It would provide the additional benefit of controlling aquatic weeds which are not controlled by molinate.

### Stale Seedbed Test

For various reasons there is growing interest in minimum tillage planting involving stale seedbed weed control. The possibility of using stale seedbed weed control as a means of getting selective red rice control has been investigated on and off for 30 years with varying degrees of success. In this test two herbicides which have previously shown promise were evaluated. Treatments and ratings are presented in Table 4. The ratings were taken at maturity. The only treatment that effected any degree of red rice control was the tilled check. The unusually dry weather conditions may be at least partially responsible for the lack of activity of the herbicides. These treatments have performed satisfactorily in the past.

Table 3. Preplant granular herbicide formulations for red rice control in water-seeded rice.<sup>1/</sup> Rice Research Station, Crowley, LA, 1990.

| Herbicide   | Rate      | Seedbed type | Time of treatment | Red rice stand <sup>2/</sup>       |          | Lemont stand |
|-------------|-----------|--------------|-------------------|------------------------------------|----------|--------------|
|             |           |              |                   | 1st test                           | 2nd test | 2nd test     |
|             | (lb ai/A) |              |                   | - - - - - plants / sq ft - - - - - |          |              |
| Untreated   | -         | Rough        | -                 | 13.6 a                             | 26.0 ab  | 12.5         |
| Untreated   | -         | Dragged      | -                 | 8.2 b                              | 33.8 a   | 24.5         |
| Thiobencarb | 3         | Dragged      | Delayed           | 3.6 cd                             | 18.8 abc | 28.5         |
| Thiobencarb | 4         | Dragged      | Delayed           | 5.4 bc                             | 11.7 bc  | 25.4         |
| Thiobencarb | 3         | Dragged      | Postflood         | 2.1 d                              | 17.8 abc | 17.5         |
| Thiobencarb | 4         | Dragged      | Postflood         | 1.9 d                              | 10.5 bc  | 30.5         |
| Thiobencarb | 3         | Rough        | Postflood         | 1.3 d                              | 22.4 abc | 21.4         |
| Thiobencarb | 4         | Rough        | Postflood         | 0.7 d                              | 21.8 abc | 21.3         |
| Molinate    | 4         | Dragged      | Postflood         | 1.5 d                              | 4.8 c    | 28.0         |

<sup>1/</sup> Plots flooded, dragged, and postflood treatments applied on 4/24/90 in the first test and on 5/25/90 in the second test. The delayed treatments applied on 4/30 in the first test and on 6/1/90 in the second test. The first test was seeded on 5/2/90 and the second on 6/5/90.

<sup>2/</sup> Means within a column followed by the same letter are not significantly different at alpha = .05.

Table 4. Stale seedbed red rice control test.<sup>1/</sup> Rice Research Station, Crowley, LA, 1990.

| Herbicide                    | Rate                       | Red rice <sup>2/</sup><br>control rating |
|------------------------------|----------------------------|------------------------------------------|
| Glyphosate +<br>X-77         | 1.0 lb ai/A<br>1 % v/v     | 2.0 b                                    |
| Glyphosate +<br>Thiobencarb  | 1.0 lb ai/A<br>4.0 lb ai/A | 2.0 b                                    |
| Glufosinate                  | 0.5 lb ai/A                | 2.0 b                                    |
| Glufosinate +<br>Thiobencarb | 0.5 lb ai/A<br>4.0 lb ai/A | 2.0 b                                    |
| Tilled check                 | ----                       | 4.0 c                                    |
| Stale check                  | ----                       | 1.0 a                                    |

<sup>1/</sup> Seedbed prepared 4/20/90. Herbicides applied 5/11/90.  
Tilled check worked 5/15/90. Flooded for seeding  
5/16/90 and seeded 5/18/90. Ratings taken 8/9/90.

<sup>2/</sup> Means followed by the same letter are not significantly  
different at alpha = .05.



### Herbicide Screening Trial

This test was conducted in a nonplanted field which had been prepared as if for seeding, and the red rice and other weeds allowed to develop. Treatments were applied when red rice was in the 2-3 leaf stage. Treatments and weed control ratings are presented in Table 5.

Fluazifop-p-butyl, quizalofop, fenoxaprop-ethyl and clethodim were highly effective in controlling red rice and junglerice but were not effective in controlling sedges and broadleaf weeds. DPX-V9360 was not effective in controlling red rice but was quite effective in controlling junglerice, sedges, and broadleaf weeds. At the rates tested AC 263222 did not provide adequate control of any of the weeds except possibly rice flatsedge. Propanil:molinat with crop oil concentrate was highly effective on all weeds except red rice.

In the case of those herbicides that controlled red rice, further tests are needed to see if "antidote" seed treatments will provide sufficient tolerance in cultivars to make selective red rice control possible. Other herbicides controlling weeds other than red rice should be investigated for general weed control in rice.

Table 5. Red rice herbicide screening trial.<sup>1/</sup> Rice Research Station, Crowley, LA, 1990.

| Herbicide <sup>3/</sup> | Rate<br>(lb ai/A) | Weed Control Ratings <sup>2/</sup> |         |         |       |        |  |
|-------------------------|-------------------|------------------------------------|---------|---------|-------|--------|--|
|                         |                   | ORYSA                              | ECHCO   | CYPES   | CYPIR | BRDLF  |  |
| Fluazifop-p-butyl       | .10               | 2.5 bc                             | 4.8 ab  | 2.0 b-e | 1.8 b | 1.0 e  |  |
| Fluazifop-p-butyl       | .20               | 5.0 a                              | 5.0 a   | 1.0 e   | 1.3 b | 1.0 e  |  |
| Fluazifop-p-butyl       | .30               | 5.0 a                              | 5.0 a   | 1.5 de  | 2.0 b | 1.5 de |  |
| DPX-V9360               | .025              | 1.3 d                              | 3.3 d   | 2.0 b-e | 5.0 a | 4.0 ab |  |
| DPX-V9360               | .05               | 1.0 d                              | 4.8 ab  | 3.5 ab  | 4.5 a | 3.0 bc |  |
| DPX-V9360               | .075              | 1.8 cd                             | 4.8 ab  | 4.3 a   | 5.0 a | 4.3 a  |  |
| AC 263222               | .008              | 1.3 d                              | 3.5 cd  | 3.5 ab  | 4.0 a | 2.3 cd |  |
| AC 263222               | .016              | 2.3 bc                             | 3.8 bcd | 3.0 a-d | 4.8 a | 3.0 bc |  |
| AC 263222               | .024              | 2.0 cd                             | 3.5 cd  | 3.3 abc | 4.5 a | 3.5 ab |  |
| Quizalofop              | .04               | 4.8 a                              | 5.0 a   | 1.8 cde | 1.8 b | 1.3 de |  |
| Quizalofop              | .08               | 4.8 a                              | 5.0 a   | 1.5 de  | 1.8 b | 1.0 e  |  |
| Quizalofop              | .12               | 5.0 a                              | 5.0 a   | 1.3 e   | 1.3 b | 1.0 e  |  |
| Clethodim               | .05               | 3.0 b                              | 4.5 abc | 1.5 de  | 2.0 b | 1.0 e  |  |
| Clethodim               | .10               | 4.8 a                              | 5.0 a   | 2.3 b-e | 1.3 b | 1.3 de |  |
| Clethodim               | .15               | 4.8 a                              | 5.0 a   | 1.8 cde | 1.5 b | 1.3 de |  |
| Fenoxaprop + COC        | .10               | 4.5 a                              | 5.0 a   | 1.0 e   | 1.3 b | 1.3 de |  |
| Propanil:               |                   |                                    |         |         |       |        |  |
| molinate + COC 3.0:3.0  |                   | 1.0 d                              | 4.5 abc | 4.3 a   | 5.0 a | 4.0 ab |  |
| Untreated               |                   | 1.0 d                              | 1.0 e   | 1.0 e   | 1.3 b | 1.0 e  |  |

<sup>1/</sup> Test area worked on 6/20/90 and weed allowed to develop. Herbicides applied on 7/12/90 when red rice was in the 3-leaf stage.

<sup>2/</sup> Weed codes are:

|       |                            |                           |
|-------|----------------------------|---------------------------|
| ORYSA | red rice                   | <u>Oryza sativa</u>       |
| ECHCO | junglerice                 | <u>Echinochloa colona</u> |
| CYPES | yellow nutsedge            | <u>Cyperus esculentus</u> |
| CYPIR | rice flatsedge             | <u>Cyperus iria</u>       |
| BRDLF | mixture of broadleaf weeds |                           |

Means within a column followed by the same letter are not significantly different at alpha = .05.

<sup>3/</sup> Crop oil concentrate (COC) added at a rate of 1 quart per acre where indicated.

Table 6. Herbicides tested in red rice studies at the Rice Research Station, Crowley, LA. 1990.

| Name or code<br>no. used in<br>report | Chemical nature of<br>active ingredient                                                                                     | Manufacturer      |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------|
| AC 263222                             | (Chemistry not released)                                                                                                    | American Cyanamid |
| clethodim                             | ( <u>E,E</u> )-(±)-2-[1[[3-chloro-2-propenyl)oxy]imino]<br>propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-<br>2-cyclohexen-1-one | Valent            |
| DPX-V9360                             | (Chemistry not released)                                                                                                    | DuPont            |
| fenoxaprop-ethyl                      | (±)-2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy]<br>propanoic acid, ethyl ester                                              | Hoechst-Roussel   |
| fluazifop-p-butyl                     | (±)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]<br>oxy]phenoxy]propanoic acid, p-butyl ester                                | ICI               |
| glufosinate                           | ammonium-DL-homoanalin-4-yl(methyl)phosphinate                                                                              | Hoechst-Roussel   |
| glyphosate                            | N-phosphonomethylglysine                                                                                                    | Monsanto          |
| molinate                              | <u>S</u> -ethyl hexahydro-1 <u>H</u> -azepine-1-carbothioate                                                                | ICI               |
| propanil:molinate                     | <u>N</u> -(3,4-dichlorophenyl)propionamide: <u>S</u> -ethyl-<br>hexahydro-1 <u>H</u> -azepine-1-carbothioate (premix)       | ICI               |
| quinclorac                            | 3,7-dichloro-8-quinolinecarboxylic acid                                                                                     | BASF              |
| quizalofop                            | (±)-2-[4-[(6-chloro-2-quinoxalinyloxy]phenoxy]<br>propanoic acid, ethyl ester                                               | DuPont            |
| thiobencarb                           | <u>S</u> -[(4-chlorophenyl)methyl]diethylcarbamothioate                                                                     | Valent            |

## RICE INSECTS RESEARCH

### RICE WATER WEEVIL CONTROL: CARBOFURAN

S. S. Quisenberry, G. B. Trahan, and P. B. Bollich

Location: Rice Research Station, Crowley, LA.

Soil: Crowley silt loam.

Variety: 'Lemont'.

Seeding Rate: 100 lb/A.

Planting Method and Date: Drill seeded with a Kincaid drill, 7 inch row spacing, 16 May 1990.

Plot Size: 15 X 4 ft.

Water Management: Flushed 18 and 23 May and 1 and 7 June. Flooded 12 June.

Fertilization: 60-60-60 lb/A N-P-K applied 16 May with a Kincaid drill; 30 lb/A N applied 14 June and 30 lb/A N applied 28 June by hand. 6 pints/A Zinc applied 29 June by airplane.

Herbicides: Propanil (4 lb ai/A) and bentazon (1 lb ai/A) applied 6 June and a second application of propanil (4 lb ai/A) applied 11 June with a CO<sub>2</sub> hand boom delivering 15 GPA @ 25 psi.

Insecticides: Carbofuran 4F (1 lb ai/A) impregnated on 30 lb/A N applied 14 June and carbofuran 4F (1 lb ai/A) impregnated on 30 lb/A N applied 28 June by hand. Carbofuran 4F (1 lb ai/A) applied 14 June with a CO<sub>2</sub> hand boom delivering 15 GPA @ 24 psi. Carbofuran 3G (0.6 lb ai/A) applied 28 June with a shaker jar.

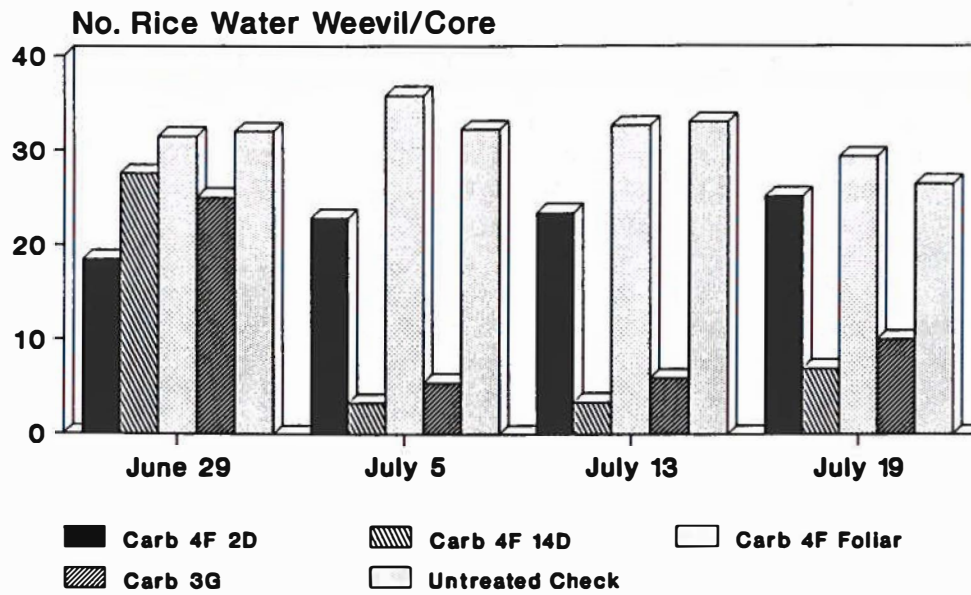
Treatments: 1) Carbofuran 4F 1 lb ai/A impregnated on fertilizer, applied 2 days post-flood; 2) Carbofuran 4F 1 lb ai/A impregnated on fertilizer, applied 14 days post-flood; 3) Carbofuran 4F 1 lb ai/A foliar spray, 2 days post-flood; 4) Carbofuran 3G 0.6 lb ai/A applied 14 days post-flood; 5) No treatment (control).

Experimental Design: Randomized block design with four replicates.

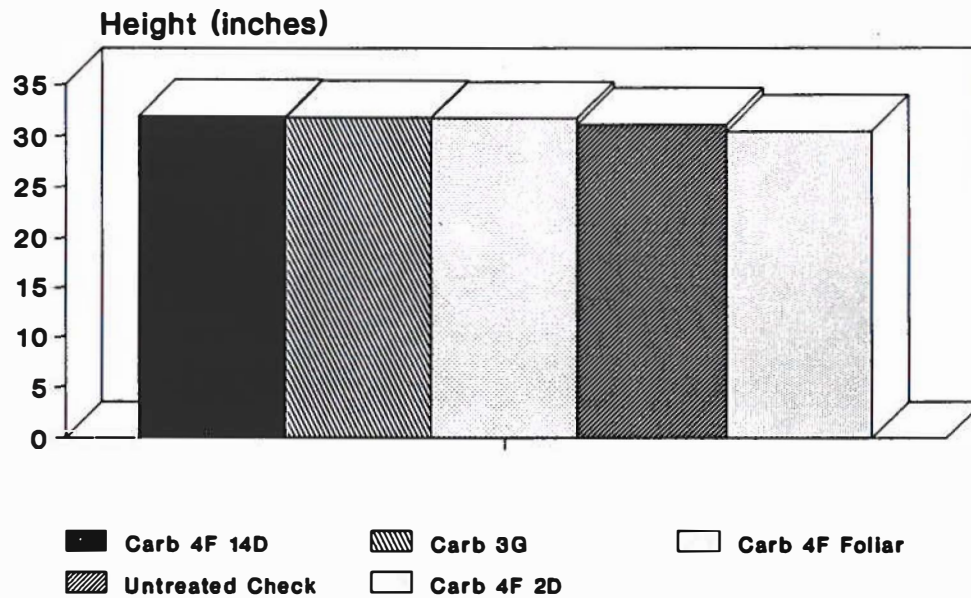
Harvested: 18 September

Comments: Carbofuran application methodologies were compared for rice water weevil (RWW) control. Carbofuran 4F (1 lb ai/A impregnated on fertilizer and applied 14 days post-flood) and carbofuran 3G effectively controlled RWW after treatment with the insecticides (Fig. 1). Plant heights were not affected by any treatment (Fig. 2). Yields were significantly greater (1381 and 1184 lb/A) in the carbofuran 4F (1 lb ai/A impregnated on fertilizer and applied 14 days post-flood) and carbofuran 3G plots as compared with the control plots (Fig. 3).

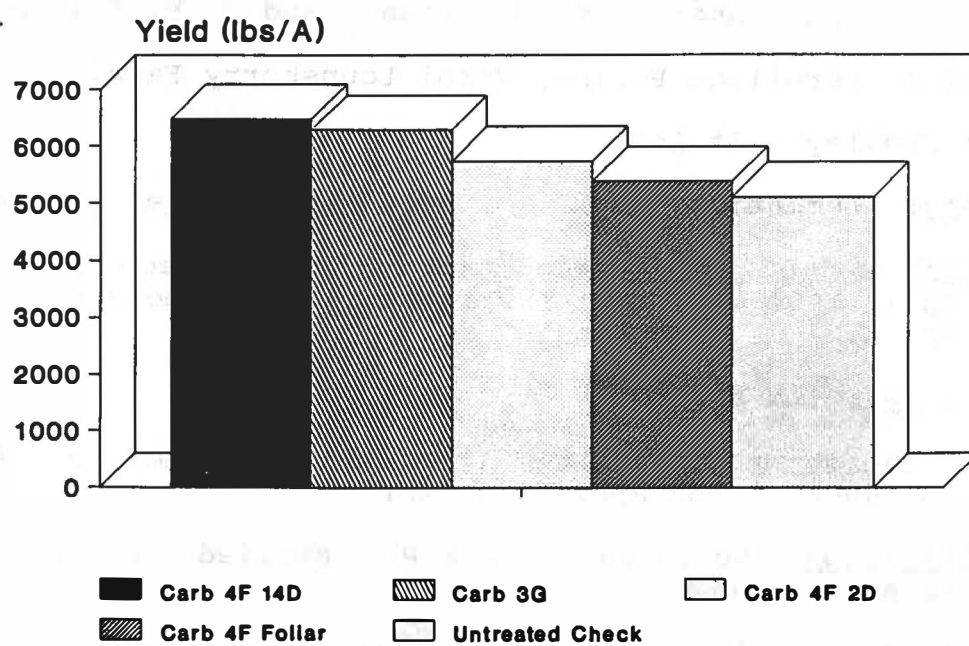
**FIG. 1. Rice water weevil control in carbofuran plots, 1990.**



**FIG. 2. Plant height in carbofuran plots, 1990.**



**FIG. 3. Yield in carbofuran plots, 1990.**





RICE WATER WEEVIL CONTROL: CARBOFURAN AND ISOZOPHOS

S. S. Quisenberry, G. B. Trahan, and P. B. Bollich

Location: Vermilion Parish, Errol Lounsberry Farm.

Soil: Crowley silt loam.

Variety: 'Lemont'.

Seeding Rate: 150 lb/A.

Planting Method and Date: Grppved with a Sweco groover 17 April 1990, 7 inch row spacing, water seeded by hand 19 April.

Plot Size: 25 X 7 ft.

Water Management: Flushed 17 April, drained 21 April. Permanent flood applied 24 April.

Fertilization: 60-60-60 lb/A N-P-K applied 17 April with Kalamco drill.

Herbicide: Bensulfuron-methyl (0.9 oz ai/A) and molinate (3 lb ai/A) applied 12 May by airplane.

Insecticide: Carbofuran 4F (0.75, 1.0 lb ai/A) impregnated on 30 lb/A N applied 22 May by hand. Carbofuran 3G (0.6 lb ai/A) and isozophos 10G (1,2 lb ai/A) applied 22 May with a shaker jar.

Treatments: 1) Carbofuran 4F 0.75 lb ai/A impregnated on fertilizer, applied post-flood; 2) Carbofuran 4F 1 lb ai/A imprenated on fertilzer, applied post-flood; 3) Carbofuran 3G 0.6 lb ai/A; 4) Isozoophos 10G 1 lb ai/A; 5) Isozophos 10G 2 lb ai/A; 6) No treatment (Control).

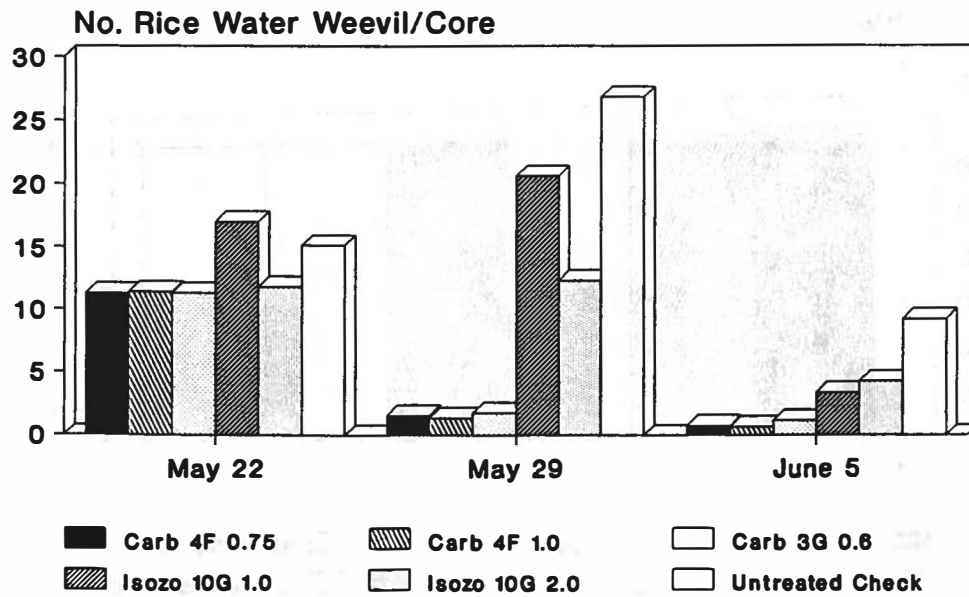
Experimental Design: Radomized block design with four replicates.

Harvested: 9 August.

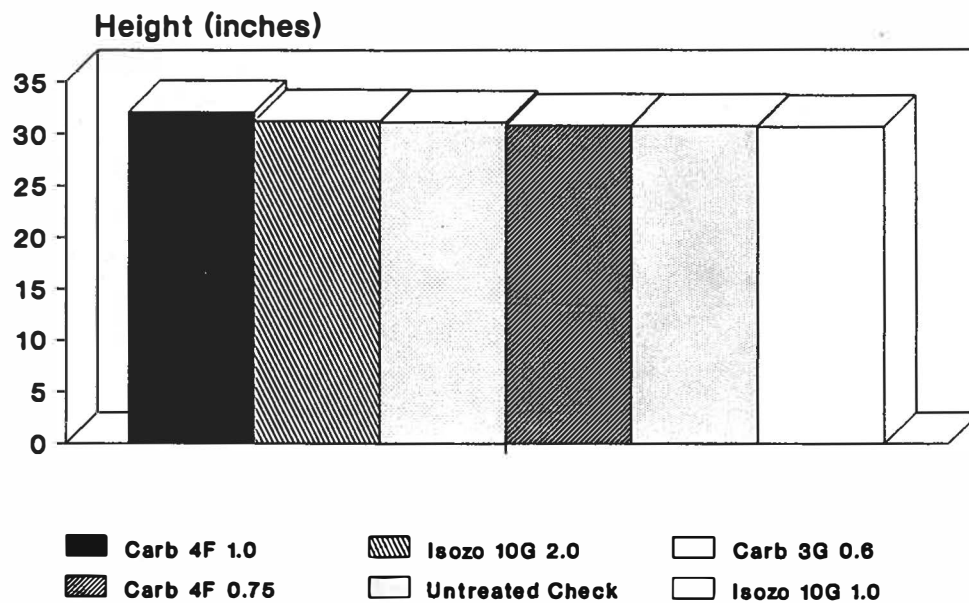
Comments: Carbofuran and isozophos were compared for rice water weevil (RWW) control. Carbofuran 3G and 4F (0.75, 1.0 lb ai/A impregnated on fertilizer) were effective in controlling RWW after treatment with the insecticides (Fig. 1). Plant heights were not affected by any treatment (Fig.2). Yields were greater (101 to 464 lb/A) in all treatments as compared with the control plots (Fig.3). Carbofuran 4F (1.0 lb ai/A impregnated on fertilizer) plots had significantly higher yields than the control plots.



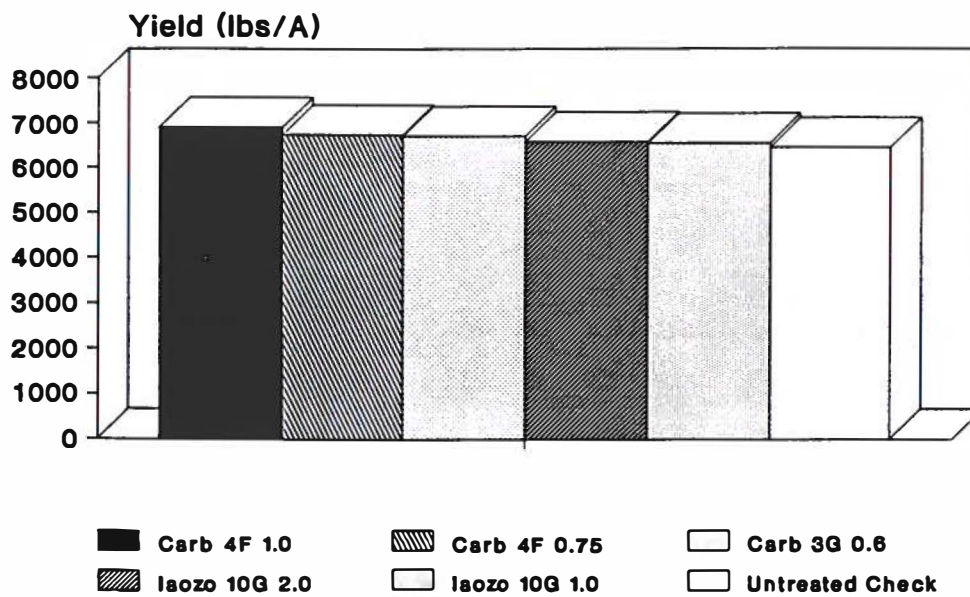
**FIG. 1. Rice water weevil control in carbofuran and isozophos plots, 1990.**



**FIG. 2. Plant height in carbofuran and isozophos plots, 1990.**



**FIG. 3. Yield in carbofuran and  
isozophos plots, 1990.**



## RICE WATER WEEVIL CONTROL: CYCLOPROTHRIN

S. S. Quisenberry, G. B. Trahan, and P. B. Bollich

Location: Rice Research Station, Crowley, LA.

Soil: Crowley silt loam.

Variety: 'Mars'.

Seeding Rate: 111 lb/A.

Planting Method and Date: Drill seeded with a Kincaid drill, 7 in row spacing, 24 April 1990.

Plot Size: 16 X 4 ft.

Water Management: Flushed 2 May. Flooded 17 May.

Fertilization: 106-53-53 lb/A N-P-K applied 24 April with Kincaid drill; 72 lb N applied 16 May with a motorized Gandy. 6 pints/A zinc applied 29 June by airplane.

Herbicide: Propanil (4 lb ai/A) applied 14 May with a CO<sub>2</sub> hand boom delivering 15 GPA @ 27 psi.

Insecticides: Cycloprothrin (0.18, 0.26 lb ai/A) applied 18 May (1 day post-flood). Cycloprothrin (0.18, 0.26 lb ai/A) applied 18 May (1 day post-flood) and 25 May (8 days post-flood). Carbofuran 3G (0.6 lb ai/A) applied 7 June (14 days post-flood). All insecticides were applied with a shaker jar.

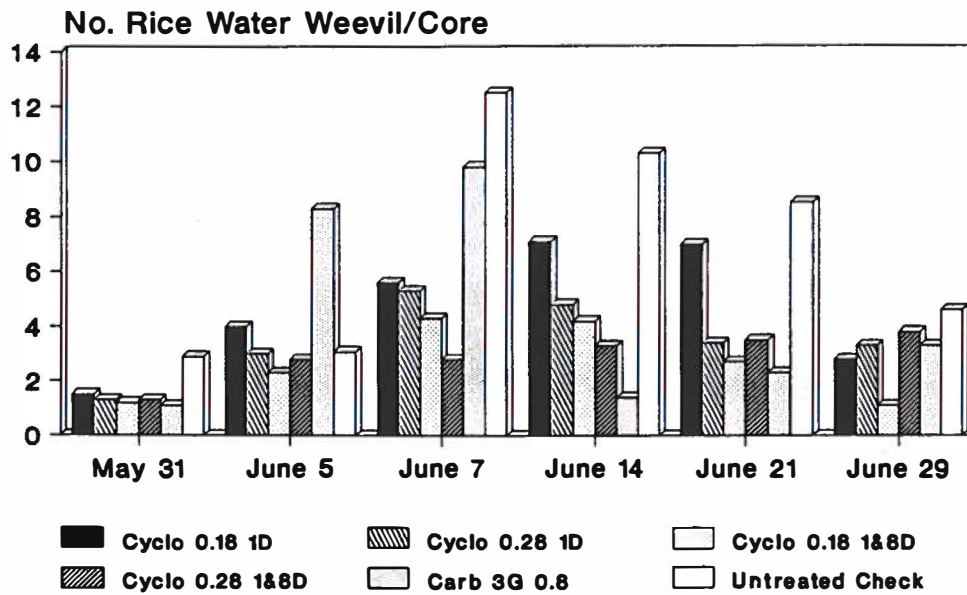
Treatments: 1) Cycloprothrin 0.18 lb ai/A applied 1 day post-flood; 2) Cycloprothrin 0.26 lb ai/A applied 1 day post-flood; 3) Cycloprothrin 0.18 lb ai/A applied 1 and 8 day post-flood; 4) Cycloprothrin 0.26 lb ai/A applied 1 and 8 days post-flood; 5) Carbofuran 3G 0.6 lb ai/A; 6) No treatment (control).

Experimental Design: Randomized block design with four replicates.

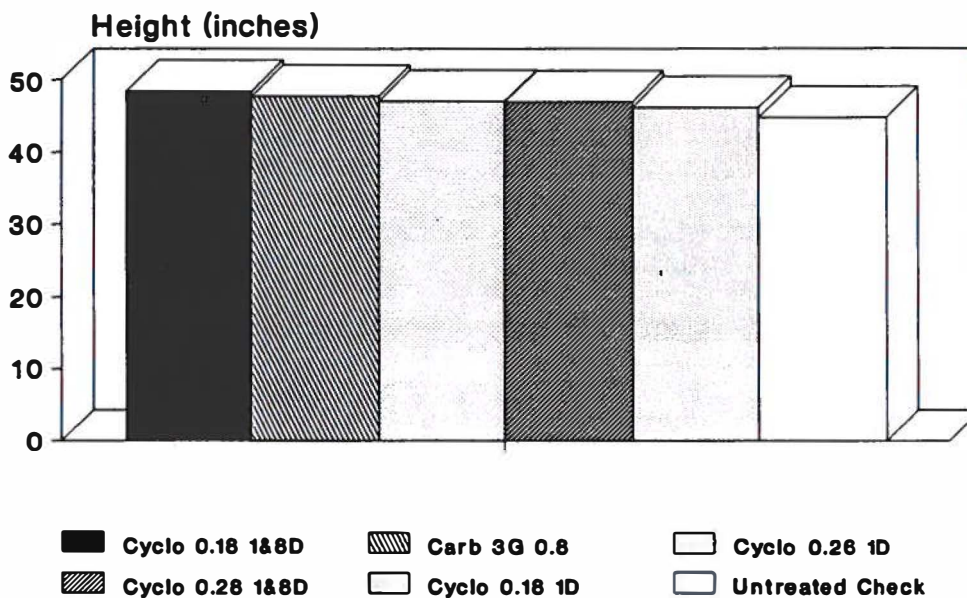
Harvested: 15 August.

Comments: Cycloprothrin and carbofuran were compared for rice water weevil (RWW) control. All insecticide treatments were effective in controlling RWW after treatment (Fig. 1). Plant heights averaged 1.4 to 3.7 inches taller in treated plots (Fig. 2). Yields were not significantly affected by any treatment; however, yields in plots treated with cycloprothrin (0.18 lb ai/A) 1 day and 1 and 8 days post-flood yielded 100 and 91 lb/A more than the control plots, respectively (Fig.3).

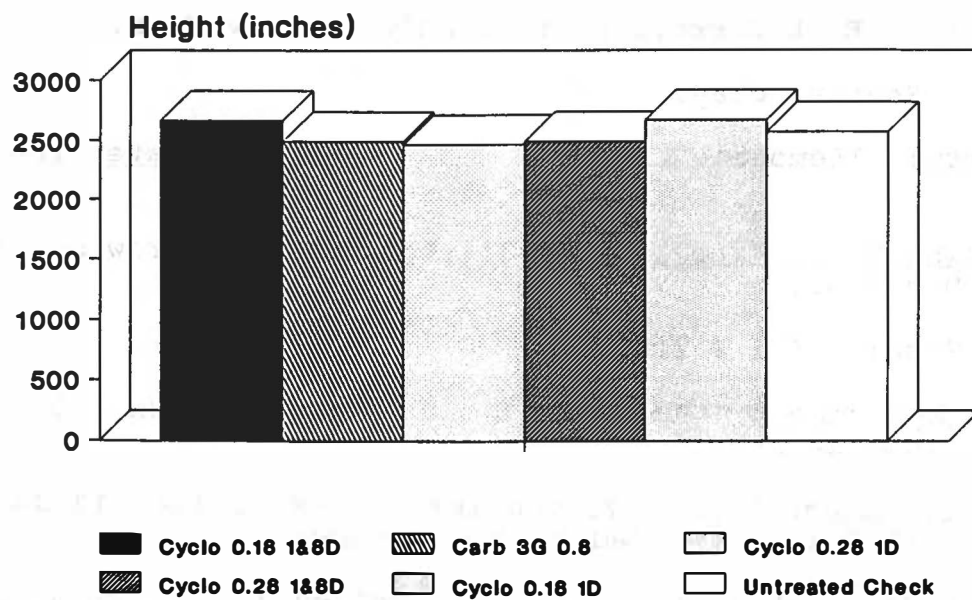
**FIG. 1. Rice water weevil control in cycloprothrin and carbofuran plots, 1990**



**FIG. 2. Plant height in cycloprothrin and carbofuran plots, 1990.**



**FIG. 3. Yield in cycloprothrin and carbofuran plots, 1990.**



RICE WATER WEEVIL CONTROL: CARBOFURAN AND CYCLOPROTHRIN

S. S. Quisenberry, G. B. Trahan, and P. B. Bollich

Location: East Carroll Parish, Buford Perry Farm.

Soil: Sharkey clay.

Variety: 'Lemont'.

Seeding Rate: 100 lb/A.

Planting Method and Date: Drill Seeded, 7 in. row spacing, 1 May 1990.

Plot Size: 25 X 7 ft.

Water Management: Flushed 5 and 26 May and 9 June. Permanent flood 14 June.

Fertilization:  $\text{NH}_4\text{SO}_4$ , 72-0-0 lb/A N-P-K applied 13 June and 48-0-0 lb/A applied 28 June by hand.

Herbicide: Molinate (3 lb ai/A) applied 22 June by airplane.

Insecticide: Carbofuran 4F (1 lb ai/A) impregnated on 72 lb/A N applied 13 June; carbofuran 4F (1 lb ai/A) impregnated on 48 lb/A N applied 28 June. Carbofuran 4F (1 lb ai/A) applied 13 June with a  $\text{CO}_2$  hand boom delivering 15 GPA @ 24 psi. Carbofuran 3G (0.6 lb ai/A) applied 13 June with a shaker jar; Carbofuran 3G (0.6 lb ai/A) applied 28 June with shaker jar. Cycloprothrin (0.18, 0.26 lb ai/A) applied 13 June (1 day pre-flood) with a shaker jar. Cycloprothrin (0.18, 0.26 lb ai/A) applied 13 June (1 day pre-flood) and 20 June (6 days post-flood) with a shaker jar.

Treatments: 1) Carbofuran 4F 1.0 lb ai/A impregnated on fertilizer, applied 1 day pre-flood; 2) Carbofuran 4F 1.0 lb ai/A, applied 1 day pre-flood as a foliar spray; 3) Carbofuran 3G 0.6 lb ai/A, applied 15 days post-flood; 4) Cycloprothrin 0.18 lb ai/A, applied 1 day pre-flood; 5) Cycloprothrin 0.26 lb ai/A, applied 1 day pre-flood; 6) Cycloprothrin 0.18 lb ai/A, applied 1 day pre-flood and 6 day post-flood; 7) Cycloprothrin 0.26 lb ai/A applied 1 day pre-flood and 6 day post-flood; 8) Carbofuran 4F 1.0 lb ai/A, applied 1 day pre-flood and 6 days post-flood; 9) Carbofluran 3G 0.6 lb ai/A, applied 15 days post-flood; 10) No treatment (control).

Experimental Design: Randomized block design with 4 replicates.

Harvested: 26 August.

Comments: Cycloprothrin and carbofuran application methodologies were compared as rice water weevil (RWW) control tactics. All treatments significantly reduced RWW larval populations after treatments were applied (Table 1). Plants heights were not significantly affected by any treatment (Table 2). Yields were greater (532 to 1219 lb/A) in treated plots as compared with control plots (Table 2). Yield in plots treated with cycloprothrin (Treatment 6- 0.18 lb ai/A, pre-flooded and 6 days post-flood) was significantly greater than control plots.

Table 1.

Rice water weevil larvae per core in cycloprothrin and carbofuran treated plots, East Carroll Parish, LA, 1990

| Treatment       | Rate<br>lb ai/A | Application<br>Method      | Date  |        |      |
|-----------------|-----------------|----------------------------|-------|--------|------|
|                 |                 |                            | 6/28  | 7/11   | 7/19 |
| Carbofuran 4F   | 1.0             | Pre-flood,<br>impregnated  | 0.5b  | 1.0d   | 1.3b |
| Carbofuran 4F   | 1.0             | Pre-flood,<br>foliar spray | 0.5b  | 1.3d   | 1.4b |
| Carbofuran 3G   | 0.6             | Pre-flood                  | 0.2b  | 2.1cd  | 1.4b |
| Cycloprothrin   | 0.18            | Pre-flood                  | 2.0ab | 4.2bc  | 1.7b |
| Cycloprothrin   | 0.26            | Pre-flood                  | 3.1a  | 3.4bcd | 1.6b |
| Cycloprothrin   | 0.18            | Pre-flood<br>6D Post-flood | 1.8ab | 5.3b   | 1.3b |
| Cycloprothrin   | 0.26            | Pre-flood<br>6D Post-flood | 1.6ab | 2.6cd  | 1.3b |
| Carbofuran 4F   | 1.0             | Post-flood,<br>impregnated | 2.8a  | 1.2d   | 1.2b |
| Carbofuran 3G   | 0.6             | Post-flood                 | 3.0a  | 2.4cd  | 2.4b |
| Untreated check |                 |                            | 2.3ab | 10.8a  | 4.3a |

Means within a column followed by the same letter are not significantly different ( $P > 0.05$ ; Duncan's Multiple range test).



Table 2.

Height and yield in cycloprothrin and carbofuran treated plots, East Carroll Parish, LA, 1990

| Treatment       | Rate<br>(lb ai/A) | Application<br>method and date | Height<br>(inches) | Yield<br>(lb/A) |
|-----------------|-------------------|--------------------------------|--------------------|-----------------|
| Cycloprothrin   | 0.26              | Pre-flood,<br>6D Post-flood    | 31.8a              | 7469.7ab        |
| Carbofuran 4F   | 1.0               | Pre-flood,<br>impregnated      | 31.7a              | 7567.0ab        |
| Carbofuran 3G   | 0.6               | Post-flood                     | 31.7a              | 7680.3ab        |
| Carbofuran 4F   | 1.0               | Post-flood,<br>impregnated     | 31.4a              | 7688.0ab        |
| Cycloprothrin   | 0.26              | Pre-flood                      | 31.3a              | 7755.9ab        |
| Carbofuran 3G   | 0.6               | Pre-flood                      | 31.3a              | 7233.2ab        |
| Cycloprothrin   | 0.18              | Pre-flood                      | 31.0a              | 7270.7ab        |
| Cycloprothrin   | 0.18              | Pre-flood,<br>6D Post-flood    | 31.0a              | 7920.9a         |
| Carbofuran 4F   | 1.0               | Pre-flood,<br>foliar spray     | 30.9a              | 7465.4ab        |
| Untreated check |                   |                                | 30.2a              | 6701.9b         |

Means within a column followed by the same letter are not significantly different ( $P > 0.05$ ; Duncan's Multiple range test).

## RICE WATER WEEVIL CONTROL: NEMATODES

S. S. Quisenberry, G. B. Trahan, and P. A. Bollich

Location: Rice Research Station, Crowley, LA.

Soil: Crowley silt loam.

Variety: 'Lemont'.

Seeding Rate: 100 lb/A.

Planting Method and Date: Drill seeded with a Kincaid drill, 7 inch row spacing, 16 May 1990.

Plot Size: 15 X 4 ft. Each plot surrounded by metal barrier.

Water Management: Flushed 18, 21 and 23 May, 1, 7 and 12 June. Permanent flood applied 12 June 2 h after Steinernema #25 were applied to treatments 3 and 4. Water removed 25 June from treatments 5, 6 and 7 with 2 cm standing water left on treatment 7. Nematodes applied to treatments 5, 6 and 7 on 26 June. Permanent flood re-established on 29 June.

Fertilization: 60-60-60 lb/A N-P-K applied 16 May with Kincaid drill; 90 lb/A N applied 11 June and 40 lb/A N 5 July by hand. 6 pints/A Zinc applied 29 June by airplane.

Herbicides: Propanil (4 lb ai/A) and bentazon (1 lb ai/A) applied 6 June and a second application of propanil (4 lb ai/A) applied 11 June with a CO<sub>2</sub> hand boom delivering 15 GPA @ 25 psi.

Insecticide: Carbofuran (3G) 0.6 lb/A applied 26 June with a shaker jar.

Nematodes: Steinernema #25, 125 and 250 nemas/sq. in., applied 12 June to moist soil; Steinernema #25, 125 and 250 nemas/sq.in., applied 26 June to moist soil; and Steinernema #27, 500 nemas/sq.in., applied 26 June to 2 cm standing water. A CO<sub>2</sub> single nozzle hand boom delivering 100 GPA @ 20 psi was used for nematode applications.

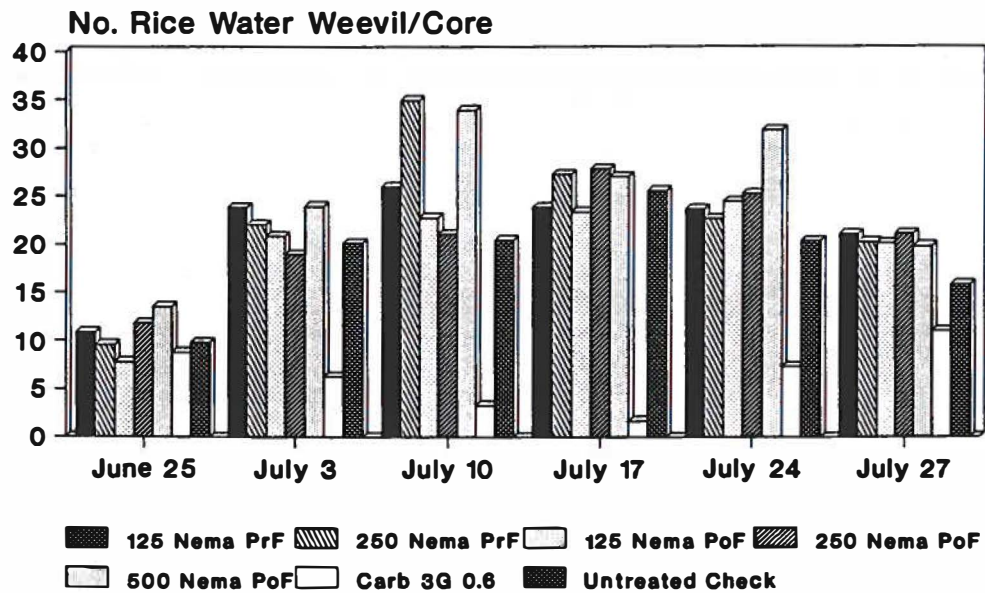
Treatments: 1) No treatment (control); 2) Carbofuran 0.6 lb ai/A; 3) Steinernema #25, 125 nemas/sq. in., applied before permanent flood; 4) Steinernema #25, 250 nemas/sq. in., applied before permanent flood; 5) Steinernema #25, 125 nemas/sq. in., applied 14 days following permanent flood; 6) Steinernema #25, 250 nemas/sq. in., applied 14 days following permanent flood; 7) Steinernema #27, 500 nemas/sq. in., applied 14 days following permanent flood to 2 cm of standing water.

Experimental Design: Randomized block design with four replicates.

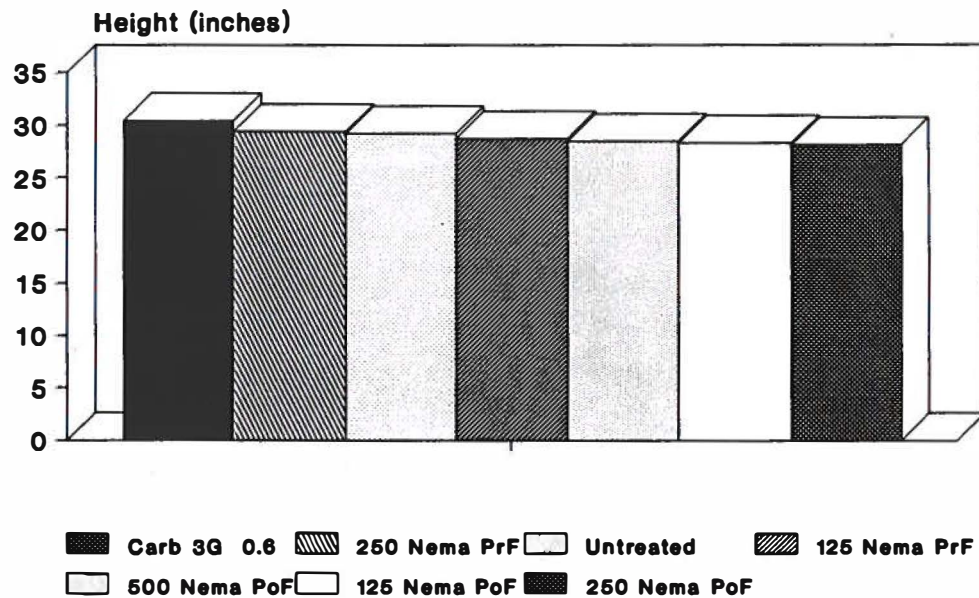
Harvested: 18 September.

Comments: Parasitic nematodes and carbofuran were compared as rice water weevil (RWW) control tactics. Carbofuran was effective in controlling RWW after treatment with insecticide (Fig. 1). There was no apparent control observed with any of the nematode treatments. Plant heights (Fig. 2) and yields (Fig. 3) were not significantly different among treatments as compared with the control.

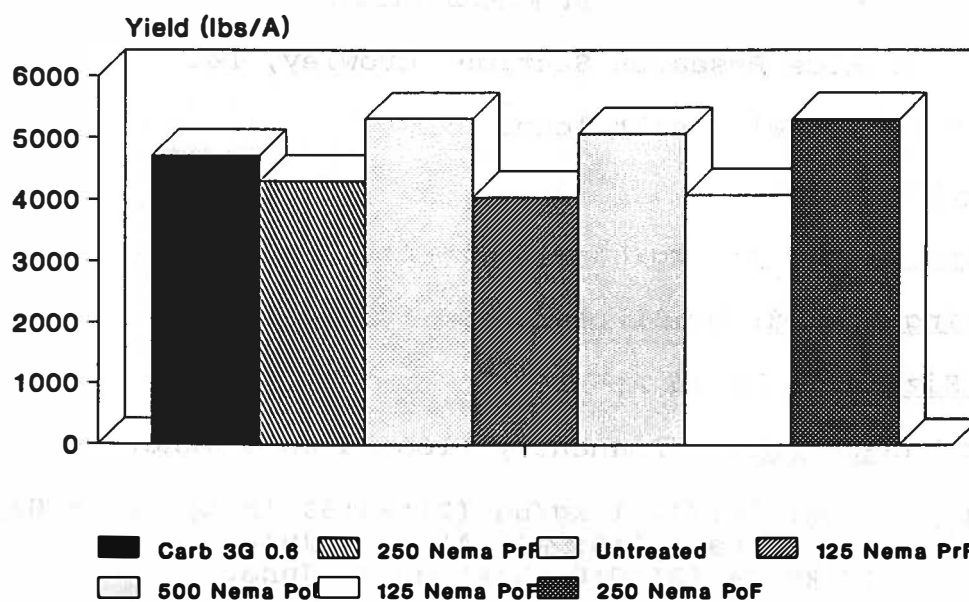
**FIG. 1. Rice water weevil control in nematode and carbofuran plots, 1990.**



**FIG. 2. Plant height in nematode and carbofuran plots, 1990.**



**FIG. 3. Yield in nematode and carbofuran plots, 1990.**



## STICKY TRAP MONITORING STUDIES

R.A. Thompson, S.S. Quisenberry, G.B. Trahan  
and P.A. Bollich

Location: Rice Research Station, Crowley, La.

Soil Type: Crowley silt loam.

Variety: 'Della'.

Seeding Rate: 112 kg/ha (100 lb/A).

Planting Method: Drill seeded on 18 May 1990.

Plot Size: 2.4 ha (5 A).

Water Management: Permanently flooded on 5 June.

Fertilization: 24:71:71 kg/ha (21:63:63 lb/A) on 18 May  
103:0:0 kg/ha (92:0:0 lb/A) on 4 June  
38:0:0 kg/ha (34:0:0 lb/A) on 26 June.

Herbicide: Stam F (4F) @ 9.3 liters/ha (1 gal/A).

Insecticide: None.

Harvested: 18 September.

Design: Wooden-stakes (2.5 m long; 8 ft) were placed 15.3 m (50') apart along the north-south and east-west axes bisecting the field. Eleven stakes were placed along the north-south axis and 10 stakes placed along the east-west axis. Four 23-cm diam (9 inch) plastic plates that were coated with 'tangle trap' were placed on each stake at a height of 1.5 - 2 m (4.9 - 5.5 ft) above the ground. Each plate faced one of the four cardinal directions on the compass.

Comments: Sticky traps were monitored twice weekly, from 5 June to 16 August. Adult rice water weevils caught in the traps were counted, removed and stored in a freezer for dissection later. The seasonal distribution of adults and larvae followed an identical trend (Fig. 1). Adult population peaked on 21 June, while larval population peaked 1 wk later. Leaf-scar counts taken on 11 June and 18 June showed no correlation with adult populations recorded on those days and the larval populations sampled on 16 June, 29 June and 5 July. Significantly higher numbers of adults were caught on the northern and western facing traps compared to those facing the southern and eastern directions. Three traps located within 45 m (150 ft) of the northern edge of the field, contiguous to another rice field, caught the highest number of adult weevils.

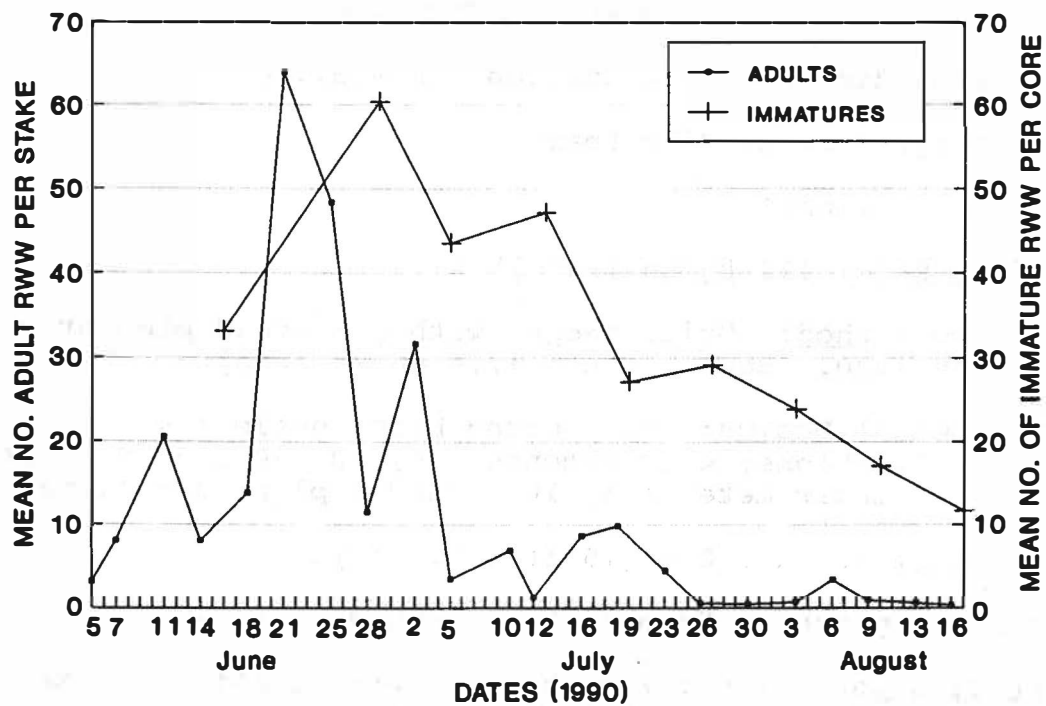


Fig. 1. Rice water weevil adults caught in sticky traps and immatures recovered in core samples between June and August 1990, Rice Research station, Crowley.



## EFFECT OF PLANT DENSITY ON RICE WATER WEEVIL POPULATIONS

R.A. Thompson, S.S. Quisenberry, G.B. Trahan  
and P.A. Bollich

Location: Rice Research Station, Crowley, La.

Soil Type: Crowley Silt Loam.

Variety: 'Lemont'.

Seeding Rate: 112 kg/ha (100 lb/A).

Planting Method: Drill-seeded with a Kincaid planter on 22 May 1990. Row Spacing: 17.6 cm (7 inch).

Experimental Design: Randomized block design; 4 replications; 4 treatments: 40, 30, 20 and 10 plants per linear meter (13, 10, 6 and 3 plant per linear ft).

Plot size: 4.6 x 1.2 m (15 ft x 3.6 ft).

Water Management: Permanently flooded on 15 June.

Fertilization: 67:67:67 kg/ha (60:60:60 lb/A) on 22 May  
100 kg/ha (90 lb/A) N on 14 June.

Herbicide: Propanil applied @ 4.5 kg AI/ha (4 lb AI/A) on 6 June and 14 June.

Insecticide: None.

Harvested: 19 September.

Comments: At 3 weeks after planting, plots were thinned to their respective plant densities and permanently flooded. Plots were sampled weekly for rice water weevil larval populations, from 14 to 63 days after flooding. During the period of sampling, larval populations were significantly different only on the first two sampling dates (Fig. 1). Rice plants in the thinner stands showed compensatory growth because heights and yields were not significantly different among treatments (Fig. 2).



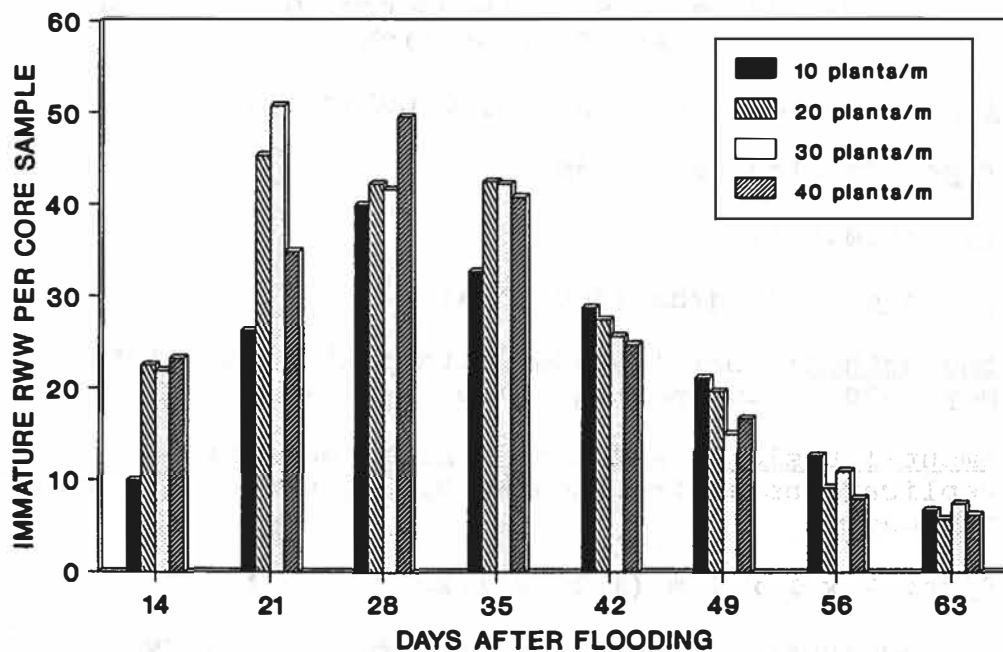


Fig. 1. Effect of plant density on rice water weevil populations .

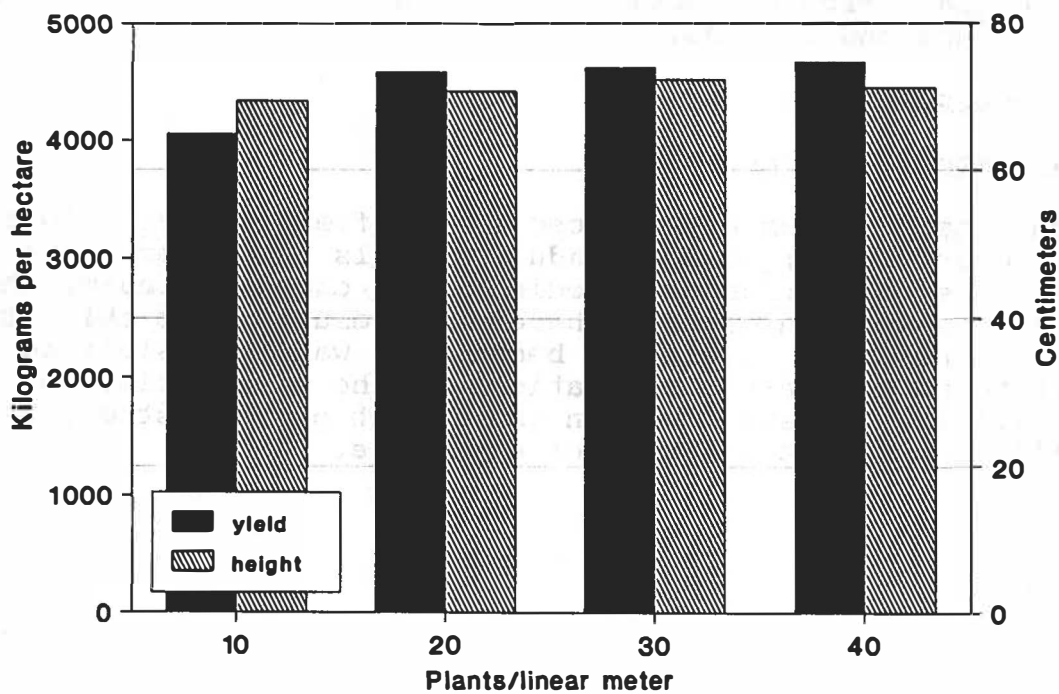


Fig. 2. Yield and height at harvest.

DETERMINATION OF DAMAGING RICE WATER WEEVIL POPULATIONS  
USING CAGES

R.A. Thompson, S.S. Quisenberry, G.B. Trahan  
and P.A. Bollich

Location: Rice Research Station, Crowley, La.

Soil Type: Crowley Silt Loam.

Variety: 'Lemont'.

Seeding Rate: 112 kg/ha (100 lb/A).

Planting Method: Drill-seeded with a Kincaid planter on 22  
May 1990. Row spacing: 17.6 cm (7 inch).

Experimental Design: Randomized block design; 5  
replications; 4 treatments: 0, 30, 60 and 120 weevils  
per cage.

Cage Size: 1 x 1 x 1 m (1.25 x 1.25 x 1.25 ft)

Water Management: Permanently flooded on 15 June.

Fertilization: 67:67:67 kg/ha (60:60:60 lb/A) on 22 May  
100 kg/ha (90 lb/A) N on 14 June  
39 kg/ha (30 lb/A) N on 13 July.

Herbicide: Propanil applied @ 4.5 kg AI/ha (4 lb AI/A) on 6  
June and 14 June.

Insecticide: None.

Harvested: 18 September.

Comments: Cages were placed in the field 4 days before  
permanent flood; however, adult weevils had entered the  
field before permanent flooding. All cages including the  
controls were infested. Therefore, results from this study  
were considered unreliable because it was impossible to  
determine the weevil populations in the cages prior to  
artificial infestation. In the repeat of this study, plants  
will be caged at the time of emergence.

SCREENING OF ANTHER-CULTURE LINES FOR RESISTANCE TO  
RICE WATER WEEVIL DAMAGE

R.A. Thompson, S.S. Quisenberry, G.B. Trahan  
and P.A. Bollich

Location: Rice Research Station, Crowley, La.

Soil Type: Crowley Silt Loam.

Variety: Anther-culture lines, 'Mars', CA86, CI11048,  
WC1403 and WC1711.

Seeding Rate: 1.5 g/row (0.05 oz/row).

Planting Method: Drill-seeded with Hege planter on 15 May  
1990. Row spacing: 25 cm (10 inch).

Experimental Design: Randomized block design; 6  
replications; 57 treatments, i.e. 52 anther-culture  
lines and five standard susceptible ('Mars') and  
tolerant (CA86, CI11086, WC1403, WC1711)  
cultivars/lines.

Plot size: 1.2 m (4 ft) rows.

Water management: Permanently flooded on 4 June.

Fertilization: 134:67:67 kg/ha (120:60:60 lb/A) on 4 June  
Zinc chelate @ 7 liters /ha (6 pints/A) on 29 June.

Herbicide: Propanil applied @ 4.5 kg AI/ha (4 lb AI/A) on 1  
June and Bolero @ 4.5 kg AI/ha (4 lb AI/ac) 11 June.

Insecticide: None.

Harvested: Rows were hand harvested on different dates,  
according to plant maturity.

Comments: Fifty-two anther-culture lines were screened for  
their resistance to rice water weevil. The anther-culture  
lines were developed from a parental cross which involved  
the tolerant resistant line CI11048. In addition to  
CI11048, three other resistant lines and 'Mars' as a  
susceptible standard were included in the trial. Core  
samples (1 per row) for rice water weevil larval population  
were taken at 3 weeks after permanent flood. Larval  
population was high (> 30 larvae per core), with no  
significant difference in infestation levels among the lines  
and 'Mars'. Since tolerance resistance is the only likely  
resistance present, the first maturing lines were selected  
for further screening in 1991. The 1991 tests will include  
eight anther-culture lines, 'Mars' and two tolerant lines,  
including CI11048.

SCREENING ANTHR CULTURE LINES FOR RESISTANCE TO  
THE RICE WATER WEEVIL

K. F. N'Guessan, S. S. Quisenberry, G. B. Trahan  
and P. A. Bollich

Location: Rice Research Station, Crowley, LA.

Soil type: Crowley silt loam.

Seeding rate: 0.05 oz/row.

Planting method and date: Drill seeded on May 21. Row  
spacing-10 inch.

Plot size: 4 ft single row.

Water management: Flushed on May 23, June 1, 7, and permanent  
flood on June 15.

Fertilization: 120-60-60 lb/A N-P-K applied on June 14 with  
a motorized Gandy Spreader. 40 lb/A  $\text{NH}_3\text{SO}_4$  applied by hand  
on July 13. 6 pints/A Zinc applied on June 29 by  
airplane.

Herbicide: Thiobencarb 4 lb/A, applied on June 6 and 14 with  
a  $\text{CO}_2$  backpack sprayer delivering 15 GPA at 26 psi.

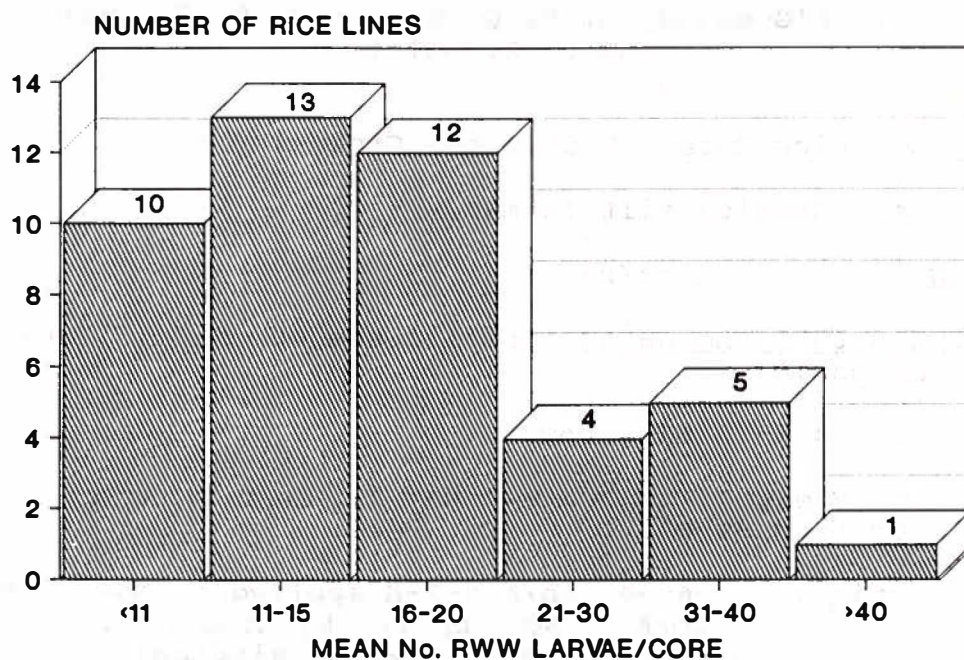
Treatments: 43 anther culture lines and two Susceptible  
cultivars ('Lemont' and 'Mars').

Experimental design: Randomized block design with four  
replicates.

Harvested: Plot were individually harvested by hand late  
September trough early October according to plant  
maturity.

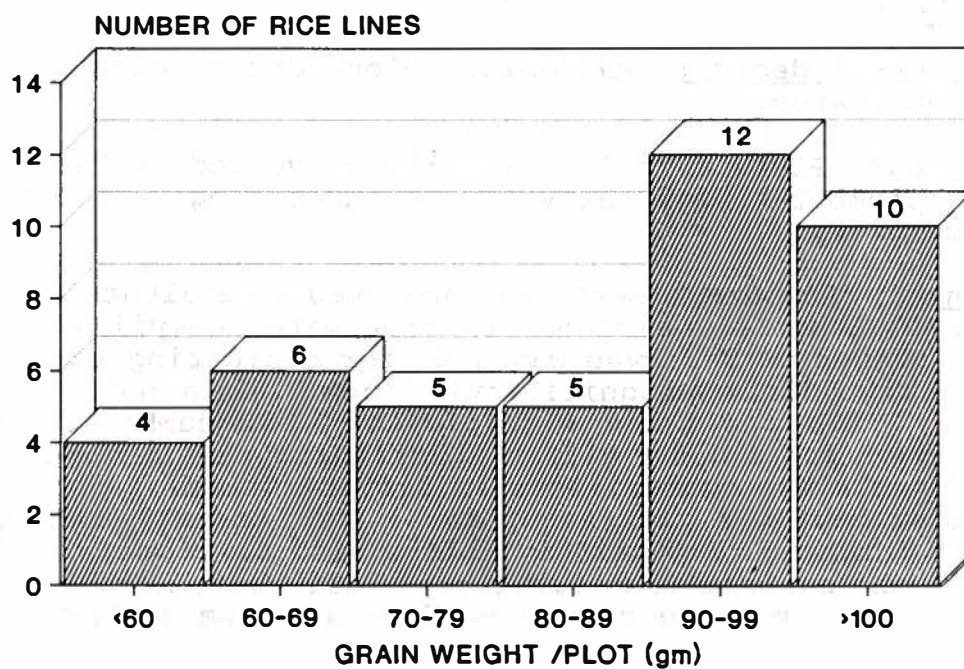
Comment: Field research was conducted to evaluate 43 anther  
culture lines for resistance to the rice water weevil (RWW).  
The total number of RWW larvae was determined for each plot  
and used for evaluating resistance. Significant differences  
( $P < 0.05$ ) in number of RWW larvae were found among the lines  
tested. The susceptible cultivar, 'Mars', averaged 33.5  
larvae per core. Several lines had lower number of RWW larvae  
than 'Mars' (Fig. 1). However, 'Lemont', the other susceptible  
cultivar, averaging 8.3 larvae per core, was among the least  
infested in this experiment. Lines with relatively low number  
of larvae compared to the susceptible cultivars will be  
included in a more advanced test next year to determine their  
potential for nonpreference. Fig. 2 presents yield potential  
of the different lines tested. Lines with high yielding  
potential will be tested next year for tolerance to the RWW.

Fig. 1 Number of rice lines in number categories of RWW larvae, Crowley, 1990.



CHECKS: 'MARS' = 33.5 LARVAE, 'LEMONT' = 8.3 LARVAE

Fig. 2 Numbers of rice lines in grain yield categories, Crowley, 1990.



CHECKS: 'MARS' = 178.8 gm, 'LEMONT' = 76.3 gm



SCREENING TISSUE CULTURE LINES FOR RESISTANCE TO  
THE RICE WATER WEEVIL

K. F. N'Guessan, S. S. Quisenberry, G. B. Trahan  
and P. A. Bollich

Location: Rice Research Station, Crowley, LA.

Soil type: Crowley silt loam.

Seeding rate: 0.05 oz/row.

Planting method and date: Drill seeded on May 17. Row  
spacing-10 inch.

Plot size: 4 ft single row.

Water management: Flushed on May 23, June 1, 7, and permanent  
flood on June 12.

Fertilization: 60-60-60 lb/A N-P-K applied on May 11 before  
planting. 40 lb/A  $\text{NH}_4\text{SO}_4$  applied by hand on July 13. 6  
pints/A Zinc applied on June 29 by airplane.

Herbicide: Thiobencarb 4 lb/A, applied on June 6 and 11 with  
a  $\text{CO}_2$  backpack sprayer delivering 15 GPA at 26 psi.

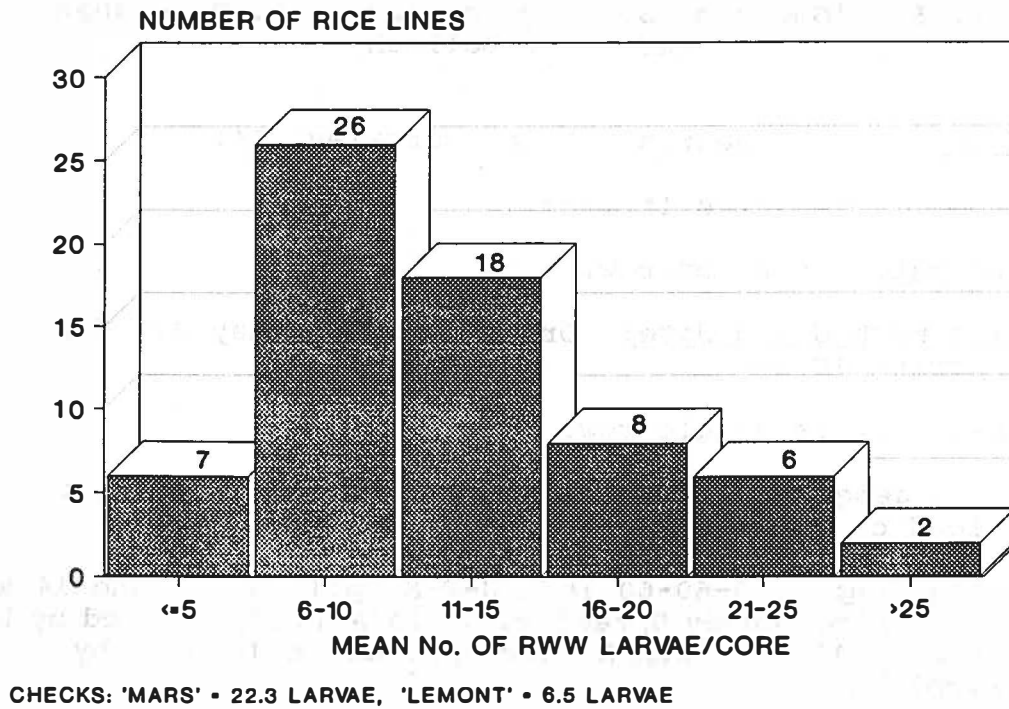
Treatments: 66 tissue culture lines and five Susceptible  
cultivars ('Lemont', 'Mars', 'Brazos', 'Lebonnet', and  
'Tebonnet').

Experimental design: Randomized block design with four  
replicates.

Harvested: Plots were individually harvested by hand late  
September through early October according to plant  
maturity.

Comment: Field experiment was conducted to evaluate 66 tissue  
culture lines for resistance to rice water weevil (RWW). The  
mean number of RWW larvae was used for evaluating resistance.  
The lines differed significantly ( $p < 0.01$ ) in number of RWW  
larvae. Ten lines had significantly lower number of larvae  
than Mars but did not differ significantly from 'Lemont'. Fig.  
1 presents the number lines in different larval populations.  
Both susceptible cultivars 'Mars' and 'Lemont' averaged 22.3  
and 6.5 larvae respectively. Lines with lower number of larvae  
than both susceptible cultivars will be included in an  
advanced test next year for possible moderate or low level of  
resistance.

Fig. 1 Numbers of rice lines in number categories of RWW larvae, Crowley, 1990.



SCREENING RICE LINES FOR RESISTANCE TO  
THE RICE WATER WEEVIL

K. F. N'Guessan, S. S. Quisenberry, G. B. Trahan  
and P. A. Bollich

Location: Rice Research Station, Crowley, LA.

Soil type: Crowley silt loam.

Seeding rate: 0.05 oz/row.

Planting method and date: Drill seeded on May 21. Row  
spacing-10 inch.

Plot size: 4 ft single row.

Water management: Flushed on May 23, June 1, 7, and permanent  
flood on June 15.

Fertilization: 120-60-60 lb/A N-P-K applied on June 14 with  
a motorized Gandy Spreader. 40 lb/A  $\text{NH}_4\text{SO}_4$  applied by hand  
on July 13. 6 pints/A Zinc applied on June 29 by  
airplane.

Herbicide: Thiobencarb 4 lb/A, applied on June 6 and 14 with  
a  $\text{CO}_2$  backpack sprayer delivering 15 GPA at 26 psi.

Treatments: 48 rice lines of various origin including Rice  
World Collection, South American and Uniform Regional  
Nursery lines, and two Susceptible cultivars ('Lemont'  
and 'Mars').

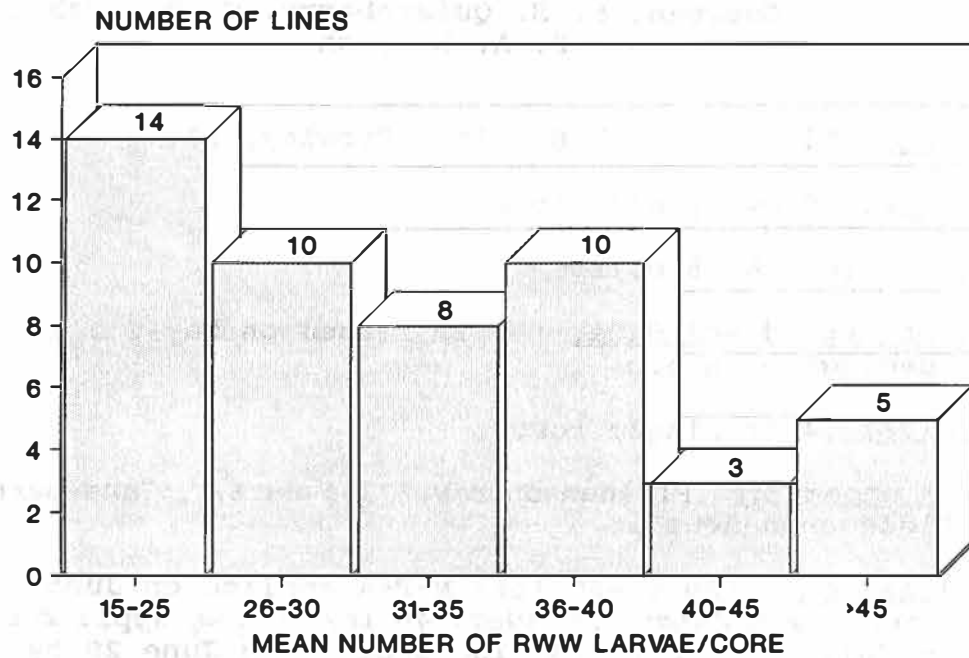
Experimental design: Randomized block design with six  
replicates.

Harvested: Plots were individually harvested by hand late  
September through early October according to plant  
maturity.

Comment: Rice lines from various origin were evaluated in the  
field for resistance to the rice water weevil (RWW). The  
number of RWW larvae was used to determine resistance. The  
various lines tested differed significantly ( $P < 0.05$ ) in number  
of RWW larvae. Several lines had lower number of larvae than  
both susceptible cultivars, 'Mars' and 'Lemont' (Fig. 1) but  
did not differ significantly from them. Among those, five  
lines with the lowest number of RWW larvae will be retained  
for advanced test next year for possible low or moderate  
resistance. Fig. 2 presents yield potential of the different  
lines tested. Lines with high yielding potentiality will be  
tested next year for tolerance to the RWW.

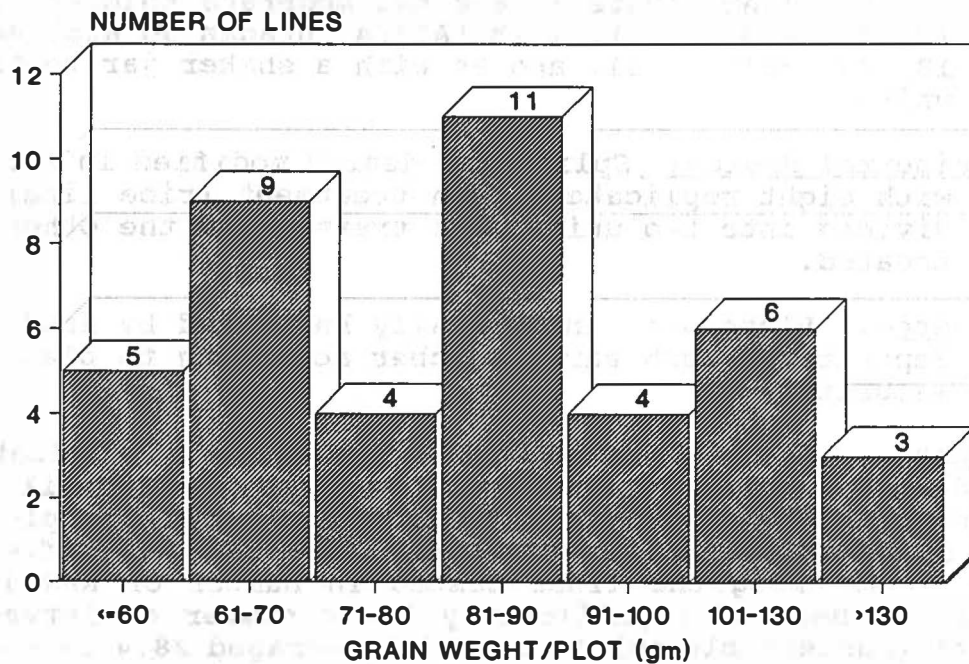


Fig. 1 Numbers of rice lines in number categories of RWW larvae, Crowley, 1990.



CHECKS: 'MARS' • 40.5 LARVAE, 'LEMONT' • 39.3 LARVAE

Fig. 2 Numbers of rice lines in grain yield categories, Crowley, 1990.



CHECKS: 'MARS' • 87 gm, 'LEMONT' • 77.2 gm

SCREENING RICE BREEDING LINES FOR TOLERANCE  
TO THE RICE WATER WEEVIL

K. F. N'Guessan, S. S. Quisenberry, G. B. Trahan  
and P. A. Bollich

Location: Rice Research Station, Crowley, LA.

Soil type: Crowley silt loam.

Seeding rate: 0.05 oz/row.

Planting method and date: Drill seeded on May 21. Row spacing-10 inch.

Plot size: 4 ft single row.

Water management: Flushed on May 23, June 1, 7, and permanent flood on June 15.

Fertilization: 120-60-60 lb/A N-P-K applied on June 14 with a motorized Gandy Spreader. 40 lb/A  $\text{NH}_4\text{SO}_4$  applied by hand on July 13. 6 pints/A Zinc applied on June 29 by airplane.

Herbicide: Thiobencarb 4 lb/A, applied on June 6 and 14 with a  $\text{CO}_2$  backpack sprayer delivering 15 GPA at 26 psi.

Treatments: 40 breeding lines and two susceptible cultivars ('Lemont' and 'Mars'), and two moderate tolerant lines (WC1403 and CA-86). 1 lb [AI]/A furadan 3G applied June 18, 25, July 2, 11, and 24 with a shaker jar to treated units.

Experimental design: Split-plot design modified in stripping with eight replicates. Each treatment (rice line) is divided into two units, one treated and the other not treated.

Harvested: Plots were individually harvested by hand late September through early October according to plant maturity.

Comment: A field experiment was conducted to evaluate 40 breeding lines for tolerance to the rice water weevil (RWW). Number of RWW larvae, plant height, and yield per plot were used to determine resistance. Significant ( $P < 0.01$ ) differences were found among the lines tested in number of RWW larvae. Several lines had significantly lower number of larvae than 'Mars' (susceptible cultivar) which averaged 28.4 larvae/core (Fig 1). Among those, 2 lines with designation numbers 36 and 43 had also significantly lower number of larvae than 'Lemont' (21.1 larvae/core), another susceptible cultivar. Strong

relationships were found between the different RWW larval categories (small, medium, large) (Table 1). This suggests that antibiosis is questionable among the lines tested. Plant height data indicated that several lines showed significant growth reduction when not treated with insecticide. Most lines averaged greater percent height reduction than both susceptible cultivars ('Mars', 4 % and 'Lemont', 6.9 %) (Fig 2). However, several lines averaged lower percent yield loss than 'Mars' (Fig 3). Lines that showed significant height and yield reduction when not treated with insecticide can be characterized as susceptible because they can only give optimum yield when insecticide is applied. A few lines gave negative percent yield loss. This may be attributed to possible phytotoxicity of the insecticide. Correlations between number of RWW larvae and height or yield decrease were not significant (Table 2). However, yield decrease was significantly correlated to height reduction. The lack of correlation between number RWW larvae associated with a rice lines does not necessarily account for its yield decrease. This suggests that some of the lines evaluated have potential for maintaining good yield despite the RWW population. Lines with good yield potential will be included in an advanced tolerance test next year and those with low number of RWW larvae will be tested for nonpreference.

Fig. 1 Numbers of rice lines in number categories of RWW larvae, Crowley, 1990.

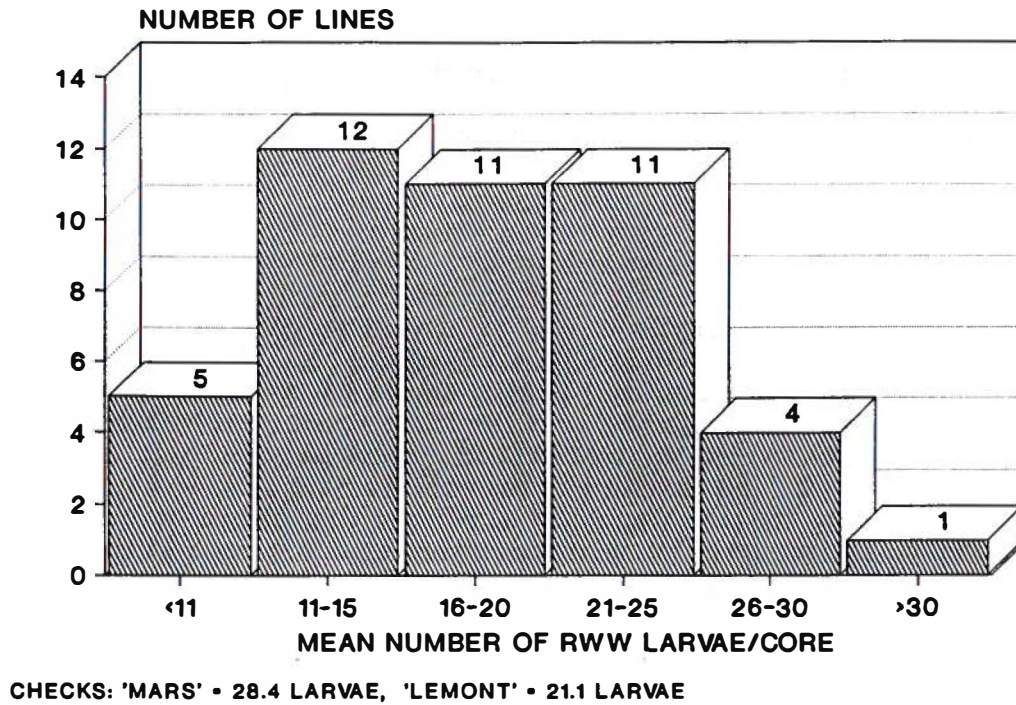


Fig 2. Numbers of rice lines in height reduction categories, Crowley, 1990.

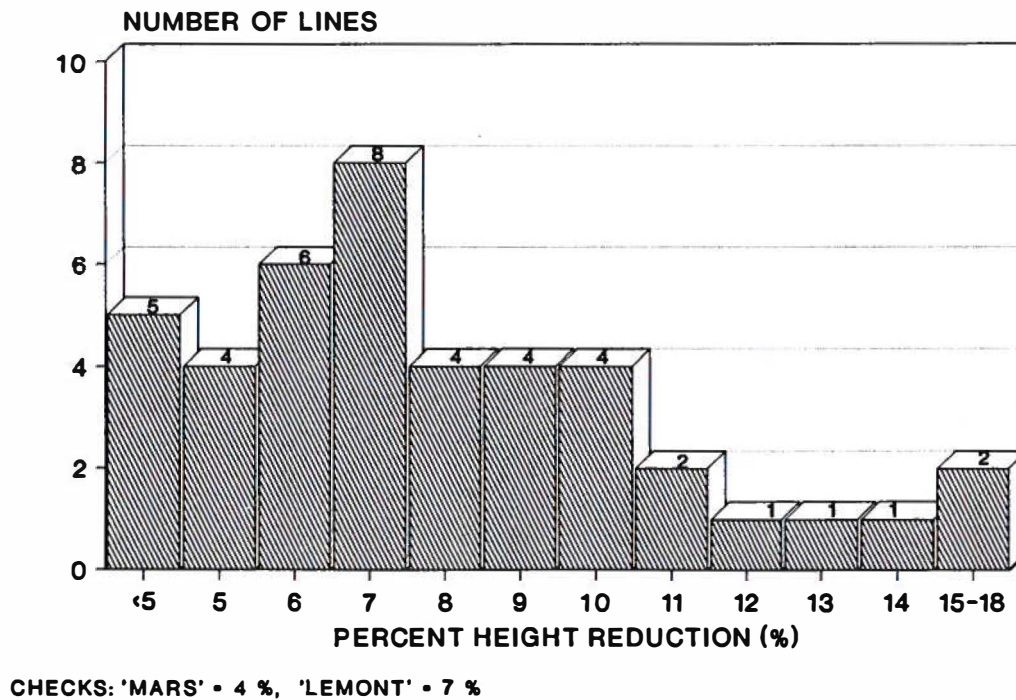
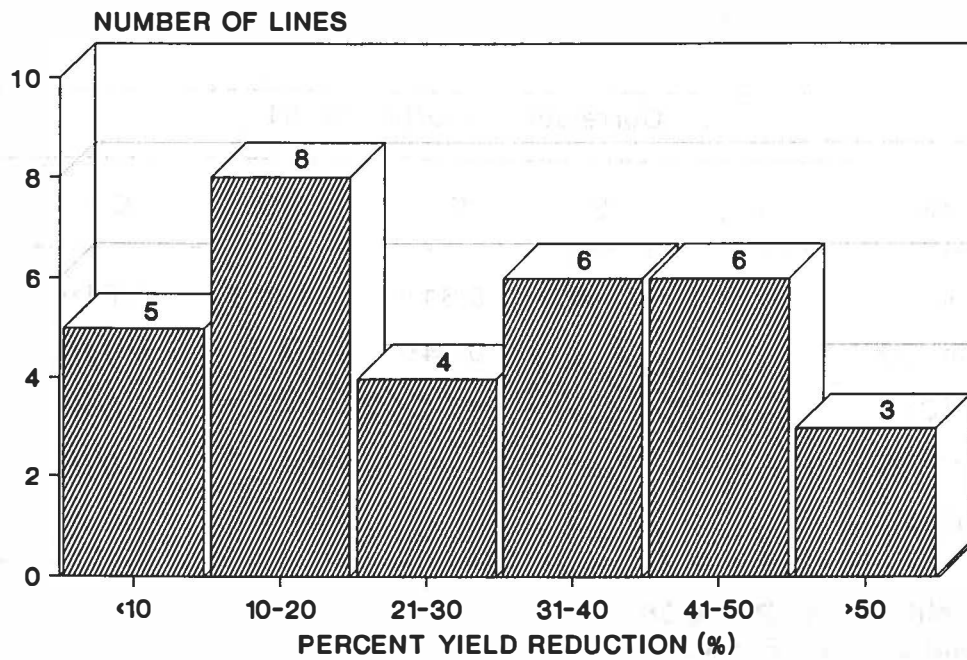


Figure 3. Numbers of rice lines in yield loss categories, Crowley, 1990.



CHECKS: 'MARS' - 47 %, 'LEMONT' - 14.4 %

**Table 1. Correlations between RWW larval categories in rice lines, Crowley, 1990.**

| Correlation coefficient (r) |   |        |        |       |        |
|-----------------------------|---|--------|--------|-------|--------|
| Categories                  | A | B      | C      | D     | E      |
| Small (A)                   | x | 0.62** | 0.31** | 0.13* | 0.74** |
| Medium (B)                  |   | x      | 0.54** | 0.07  | 0.84** |
| Large (C)                   |   |        | x      | 0.13* | 0.83** |
| Pupa (D)                    |   |        |        | x     | 0.20** |
| Total (E)                   |   |        |        |       | x      |

\* Significant at  $P < 0.05$

\*\* Significant at  $P < 0.01$

**Table 2. Correlations among parameters used to evaluate rice tolerance to RWW, crowley, 1990.**

| Correlation coefficient (r) |   |      |        |
|-----------------------------|---|------|--------|
| Parameters                  | A | B    | C      |
| No. RWW larvae (A)          | x | 0.06 | 0.05   |
| % Height reduction (B)      |   | x    | 0.19** |
| % Yield reduction (C)       |   |      | x      |

\*\* Significant at  $P < 0.01$



# USE OF VELVETBEAN CATERPILLAR PHEROMONE TRAPS IN SOYBEAN PEST MANAGEMENT AND MIGRATION RESEARCH

S.J. Johnson, A.M. Hammond, B.M. Gregory,  
R.T. Bessin, G.B. Trahan, and P.A. Bollich

## INTRODUCTION

The velvetbean caterpillar, *Anticarsia gemmatilis* Hubner, is an important defoliating pest of soybean in the southeastern United States. For example, estimated annual losses and costs of control due to velvetbean caterpillar alone totaled approximately \$30 million in Louisiana in 1982 (Louisiana Cooperative Extension Service). The Soybean Insect Control Guide (Louisiana Cooperative Extension Service) lists the velvetbean caterpillar as one of the three key soybean pests in Louisiana along with soybean looper and stink bugs. Pest management programs for velvetbean caterpillar require prediction of population trends during the soybean growing season. Two larval sampling methods, either shake cloth or sweep net, are presently the only techniques recommended to estimate population levels and the need for insecticide use. Larval sampling is laborious and time consuming. A reliable early warning system of the potential for larval populations to exceed the economic threshold would greatly benefit producers by reducing monitoring costs and providing advance notice to plan control operations.

The velvetbean caterpillar is predominately a tropical species that feeds on various cultivated and wild legumes. It cannot withstand cold temperatures and, consequently, does not survive the winter any farther north than southern Florida and southern Texas. It possesses strong dispersal capabilities since it can be found in eastern Canada and Wisconsin by late summer. It is present also in tropical areas of Central and South America and the Caribbean where it may occur on a year round basis if host plants are available. Since velvetbean caterpillar life stages cannot survive the winter in Louisiana our populations are established each summer through migratory flights by moths from more southerly latitudes. Possible sources include populations on non-crop hosts in southern Florida, southern Texas, Mexico, and some of the Caribbean Islands.

Investigation of the migration of velvetbean caterpillar into Louisiana requires some type of monitoring system to determine its spatial and temporal distribution pattern. Pheromone traps offer the possibility of a relatively inexpensive monitoring device with minimal labor requirements.

The objectives of this research project were twofold. The first objective was to determine the efficiency of pheromone traps as a method of predicting the abundance of larval populations for pest management decisions. The second objective was to determine if pheromone traps can be used to detect initial immigration into an area and accurately estimate actual adult density throughout the season.

## MATERIALS AND METHODS

This study was conducted on the main farm of the Rice Research Station in 1989 and 1990 in Centennial soybean grown as part of a rotation study under the direction of Dr. P. K. Bollich and Mr. Robert J. Habetz. Field size was 2 ha in 1989 and 1 1/2 ha in 1990. Fields were planted with a 7-inch grain drill. Planting dates were May 26, 1989 and May 28, 1990, respectively. Fields did not receive any insecticide treatment except for spot treatment with Sevin 0.8 lb a.i./A for Blister beetles on the south end of the field in 1990.

Sex attractant lures and traps. The pheromone traps were 2-L capacity bucket style Universal Moth Trap (International Pheromone Systems Limited London, England) mounted on a steel rod with a string so that height above ground could be adjusted to 30 cm above soybean plants (47-150 cm above ground). Five traps were placed 30 m apart in a line at the edge of the field running N-S in 1989 and E-W in 1990. The traps were operated on a daily basis M-F from planting to harvest. The specimens from each trap were emptied into a plastic bag, identified by trap number and date, and kept in a freezer until the end of the study period, when the moth catch was determined in the laboratory. The numbers of captures in the five traps were averaged for use in analysis.

The lure used in these studies was a mixture of 0.2 mg of (z,z,z) 3,6,9 - Eicosatriene and 0.3 mg of (z,z,z) 3,6,9 - Heneicosatriene impregnated in a rubber septa. The lure was synthesized by Raylo Chemicals LTD, Edmonton, Alberta, Canada.

Absolute adult density. Absolute adult velvetbean caterpillar density was determined by an adult trap-cage. It was designed and tested by B. M. Gregory, Jr. during his Ph.D. research at the University of Florida to sample velvetbean caterpillar moths in soybean fields during the day since moths reside in host fields during the day after plant canopy closure. Outside dimensions of the cage were 4.6 x 4.6 x 2.1 m, and the frame was 3.18 cm polyvinylchloride pipe (PVC P.R. 160). The frame was covered with Lumite Saran Screen (Chicopee, Style #51821000) that extended 0.3 m below the cage on all sides (i.e. extension flaps). Four people carried the cage (one at each corner) via 0.9 m handles and walked one row distant from the sampled rows. The cage was carried above the crop canopy to avoid flushing the moths. At each sample site, bearers dropped the cage rapidly and quickly cleared depressed plants from beneath the base of the frame so that the extension flap would form a level seal with the ground and prevent moth escape. The cage was entered via a full-length zipper on one side. We took 16 and 15 random samples on a weekly basis in 1989 and 1990, respectively. Sample sites were marked a week in advance so that the plants were not disturbed immediately prior to sampling. Adult sampling was initiated on August 10 and August 2 in 1989 and 1990, respectively. Moth density at the sample site was determined by shaking the plants by hand to flush the moths onto the sides of the cage. The soil surface was also searched as sometimes the moths flew to the ground. A minimum of 10 minutes was spent searching and counting moths at each sample station when density was low and up to 30 minutes at peak density. Moths inside the cage were captured by hand or net and released outside the cage as counted. In 1988, moths were marked with a magic marker on the wing before release to get some idea about recapture probability in another sample on the same day. Only one moth was recaptured throughout the entire summer.



Larval density. Larval velvetbean caterpillar populations were sampled on a weekly basis in the same research field on the same day adults were sampled with the trap-cage. A 38-cm sweep net was used to take 10 and 8 sets of 100 sweeps, respectively in 1989 and 1990. All stage larvae were lumped together. Larval sampling was initiated on August 9 and July 24 in 1989 and 1990, respectively.

Statistical analysis. Pearson correlation analysis was used initially to test for relationships between larval density and pheromone trap catch, and larval density and actual adult density. The same analysis was also used to look at relationships between adult density and pheromone trap catch. To examine for effects of lag time in the relationships due to development time in the normal life cycle, we used a classification system such that for example, a given larval sample could be compared to pheromone trap catch values for the previous week, same day and the next week. The data for each of the three variables were classified in this way. When significant correlations were found, we subjected the data to linear regression analysis.

## RESULTS & DISCUSSION

In 1989, the best correlation between larval density and pheromone trap catch was larval density running 1 week ahead of pheromone trap catch ( $r = 0.78$ ;  $df = 11$ ;  $p < 0.05$ ) (Fig. 1). The regression analysis of this relationship was also significant ( $Y = 52.83 + 3.33 X$ ;  $F = 7.66$ ;  $df = 1$ ;  $p < 0.05$ ;  $R^2 = 0.61$ ). Larval density peaked at 321/100 sweeps on September 7 close to the economic threshold of 300 medium to large larvae/100 sweeps. The larval peak occurred well before any appreciable pheromone trap catch. In 1990, the best correlation between larval density and pheromone trap catch was with larval density running 2 weeks ahead of pheromone trap catch ( $r = 0.78$ ;  $df = 8$ ;  $p < 0.01$ ) (Fig. 2). The regression analysis of this relationship was also significant ( $Y = 28.64 + 0.24 X$ ;  $F = 24.20$ ;  $df = 1$ ;  $p < 0.01$ ;  $R^2 = 0.80$ ). Larval density peaked at 447/100 sweeps on September 19, well above the economic threshold, and the field was defoliated before the end of September. The larval peak occurred 2 weeks before the pheromone trap catch peak. In both years, the pheromone trap had no utility as a predictor of larval populations, especially as to when the larval population would reach the economic threshold. The larval population was predicting the adult male pheromone trap catch rather than the pheromone trap catch predicting the larval population peak.

The relationship between larval density and actual adult (male and female) density in the field was similar to that between larval density and male pheromone trap catch. In 1989, the best correlation between larval density and adult density was larval density running two weeks ahead of adult density ( $r = 0.95$ ;  $df = 7$ ;  $p < 0.01$ ) (Fig. 3). The regression analysis of this relationship was also significant ( $Y = 7.26 + 8.66 X$ ;  $F = 43.75$ ;  $df = 1$ ;  $p < 0.01$ ). Male and female adult densities were closely correlated and as expected larval density was also strongly correlated with actual male density ( $r = 0.93$ ,  $df = 7$ ;  $p < 0.01$ ) and actual female density ( $r = 0.95$ ;  $df = 7$ ;  $p < 0.01$ ). In 1990, the best correlation between larval density and adult density was larval density running 1 week ahead of actual adult density ( $r = 0.85$ ;  $df = 9$ ;  $p < 0.01$ ) (Fig. 4). The regression analysis of this relationship was also significant ( $Y = 17.92 + 8.29 X$ ;  $F = 14.20$ ;  $df = 1$ ;  $p < 0.01$ ). Likewise, as in 1989, the male and female

densities were closely correlated with each other, and as expected, larval density was also strongly correlated with actual male density ( $r = 0.84$ ;  $df = 9$ ;  $p < 0.01$ ) and actual female density ( $r = 0.85$ ;  $df = 9$ ;  $p < 0.01$ ).

Analysis of the relationship between male pheromone trap catch and actual adult density yielded some unusual and surprising results. In 1989, none of the correlations were significant, and examination of the data in Fig. 5 easily explains why. When the adult density peaked in the field, the pheromone trap catch crashed and the adult peak extended over more than 2 weeks. The pheromone trap catch had a bimodal peak; one peak just before the actual adult peak and the other as the actual adult density was crashing. In 1990, the strongest correlation between adult density and pheromone trap catch was the pheromone trap catch lagging 1 week after the actual adult density ( $r = 0.998$ ;  $df = 9$ ;  $p < 0.01$ ) (Fig. 6). The regression analysis of this relationship was also significant ( $Y = -31.34 + 38.23 X$ ;  $F = 1590.2$ ;  $df = 1$ ;  $p < 0.01$ ). When the relationship was analyzed by sex, the regression of trap catch on female density was significant ( $Y = -37.00 + 62.20 X$ ;  $F = 881.45$ ;  $df = 1$ ;  $p < 0.01$ ), as well as the regression of trap catch on male density ( $Y = -21.31 + 98.93 X$ ;  $F = 3393.6$ ;  $df = 1$ ;  $p < 0.01$ ). In 1990, the trap catch was very low in the first week of the adult peak but it came up in the second week indicating something was going on with adult male perception and attraction to the pheromone traps at peak adult density but it wasn't as pronounced as in 1989. We do not know why the pheromone traps did not work well at peak adult density but we plan experiments in 1991 to try and find out.

Our second objective was to determine if pheromone traps can be used in migration studies where you need to pick up the first immigrants into an area. Our 1989 and 1990 studies clearly show that the pheromone trap did not pick up the first velvetbean caterpillar immigrants (Fig. 1 & 2). In both years we had larvae in the field before or near to the time we captured the first adult male. If larvae were detected first, obviously the pheromone trap was not picking up early immigrants. We also picked up adults in the cage before we picked up a male in the pheromone trap (Fig. 5 & 6). Explanations for the apparent trap failure include the possibility that females migrate into a new area first or the immigrant male density is too low to be accurately sampled by pheromone trap.

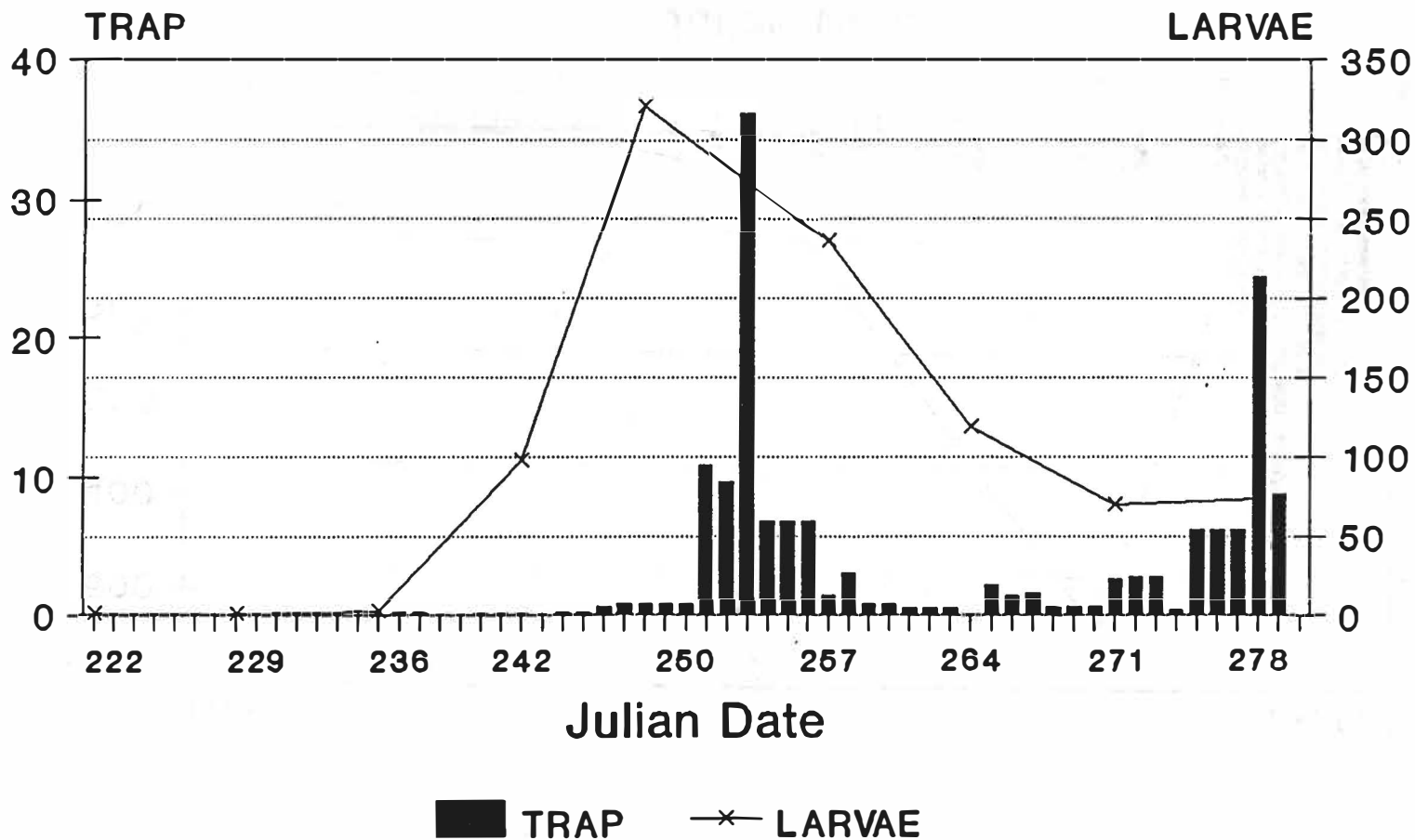


Figure 1. Comparison of velvetbean caterpillar adult male catch in pheromone traps with larval density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1989.

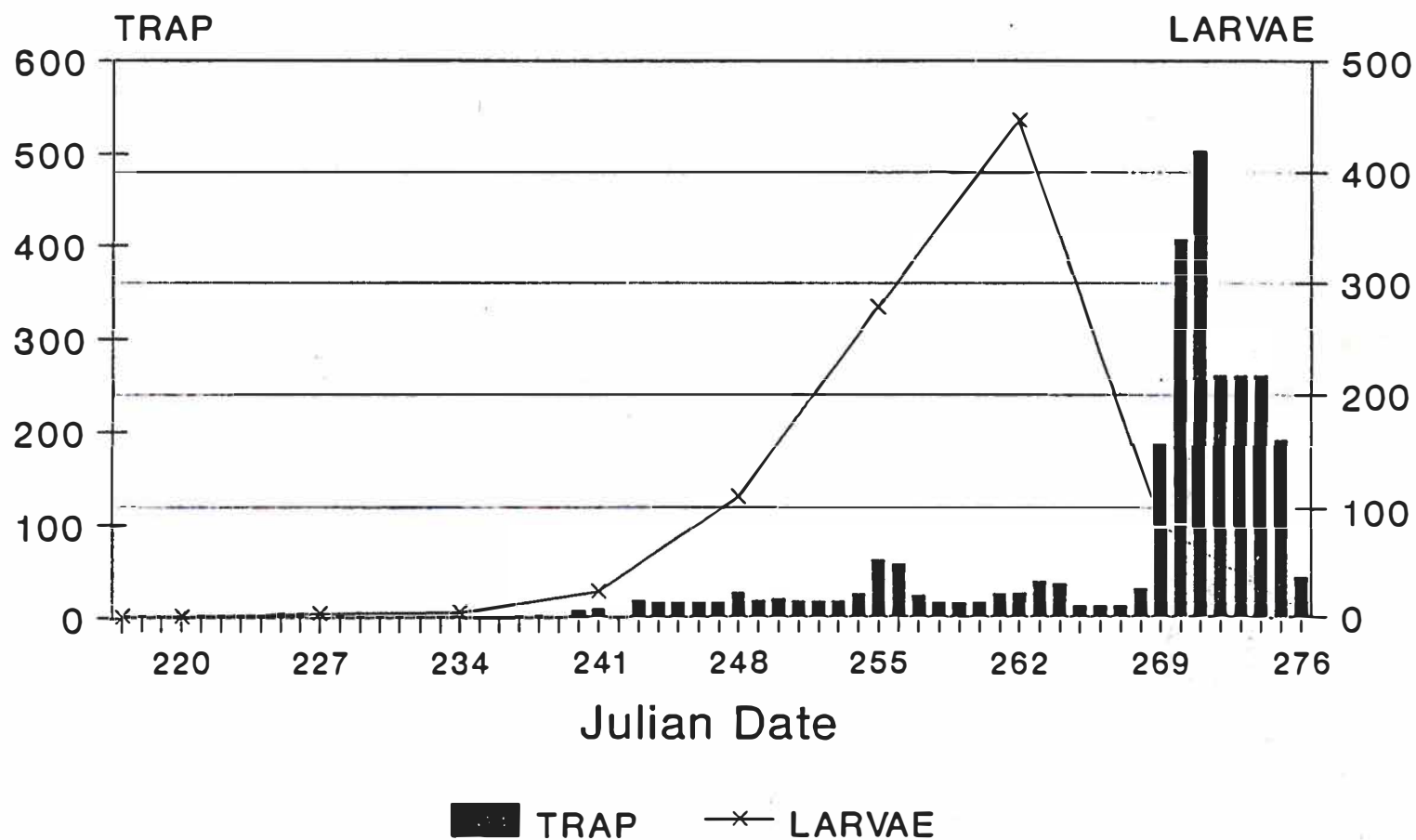


Figure 2. Comparison of velvetbean caterpillar adult male catch in pheromone traps with larval density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1990.

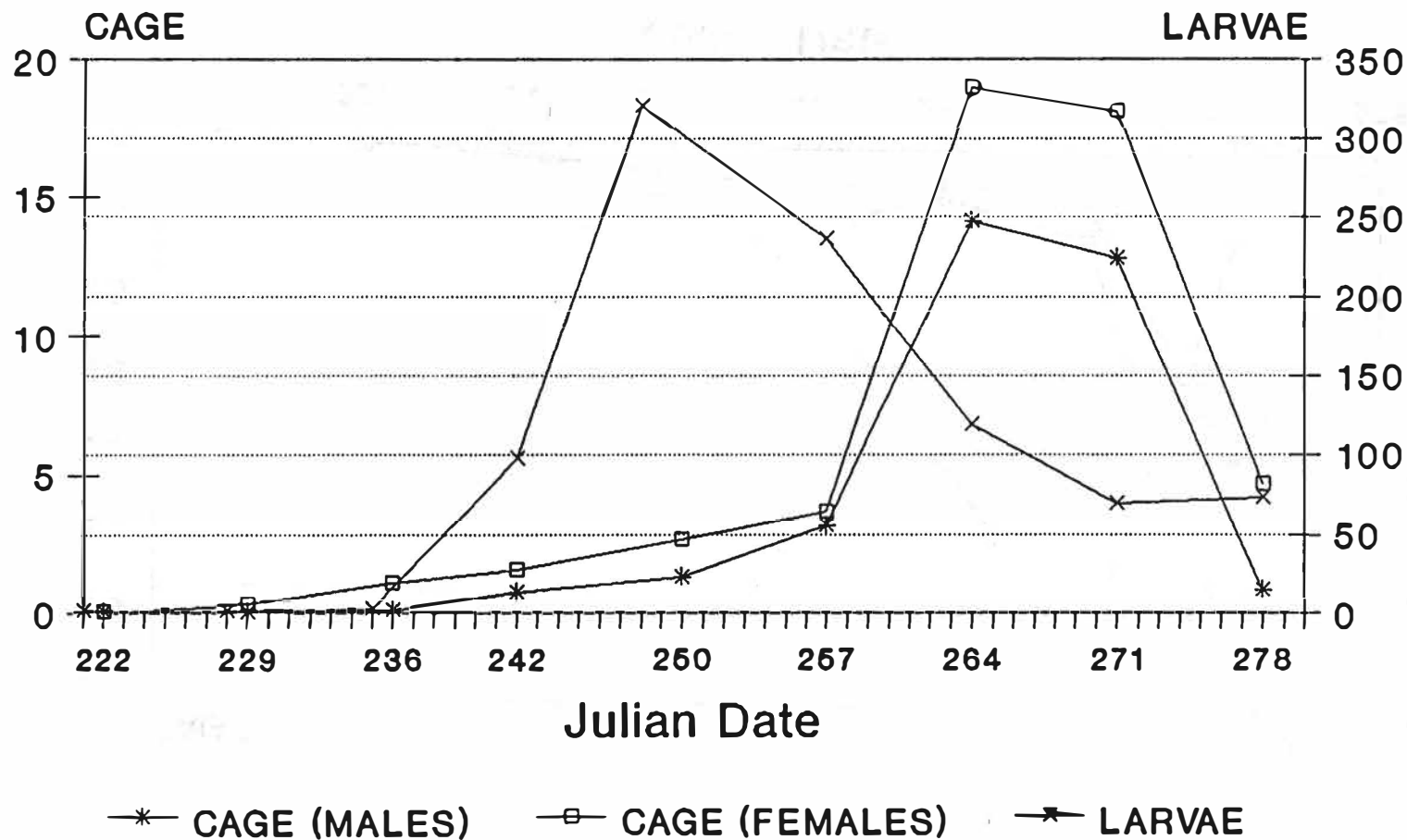


Figure 3. Comparison of velvetbean caterpillar adult male and female density with larval density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1989.

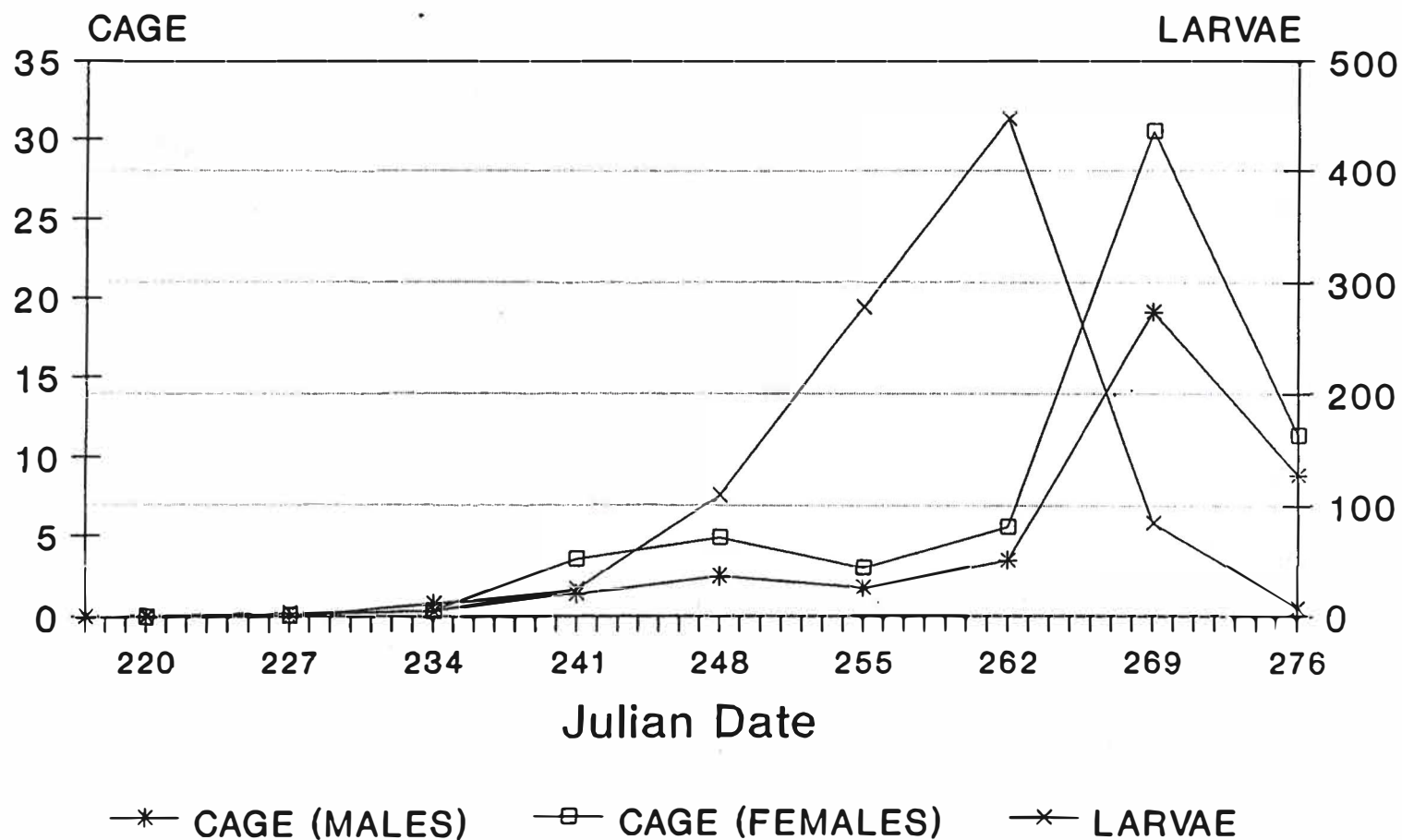


Figure 4. Comparison of velvetbean caterpillar adult male and female density with larval density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1990.

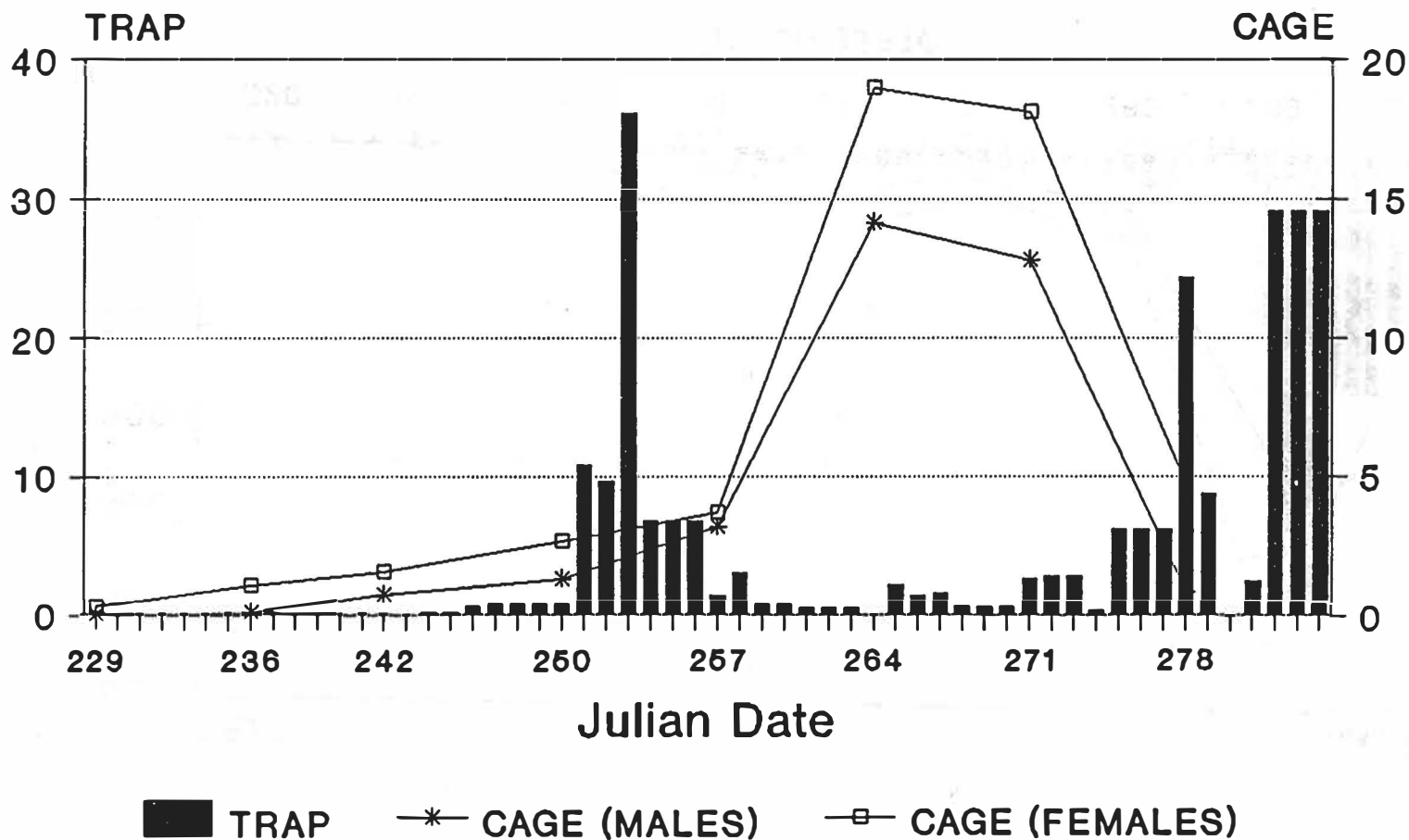


Figure 5. Comparison of velvetbean caterpillar adult male catch in pheromone traps with adult male and female density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1989.

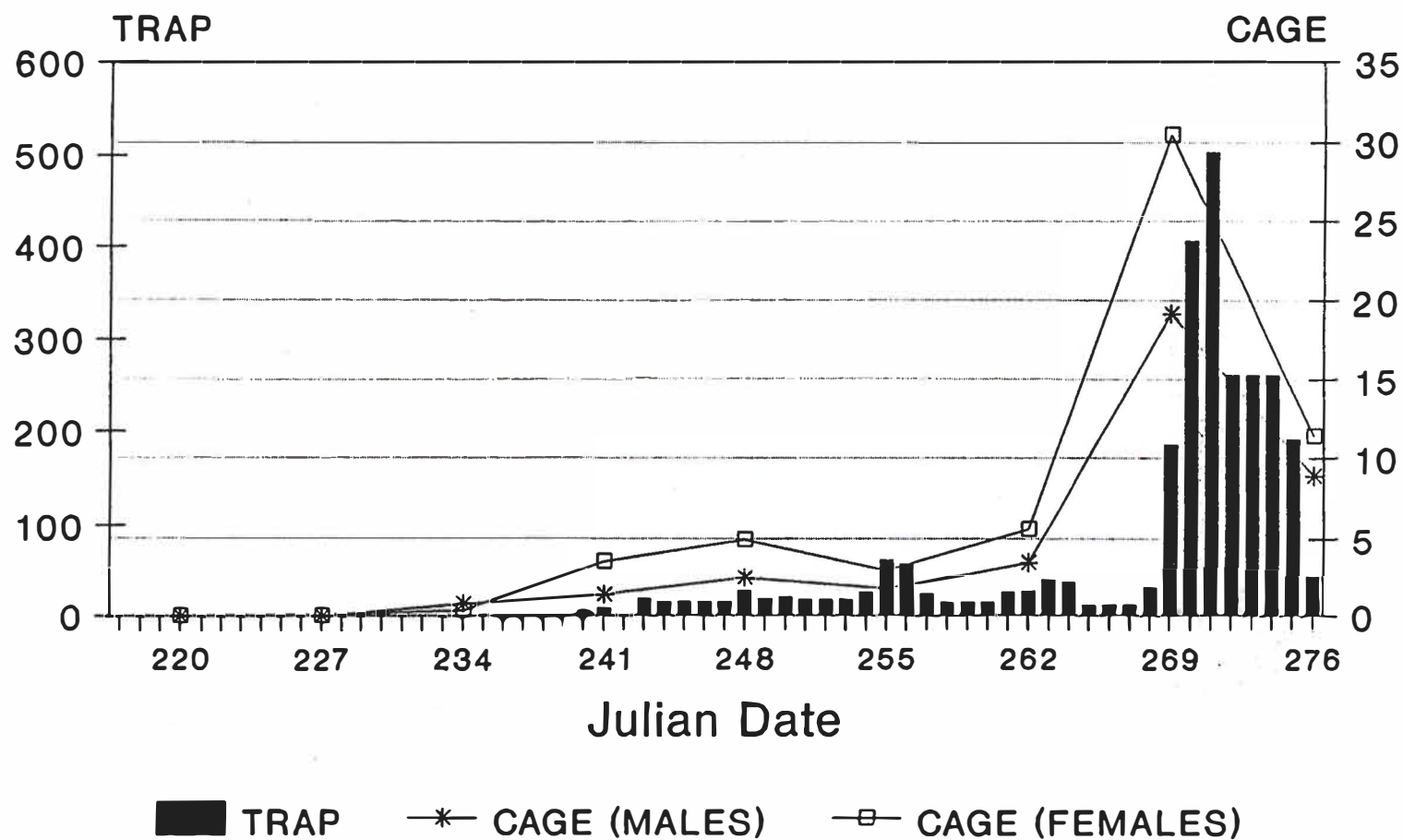


Figure 6. Comparison of velvetbean caterpillar adult male catch in pheromone traps with adult male and female density in Centennial narrow row soybeans at the Rice Research Station, Crowley, LA in 1990.



## DISEASE CONTROL STUDIES

### RICE DISEASE CONTROL STUDIES

D.E. Groth, M. Frey, J. Nugent, P.K. Bollich, and M.C. Rush

#### Advanced Fungicide Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 lb/A

Planting Method/Date: Drill seeded, May 2, 1990

Emergence Date: May 10

Fertilization: 60-60-60, May 2; 120-0-0, May 21

Plot Size: 16 x 4 ft

Water Management: Permanent flood, May 23

Herbicides: 4 qt/A Propanil, May 22; 1 oz/A Londax, May 30;  
20 lb/A Ordram, June 4; 1.2 pt/A Whip 1EC, June 12

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: PD stage, June 29; boot stage (B), July 13;  
heading stage (H), July 25

Drained: Aug 13

Harvest: Aug 29

Experimental Design: Randomized block design with four  
replications

Disease Ratings: Sheath blight, narrow brown and leaf smut  
severities (0-9 scale), Aug 28; Infestation  
levels and area covered by sheath blight  
symptoms (0-100%), Aug 28

Results: Table 1

Comments: Sheath blight severity was high, other diseases were  
low.

Table 1. Effects of rice foliar fungicides on sheath blight, narrow brown spot, and leaf smut control and rice yield. Rice Research Station, Crowley, LA. 1990.

| Treatment               | Rate         | Timing | Sheath blight  |                  |                      | Narrow brown spot (0-9) | Leaf smut (0-9) | Yield (lb/A) |
|-------------------------|--------------|--------|----------------|------------------|----------------------|-------------------------|-----------------|--------------|
|                         |              |        | Severity (0-9) | Area covered (%) | Tillers infected (%) |                         |                 |              |
| Uninoculated Check      |              |        | 5.31           | 25.01-m          | 62.5gh               | 3.5a                    | 3.5ab           | 7018.5a-e    |
| Unsprayed Inoculated CK |              |        | 8.0ab          | 80.0a            | 97.5ab               | 3.5a                    | 4.0a            | 6001.8h      |
| Benlate 50 DF           | 1.0 lb pr/A  | B+H    | 6.8c-f         | 37.5f-j          | 86.5a-g              | 1.5f-1                  | 2.8a-e          | 6960.5a-e    |
| Benlate 50 DF           | 1.5 lb pr/A  | B+H    | 6.0f-1         | 17.5j-m          | 72.0c-h              | 1.5f-1                  | 2.3b-e          | 7152.0abc    |
| Benlate 50 DF           | 1.5 lb pr/A  | B      | 6.8c-f         | 31.31-1          | 85.5a-g              | 1.3g-j                  | 1.8de           | 6685.3a-g    |
| Benlate 50 DF           | 1.0 lb pr/A  | H      |                |                  |                      |                         |                 |              |
| Benlate 50 DF           | 1.5 lb pr/A  | B      | 7.5abc         | 58.8b-e          | 85.5a-g              | 1.8e-h                  | 2.5b-e          | 6853.8a-g    |
| Tilt 3.6 EC             | 6 oz pr/A    | PI+B   | 7.0cde         | 51.3d-h          | 82.5a-h              | 1.5f-1                  | 0.5fg           | 6958.3a-e    |
| Tilt 3.6 EC             | 10 oz pr/A   | B      | 6.3e-h         | 30.31-1          | 67.5e-h              | 1.0hij                  | 0.0g            | 6825.8a-g    |
| Tilt 3.6 EC             | 10 oz pr/A   | B      | 6.3e-h         | 18.8j-m          | 75.0b-h              | 0.81j                   | 0.0g            | 6983.0a-e    |
| Benlate 50 DF           | 1.0 lb pr/A  | H      |                |                  |                      |                         |                 |              |
| Tilt 3.6 EC             | 10 oz pr/A   | B      | 6.0f-1         | 20.01-m          | 79.0a-h              | 1.3g-j                  | 0.0g            | 7341.3a      |
| Benlate 50 DF           | 1.5 lb pr/A  | H      |                |                  |                      |                         |                 |              |
| Rovral 4 SC             | 0.5 qt pr/A  | B+H    | 6.3e-h         | 30.01-1          | 90.5a-e              | 3.0abc                  | 2.3b-e          | 6885.5a-f    |
| EXP10064B 1.67 SC       | 0.27 lb ai/A | B+H    | 7.3bcd         | 30.01-1          | 84.5a-h              | 0.5j                    | 0.3g            | 7135.8a-d    |
| Moncerene 4 F           | 0.25 lb ai/A | B+H    | 6.0f-1         | 20.01-m          | 83.0a-h              | 3.3ab                   | 3.3abc          | 6887.3a-f    |
| Moncerene 50 WP         | 0.25 lb ai/A | B+H    | 5.5hi          | 7.5m             | 63.5fgh              | 3.0abc                  | 3.0a-d          | 6952.8a-e    |

Continued

Table 1. Continued.

| Treatment       | Rate         | Timing | Sheath blight     |                        |                            | Narrow<br>brown<br>spot<br>(0-9) | Leaf<br>Smut<br>(0-9) | Yield<br>(lb/A) |
|-----------------|--------------|--------|-------------------|------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
|                 |              |        | Severity<br>(0-9) | Area<br>covered<br>(%) | Tillers<br>infected<br>(%) |                                  |                       |                 |
| Moncerene 50 WP | 0.25 lb ai/A | PI+B   | 5.5hi             | 15.0klm                | 70.0d-h                    | 3.3ab                            | 3.3abc                | 7218.5ab        |
| Moncut 50 WP    | 0.25 lb ai/A | PI+B   | 7.0cde            | 30.0i-l                | 69.0e-h                    | 3.3ab                            | 2.0cde                | 7232.0ab        |
| Moncut 50 WP    | 0.25 lb ai/A | B+H    | 6.0f-i            | 12.5lm                 | 60.5h                      | 3.5a                             | 2.0cde                | 6858.5a-g       |
| Tilt 3.6 EC     | 10 oz pr/A   | B      | 6.0f-i            | 12.5lm                 | 83.0a-h                    | 1.0hij                           | 0.0g                  | 7190.0ab        |
| Rovral 4 SC     | 0.5 qt pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Folatec 3.8 SC  | 12 oz pr/A   | B+H    | 7.3bcd            | 67.5a-d                | 98.0ab                     | 3.0abc                           | 3.3abc                | 6468.0d-h       |
| Topcop 4.2 EC   | 12 oz pr/A   | B+H    | 8.0ab             | 82.5a                  | 99.5a                      | 3.0abc                           | 2.8a-e                | 6276.5fgh       |
| Rovral 4 SC     | 0.5 qt pr/A  | B      | 6.8c-f            | 40.0e-i                | 85.5a-g                    | 2.5b-e                           | 2.8a-e                | 6720.3a-g       |
| Benlate 50 DF   | 1.0 lb pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Moncerene 50 WP | 0.25 lb ai/A | B      | 5.5hi             | 17.5j-m                | 79.5a-h                    | 2.3c-f                           | 2.0cde                | 6899.0a-f       |
| Benlate 50 DF   | 1.0 lb pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Moncerene 50 WP | 0.25 lb ai/A | B      | 6.0f-i            | 25.0i-m                | 79.5a-h                    | 3.0abc                           | 2.0cde                | 6718.5a-g       |
| Rovral 4 SC     | 0.5 lb ai/A  | H      |                   |                        |                            |                                  |                       |                 |
| Moncut 50 WP    | 0.5 lb ai/A  | B      | 5.8ghi            | 12.5lm                 | 76.5a-h                    | 2.0d-g                           | 2.3b-e                | 7333.8a         |
| Benlate 50 DF   | 1.0 lb pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Moncut 50 WP    | 0.5 lb ai/A  | B      | 5.5hi             | 15.0klm                | 67.0e-h                    | 3.0abc                           | 1.5ef                 | 6955.5a-e       |
| Rovral 4 SC     | 0.5 qt pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Benlate 50 DF   | 1.0 lb pr/A  | H      | 7.0cde            | 53.8c-g                | 87.0a-f                    | 1.8e-h                           | 3.0a-d                | 6687.5a-g       |

Continued.

Table 1. Continued.

| Treatment         | Rate         | Timing | Sheath blight     |                        |                            | Narrow<br>brown<br>spot<br>(0-9) | Leaf<br>Smut<br>(0-9) | Yield<br>(lb/A) |
|-------------------|--------------|--------|-------------------|------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
|                   |              |        | Severity<br>(0-9) | Area<br>covered<br>(%) | Tillers<br>infected<br>(%) |                                  |                       |                 |
| Benlate 50 DF     | 1.5 lb pr/A  | H      | 7.3bcd            | 60.0bcd                | 85.5a-g                    | 1.8e-h                           | 2.3b-e                | 6385.3e-h       |
| Benlate 50 DF     | 2.0 lb pr/A  | H      | 7.3bcd            | 55.0c-f                | 93.5a-d                    | 2.0d-g                           | 2.3b-e                | 6367.5e-h       |
| Rovral 4 SC       | 0.5 lb ai/A  | H      | 7.0cde            | 52.5c-g                | 87.0a-f                    | 3.3ab                            | 2.3b-e                | 6633.5b-h       |
| Rovral 4 SC       | 0.75 lb ai/A | H      | 6.5d-g            | 27.5l-m                | 78.5a-h                    | 3.0abc                           | 2.3b-e                | 6993.0a-e       |
| Rovral 4 SC       | 1.0 lb ai/A  | H      | 6.8c-f            | 52.5c-g                | 83.5a-h                    | 3.0abc                           | 1.5ef                 | 6590.0b-h       |
| Rovral 4 SC       | 0.33 lb ai/A | PIBH   | 7.0cde            | 40.0e-i                | 84.0a-h                    | 2.8a-d                           | 2.0cde                | 7077.0a-d       |
| Tilt 3.6 EC       | 6 oz pr/A    | PI     | 8.0ab             | 72.5abc                | 97.5ab                     | 1.3g-j                           | 0.5fg                 | 6506.8c-h       |
| EXP10064B 1.67 SC | .22 lb ai/A  | B+H    | 6.3e-h            | 35.0g-k                | 85.5a-g                    | 1.0hij                           | 0.0g                  | 6845.3a-g       |
| Tilt 3.6 EC       | 8 oz pr/A    | B      | 6.5d-g            | 32.5h-l                | 87.0a-f                    | 0.8ij                            | 0.0g                  | 7120.3a-d       |
| Benlate 50 DF     | 1.0 lb pr/A  | H      |                   |                        |                            |                                  |                       |                 |
| Aliette 80 WP     | 1.6 lb ai/A  | B+H    | 8.0ab             | 70.0a-d                | 96.0abc                    | 2.5b-e                           | 1.8de                 | 6504.0c-h       |
| EXP10108A 15 WP   | 0.18 lb ai/A | B+H    | 6.3e-h            | 32.5h-l                | 86.0a-g                    | 1.8e-h                           | 2.0cde                | 7015.8a-e       |
| Benlate 50 DF     | 1.0 lb pr/A  | PI+B   | 8.0ab             | 65.0a-d                | 97.5ab                     | 2.3c-f                           | 2.3b-e                | 6622.0b-h       |
| Rovral 4 SC       | 0.5 lb ai/A  | PI+B   | 8.3a              | 65.0a-d                | 94.5abc                    | 2.8a-d                           | 2.5b-e                | 6487.3c-h       |
| Unsprayed Ch      |              |        | 8.0ab             | 75.0ab                 | 99.5a                      | 3.0abc                           | 4.0a                  | 6191.0gh        |
| LSD (.05)         | =            |        | 0.7               | 16.9                   | 19.4                       | 0.8                              | 1.1                   | 544.2           |
| Standard Dev.     | =            |        | .51182            | 12.076                 | 13.872                     | .56068                           | .78952                | 388.72          |
| CV                | =            |        | 7.64              | 30.64                  | 16.69                      | 24.99                            | 40.36                 | 5.71            |

## ROVRAL SPREADER STICKER STUDY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 lb/A

Planting Method/Date: Drill seeded, May 2, 1990

Emergence Date: May 10

Fertilization: 60-60-60, May 2; 120-0-0, May 21

Plot Size: 16 x 4 ft

Water Management: Permanent flood, May 23

Herbicides: 4 qt/A Propanil, May 22; 1 oz/A Londax, May 30;  
20 lb/A Ordram, June 4; 1.2 pt/A Whip 1EC, June 12

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Boot stage (B), July 13;  
Heading stage (H), July 25

Drained: Aug 13

Harvest: Aug 29

Experimental Design: Randomized block design with four  
replications

Disease Ratings: Sheath blight, narrow brown and leaf smut  
severities (0-9 scale), Aug 28; Infestation  
levels (0-100%), Aug 28

Results: Table 2

Comments: Sheath blight severity was high, other diseases were  
low.

Table 2. Effect of spreader stickers on performance of Rovral disease control and rice yields.  
Rice Research Station, Crowley, LA. 1990.

| Treatment           | Rate        | Timing | Sheath blight     |                        |                            | Narrow<br>brown<br>spot<br>(0-9) | Leaf<br>Smut<br>(0-9) | Yield<br>(lb/A) |
|---------------------|-------------|--------|-------------------|------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
|                     |             |        | Severity<br>(0-9) | Area<br>covered<br>(%) | Tillers<br>infected<br>(%) |                                  |                       |                 |
| Unsprayed CK        |             |        | 8.3a              | 82.5a                  | 100.0a                     | 3.5a                             | 3.5a                  | 5950.3c         |
| Rovral 4 F          | 0.5 qt pr/A | B+H    | 6.8bc             | 25.0cd                 | 81.0bc                     | 3.0ab                            | 1.8bc                 | 6816.0ab        |
| Rovral 4 F          | 0.5 qt pr/A | B+H    | 6.3c              | 22.5d                  | 90.8ab                     | 3.0ab                            | 1.3c                  | 6837.0ab        |
| Triton CS-7 8.33 EC | 0.75% v/v   | B+H    |                   |                        |                            |                                  |                       |                 |
| Rovral 4 F          | 0.5 qt pr/A | B+H    | 6.5bc             | 20.0d                  | 77.0c                      | 3.0ab                            | 1.5bc                 | 7281.5a         |
| Nu-Film-17 8.33 EC  | 0.75% v/v   | B+H    |                   |                        |                            |                                  |                       |                 |
| Rovral 4 F          | 0.5 qt pr/A | B+H    | 6.5bc             | 23.8d                  | 82.0bc                     | 3.0ab                            | 2.0bc                 | 6487.5b         |
| Triton AG98 8.33 EC | 0.75% v/v   | B+H    |                   |                        |                            |                                  |                       |                 |
| Tilt 3.6 EC         | 10 oz pr/A  | B      | 6.3c              | 31.3cd                 | 91.5ab                     | 1.0d                             | 0.0d                  | 6997.3ab        |
| Rovral 4 F          | 0.5 qt pr/A | H      |                   |                        |                            |                                  |                       |                 |
| Triton CS-7 8.33 EC | 0.75% v/v   | H      |                   |                        |                            |                                  |                       |                 |
| Rovral 4F           | 0.5 qt pr/A | B      | 7.3b              | 30.0cd                 | 83.0bc                     | 2.5b                             | 2.3bc                 | 6753.0ab        |
| Triton CS-7 8.33 EC | 0.75% v/v   | B      |                   |                        |                            |                                  |                       |                 |
| Benlate 50 DF       | 1.0 lb pr/A | H      |                   |                        |                            |                                  |                       |                 |
| Aliette 80 WP       | 2.4 lb ai/A | B+H    | 7.0bc             | 36.3bc                 | 87.5abc                    | 2.8b                             | 2.5b                  | 6553.8b         |
| Rovral 4 F          | 0.5 qt pr/A | B+H    |                   |                        |                            |                                  |                       |                 |
| Triton CS-7 8.33 EC | 0.75% v/v   |        |                   |                        |                            |                                  |                       |                 |
| Rovral 4 F          | 0.5 qt pr/A | B+H    | 6.5bc             | 26.3cd                 | 80.5bc                     | 2.8b                             | 2.0bc                 | 6972.0ab        |
| Crop oil 8.33 EC    | 0.75% v/v   | B+H    |                   |                        |                            |                                  |                       |                 |
| Benlate 50 DF       | 1.0 lb pr/A | B+H    | 7.3b              | 42.5b                  | 96.0a                      | 1.8c                             | 2.0bc                 | 6968.5ab        |
| LSD (.05)           | =           |        | 0.7               | 10.4                   | 11.6                       | 0.6                              | 0.9                   | 479.2           |
| Standard Dev.       | =           |        | .49441            | 7.1879                 | 7.9802                     | .39322                           | .61938                | 330.24          |
| CV                  | =           |        | 7.22              | 21.14                  | 9.18                       | 14.98                            | 33.06                 | 4.88            |

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

## BENLATE SPREADER STICKER STUDY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 lb/A

Planting Method/Date: Drill seeded, May 2, 1990

Emergence Date: May 10

Fertilization: 60-60-60, May 2; 120-0-0, May 21

Plot Size: 16 x 4 ft

Water Management: Permanent flood, May 23

Herbicides: 4 qt/A Propanil, May 22; 1 oz/A Londax, May 30;  
20 lb/A Ordram, June 4; 1.2 pt/A Whip 1EC, June 12

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Boot stage, July 13; Heading stage, July 25

Drained: Aug 13

Harvest: Aug 27

Experimental Design: Randomized block design with four replications

Disease Ratings: Sheath blight, Narrow brown spot and leaf smut severity (0-9 scale), Aug 27; Infestation levels (0-100%), Aug 27

Results: Table 3

Comments: Sheath blight severity was high, other diseases were low.

Table 3. Effect of spreader stickers on Benlate disease control and rice yield. Rice Research Station, Crowley, LA. 1990.

| Treatment            | Rate         | Timing | Sheath blight  |                  |                      | Narrow brown spot (0-9) | Leaf Smut (0-9) | Yield (lb/A) |
|----------------------|--------------|--------|----------------|------------------|----------------------|-------------------------|-----------------|--------------|
|                      |              |        | Severity (0-9) | Area covered (%) | Tillers infected (%) |                         |                 |              |
| Unsprayed CK         |              |        | 8.0a           | 82.5a            | 98.5a                | 3.0a                    | 4.0a            | 6034.3b      |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.0bc          | 57.5b-e          | 87.5ab               | 1.5bc                   | 2.0b            | 6976.8a      |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 8.0a           | 70.0b            | 95.5a                | 1.3bc                   | 1.5b            | 6591.0ab     |
| Triton CS-7 8.33 EC  | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 6.8bc          | 52.5cde          | 91.5ab               | 1.3bc                   | 1.5b            | 7120.5a      |
| Nu-Film-17 8.33 EC   | 0.75 lb pr/A | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.3bc          | 65.0bc           | 92.0ab               | 1.0c                    | 1.8b            | 6889.5a      |
| Triton AG98 8.33 EC  | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 6.5c           | 50.0de           | 82.5b                | 1.5bc                   | 1.8b            | 6887.3a      |
| Crop oil 8.33 EC     | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.0bc          | 45.0e            | 87.5ab               | 1.0c                    | 1.8b            | 6592.5ab     |
| Surfix               | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.3b           | 65.0bc           | 95.0a                | 1.5bc                   | 1.8b            | 6744.3ab     |
| Lemon Fresh 8.33 EC  | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.5ab          | 62.5bcd          | 95.5a                | 1.8b                    | 1.8b            | 6570.3ab     |
| Triton B1956 8.33 EC | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| Benlate 50 DF        | 1.0 lb pr/A  | B+H    | 7.5ab          | 55.0cde          | 97.0a                | 1.3bc                   | 1.8b            | 6810.5a      |
| Ortho X-77 8.33 EC   | 0.75% v/v    | B+H    |                |                  |                      |                         |                 |              |
| LSD (0.05)           | =            |        | 0.7            | 12.1             | 11.1                 | 0.6                     | 0.9             | 682.9        |
| Standard Dev.        | =            |        | .46248         | 8.3666           | 7.6436               | .44721                  | .60858          | 470.61       |
| CV                   | =            |        | 6.36           | 13.83            | 8.29                 | 29.81                   | 31.21           | 7.00         |

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).



## TILT SPREADER STICKER STUDY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 lb/A

Planting Method/Date: Drill seeded, May 2, 1990

Emergence Date: May 10

Fertilization: 60-60-60, May 2; 120-0-0, May 21

Plot Size: 16 x 4 ft

Water Management: Permanent flood, May 23

Herbicides: 4 qt/A Propanil, May 22; 1 oz/A Londax, May 30;  
20 lb/A Ordram, June 4, 1.2 pt whip 1EC, June 12

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: PD stage, June 29; boot stage (B), July 13

Drained: Aug 13

Harvest: Aug 27

Experimental Design: Randomized block design with four  
replications

Disease Ratings: Sheath blight, narrow brown spot and leaf  
smut severities (0-9 scale), Aug 27;  
Infestation levels (0-100%), Aug 27

Results: Table 4

Comments: Sheath blight severity was high, other diseases were  
low.

Table 4. Effect of spreader stickers on Tilt disease control and rice yield. Rice Research Station, Crowley, LA. 1990.

| Treatment                           | Rate                        | Timing      | Sheath blight  |                  | Tillers infected (%) | Narrow brown spot (0-9) | Leaf smut (0-9) | Yield (lb/A) |
|-------------------------------------|-----------------------------|-------------|----------------|------------------|----------------------|-------------------------|-----------------|--------------|
|                                     |                             |             | Severity (0-9) | Area covered (%) |                      |                         |                 |              |
| Unsprayed Ch                        |                             |             | 8.0ab          | 87.5a            | 99.0a                | 3.0a                    | 3.0a            | 5565.5b      |
| Tilt 3.6 EC                         | 6.0 oz pr/A                 | PI+B        | 7.5abc         | 65.0cd           | 92.5a                | 1.0c                    | 0.3b            | 6621.8a      |
| Tilt 3.6 EC<br>Triton CS-7 8.33 EC  | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 7.5abc         | 67.5bcd          | 94.0a                | 1.0c                    | 0.0b            | 5976.0ab     |
| Tilt 3.6 EC<br>Nu-Film-17 8.33 EC   | 6.0 oz pr/A<br>0.75 lb pr/A | PI+B<br>B+H | 8.0ab          | 67.5bcd          | 98.0a                | 1.0c                    | 0.0b            | 6085.3ab     |
| Tilt 3.6 EC<br>Triton AG98 8.33 EC  | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 7.3bc          | 62.5cd           | 96.5a                | 1.0c                    | 0.0b            | 6093.0ab     |
| Tilt 3.6 EC<br>Crop oil 8.33 EC     | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 7.0c           | 62.5cd           | 96.5a                | 1.0c                    | 0.0b            | 6178.5ab     |
| Tilt 3.6 EC<br>Surfix               | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 7.3bc          | 57.5d            | 97.5a                | 1.0c                    | 0.3b            | 6355.8ab     |
| Tilt 3.6 EC<br>Lemon Fresh 8.33 EC  | 6.0 lb pr/A<br>0.75% v/v    | PI+B<br>B+H | 8.3a           | 82.5ab           | 94.0a                | 1.3b                    | 0.0b            | 5792.8ab     |
| Tilt 3.6 EC<br>Triton B1956 8.33 EC | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 8.0ab          | 77.5abc          | 96.0a                | 1.0c                    | 0.3b            | 5692.3b      |
| Tilt 3.6 EC<br>Ortho X-77 8.33 EC   | 6.0 oz pr/A<br>0.75% v/v    | PI+B<br>B+H | 7.8abc         | 65.0cd           | 97.5a                | 1.0c                    | 0.0b            | 6269.8ab     |
| LSD (.05)                           | =                           |             | 0.9            | 14.9             | 6.5                  | 0.2                     | 0.5             | 801.3        |
| Standard Dev.                       | =                           |             | .59317         | 10.274           | 4.4501               | .15811                  | .36387          | 552.25       |
| CV                                  | =                           |             | 7.75           | 14.78            | 4.63                 | 12.91                   | 97.03           | 9.11         |

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

## EFFECT OF TIME OF FUNGICIDE APPLICATION

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 lb/A

Planting Method/Date: Drill seeded, May 2, 1990

Emergence Date: May 10

Fertilization: 60-60-60, May 2; 120-0-0, May 21

Plot Size: 16 x 4 ft

Water Management: Permanent flood, May 23

Herbicides: 4 qt/A Propanil, May 22; 1 oz/A Londax, May 30;  
20 lb/A Ordram, June 4; 1.2 pt/A Whip 1EC, June 12

Insecticides: 17 lb/A Furadan, May 31

Fungicides: Rovral 4F, Benlate 50DF, Tilt 3.6 EC

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: PD stage, June 29; boot stage, July 16;  
heading stage, July 28

Drained: Aug 13

Harvest: Aug 27

Experimental Design: Randomized block design with four  
replications

Disease Ratings: Sheath blight, narrow brown and leaf smut  
severities (0-9 scales), Aug 27; Infestation  
levels (0-100%), Aug 27

Results: Table 5

Comments: Sheath blight severity was high, other diseases were  
low.

Table 5. Effect of time of day on fungicide performance reducing disease and increasing rice yields. Rice Research Station, Crowley, LA. 1990.

| Treatment | Time of day applied | Rate         | Timing | Sheath blight  |                  |                      | Narrow brown spot (0-9) | Leaf Smut (0-9) | Yield (lb/A) |
|-----------|---------------------|--------------|--------|----------------|------------------|----------------------|-------------------------|-----------------|--------------|
|           |                     |              |        | Severity (0-9) | Area covered (%) | Tillers infected (%) |                         |                 |              |
| Untreated |                     |              |        | 7.8ab          | 72.5a            | 95.0ab               | 4.0a                    | 3.8a            | 6183.5cd     |
| Rovral    | 8 AM                | 0.50 lb ai/A | B+H    | 6.3efg         | 30.0d-g          | 87.0abc              | 3.5ab                   | 1.8cde          | 6453.3bcd    |
| Rovral    | 10 AM               | 0.50 lb ai/A | B+H    | 6.8c-f         | 28.8d-g          | 89.5abc              | 3.5ab                   | 1.8cde          | 6263.8bcd    |
| Rovral    | 12 N                | 0.50 lb ai/A | B+H    | 5.8g           | 12.5g            | 85.5abc              | 3.0b                    | 2.0cde          | 6804.8ab     |
| Rovral    | 2 PM                | 0.50 lb ai/A | B+H    | 6.5d-g         | 20.0fg           | 85.0abc              | 3.5ab                   | 2.3cd           | 6400.3bcd    |
| Rovral    | 4 PM                | 0.50 lb ai/A | B+H    | 6.3efg         | 35.0def          | 84.0abc              | 4.0a                    | 2.0cde          | 6593.0a-d    |
| Rovral    | 6 PM                | 0.50 lb ai/A | B+H    | 6.0fg          | 25.0fg           | 74.5c                | 2.8bc                   | 3.3ab           | 6368.3bcd    |
| Benlate   | 8 AM                | 0.50 lb ai/A | B+H    | 6.8c-f         | 50.0bcd          | 93.5ab               | 2.0cd                   | 2.0cde          | 6135.5cd     |
| Benlate   | 10 AM               | 0.50 lb ai/A | B+H    | 7.3a-d         | 60.0abc          | 93.0abc              | 1.3d-g                  | 2.8bc           | 6405.3bcd    |
| Benlate   | 12 N                | 0.50 lb ai/A | B+H    | 6.3efg         | 27.5efg          | 88.0abc              | 1.0e-h                  | 1.3de           | 6316.8bcd    |
| Benlate   | 2 PM                | 0.50 lb ai/A | B+H    | 6.5d-g         | 25.0fg           | 85.5abc              | 1.8de                   | 1.0ef           | 6492.3a-d    |
| Benlate   | 4 PM                | 0.50 lb ai/A | B+H    | 6.8c-f         | 31.3d-g          | 89.5abc              | 1.8de                   | 2.5bc           | 7025.8a      |
| Benlate   | 6 PM                | 0.50 lb ai/A | B+H    | 6.8c-f         | 35.0d-g          | 86.5abc              | 1.5def                  | 2.0cde          | 6468.8bcd    |
| Tilt      | 8 AM                | 6 oz pr/A    | PI+B   | 7.8ab          | 67.5ab           | 92.5abc              | 0.8fgh                  | 0.3f            | 6349.5bcd    |
| Tilt      | 10 AM               | 6 oz pr/A    | PI+B   | 7.8ab          | 72.5a            | 99.0a                | 0.5gh                   | 0.0f            | 6044.3d      |

Continued.

Table 5. Continued.

| Treatment     | Time<br>of day<br>applied | Rate      | Timing | Sheath blight     |                        |                            | Narrow<br>brown<br>spot<br>(0-9) | Leaf<br>Smut<br>(0-9) | Yield<br>(lb/A) |
|---------------|---------------------------|-----------|--------|-------------------|------------------------|----------------------------|----------------------------------|-----------------------|-----------------|
|               |                           |           |        | Severity<br>(0-9) | Area<br>covered<br>(%) | Tillers<br>infected<br>(%) |                                  |                       |                 |
| Tilt          | 12 N                      | 6 oz pr/A | PI+B   | 7.5abc            | 60.0abc                | 91.5abc                    | 0.8fgh                           | 0.3f                  | 6110.8cd        |
| Tilt          | 2 PM                      | 6 oz pr/A | PI+B   | 7.0b-e            | 60.0abc                | 79.5bc                     | 0.8fgh                           | 0.0f                  | 6455.3bcd       |
| Tilt          | 4 PM                      | 6 oz pr/A | PI+B   | 7.0b-e            | 40.0c-f                | 86.5abc                    | 0.3h                             | 0.0f                  | 6644.0abc       |
| Tilt          | 6 PM                      | 6 oz pr/A | PI+B   | 7.0b-e            | 47.5b-e                | 91.0abc                    | 1.0e-h                           | 0.3f                  | 6612.5a-d       |
| Untreated     |                           |           |        | 8.0a              | 75.0a                  | 97.5ab                     | 3.5ab                            | 3.8a                  | 6175.5cd        |
| LSD (.05)     | =                         |           |        | 0.8               | 19.1                   | 15.5                       | 0.8                              | 0.9                   | 479.3           |
| Standard Dev. | =                         |           |        | .53884            | 13.515                 | 10.976                     | .57277                           | .64362                | 338.92          |
| CV            | =                         |           |        | 7.84              | 30.89                  | 12.38                      | 27.94                            | 39.31                 | 5.28            |

## SOIL FUNGICIDES

VS.

## SEED SOAKING AND SEED TREATMENTS

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Water seeded, March 30, 1990

Fertilization: 40-60-60, June 4; 21-0-0, June 6

Plot Size: 16 x 4 ft

Herbicides: 4 qt/A Basagran + Propanil, April 23; 1 oz/A Londax, May 30; 20 lb/A

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Preplant, May 10

Drained: July 17

Harvest: Aug 6

Experimental Design: Randomized block design with four replications

Data Taken: plants/ft<sup>2</sup>, and plant height Apr 16

Results: Table 6

Comments: Water mold severity was moderate, other diseases were low except in the ridomil treated plots where sheath blight was severe.

Table 6. The effect of seed treatment, seed soaking, and soil applied fungicides on plant stand densities, plant height, and rice yield. Rice Research Station, Crowley, LA. 1990.

| Treatment                         | Rate<br>soil<br>fungicide<br>(lb ai/A) | Plant<br>stand<br>(pl/ft <sup>2</sup> ) | Plant<br>height<br>(cm) | Yield<br>(lb/A) |
|-----------------------------------|----------------------------------------|-----------------------------------------|-------------------------|-----------------|
| Unsprayed Ch<br>Untrt/Unsoak      |                                        | 10.0d                                   | 13.0g                   | 7498.3def       |
| Unsprayed Ch<br>Untrt/Soaked      |                                        | 14.0cd                                  | 16.0abc                 | 8227.5a         |
| Unsprayed Ch<br>Trt/Unsoaked      |                                        | 11.5d                                   | 13.5fg                  | 7665.5b-f       |
| Unpsrayed Ch<br>Trt/Soaked        |                                        | 16.0bcd                                 | 16.8ab                  | 7893.5a-d       |
| Ridomil 2 EC<br>Untrt/Unsoak      | 0.25 PRPL                              | 17.0bcd                                 | 15.3b-e                 | 7596.3c-f       |
| Ridomil 2 EC<br>Untrt/Soaked      | 0.25 PRPL                              | 23.0b                                   | 17.3a                   | 7311.3f         |
| Ridomil 2 EC<br>Trt/Unsoaked      | 0.25 PRPL                              | 23.0b                                   | 15.0c-f                 | 7544.5def       |
| Ridomil 2 EC<br>Trt/Soaked        | 0.25 PRPL                              | 31.0a                                   | 17.3a                   | 7372.5ef        |
| Dithane F-45 4 SC<br>Untrt/Unsoak | 1.6 PRPL                               | 9.5d                                    | 13.3g                   | 7964.0a-d       |
| Dithane F-45 4 SC<br>Untrt/Soaked | 1.6 PRPL                               | 14.5cd                                  | 15.8a-d                 | 7818.0a-e       |
| Dithane F-45 4 SC<br>Trt/Unsoaked | 1.6 PRPL                               | 9.8d                                    | 13.8efg                 | 7987.8a-d       |
| Dithane F-45 4 SC<br>Trt/Soaked   | 1.6 PRPL                               | 16.8bcd                                 | 16.0abc                 | 8125.5ab        |
| Aliette 80 WP<br>Untrt/Unsoak     | 1.6 PRPL                               | 10.3d                                   | 14.3d-g                 | 7926.0a-d       |
| Aliette 80 WP<br>Untrt/Soaked     | 1.6 PRPL                               | 16.3bcd                                 | 16.3abc                 | 7942.3a-d       |
| Aliette 80 WP<br>Trt/Unsoaked     | 1.6 PRPL                               | 12.3d                                   | 13.8efg                 | 8089.0abc       |
| Aliette 80 WP<br>Trt/Soaked       | 1.6 PRPL                               | 20.8bc                                  | 17.0a                   | 7727.0a-f       |
| LSD (.05)                         | =                                      | 6.7                                     | 1.4                     | 435.1           |
| Standard Dev.                     | =                                      | 4.6935                                  | 1.0069                  | 304.48          |
| CV                                | =                                      | 29.39                                   | 6.60                    | 3.91            |

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

## RIDOMIL CULTURAL MANAGEMENT

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Water seeded, Apr 11, 1990

Fertilization: 100-50-50, May 11; 40-20-20, June 4

Plot Size: 16 x 4 ft

Water Management: Flooded, Apr 11; Drained, Apr 17,  
Permanent flood, April 20

Herbicides: 3 qt/A Propanil, May 7; 1 oz/A Londax, May 30;  
Basagran, May 11; 20 lb/A Ordram, June 4

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Preplant (dry), Apr 10; During seeding (in  
water), Apr 11; Post-emerge (in mud), Apr 20

Drained: July 24

Harvest: Aug 6

Experimental Design: Randomized block design with four  
replications

Data Taken: plants/ft<sup>2</sup>, May 8

Results: Table 7

Comments: Water mold severity was low, other diseases were also  
low.



Table 7. Effect of application timing and water management on Ridomil ability to improve rice stands and yield. Rice Research Station, Crowley, LA. 1990.

| Treatment combination           | Rate (ai/A) | Fungicide timing | Plants/ft <sup>2</sup> | Yield (lb/A) |
|---------------------------------|-------------|------------------|------------------------|--------------|
| Clear water<br>(Untreated soil) |             |                  | 27.5a                  | 6260a        |
| Clear water<br>(Ridomil 2 EC)   | 0.5         | PREF             | 36.8a                  | 6369a        |
| Clear water<br>(Ridomil 5 GR)   | 0.5         | FLOD             | 26.3a                  | 6189a        |
| Clear water<br>(Ridomil 2 EC)   | 0.5         | DRAI             | 33.3a                  | 6331a        |
| Muddy water<br>(Untreated soil) |             |                  | 29.5a                  | 6034a        |
| Muddy water<br>(Ridomil 2 EC)   | 0.5         | PREF             | 29.3a                  | 6056a        |
| Muddy water<br>(Ridomil 5 GR)   | 0.5         | FLOD             | 35.0a                  | 6183a        |
| Muddy water<br>(Ridomil 2 EC)   | 0.5         | DRAI             | 32.5a                  | 6264a        |
| LSD (.05) =                     |             |                  | 11.7                   | 567          |
| Standard Dev. =                 |             |                  | 7.9776                 | 385.48       |
| CV =                            |             |                  | 25.53                  | 6.21         |

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

## UNIFORM RICE DISEASE NURSERIES

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Various varieties 100 lb/A

Planting Method/Date: Drill seeded, Apr 23, 1990

Fertilization: 60-60-60, Apr 23; 100-0-0, May 14; 40-0-0, June 4

Plot Size: 16 x 4 ft

Water Management: Flushed, May 2; Permanent flood, May 15

Herbicides: 4 qt/A Propanil + 1 qt/A Basagran, May 14; 1 oz/A Londax, May 30; 20 lb/A Ordram, June 4

Insecticides: 17 lb/A Furadan, May 31

Application Equipment: CO<sub>2</sub> backpack sprayer, 8002 tips, 10 gal/A

Application Dates: None

Drained: N/A

Harvest: N/A

Experimental Design: Randomized block design with two replications

Disease Ratings: Sheath blight severity, Aug 20

Results: Table 8

Comments: Sheath blight severity was high due to favorable rainy weather during boot and heading growth stages while blast was moderate in intensity. 'Jasmine 85' and 'Della' cultivars were most resistant to sheath blight. The cultivars 'Newbonnet,' 'Mars,' 'Mercury,' and 'L202' were most susceptible to blast.

Table 8. Reaction of rice varieties in the Uniform Rice Nursery to sheath blight and leaf blast. Rice Research Station, Crowley, LA. 1990.

| Cultivar     | Sheath blight* | Leaf blast* |
|--------------|----------------|-------------|
| Katy         | 6.0            | 3.5         |
| Millie       | 6.0            | 4.0         |
| Labelle      | 8.0            | 5.0         |
| Tebonnet     | 6.5            | 4.5         |
| Skybonnet    | 6.0            | 4.0         |
| Gulfmont     | 8.0            | 5.0         |
| L202         | 8.0            | 5.5         |
| Lemont       | 8.0            | 5.0         |
| Lebonnet     | 8.5            | 4.0         |
| Newbonnet    | 6.5            | 5.5         |
| Maybelle     | 8.0            | 4.0         |
| Alan         | 8.0            | 4.0         |
| Texmont      | 8.0            | 5.0         |
| Mars         | 6.0            | 5.5         |
| Mercury      | 6.5            | 6.0         |
| Rico-1       | 6.0            | 4.0         |
| Jasmine 85   | 3.0            | 5.0         |
| Della        | 5.0            | 4.0         |
| LSD (P=0.05) | 0.9            | 1.3         |

\* Ratings based on 0 to 9 scale where 0 = no disease (immune) and 9 = maximum disease (very susceptible).

## SHEATH BLIGHT YIELD LOSS AND SCOUTING METHODS

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, Mars, Tebonnet, 100 lb/A

Planting Method/Date: Drill seeded, Apr 24, 1990

Fertilization: 75-75-75, Apr 23; 90-0-0, May 16

Plot Size: 16 x 4 ft

Emergence Date: Apr 30

Water Management: Flushed, May 2; Permanent flood, May 17

Herbicides: 4 qt/A Propanil + 1.5 pt/A Basagran, May 15;  
2 oz/A Londax, May 20

Insecticides: 17 lb/A Furadan, May 31

Harvest: Aug 16

Experimental Design: Randomized block design with five  
replications

Disease Ratings: Sheath blight severity (0-9 scale), Aug 13;  
Infestation levels (0-100%), Aug 13

Results: Table 9

Comments: Sheath blight severity was high, other diseases were  
very low.

There was a clear trend between the increase in initial tillers infected at panicle initiation and a decrease in yields due to sheath blight with the susceptible cultivar Lemont. There were no such trends with the less susceptible cultivars Mars and Tebonnet. On Mars and Tebonnet, initial infection did not exceed 10%, but on Lemont it was as high as 20% at the high inoculum levels.

Table 9. Results of sheath blight yield loss and scouting experiment. Rice Research Station, Crowley, LA. 1990.

| Variety<br>ml inoc/plot | Percent tillers infected |          | Sheath blight<br>rating | Yield<br>(lb/A) |
|-------------------------|--------------------------|----------|-------------------------|-----------------|
|                         | Tillering                | Maturity |                         |                 |
| <u>Lemont</u>           |                          |          |                         |                 |
| 0                       | 5.6                      | 66       | 5.0                     | 6740            |
| 0                       | 1.8                      | 68       | 4.2                     | 7324            |
| 12                      | 6.6                      | 43       | 6.4                     | 6004            |
| 25                      | 7.8                      | 81       | 6.8                     | 6166            |
| 50                      | 8.4                      | 74       | 6.6                     | 6042            |
| 75                      | 17.8                     | 87       | 7.2                     | 6290            |
| 100                     | 20.4                     | 87       | 7.6                     | 5724            |
| 125                     | 11.6                     | 92       | 7.8                     | 5773            |
| <u>Mars</u>             |                          |          |                         |                 |
| 0                       | 0.8                      | 19       | 4.0                     | 7953            |
| 0                       | 2.6                      | 33       | 3.6                     | 8188            |
| 12                      | 1.4                      | 37       | 4.4                     | 8140            |
| 25                      | 3.6                      | 49       | 4.6                     | 8304            |
| 50                      | 7.4                      | 49       | 5.4                     | 8145            |
| 75                      | 7.6                      | 64       | 5.4                     | 8557            |
| 100                     | 5.8                      | 54       | 5.6                     | 8234            |
| 125                     | 6.2                      | 63       | 4.8                     | 8173            |
| <u>Tebonnet</u>         |                          |          |                         |                 |
| 0                       | 3.2                      | 18       | 4.0                     | 7499            |
| 0                       | 1.4                      | 10       | 3.6                     | 7600            |
| 12                      | 5.6                      | 44       | 5.4                     | 7546            |
| 25                      | 3.2                      | 33       | 5.4                     | 7330            |
| 50                      | 4.0                      | 53       | 6.6                     | 7216            |
| 75                      | 3.1                      | 61       | 6.0                     | 7280            |
| 100                     | 7.8                      | 76       | 6.8                     | 7030            |
| 125                     | 7.6                      | 52       | 7.0                     | 7201            |

# **CHEMICAL CONTROL OF BLAST IN LOUISIANA<sup>1</sup>**

**M.C. Rush and D.E. Groth**

## **INTRODUCTION**

Chemical control of rice blast is one part of a broader program of chemical control of foliar diseases of rice. Coordination of all chemical control studies in rice provides better knowledge of the full capabilities of all of the materials that are used.

## **MATERIALS AND METHODS**

The blast susceptible California rice cultivar M-201 was planted April 24, 1990. A randomized complete block design with five replicates were used for this test. The plots measured 4 ft X 20 ft with seven drill rows on a 7 inch spacing. All of the fertilizer was applied at the rate of 120-60-60 lb of total N, P, and K per acre. The chemicals were applied with a 2-nozzle (8002) boom at the rate of 20 gal/A and approximately 40 psi. Twenty-three fungicide rates were used with an application at the boot stage (June 22) and one at the heading stage (July 3) (Table 1). Four samples of 25 panicles in each plot were examined and the percentage rotten-neck and panicle blast was determined. The center four rows were harvested (46.7 sq. ft.) with a small-plot combine (August 8, 1990).

## **RESULTS AND DISCUSSION**

In this test 9 of 23 fungicidal treatments gave significantly increased yields over the unsprayed control (Table 1). The RO43-2664, RO43-1056, Beam, and Benlate treatments significantly increased yields. Rotten-neck blast was very severe in 1990. The RO43-2664 and RO43-1056 compounds gave outstanding blast control in this test. These treatments increased yield from 1844 to 3738 lb/A over the unsprayed control. The best Beam treatment increased yield by 1812 lb/A. The Benlate treatment increased yield by 1374 lb/A.

The RO43-2664 compound appeared to be very broad spectrum, giving significant control of both blast and sheath blight in the 1990 tests.

---

<sup>1</sup> Mention of trade names of the fungicides or other chemicals described in this report are for identification purposes only and does not imply endorsement by Louisiana State University Agricultural Center.

Table 1. Effect of fungicidal spray applications on control of panicle blast, rotten-neck blast and on yield. Rice Research Station, Crowley, LA. 1990.

| Treatment               | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>Rotten-neck<br>blast<br>(%) | Mean <sup>b/</sup><br>Panicle<br>blast<br>(%) | Mean <sup>b/</sup><br>Yield<br>(lb/A) | Change<br>from<br>unsprayed<br>(lb/A) |
|-------------------------|------------------------------------|----------------------|---------------------------------------------------|-----------------------------------------------|---------------------------------------|---------------------------------------|
| RO43-2664               | 0.9 pt                             | B + H                | 15.4**                                            | 22.2**                                        | 6803**                                | 3738                                  |
| RO43-2664               | 1.4 pt                             | B + H                | 11.4**                                            | 18.8**                                        | 6421**                                | 3356                                  |
| RO43-2664               | 1.8 pt                             | B + H                | 9.4**                                             | 18.0**                                        | 6694**                                | 3629                                  |
| RO43-1056               | 0.9 pt                             | B + H                | 63.0**                                            | 64.2**                                        | 5369**                                | 2304                                  |
| RO43-1056               | 1.4 pt                             | B + H                | 84.2**                                            | 91.6                                          | 4909**                                | 1844                                  |
| RO43-1056               | 1.8 pt                             | B + H                | 47.8**                                            | 54.0**                                        | 5478**                                | 2413                                  |
| Exp 10064B              | 0.18 lb                            | B + H                | 96.2                                              | 99.2                                          | 3549                                  | 484                                   |
| Exp 10064B              | 0.22 lb                            | B + H                | 97.4                                              | 97.6                                          | 3368                                  | 300                                   |
| Exp 10064B              | 0.27 lb                            | B + H                | 98.8                                              | 100.0                                         | 3411                                  | 346                                   |
| Exp 10064B<br>+ Rovral  | 0.18 lb<br>0.5 lb                  | B + H<br>B + H       | 96.6                                              | 98.4                                          | 3261                                  | 196                                   |
| Aliette                 | 1.6 lb                             | B + H                | 99.2                                              | 99.2                                          | 2882                                  | -183                                  |
| Aliette<br>+ Exp 10064B | 1.6 lb<br>0.18 lb                  | B + H<br>B + H       | 98.8                                              | 100.0                                         | 3235                                  | 170                                   |
| Exp 10064B              | 0.36 lb                            | B                    | 98.4                                              | 98.6                                          | 3541                                  | 476                                   |
| Beam                    | 0.3 lb                             | B + H                | 66.6**                                            | 72.0**                                        | 4877**                                | 1812                                  |
| Benlate                 | 1.0 lb                             | B + H                | 89.6                                              | 92.2                                          | 4439**                                | 1374                                  |
| Exp 10211A              | 0.18 lb                            | B + H                | 99.2                                              | 99.4                                          | 3082                                  | 17                                    |

Continued

Table 1. (Cont'd)

| Treatment         | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>Rotten-neck<br>blast<br>(%) | Mean <sup>b/</sup><br>Panicle<br>blast<br>(%) | Mean <sup>b/</sup><br>Yield<br>(lb/A) | Change<br>from<br>unsprayed<br>(lb/A) |
|-------------------|------------------------------------|----------------------|---------------------------------------------------|-----------------------------------------------|---------------------------------------|---------------------------------------|
| Exp 10211A        | 0.27 lb                            | B + H                | 96.8                                              | 98.4                                          | 3588                                  | 523                                   |
| Exp 10108A        | 0.18 lb                            | B + H                | 99.2                                              | 99.4                                          | 3241                                  | 176                                   |
| Exp 10108A        | 0.27 lb                            | B + H                | 97.0                                              | 98.6                                          | 3754                                  | 689                                   |
| BAS 480 OOF       | 0.15 lb                            | B + H                | 97.6                                              | 98.6                                          | 3789                                  | 724                                   |
| SAN 619           | 0.10 lb                            | B + H                | 97.6                                              | 98.8                                          | 3627                                  | 562                                   |
| HWG 1608          | 0.125 qt                           | B + H                |                                                   |                                               |                                       |                                       |
| + Triton CS-7     | 0.5% v/v                           | B + H                | 98.6                                              | 99.4                                          | 3142                                  | 77                                    |
| Beam              | 0.60 lb                            | B                    | 92.4                                              | 94.2                                          | 4586**                                | 1521                                  |
| Untreated Control | --                                 | --                   | 98.6                                              | 99.2                                          | 3065                                  | --                                    |
| LSD 0.01          |                                    |                      | 12.7                                              | 12.9                                          | 1082                                  |                                       |
| LSD 0.05          |                                    |                      | 9.6                                               | 9.8                                           | 819                                   |                                       |

<sup>a/</sup> B = boot stage (1 to 2 inch panicle), H = heading stage (80% of panicles emerging).

<sup>b/</sup> Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.



# FUNGICIDAL CONTROL OF RICE FOLIAR AND STEM DISEASES<sup>1</sup>

M.C. Rush, D.E. Groth, and E. Higgins

## INTRODUCTION

Field testing of foliar applications of fungicides for the control of disease caused by fungi was initiated in 1972. Theoretically, the fungal diseases occurring on rice in Louisiana can be controlled by foliar applications of fungicides. The diseases which are economically significant include blast (*Pyricularia oryzae*), brown spot (*Bipolaris oryzae*), narrow brown leaf spot (*Cercospora oryzae*), and leaf smut (*Entyloma oryzae*). These diseases are endemic in the Louisiana rice area becoming epidemic periodically. Certain of our presently grown commercial varieties are very susceptible to these diseases. Ultimately, control of these diseases will be by an integrated disease management system using a combination of pesticides, disease resistance, cultural practices, biological control, and legislative-regulatory procedures. It is important that effective fungicides are found, developed, and made available to Louisiana rice growers for use in disease management programs.

## MATERIALS AND METHODS

A test was conducted at the Rice Research Station, Crowley, LA, during the 1990 season to screen fungicides for their efficacy in controlling foliar and stem diseases on Lemont rice. The tests were conducted on Crowley silt loam soil with a Ph of 6.0. Plots were 20-ft, 7-row, drill strips with 7-inch row spacing and 14-inch alleys. Each treatment was replicated five times using a randomized complete block design. The plots in this test were inoculated with *Rhizoctonia solani* as previously described and infections by the target fungi were from this inoculation or from natural sources of inoculum. Six hundred lb/A of 20-10-10 fertilizer was applied by a drill application to the test area at planting. Plots were planted April 24, 1990, and 4 lb/A of propanil was applied over the test area before applying the permanent flood. Fungicide applications were made at the green ring (June 22), early boot (July 5), and heading (July 25) stages of growth. Fungicides were applied in 20 gal/A of water with a backpack type CO<sub>2</sub> sprayer. The treatments were as indicated in Table 1.

Plots were rated for disease incidence 5 days before harvest. Rating systems for the foliar diseases (1) were previously reported. The plots were harvested with a small-plot combine on August 23, 1990. Rough rice weights were corrected to 12% moisture.

---

<sup>1</sup> Mention of trade names of the fungicides or other chemicals described in this report are for identification purposes only and does not imply endorsement by Louisiana State University Agricultural Center.

## RESULTS AND DISCUSSION

In this test, 25 of 55 fungicidal treatments gave significant yield increases ranging from 544 to 1384 lb/A (Table 1). The mean difference between the inoculated and uninoculated control plots was 693 lb/A. Outstanding sheath blight control was given by the RO43-2664, and Mon-24004 treatments.

Narrow brown leaf spot, brown spot, and leaf smut infections were low in 1990. This probably was a reflection of 3 weeks of dry weather late in the season. The BAS 480 OOF, RO43-2664, and RO43-1056 treatments nearly eliminated all three diseases in this test (Table 2).

## LITERATURE CITED

1. Groth, D.E. and M.C. Rush. 1985. Rice disease assessment keys. Ann. Prog. Rpt., Rice Res. Sta., LA Agr. Expt. Sta., LSU Agricultural Center 77:250-257.

Table 1. Effects of foliar fungicides on sheath blight control and yield in 1990. Rice Research Station; Crowley, LA.

| Treatment                       | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Yield<br>(lb/A) | Change from<br>unsprayed<br>(lb/A) | Mean <sup>b/</sup><br>% tillers<br>infected at<br>maturity | Mean <sup>b/</sup><br>% tillers<br>dead at<br>maturity | Mean <sup>b/</sup><br>disease rating<br>at maturity<br>(0-9) |
|---------------------------------|------------------------------------|----------------------|-----------------|------------------------------------|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| Uninoculated check              | --                                 | --                   | 7650**          | 813                                | 16.8**                                                     | 0.2**                                                  | 1.8**                                                        |
| Unsprayed -<br>inoculated check | --                                 | --                   | 6837            | --                                 | 83.2                                                       | 16.0                                                   | 4.6                                                          |
| Monceren 50WP                   | 0.5 lb                             | B + H                | 7503*           | 666                                | 35.8**                                                     | 1.0**                                                  | 2.4**                                                        |
| Monceren 4SL                    | 0.25 qt                            | B + H                | 7537*           | 700                                | 37.4**                                                     | 0.5**                                                  | 2.8*                                                         |
| Monceren 4SL<br>+ Triton CS-7   | 0.25 qt<br>0.50% v/v               | B + H<br>B + H       | 7173            | 336                                | 51.2*                                                      | 0.5**                                                  | 2.0**                                                        |
| HWG 1608<br>+ Triton CS-7       | 0.125 qt<br>0.50% v/v              | B + H<br>B + H       | 6914            | 77                                 | 89.6                                                       | 7.0                                                    | 4.8                                                          |
| RH-7592<br>+ Triton CS-7        | 0.125 lb<br>0.25% v/v              | B + H<br>B + H       | 7217            | 380                                | 77.4                                                       | 6.7                                                    | 3.8                                                          |
| RH-7592<br>+ Triton CS-7        | 0.17 lb<br>0.25% v/v               | B + H<br>B + H       | 7092            | 255                                | 63.6                                                       | 6.2*                                                   | 4.0                                                          |
| Moncut 50WP                     | 0.5 lb                             | GR + B               | 7367            | 530                                | 37.6**                                                     | 2.5*                                                   | 3.6                                                          |
| Moncut 50WP                     | 0.7 lb                             | GR + B               | 7450*           | 613                                | 31.8**                                                     | 7.0                                                    | 3.0*                                                         |
| Moncut 70DF                     | 0.36 lb                            | GR + B               | 7626**          | 789                                | 28.6**                                                     | 15.9                                                   | 5.2                                                          |
| Moncut 70DF                     | 0.5 lb                             | GR + B               | 7372            | 535                                | 39.2**                                                     | 10.7                                                   | 4.2                                                          |
| Tilt 3.6EC                      | 10 oz                              | B                    | 6786            | -51                                | 58.6                                                       | 17.5                                                   | 5.4                                                          |

Continued

Table 1 (Cont'd)

| Treatment                    | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Yield<br>(lb/A) | Change from<br>unsprayed<br>(lb/A) | Mean <sup>b/</sup><br>% tillers<br>infected at<br>maturity | Mean <sup>b/</sup><br>% tillers<br>dead at<br>maturity | Mean <sup>b/</sup><br>disease rating<br>at maturity<br>(0-9) |
|------------------------------|------------------------------------|----------------------|-----------------|------------------------------------|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| Tilt 3.6EC<br>+ Benlate 50DF | 10 oz<br>1 lb                      | B<br>H               | 7555*           | 718                                | 60.4                                                       | 0.6**                                                  | 2.8*                                                         |
| Benlate 50DF                 | 1 lb                               | B + H                | 7231            | 394                                | 37.8**                                                     | 1.3**                                                  | 3.4                                                          |
| BAS 480 00F                  | 0.1 lb                             | GR + B               | 6816            | -21                                | 60.2                                                       | 30.0**(-)                                              | 5.6                                                          |
| BAS 480 00F                  | 0.15 lb                            | GR + B               | 7347            | 510                                | 38.2**                                                     | 7.1                                                    | 4.2                                                          |
| BAS 480 00F                  | 0.1 lb                             | B + H                | 7281            | 444                                | 56.0*                                                      | 0.4**                                                  | 2.8*                                                         |
| BAS 480 00F                  | 0.15 lb                            | GR + H               | 7237            | 400                                | 37.4**                                                     | 0.8**                                                  | 3.2*                                                         |
| BAS 480 00F                  | 0.15 lb                            | B + H                | 7164            | 327                                | 48.0**                                                     | 0.4**                                                  | 2.2**                                                        |
| BAS 480 00F                  | 0.1 lb                             | GR + H               | 7155            | 318                                | 59.4                                                       | 13.9                                                   | 3.8                                                          |
| Tilt 3.6EC                   | 6 oz                               | GR + B               | 7061            | 224                                | 71.8                                                       | 29.0*(-)                                               | 5.8                                                          |
| Rovral                       | 1 pt                               | B + H                | 7257            | 420                                | 50.0**                                                     | 0.8**                                                  | 3.2*                                                         |
| SAN 619                      | 0.94 pt                            | GR + B               | 7330            | 493                                | 34.0**                                                     | 7.0                                                    | 4.0                                                          |
| SAN 619                      | 1.88 pt                            | B                    | 7399*           | 562                                | 33.4**                                                     | 1.9**                                                  | 2.2**                                                        |
| SAN 619<br>+ Benlate 50DF    | 1.88 pt<br>1 lb                    | B<br>H               | 7689**          | 852                                | 30.4**                                                     | 0.5**                                                  | 1.6**                                                        |
| SAN 619                      | 0.625 pt                           | GR + B               | 7498*           | 661                                | 42.4**                                                     | 8.4                                                    | 4.2                                                          |
| SAN 619                      | 1.25 pt                            | B                    | 7520*           | 683                                | 53.4**                                                     | 1.2**                                                  | 2.8*                                                         |

Continued

Table 1 (Cont'd)

| Treatment           | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Yield<br>(lb/A) | Change from<br>unsprayed<br>(lb/A) | Mean <sup>b/</sup><br>% tillers<br>infected at<br>maturity | Mean <sup>b/</sup><br>% tillers<br>dead at<br>maturity | Mean <sup>b/</sup><br>disease rating<br>at maturity<br>(0-9) |
|---------------------|------------------------------------|----------------------|-----------------|------------------------------------|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| SAN 619<br>+ Moncut | 0.94 pt<br>0.7 lb                  | GR<br>B              | 7493*           | 656                                | 51.6*                                                      | 8.4                                                    | 3.6                                                          |
| SAN 619<br>+ Moncut | 0.625 pt<br>0.7 lb                 | GR<br>B              | 6978            | 141                                | 37.0**                                                     | 13.0                                                   | 3.8                                                          |
| Moncut<br>+ SAN 619 | 0.7 lb<br>0.94 pt                  | GR<br>B              | 7813*           | 973                                | 44.6**                                                     | 11.7                                                   | 4.2                                                          |
| SAN 619             | 0.94 pt                            | B + H                | 7872**          | 1035                               | 41.8**                                                     | 0.0**                                                  | 1.4**                                                        |
| R043-2664           | 0.9 pt                             | B + H                | 8221**          | 1384                               | 36.8**                                                     | 0.0**                                                  | 1.4**                                                        |
| R043-2664           | 1.4 pt                             | B + H                | 7734**          | 897                                | 17.2**                                                     | 0.0**                                                  | 1.2**                                                        |
| R043-2664           | 1.8 pt                             | B + H                | 8099**          | 1262                               | 25.8**                                                     | 0.0**                                                  | 1.0**                                                        |
| R043-1056           | 0.9 pt                             | B + H                | 7919**          | 1082                               | 44.6**                                                     | 0.5**                                                  | 1.8**                                                        |
| R043-1056           | 1.4 pt                             | B + H                | 7633**          | 796                                | 33.2**                                                     | 0.0**                                                  | 2.2**                                                        |
| R043-1056           | 1.8 pt                             | B + H                | 7456*           | 619                                | 44.6**                                                     | 0.4**                                                  | 1.8**                                                        |
| Mon-24004           | 0.25 lb                            | GR                   | 7653**          | 816                                | 21.0**                                                     | 0.7**                                                  | 1.8**                                                        |
| Mon-24004           | 0.06 lb                            | GR + B               | 7406*           | 569                                | 13.0**                                                     | 1.0**                                                  | 2.2**                                                        |
| Mon-24004           | 0.125 lb                           | GR + B               | 7495*           | 658                                | 15.8**                                                     | 0.0**                                                  | 1.4**                                                        |
| Mon-24004           | 0.188 lb                           | GR + B               | 7430*           | 593                                | 11.2**                                                     | 0.0**                                                  | 1.0**                                                        |
| Mon-24004           | 0.25 lb                            | GR + B               | 7652**          | 815                                | 9.0**                                                      | 0.0**                                                  | 1.2**                                                        |

Continued

Table 1 (Cont'd)

| Treatment              | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Yield<br>(lb/A) | Change from<br>unsprayed<br>(lb/A) | Mean <sup>b/</sup><br>% tillers<br>infected at<br>maturity | Mean <sup>b/</sup><br>% tillers<br>dead at<br>maturity | Mean <sup>b/</sup><br>disease rating<br>at maturity<br>(0-9) |
|------------------------|------------------------------------|----------------------|-----------------|------------------------------------|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| Mon-24004              | 0.25 lb                            | B                    | 7355            | 518                                | 43.4**                                                     | 0.2**                                                  | 2.2**                                                        |
| Exp 10211A             | 0.2 lb                             | B + H                | 7237            | 400                                | 66.6                                                       | 14.2                                                   | 4.8**                                                        |
| Exp 10211A             | 0.4 lb                             | B + H                | 6934            | 97                                 | 66.6                                                       | 18.0                                                   | 4.8                                                          |
| Exp 10108A             | 0.18 lb                            | B + H                | 7240            | 403                                | 39.8**                                                     | 4.7*                                                   | 3.8                                                          |
| Exp 10108A             | 0.27 lb                            | B + H                | 7620**          | 783                                | 35.4**                                                     | 1.1**                                                  | 3.0*                                                         |
| Exp 10108A<br>+ Rovral | 0.18 lb<br>0.5 lb                  | B + H<br>B + H       | 7623**          | 786                                | 49.8**                                                     | 0.0**                                                  | 1.6**                                                        |
| Exp 10064B             | 0.18 lb                            | B + H                | 7267            | 430                                | 52.4*                                                      | 1.4**                                                  | 3.2*                                                         |
| Exp 10064B             | 0.22 lb                            | B + H                | 7282            | 445                                | 45.8**                                                     | 3.5*                                                   | 3.4                                                          |
| Exp 10064B             | 0.27 lb                            | B + H                | 7185            | 348                                | 54.8*                                                      | 3.5*                                                   | 2.8*                                                         |
| Exp 10064B             | 0.27 lb                            | GR + B               | 7162            | 325                                | 59.4                                                       | 17.5                                                   | 5.0                                                          |
| Exp 10064B<br>+ Rovral | 0.18 lb<br>0.5 lb                  | B + H<br>B + H       | 7330            | 493                                | 38.0**                                                     | 0.5**                                                  | 2.2**                                                        |
| Exp 10064B             | 0.36 lb                            | B                    | 7011            | 174                                | 80.4                                                       | 18.5                                                   | 4.8                                                          |

Continued

Table 1 (Cont'd)

| Treatment                    | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Yield<br>(lb/A) | Change from<br>unsprayed<br>(lb/A) | Mean <sup>b/</sup><br>% tillers<br>infected at<br>maturity | Mean <sup>b/</sup><br>% tillers<br>dead at<br>maturity | Mean <sup>b/</sup><br>disease rating<br>at maturity<br>(0-9) |
|------------------------------|------------------------------------|----------------------|-----------------|------------------------------------|------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------|
| Aliette 80WP                 | 1.6 lb                             | B + H                | 7206            | 369                                | 44.0**                                                     | 10.4                                                   | 3.8                                                          |
| Aliette 80WP<br>+ Exp 10064B | 1.6 lb<br>0.18 lb                  | B + H<br>B + H       | 7550*           | 713                                | 49.6**                                                     | 1.9**                                                  | 3.6                                                          |
| LSD 0.01                     |                                    |                      | 715             |                                    | 33.1                                                       | 13.88                                                  | 1.9                                                          |
| LSD 0.05                     |                                    |                      | 544             |                                    | 25.2                                                       | 10.56                                                  | 1.4                                                          |

<sup>a/</sup> GR = green-ring stage of growth (first internode elongating), B = boot stage (1-2 inch panicles), H = heading stage (80-90% of panicles emerging).

<sup>b/</sup> Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.

Table 2. Effects of foliar fungicides on control of leaf smut, brown spot and narrow brown spot in 1990.  
Rice Research Station; Crowley, LA.

| Treatment                       | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>disease rating<br>leaf smut<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>brown spot<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>narrow brown spot<br>(0-9) |
|---------------------------------|------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| Uninoculated check              | --                                 | --                   | 1.6**                                                      | 1.2                                                         | 2.2                                                                |
| Unsprayed -<br>inoculated check | --                                 | --                   | 3.2                                                        | 1.6                                                         | 2.4                                                                |
| Monceren 50WP                   | 0.5 lb                             | B + H                | 2.0*                                                       | 1.0                                                         | 2.6                                                                |
| Monceren 4SL                    | 0.25 qt                            | B + H                | 1.8**                                                      | 1.6                                                         | 3.0                                                                |
| Monceren 4SL<br>+ Triton CS-7   | 0.25 qt<br>0.50% v/v               | B + H<br>B + H       | 2.2*                                                       | 1.2                                                         | 2.6                                                                |
| HWG 1608<br>+ Triton CS-7       | 0.125 qt<br>0.50% v/v              | B + H<br>B + H       | 1.4**                                                      | 1.0                                                         | 1.6                                                                |
| RH-7592<br>+ Triton CS-7        | 0.125 lb<br>0.25% v/v              | B + H<br>B + H       | 0.0**                                                      | 0.2**                                                       | 0.0**                                                              |
| RH-7592<br>+ Triton CS-7        | 0.17 lb<br>0.25% v/v               | B + H<br>B + H       | 0.0**                                                      | 0.4**                                                       | 0.0**                                                              |
| Moncut 50WP                     | 0.5 lb                             | GR + B               | 0.2**                                                      | 2.0                                                         | 2.0                                                                |
| Moncut 50WP                     | 0.7 lb                             | GR + B               | 0.0**                                                      | 1.2                                                         | 1.8                                                                |
| Moncut 70DF                     | 0.36 lb                            | GR + B               | 0.4**                                                      | 2.0                                                         | 2.0                                                                |
| Moncut 70DF                     | 0.5 lb                             | GR + B               | 0.0**                                                      | 1.0                                                         | 2.8                                                                |
| Tilt 3.6EC                      | 10 oz                              | B                    | 0.2**                                                      | 0.8                                                         | 1.4                                                                |

Continued



Table 2 (Cont'd)

| Treatment                    | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>disease rating<br>leaf smut<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>brown spot<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>narrow brown spot<br>(0-9) |
|------------------------------|------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| Tilt 3.6EC<br>+ Benlate 50DF | 10 oz<br>1 lb                      | B<br>H               | 0.0*                                                       | 0.4**                                                       | 1.4                                                                |
| Benlate 50DF                 | 1 lb                               | B + H                | 0.6**                                                      | 0.4**                                                       | 1.2*                                                               |
| BAS 480 00F                  | 0.1 lb                             | GR + B               | 0.0**                                                      | 1.0                                                         | 1.2*                                                               |
| BAS 480 00F                  | 0.15 lb                            | GR + B               | 0.0**                                                      | 1.0                                                         | 1.8                                                                |
| BAS 480 00F                  | 0.1 lb                             | B + H                | 0.0**                                                      | 0.2**                                                       | 0.0**                                                              |
| BAS 480 00F                  | 0.15 lb                            | GR + H               | 0.0**                                                      | 0.0**                                                       | 0.0**                                                              |
| BAS 480 00F                  | 0.15 lb                            | B + H                | 0.0**                                                      | 0.2**                                                       | 0.0**                                                              |
| BAS 480 00F                  | 0.1 lb                             | GR + H               | 0.0**                                                      | 1.0                                                         | 0.4**                                                              |
| Tilt 3.6EC                   | 6 oz                               | GR + B               | 0.0**                                                      | 1.6                                                         | 1.2*                                                               |
| Rovral                       | 1 pt                               | B + H                | 0.2**                                                      | 0.8                                                         | 2.4                                                                |
| SAN 619                      | 0.94 pt                            | GR + B               | 0.0**                                                      | 1.6                                                         | 0.8**                                                              |
| SAN 619                      | 1.88 pt                            | B                    | 0.0**                                                      | 0.8                                                         | 1.0*                                                               |
| SAN 619<br>+ Benlate 50DF    | 1.88 pt<br>1 lb                    | B<br>H               | 0.0**                                                      | 0.4**                                                       | 1.0*                                                               |
| SAN 619                      | 0.625 pt                           | GR + B               | 0.0**                                                      | 1.0                                                         | 1.6                                                                |
| SAN 619                      | 1.25 pt                            | B                    | 0.0**                                                      | 1.2                                                         | 1.8                                                                |

Continued

Table 2 (Cont'd)

| Treatment           | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>disease rating<br>leaf smut<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>brown spot<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>narrow brown spot<br>(0-9) |
|---------------------|------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| SAN 619<br>+ Moncut | 0.94 pt<br>0.7 lb                  | GR<br>B              | 0.2**                                                      | 1.4                                                         | 1.6                                                                |
| SAN 619<br>+ Moncut | 0.625 pt<br>0.7 lb                 | GR<br>B              | 0.2**                                                      | 0.8                                                         | 1.8                                                                |
| Moncut<br>+ SAN 619 | 0.7 lb<br>0.94 pt                  | GR<br>B              | 0.0**                                                      | 1.8                                                         | 0.2**                                                              |
| SAN 619             | 0.94 pt                            | B + H                | 0.0**                                                      | 0.8                                                         | 0.0**                                                              |
| R043-2664           | 0.9 pt                             | B + H                | 0.0**                                                      | 0.4**                                                       | 0.0**                                                              |
| R043-2664           | 1.4 pt                             | B + H                | 0.0**                                                      | 0.0**                                                       | 0.0**                                                              |
| R043-2664           | 1.8 pt                             | B + H                | 0.0**                                                      | 0.6*                                                        | 0.0**                                                              |
| R043-1056           | 0.9 pt                             | B + H                | 0.0**                                                      | 0.6*                                                        | 0.0**                                                              |
| R043-1056           | 1.4 pt                             | B + H                | 0.0**                                                      | 1.0                                                         | 0.0**                                                              |
| R043-1056           | 1.8 pt                             | B + H                | 0.0**                                                      | 0.8                                                         | 0.0**                                                              |
| Mon-24004           | 0.25 lb                            | GR                   | 0.2**                                                      | 1.4                                                         | 1.6                                                                |
| Mon-24004           | 0.06 lb                            | GR + B               | 0.0**                                                      | 1.2                                                         | 1.0*                                                               |
| Mon-24004           | 0.125 lb                           | GR + B               | 0.2**                                                      | 0.6*                                                        | 2.4                                                                |
| Mon-24004           | 0.188 lb                           | GR + B               | 0.0**                                                      | 1.0                                                         | 1.8                                                                |
| Mon-24004           | 0.25 lb                            | GR + B               | 0.0**                                                      | 0.6*                                                        | 0.8**                                                              |

Continued

Table 2 (Cont'd)

| Treatment              | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>disease rating<br>leaf smut<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>brown spot<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>narrow brown spot<br>(0-9) |
|------------------------|------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| Mon-24004              | 0.25 lb                            | B                    | 0.0**                                                      | 0.8                                                         | 2.2                                                                |
| Exp 10211A             | 0.2 lb                             | B + H                | 2.4                                                        | 1.4                                                         | 2.2                                                                |
| Exp 10211A             | 0.4 lb                             | B + H                | 1.8**                                                      | 1.2                                                         | 2.0                                                                |
| Exp 10108A             | 0.18 lb                            | B + H                | 0.0**                                                      | 1.0                                                         | 1.2*                                                               |
| Exp 10108A             | 0.27 lb                            | B + H                | 0.0**                                                      | 1.2                                                         | 1.6                                                                |
| Exp 10108A<br>+ Rovral | 0.18 lb<br>0.5 lb                  | B + H<br>B + H       | 0.0**                                                      | 0.2**                                                       | 0.6**                                                              |
| Exp 10064B             | 0.18 lb                            | B + H                | 0.0**                                                      | 1.0                                                         | 0.0**                                                              |
| Exp 10064B             | 0.22 lb                            | B + H                | 0.0**                                                      | 0.6*                                                        | 0.0**                                                              |
| Exp 10064B             | 0.27 lb                            | B + H                | 0.0**                                                      | 0.0**                                                       | 0.0**                                                              |
| Exp 10064B             | 0.27 lb                            | GR + B               | 0.0**                                                      | 1.4                                                         | 0.8**                                                              |
| Exp 10064B<br>+ Rovral | 0.18 lb<br>0.5 lb                  | B + H<br>B + H       | 0.0**                                                      | 0.2**                                                       | 0.0**                                                              |
| Exp 10064B             | 0.36 lb                            | B                    | 0.0**                                                      | 1.2                                                         | 0.6**                                                              |

Continued

Table 2 (Cont'd)

| Treatment                    | Rate<br>(lb or pt/A<br>formulated) | Timing <sup>a/</sup> | Mean <sup>b/</sup><br>disease rating<br>leaf smut<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>brown spot<br>(0-9) | Mean <sup>b/</sup><br>disease rating<br>narrow brown spot<br>(0-9) |
|------------------------------|------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| Aliette 80WP                 | 1.6 lb                             | B + H                | 0.4**                                                      | 1.4                                                         | 2.4                                                                |
| Aliette 80WP<br>+ Exp 10064B | 1.6 lb<br>0.18 lb                  | B + H<br>B + H       | 0.0**                                                      | 0.8                                                         | 0.0**                                                              |
| LSD 0.01                     |                                    |                      | 1.4                                                        | 1.2                                                         | 1.6                                                                |
| LSD 0.05                     |                                    |                      | 1.0                                                        | 0.9                                                         | 1.2                                                                |

<sup>a/</sup> GR = green-ring stage of growth (first internode elongating), B = boot stage (1-2 inch panicles), H = heading stage (80-90% of panicles emerging).

<sup>b/</sup> Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.

# CHEMICAL CONTROL OF RICE SEEDLING DISEASES<sup>1</sup>

M.C. Rush and Elizabeth Higgins

## INTRODUCTION

Seed-rot and damping-off diseases are common in the Southern rice area causing stand reduction and irregularities in water-planted and, to a lesser extent, drill-planted rice. Losses are incurred directly through the costs of replanting and indirectly through the inefficient use of space and light in irregular stands, and by increased competition with weeds. Rice seed germination and growth of seedlings is often poor under the weather conditions normally encountered in March and early April in the Southern rice area. Considerable damage to water-planted seed is encountered under these cool weather conditions regardless of the seed-treatment fungicides used. The fungi causing seed rotting and water-mold in water-seeded rice included species of Achlya, Pythium, and Fusarium. Drill-seeded rice can be injured by several seedborne fungi included Helminthosporium oryzae, Curvularia lunata, Fusarium roseum, and Fusarium moniliforme. Soilborne pathogens like Rhizoctonia solani, Sclerotium rolfsii, and Pythium spp. can also cause seedling blight.

Theoretically, seed and seedling diseases of rice can be economically controlled by seed-treatment fungicides. For this reason, a program to develop more effective fungicidal seed treatments has been conducted at the LSU Rice Research Station since the early 1970's. Fungicides or formulation of fungicides are field screened in experimental tests each year. Those formulations performing well in the experimental tests are advanced to further field testing in subsequent years.

## MATERIALS AND METHODS

A single lot of Lemont rice seed was treated in the second and third weeks of March 1990 with fungicides at the rates listed in Table 1. The formulated fungicides were placed into water (2 ml/0.25 lb seed) in glass jars, stirred with a magnetic stirrer bar until in suspension, and the suspended material was used to coat the inside of each jar. Weighed seed samples were poured into the jar and the jar was placed onto a jar mill to revolve for 10 minutes. Treated seed were stored in heavy manila seed envelopes until planted.

---

<sup>1</sup> Mention of trade names of the seed protectant fungicides described in this paper is for identification purposes only and does not imply endorsement by the Louisiana Agricultural Experiment Station, Louisiana State University Agriculture Center.

Simulated water- and drill-seeded methods were used to plant treated seed at the Rice Research Station, Crowley, LA. Water-seeded tests consisted of 34 treatments with five replications of 200 presoaked seeds per plot. Seeds were soaked in five volumes of tap water for 24 to 30 hours before planting. Plots consisted of cylinders 1-ft high and 2-ft in diameter made of 1/8-inch mesh hardware cloth. After planting, each cylinder was covered with 1/2-inch mesh hardware cloth to keep out birds and rats. The cylinders were arranged in a completely randomized block design, 2-ft apart within blocks, with a 6-ft alley between blocks. The treated seeds were planted in 4 to 5 inches of water.

Two individually leveed plot areas were planted at each planting date using identical procedures. In one plot area, the water was removed after 3 days and the plots were flushed as needed. In the other plot area, the flood was maintained at 2 to 4 inches until 3 days before the stands were counted.

Drill-planted plots consisted of the same 34 treatments planted in single 10-ft rows with 350 seeds per row in an individually leveed area. Plots were replicated five times in a randomized complete block design in each test. Rows were spaced 10 inches apart within blocks with 6-ft alleys between blocks. Seeds were planted with a drop-seeder.

## RESULTS AND DISCUSSION

Fifteen fungicides or fungicide combinations, and untreated seeds (control) were treated in our laboratory and used in a regional seed-treatment fungicide test on rice. Treated seeds were sent to cooperators in Arkansas, Florida, Mississippi, and Texas for planting in those locations. A test was also planted at the LSU Rice Research Station by our laboratory. A report on the regional results was compiled and sent to industry cooperators.

In tests at the Rice Station, the 16 treatments were planted in randomized tests using three water management systems; drill-seeded; water-seeded, drained and flushed; and water-seeded with a continuous flood. Fungicides giving significant stand increases across all seeding-water management systems were GUS 42S + GUS AG-12, GUS 1AV2, Ridomil 2E, Kocide SD, Champ SD, and Zinc Starter + Champ SD (Table 2). The copper compounds were outstanding in both the drill- and water-seeded tests. Ridomil, Kocide SD, Champ SD and several GUS compounds gave significant stand increases in the continuous flood tests. Dithane F-45, Vitavax 200FF, and GUS 42S were non-copper labeled compounds that performed well in these tests. An additional 19 fungicidal treatments were treated as experimental fungicides in addition to those in the regional test. Two fungicidal treatments among the experimental compounds gave significant stand increases across the planting-water management systems. These were Zinc Starter + Exp. A893-81-3 and GUS RA1-1 + GUS 42S. Eight of the 19 treatments gave significant stand increases with two of three of the seeding methods (Table 2).

Table 1. Experimental chemicals used in the 1990 experimental seed-protectant fungicide tests at the Rice Research Station, Crowley, LA.

| Trt. # | Treatment          | Rate<br>(formulated) | Company     |
|--------|--------------------|----------------------|-------------|
| 1*     | Untreated seeds    | --                   | --          |
| 2*     | ART                |                      |             |
|        | (Apron-Rovral-TBZ) | 0.2 oz               | Gustafson   |
| 3*     | Vitavax 200FF      | 4.0 fl oz            | Gustafson   |
| 4*     | Gustafson 42S      | 3.3 fl oz            | Gustafson   |
| 5*     | Gustafson 42S      | 3.3 fl oz            | Gustafson   |
|        | + GUS AG12         | 1.0 fl oz            |             |
| 6*     | GUS 1AV2           | 0.16 oz              | Gustafson   |
| 7*     | GUS 1RK1           | 0.16 oz              | Gustafson   |
| 8*     | Dithane F-45       | 6.0 fl oz            | Rohm & Haas |
| 9*     | Ridomil 2E         | 2.0 fl oz            | CIBA-Geigy  |
| 10*    | Manex II           | 4.0 fl oz            | Griffin     |
| 11*    | Nusan 30 EC        | 1.25 fl oz           | Griffin     |
| 12*    | Nusan 30 EC        | 1.25 fl oz           | Griffin     |
|        | + Vitavax 200FF    | 2.0 fl oz            | Gustafson   |
| 13*    | Kocide SD          | 6.0 fl oz            | Griffin     |
| 14*    | Zinc Starter       | 6.0 fl oz            | Agtrol      |
| 15*    | Champ SD           | 4.0 fl oz            | Agtrol      |
| 16*    | Zinc Starter       | 6.0 fl oz            | Agtrol      |
|        | + Champ SD         | 4.0 fl oz            |             |
| 17     | Ridomil 2E         | 4.0 fl oz            | CIBA-Geigy  |
| 18     | Apron Fl           | 1.0 fl oz            | Gustafson   |
| 19     | Apron Fl           | 2.0 fl oz            | Gustafson   |
| 20     | Vitavax 200FF      | 3.0 fl oz            | Gustafson   |
|        | + Dithane F-45     | 3.2 fl oz            | Rohm & Haas |
| 21     | ART                | 0.2 oz               | Gustafson   |
|        | + GUS AG12         | 1.0 fl oz            |             |
| 22     | Vitavax 200FF      | 4.0 fl oz            | Gustafson   |
|        | + GUS AG12         | 1.0 fl oz            |             |
| 23     | Anchor             | 0.75 fl oz           | Gustafson   |
|        | + GUS AG12         | 1.0 fl oz            |             |
| 24     | Apron Fl           | 0.75 fl oz           | Gustafson   |
|        | + GUS AG12         | 1.0 fl oz            |             |
| 25     | Manex II           | 6.0 fl oz            | Griffin     |
| 26     | Expt A893-81-2     | 6.0 fl oz            | Agtrol      |
| 27     | Expt A893-81-3     | 4.0 fl oz            | Agtrol      |
| 28     | Zinc Starter       | 6.0 fl oz            | Agtrol      |
|        | + A893-81-3        | 4.0 fl oz            |             |
| 29     | Champ SD           | 4.0 fl oz            | Agtrol      |
|        | + A893-81-2        | 6.0 fl oz            |             |
| 30     | Seed Plus          | 2.0 fl oz            | Gustafson   |
|        | + Gustafson 42S    | 2.0 fl oz            |             |
| 31     | Seed Plus          | 2.0 fl oz            | Gustafson   |
| 32     | Seed Plus          | 4.0 fl oz            | Gustafson   |
| 33     | GUS RA1-1          | 1.6 oz               | Gustafson   |
| 34     | GUS RA1-1          | 1.6 oz               | Gustafson   |
|        | + Gustafson 42S    | 2.0 fl oz            |             |
| 35     | GUS RA1-1          | 2.0 oz               | Gustafson   |
|        | + Gustafson 42S    | 2.0 fl oz            |             |

\* Regional cooperative test

Table 2. Effect of seed-protectant fungicides on stand in water-seeded, drained rice (WSDF); in water-seeded, continuous flood rice (WSCF); and in drill-seeded rice (DS). Rice Research Station, Crowley, LA. 1990.

| Treatment                      | Rate<br>(oz or<br>fl oz/cwt<br>formulated) | Mean <sup>a/</sup><br>WSDF<br>Stand | WSDF<br>Stand<br>(%) | Mean <sup>b/</sup><br>WSCF<br>Stand | WSCF<br>Stand<br>(%) | Mean <sup>c/</sup><br>DS<br>Stand | DS<br>Stand<br>(%) |
|--------------------------------|--------------------------------------------|-------------------------------------|----------------------|-------------------------------------|----------------------|-----------------------------------|--------------------|
| Untreated seeds                | --                                         | 86.8                                | 43.4                 | 59.4                                | 29.7                 | 141.8                             | 40.5               |
| ART<br>(Apron-Rovral-TBZ)      | 0.2 oz                                     | 104.2                               | 52.1                 | 84.8**                              | 42.4                 | 237.8**                           | 67.9               |
| Vitavax 200FF                  | 4.0 fl oz                                  | 125.8**                             | 62.9                 | 69.8                                | 34.9                 | 189.4**                           | 54.1               |
| Gustafson 42S                  | 3.3 fl oz                                  | 133.6**                             | 66.8                 | 67.2                                | 33.6                 | 219.8**                           | 62.8               |
| Gustafson 42S<br>+ GUS AG12    | 3.3 fl oz<br>1.0 fl oz                     | 126.4**                             | 63.2                 | 76.4*                               | 38.2                 | 229.0**                           | 65.4               |
| GUS 1AV2                       | 0.16 oz                                    | 111.6                               | 55.8                 | 89.8**                              | 44.9                 | 186.6**                           | 53.3               |
| GUS 1RK1                       | 0.16 oz                                    | 104.6                               | 52.3                 | 79.2*                               | 39.6                 | 193.2**                           | 55.2               |
| Dithane F-45                   | 6.0 fl oz                                  | 59.6                                | 29.8                 | 90.0**                              | 45.0                 | 206.6**                           | 59.0               |
| Ridomil 2E                     | 2.0 fl oz                                  | 111.0                               | 55.5                 | 89.2**                              | 44.6                 | 191.4**                           | 54.7               |
| Manex II                       | 4.0 fl oz                                  | 114.8                               | 57.4                 | 70.4                                | 35.2                 | 224.6**                           | 64.2               |
| Nusan 30 EC                    | 1.25 fl oz                                 | 111.8                               | 55.9                 | 68.2                                | 34.1                 | 176.6**                           | 50.5               |
| Nusan 30 EC<br>+ Vitavax 200FF | 1.25 fl oz<br>2.0 fl oz                    | 111.8                               | 55.9                 | 71.2                                | 35.6                 | 210.0**                           | 60.0               |
| Kocide SD                      | 6.0 fl oz                                  | 137.6**                             | 68.8                 | 84.2**                              | 42.1                 | 214.4**                           | 61.3               |
| Zinc Starter                   | 6.0 fl oz                                  | 96.6                                | 48.3                 | 62.2                                | 31.1                 | 132.6                             | 37.9               |
| Champ SD                       | 4.0 fl oz                                  | 142.0**                             | 71.0                 | 87.4**                              | 43.7                 | 201.2**                           | 57.5               |
| Zinc Starter<br>+ Champ SD     | 6.0 fl oz<br>4.0 fl oz                     | 127.4**                             | 63.7                 | 80.6**                              | 40.3                 | 210.3**                           | 60.1               |

Continued



Table 2. (Cont'd)

| Treatment        | Rate<br>(oz or<br>fl oz/cwt<br>formulated) | Mean <sup>a</sup> /<br>WSDF<br>Stand | WSDF<br>Stand<br>(%) | Mean <sup>b</sup> /<br>WSCF<br>Stand | WSCF<br>Stand<br>(%) | Mean <sup>c</sup> /<br>DS<br>Stand | DS<br>Stand<br>(%) |
|------------------|--------------------------------------------|--------------------------------------|----------------------|--------------------------------------|----------------------|------------------------------------|--------------------|
| Ridomil 2E       | 4.0 fl oz                                  | 104.2                                | 52.1                 | 85.0**                               | 42.5                 | 198.8**                            | 56.8               |
| Apron Fl         | 1.0 fl oz                                  | 100.4                                | 50.2                 | 94.6**                               | 47.3                 | 194.8**                            | 55.7               |
| Apron Fl         | 2.0 fl oz                                  | 97.6                                 | 48.8                 | 78.2*                                | 39.1                 | 195.8**                            | 55.9               |
| Vitavax 200FF    | 3.0 fl oz                                  |                                      |                      |                                      |                      |                                    |                    |
| + Dithane F-45   | 3.2 fl oz                                  | 89.6                                 | 44.8                 | 76.4*                                | 38.2                 | 230.4**                            | 65.8               |
| ART              | 0.2 oz                                     |                                      |                      |                                      |                      |                                    |                    |
| + GUS AG12       | 1.0 fl oz                                  | 102.4                                | 51.2                 | 88.6**                               | 44.3                 | 189.8**                            | 54.2               |
| Vitavax 200FF    | 4.0 fl oz                                  |                                      |                      |                                      |                      |                                    |                    |
| + GUS AG12       | 1.0 fl oz                                  | 118.8*                               | 59.4                 | 70.0                                 | 35.0                 | 180.2**                            | 51.5               |
| Anchor           | 0.75 fl oz                                 |                                      |                      |                                      |                      |                                    |                    |
| + GUS AG12       | 1.0 fl oz                                  | 79.4                                 | 39.7                 | 85.0**                               | 42.5                 | 166.2*                             | 47.5               |
| Apron Fl         | 0.75 fl oz                                 |                                      |                      |                                      |                      |                                    |                    |
| + GUS AG12       | 1.0 fl oz                                  | 88.0                                 | 44.0                 | 91.6**                               | 45.8                 | 183.8**                            | 52.5               |
| Manex II         | 6.0 fl oz                                  | 87.6                                 | 43.8                 | 85.6**                               | 42.8                 | 219.0**                            | 62.6               |
| Expt A893-81-2   | 6.0 fl oz                                  | 92.2                                 | 46.1                 | 63.2                                 | 31.6                 | 142.6                              | 40.7               |
| Expt A893-81-3   | 4.0 fl oz                                  | 95.0                                 | 47.5                 | 80.8**                               | 40.4                 | 196.0**                            | 56.0               |
| Zinc Starter     | 6.0 fl oz                                  |                                      |                      |                                      |                      |                                    |                    |
| + Expt A893-81-3 | 4.0 fl oz                                  | 129.4**                              | 64.7                 | 83.2**                               | 41.6                 | 208.6**                            | 59.6               |
| Champ SD         | 4.0 fl oz                                  |                                      |                      |                                      |                      |                                    |                    |
| + Expt A893-81-2 | 6.0 fl oz                                  | 114.2                                | 57.1                 | 88.6**                               | 44.3                 | 199.0**                            | 56.9               |
| Seed Plus        | 2.0 fl oz                                  |                                      |                      |                                      |                      |                                    |                    |
| + Gustafson 42S  | 2.0 fl oz                                  | 128.6**                              | 64.3                 | 69.4                                 | 34.7                 | 197.6**                            | 56.5               |

Continued

Table 2. (Cont'd)

| Treatment                    | Rate<br>(oz or<br>fl oz/cwt<br>formulated) | Mean <sup>a/</sup><br>WSDF<br>Stand | WSDF<br>Stand<br>(%) | Mean <sup>b/</sup><br>WSCF<br>Stand | WSCF<br>Stand<br>(%) | Mean <sup>c/</sup><br>DS<br>Stand | DS<br>Stand<br>(%) |
|------------------------------|--------------------------------------------|-------------------------------------|----------------------|-------------------------------------|----------------------|-----------------------------------|--------------------|
| Seed Plus                    | 2.0 fl oz                                  | 90.0                                | 45.0                 | 63.0                                | 31.5                 | 131.0                             | 37.4               |
| Seed Plus                    | 4.0 fl oz                                  | 91.6                                | 45.8                 | 67.8                                | 33.9                 | 128.4                             | 36.7               |
| GUS RA1-1                    | 1.6 oz                                     | 97.8                                | 48.9                 | 64.6                                | 32.3                 | 134.4                             | 38.4               |
| GUS RA1-1<br>+ Gustafson 42S | 1.6 oz<br>2.0 fl oz                        | 123.4*                              | 61.7                 | 73.0                                | 36.5                 | 197.8**                           | 56.5               |
| GUS RA1-1<br>+ Gustafson 42S | 2.0 oz<br>2.0 fl oz                        | 129.6**                             | 64.8                 | 83.2**                              | 41.6                 | 225.4**                           | 64.4               |
| LSD 0.01                     |                                            | 38.8                                |                      | 20.3                                |                      | 32.0                              |                    |
| LSD 0.05                     |                                            | 29.4                                |                      | 15.4                                |                      | 24.2                              |                    |

<sup>a/</sup> WSDF = Water-seeded on April 11, 1990, drained in 3 days, and flushed as needed; 200 seeds per plot; Stand counts on May 8, 1990; Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.

<sup>b/</sup> WSCF = Water-seeded on April 11, 1990, continuous flood; 200 seeds per plot; Stand counts on May 10, 1990; Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.

<sup>c/</sup> DS = Drill-seeded on April 10, 1990; 350 seeds per plot; Stand counts on May 11, 1990; Means marked with asterisks were significantly different at the 0.01 (\*\*) or 0.05 (\*) probability levels.

## ROTATIONAL CROPS RESEARCH<sup>1</sup>

R.J. Habetz

Soybeans [Glycine max (L.) Merr.] are a major agronomic crop in Louisiana. Southwest Louisiana, where soybeans are grown primarily as a rotational crop with rice, is one of the major soybean producing areas in the state. Some of the soybean acreage is double cropped with wheat (Triticum aestivum L.). Grain sorghum [Sorghum bicolor (L.) Moench] acreage has been steady for the past few years. In the southwest area, grain sorghum may serve as an alternate crop to soybeans and may fit well into a rotation system with rice. Soybean, grain sorghum, and wheat varieties differ in their adaptability to soil types and climatic conditions. Consequently, variety trials are conducted at locations throughout the state to aid producers in selecting varieties best adapted to their area. Studies are conducted at the Rice Research Station each year to compare performance of newly released and established soybean, grain sorghum, and wheat varieties, weed control, and to determine the impact of integrating these alternate crops into rotation systems with rice.

---

<sup>1</sup> This research is partially supported by funds provided by the Louisiana Soybean and Grain Research and Promotion Board.

## SOYBEAN VARIETY TEST

R.J. Habetz, B.G. Harville, and W. Hall

Location: Rice Research Station

Soil Type: Crowley silt loam

Seeding Rate: 10 seed/row ft.

Planting Date: Group IV, May 1, 1990; Groups V, VI, VII, May 16, 1990

Row Spacing: 32 in

Fertilizer: 0-80-80 (N-P<sub>2</sub>O<sub>5</sub>K<sub>2</sub>O) banded at planting

Plot Size: 4 rows x 30 ft

Herbicide: 2.0 pt/A Dual broadcast after planting

Insecticide: None

Rainfall: Group IV, first week after planting, .27 in; 2nd week, 2.56 in; 3rd week, .01 in; Groups V, VI, VII, 1st week after planting, .01 in; 2nd week, 1.76 in; 3rd week, .40 in

Harvested: At maturity for each variety

Experimental Design: Randomized complete block with four replications

Comments: Due to the timely lack of adequate rainfall and some diseases caused by drought stress, yields were slightly lower than last year. Only two varieties produced a yield above 50.0 bu/A, Ring Around 452 (50.7 bu/A) and an experimental LA88-40 (50.2 bu/A). The overall average of all groups, which consisted of 128 varieties, was 40.0 bu/A. Comparing 3-year averages, which is used to recommend varieties, Hartz 6686 showed the highest average with 51.8 bu/A followed by Pioneer 9641 (48.9 bu/A).

Table 1. Performance of commercial varieties grown on a Crowley silt loam soil at the Rice Research Station, Crowley, LA. 1990.

| Maturity group<br>and<br>variety/brand | Yield<br>per<br>acre | Three-year<br>average<br>yield | Date<br>matured | Plant<br>height<br>at<br>maturity | Height of<br>lower pod<br>above<br>ground | Lodging <sup>1/</sup> |
|----------------------------------------|----------------------|--------------------------------|-----------------|-----------------------------------|-------------------------------------------|-----------------------|
|                                        | -----<br>(bu/A)      | -----<br>(bu/A)                |                 | -----<br>(in)                     | -----<br>(in)                             |                       |
| <u>Group IV</u>                        |                      |                                |                 |                                   |                                           |                       |
| Ring Around 452                        | 50.7                 |                                | 8/31            | 31.8                              | 4.5                                       | 1.0                   |
| S48-84                                 | 49.2                 |                                | 8/29            | 29.3                              | 4.5                                       | 1.0                   |
| Stevens                                | 48.6                 |                                | 8/30            | 26.3                              | 4.3                                       | 1.0                   |
| Riverside 499                          | 48.0                 |                                | 8/28            | 38.8                              | 5.5                                       | 1.0                   |
| Asgrow 4906                            | 46.5                 |                                | 8/31            | 28.8                              | 4.5                                       | 1.0                   |
| Pioneer 9442                           | 45.7                 |                                | 8/29            | 19.8                              | 2.5                                       | 1.0                   |
| Hartz 4464                             | 42.7                 |                                | 8/29            | 26.3                              | 4.0                                       | 1.0                   |
| Dekalb CX 415                          | 40.8                 |                                | 9/3             | 22.3                              | 2.3                                       | 1.0                   |
| Williams                               | 39.0                 |                                | 9/2             | 21.8                              | 2.3                                       | 1.0                   |
| Dekalb CX 458                          | 38.8                 |                                | 9/5             | 18.3                              | 2.3                                       | 1.0                   |
| Agratech 495                           | 29.1                 |                                | 8/27            | 13.7                              | 1.7                                       | 1.0                   |
| CV (%)                                 | 6.3                  |                                |                 |                                   |                                           |                       |
| LSD (0.1)                              | 3.3                  |                                |                 |                                   |                                           |                       |
| <u>Group V</u>                         |                      |                                |                 |                                   |                                           |                       |
| Terra-Vig TVX 5567                     | 46.9                 |                                | 9/24            | 21.5                              | 2.5                                       | 1.0                   |
| HSC 576                                | 44.6                 |                                | 10/3            | 24.0                              | 3.3                                       | 1.0                   |
| Buckshot 503                           | 43.3                 |                                | 10/21           | 24.0                              | 3.8                                       | 1.0                   |
| STV/FFR 562                            | 43.3                 |                                | 9/27            | 25.5                              | 3.5                                       | 1.0                   |
| Deltapine 415                          | 42.8                 | 41.4                           | 9/13            | 17.8                              | 2.3                                       | 1.0                   |
| Hutcheson                              | 42.5                 | 42.6                           | 9/18            | 23.2                              | 2.8                                       | 1.0                   |
| Pioneer 9591                           | 42.3                 |                                | 9/15            | 17.3                              | 2.8                                       | 1.0                   |
| Hartz X 5998                           | 42.2                 |                                | 9/18            | 21.0                              | 2.8                                       | 1.0                   |
| Pioneer 9592                           | 41.9                 |                                | 9/23            | 24.0                              | 3.8                                       | 1.0                   |
| Terra-Vig TVX 5559                     | 41.4                 |                                | 9/13            | 19.0                              | 2.5                                       | 1.0                   |
| Riverside 577                          | 41.3                 | 39.6                           | 9/16            | 22.3                              | 3.0                                       | 1.0                   |
| Coker 485                              | 41.0                 | 41.6                           | 9/25            | 23.3                              | 2.8                                       | 1.0                   |
| Hartz 5240                             | 40.9                 |                                | 9/13            | 17.3                              | 2.0                                       | 1.0                   |
| Hartz X 5566                           | 40.7                 |                                | 9/25            | 23.0                              | 2.5                                       | 1.0                   |
| Pioneer 9581                           | 39.8                 | 40.1                           | 9/27            | 20.5                              | 3.0                                       | 1.0                   |
| Asgrow 5979                            | 39.7                 |                                | 9/18            | 20.5                              | 3.5                                       | 1.0                   |
| LA88-9                                 | 39.3                 |                                | 9/14            | 28.5                              | 4.5                                       | 1.0                   |
| Buckshot 507                           | 38.6                 |                                | 9/18            | 23.3                              | 2.8                                       | 1.0                   |
| Deltapine 105                          | 38.5                 | 41.9                           | 9/22            | 23.0                              | 2.5                                       | 1.0                   |
| Coker 6995                             | 38.0                 | 41.0                           | 9/19            | 24.0                              | 4.0                                       | 1.0                   |
| Bedford                                | 37.4                 | 39.3                           | 9/12            | 24.3                              | 4.0                                       | 1.0                   |
| Terra-Vig 505                          | 37.3                 | 42.8                           | 9/25            | 20.3                              | 2.3                                       | 1.0                   |

Continued.

Table 1. Continued.

| Maturity group<br>and<br>variety/brand | Yield<br>per<br>acre | Three-year<br>average<br>yield | Date<br>matured | Plant<br>height<br>at<br>maturity | Height of<br>lower pod<br>above<br>ground | Lodging <sup>1/</sup> |
|----------------------------------------|----------------------|--------------------------------|-----------------|-----------------------------------|-------------------------------------------|-----------------------|
|                                        | ----- (bu/A) -----   |                                |                 | ----- (in) -----                  |                                           |                       |
| <u>Group V (continued)</u>             |                      |                                |                 |                                   |                                           |                       |
| Terra-Vig 515                          | 36.5                 | 40.0                           | 10/15           | 22.0                              | 2.8                                       | 1.0                   |
| Agratech 550                           | 35.5                 |                                | 9/27            | 26.0                              | 3.5                                       | 1.0                   |
| Asgrow 5403                            | 35.2                 |                                | 9/14            | 17.3                              | 2.0                                       | 1.0                   |
| Cordell                                | 35.0                 |                                | 9/25            | 27.3                              | 4.0                                       | 1.0                   |
| Pioneer 9582                           | 35.0                 |                                | 9/22            | 20.8                              | 2.3                                       | 1.0                   |
| HSC 579                                | 34.9                 |                                | 9/21            | 20.5                              | 2.3                                       | 1.0                   |
| STV/FFR XP 36578                       | 34.7                 |                                | 9/30            | 21.5                              | 2.5                                       | 1.0                   |
| Walters                                | 34.7                 |                                | 9/25            | 22.0                              | 2.8                                       | 1.0                   |
| Wilstar 550                            | 34.5                 | 39.6                           | 9/24            | 20.0                              | 2.3                                       | 1.0                   |
| Hartz X 5650                           | 33.3                 |                                | 10/24           | 17.3                              | 2.5                                       | 1.0                   |
| LA87-5013                              | 32.7                 |                                | 9/15            | 27.0                              | 3.3                                       | 1.0                   |
| CV (%)                                 | 8.9                  |                                |                 |                                   |                                           |                       |
| LSD (0.1)                              | 4.1                  |                                |                 |                                   |                                           |                       |
| <u>Group VI</u>                        |                      |                                |                 |                                   |                                           |                       |
| LA88-4                                 | 50.2                 |                                | 10/10           | 32.0                              | 5.7                                       | 1.5                   |
| Hartz 6686                             | 49.6                 | 51.8                           | 10/14           | 32.3                              | 4.5                                       | 1.0                   |
| Pioneer 9681                           | 48.6                 |                                | 10/15           | 32.3                              | 4.5                                       | 1.0                   |
| LA88-55                                | 47.4                 |                                | 10/17           | 35.3                              | 4.8                                       | 1.0                   |
| STV/FFR 695                            | 46.5                 |                                | 10/15           | 30.8                              | 4.3                                       | 1.0                   |
| Hartz X 6797                           | 44.9                 |                                | 10/23           | 36.3                              | 5.0                                       | 1.0                   |
| Hartz 6200                             | 44.7                 | 46.7                           | 9/17            | 31.8                              | 5.3                                       | 1.0                   |
| Riverside 677                          | 44.1                 | 45.8                           | 10/3            | 31.5                              | 4.3                                       | 1.0                   |
| Agratech 695                           | 44.1                 |                                | 10/17           | 40.8                              | 5.8                                       | 1.8                   |
| Brim                                   | 43.8                 |                                | 9/29            | 35.6                              | 5.0                                       | 1.8                   |
| Terra-Vig TVX 6629                     | 43.7                 |                                | 10/17           | 28.3                              | 3.7                                       | 1.8                   |
| STV/FFR 646                            | 43.5                 | 43.1                           | 9/28            | 36.5                              | 3.8                                       | 1.8                   |
| Buckshot 603                           | 43.5                 | 43.3                           | 10/15           | 41.1                              | 5.8                                       | 1.8                   |
| LA87-6055                              | 43.3                 |                                | 10/25           | 39.8                              | 7.0                                       | 1.8                   |
| Pioneer 9641                           | 43.3                 | 48.9                           | 9/15            | 31.3                              | 5.8                                       | 1.8                   |
| HSC 682                                | 43.2                 |                                | 10/29           | 26.5                              | 3.8                                       | 1.8                   |
| EHJU 5                                 | 42.1                 | 42.1                           | 10/24           | 35.3                              | 5.8                                       | 1.8                   |
| Cajun                                  | 41.9                 | 41.3                           | 10/25           | 25.8                              | 3.3                                       | 1.8                   |
| LA87-6030                              | 41.8                 |                                | 10/15           | 44.8                              | 6.3                                       | 1.8                   |
| Riverside 699                          | 41.5                 | 44.1                           | 9/28            | 31.3                              | 4.8                                       | 1.8                   |
| STV/FFR 606                            | 41.3                 | 38.3                           | 9/15            | 33.5                              | 5.5                                       | 1.8                   |
| Deltapine DPX 3627                     | 40.2                 |                                | 9/28            | 31.0                              | 4.8                                       | 1.8                   |
| Ring Around 606                        | 40.0                 | 45.2                           | 9/17            | 40.5                              | 7.0                                       | 1.8                   |

Continued.

Table 1. Continued.

| Maturity group<br>and<br>variety/brand | Yield<br>per<br>acre | Three-year<br>average<br>yield | Date<br>matured | Plant<br>height<br>at<br>maturity | Height of<br>lower pod<br>above<br>ground | Lodging <sup>1/</sup> |
|----------------------------------------|----------------------|--------------------------------|-----------------|-----------------------------------|-------------------------------------------|-----------------------|
|                                        | ----- (bu/A) -----   |                                |                 | ----- (in) -----                  |                                           |                       |
| <u>Group VI (continued)</u>            |                      |                                |                 |                                   |                                           |                       |
| S64-23                                 | 39.9                 |                                | 9/17            | 41.0                              | 6.0                                       | 1.8                   |
| Pioneer 9691                           | 39.8                 |                                | 10/17           | 33.0                              | 4.8                                       | 1.8                   |
| Bryan                                  | 39.0                 |                                | 10/26           | 30.8                              | 4.5                                       | 1.8                   |
| LA87-5014                              | 38.8                 |                                | 10/26           | 43.8                              | 7.8                                       | 1.8                   |
| S69-54                                 | 38.5                 | 45.3                           | 10/8            | 31.0                              | 5.8                                       | 1.8                   |
| Twiggs                                 | 38.1                 |                                | 9/17            | 28.5                              | 4.0                                       | 1.8                   |
| Sharkey                                | 37.8                 | 40.0                           | 10/26           | 43.0                              | 8.3                                       | 1.8                   |
| Deltapine 726                          | 37.5                 | 38.1                           | 10/17           | 35.8                              | 5.8                                       | 1.0                   |
| Asgrow 6785                            | 37.4                 | 46.3                           | 10/3            | 34.3                              | 5.8                                       | 1.0                   |
| LA87-5012                              | 36.8                 |                                | 10/17           | 46.8                              | 7.0                                       | 1.0                   |
| Davis                                  | 36.4                 | 43.4                           | 9/25            | 40.5                              | 5.3                                       | 1.0                   |
| Lamar                                  | 36.3                 |                                | 10/17           | 33.8                              | 4.8                                       | 1.0                   |
| LA88-39                                | 36.0                 |                                | 10/3            | 40.5                              | 5.3                                       | 1.0                   |
| Hartz X 1039                           | 35.5                 |                                | 10/3            | 34.8                              | 4.0                                       | 1.0                   |
| LA87-6043                              | 35.2                 |                                | 10/7            | 47.8                              | 6.0                                       | 1.5                   |
| LA78-465                               | 34.9                 |                                | 9/28            | 38.5                              | 4.3                                       | 1.0                   |
| EHJU 11                                | 34.8                 | 36.2                           | 10/13           | 35.3                              | 5.0                                       | 1.0                   |
| LA79-9729                              | 34.6                 | 41.6                           | 10/1            | 37.8                              | 5.0                                       | 1.0                   |
| EHJU 7                                 | 34.3                 | 40.9                           | 10/3            | 42.5                              | 5.5                                       | 1.0                   |
| HSC B2J                                | 33.9                 | 41.8                           | 9/28            | 32.5                              | 5.0                                       | 1.0                   |
| HSC 623                                | 33.8                 |                                | 9/23            | 31.0                              | 4.0                                       | 1.0                   |
| LA87-6050                              | 33.7                 |                                | 10/3            | 44.0                              | 6.3                                       | 1.5                   |
| Asgrow 6297                            | 33.0                 | 41.3                           | 9/25            | 28.5                              | 4.3                                       | 1.0                   |
| Terra-Vig 626                          | 32.9                 |                                | 9/28            | 37.0                              | 5.3                                       | 1.0                   |
| LA88-69                                | 32.1                 |                                | 10/17           | 40.3                              | 6.0                                       | 1.0                   |
| Agratech 685                           | 31.9                 | 38.9                           | 9/28            | 44.3                              | 6.8                                       | 1.0                   |
| Victory                                | 30.3                 |                                | 9/23            | 32.3                              | 4.8                                       | 1.0                   |
| Riverside 613                          | 28.4                 |                                | 9/28            | 43.3                              | 5.3                                       | 1.0                   |
| Hartz X 307                            | 25.5                 |                                | 10/3            | 36.3                              | 5.0                                       | 1.0                   |
| CV (%)                                 | 10.5                 |                                |                 |                                   |                                           |                       |
| LSD (0.1)                              | 4.8                  |                                |                 |                                   |                                           |                       |
| <u>Group VII</u>                       |                      |                                |                 |                                   |                                           |                       |
| Stonewall                              | 47.1                 |                                | 10/26           | 29.3                              | 3.8                                       | 1.0                   |
| LA79-1133                              | 46.5                 | 44.9                           | 10/25           | 38.3                              | 6.0                                       | 1.0                   |
| Pioneer 9791                           | 46.4                 | 45.4                           | 10/28           | 29.8                              | 4.0                                       | 1.0                   |
| Pioneer 9711                           | 46.1                 |                                | 10/20           | 31.0                              | 3.7                                       | 1.0                   |
| Asgrow 7258                            | 45.9                 |                                | 11/6            | 43.3                              | 5.8                                       | 1.0                   |

Continued.

Table 1. Continued.

| Maturity group<br>and<br>variety/brand | Yield<br>per<br>acre | Three-year<br>average<br>yield | Date<br>matured | Plant<br>height<br>at<br>maturity | Height of<br>lower pod<br>above<br>ground | Lodging <sup>1/</sup> |
|----------------------------------------|----------------------|--------------------------------|-----------------|-----------------------------------|-------------------------------------------|-----------------------|
|                                        | -----                | (bu/A)-----                    |                 | -----                             | (in)-----                                 |                       |
| <u>Group VII (continued)</u>           |                      |                                |                 |                                   |                                           |                       |
| Hartz 7585                             | 45.5                 |                                | 10/26           | 30.0                              | 4.3                                       | 1.0                   |
| Hartz 7126                             | 45.2                 | 45.3                           | 10/27           | 34.5                              | 4.8                                       | 1.0                   |
| Hartz 7190                             | 44.6                 |                                | 11/3            | 31.8                              | 5.5                                       | 1.0                   |
| Deltapine DPX 3776                     | 41.6                 |                                | 11/13           | 35.8                              | 4.8                                       | 1.0                   |
| Agratech 700                           | 41.1                 | 45.9                           | 11/6            | 38.5                              | 5.5                                       | 1.0                   |
| Asgrow 7986                            | 40.9                 | 43.7                           | 11/12           | 37.0                              | 4.8                                       | 1.0                   |
| Terra-Vig 727                          | 40.2                 |                                | 10/19           | 29.0                              | 4.0                                       | 1.0                   |
| Riverside 757                          | 40.2                 | 42.7                           | 11/6            | 40.0                              | 5.0                                       | 1.0                   |
| Buckshot 723                           | 40.1                 | 41.9                           | 11/12           | 38.8                              | 4.3                                       | 1.0                   |
| Colquitt                               | 39.9                 |                                | 10/29           | 35.0                              | 4.5                                       | 1.0                   |
| HSC 721                                | 39.9                 |                                | 10/23           | 35.3                              | 3.5                                       | 1.0                   |
| Hartz X 7788                           | 39.6                 |                                | 11/4            | 41.8                              | 6.5                                       | 1.0                   |
| Deltapine 417                          | 38.6                 | 39.0                           | 11/4            | 47.5                              | 7.0                                       | 1.0                   |
| Thomas                                 | 38.4                 |                                | 11/6            | 34.3                              | 4.8                                       | 1.0                   |
| Terra-Vig 708                          | 37.8                 | 39.4                           | 10/31           | 30.3                              | 5.0                                       | 1.0                   |
| Rally                                  | 37.4                 | 43.0                           | 10/27           | 32.8                              | 3.3                                       | 1.0                   |
| Buckshot 703                           | 36.6                 | 43.2                           | 10/27           | 41.0                              | 5.0                                       | 1.0                   |
| Pioneer 9751                           | 35.8                 | 37.5                           | 11/1            | 34.8                              | 4.0                                       | 1.0                   |
| Terra-Vig 717                          | 35.8                 | 36.4                           | 10/29           | 35.5                              | 4.5                                       | 1.0                   |
| LA88-62                                | 35.0                 |                                | 10/25           | 33.3                              | 4.0                                       | 1.0                   |
| LA78-5286                              | 34.9                 | 43.1                           | 10/29           | 35.3                              | 3.8                                       | 1.0                   |
| LA87-7001                              | 34.1                 |                                | 10/25           | 40.0                              | 5.8                                       | 1.0                   |
| EHJU 1P                                | 32.2                 |                                | 10/20           | 35.8                              | 5.8                                       | 1.0                   |
| EHJU 3                                 | 28.6                 | 34.3                           | 10/29           | 30.5                              | 3.5                                       | 1.0                   |
| CV (%)                                 | 7.8                  |                                |                 |                                   |                                           |                       |
| LSD (0.1)                              | 3.7                  |                                |                 |                                   |                                           |                       |
| <u>Group VIII</u>                      |                      |                                |                 |                                   |                                           |                       |
| Hartz X 8448                           | 42.1                 |                                | 11/6            | 31.8                              | 4.5                                       | 1.0                   |
| Hartz 8112                             | 39.0                 |                                | 11/14           | 37.5                              | 4.8                                       | 1.0                   |
| Deltapine 8787                         | 33.0                 | 38.4                           | 11/13           | 40.3                              | 6.0                                       | 1.0                   |
| CV (%)                                 | 9.5                  |                                |                 |                                   |                                           |                       |
| LSD (0.1)                              | 4.9                  |                                |                 |                                   |                                           |                       |

<sup>1/</sup> 1 = no lodging; 5 = all plants lodged.



## GRAIN SORGHUM VARIETY TEST

R.J. Habetz and M.S. Kang

Location: Rice Research Station

Soil Type: Crowley silt loam

Planting Date: Apr 19, 1990

Row Spacing: 32 in

Fertilizer: 40-80-80 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) banded at planting; 80-0-0 (21%) on May 22

Plot Size: 4 rows x 30 ft

Treated: 3 pt/A atrazine applied broadcast after planting

Rainfall: 1st week after planting, 0 in; 2nd week, 1.76 in; 3rd week, .48 in

Harvested: Aug 28

Experimental Design: Randomized complete block with four replications

Comments: In 1990, 23 early-medium maturity and 13 full season bird susceptible grain sorghum hybrid varieties were evaluated. For the early medium varieties, only two varieties, KS 780 (4589 lb/A) and Cargill 630 (4589 lb/A), had a yield over 4500 pounds (Table 1). For the full season varieties, DK 56 (4903 lb/A) and RA 787 (4623 lb/A) had the highest yields of all varieties (Table 2).

Asgrow GS 712 (4787 lb/A) had the highest overall 3-year average (Table 2), while Pioneer 8222 (4766 lb/A), Topaz (4764 lb/A), and Dekalb M565 (4708 lb/A) all showed good 3-year averages (Table 1).

Lack of adequate rainfall in the later stages of maturity and slight to moderate disease had some effect on yield.

Table 1. Performance of early-medium maturity, bird susceptible grain sorghum hybrids at the Rice Research Station, Crowley, LA. 1990.

| Company/Brand           | Hybrid              | Yield |                                      | Grain moisture | Heading date            |
|-------------------------|---------------------|-------|--------------------------------------|----------------|-------------------------|
|                         |                     | 1990  | 2-year average<br>----- (lb/A) ----- | 3-year average | ---- (%) ----<br>(days) |
| New Northrup King       | KS 780              | 4589  | 4439                                 | 4508           | 12.8 67                 |
| Cargill                 | 630                 | 4589  | -                                    | -              | 13.9 67                 |
| Cargill                 | 847                 | 4467  | 4484                                 | -              | 13.4 69                 |
| Asgrow Seed             | Osage               | 4416  | -                                    | -              | 13.6 66                 |
| Dekalb Plant Genetics   | DK 50               | 4360  | 4396                                 | 4538           | 13.9 73                 |
| Capehart Seed           | Contender           | 4341  | 4639                                 | 4675           | 13.2 65                 |
| Cargill                 | 1022                | 4312  | 4847                                 | 4431           | 13.4 65                 |
| Dekalb Plant Genetics   | M565                | 4294  | 4359                                 | 4708           | 13.2 70                 |
| Delta and Pineland      | G-522DR             | 4216  | 4398                                 | 4583           | 13.4 66                 |
| New Northrup King       | 2665                | 4202  | 4357                                 | 4695           | 13.6 67                 |
| Pioneer Hi-Bred         | 8222                | 4194  | 4659                                 | 4766           | 13.6 64                 |
| NC <sup>+</sup> Hybrids | MC <sup>+</sup> 472 | 4153  | -                                    | -              | 14.4 66                 |
| Delta and Pineland      | 1552                | 4115  | 3760                                 | -              | 13.6 65                 |
| Asgrow Seed             | Topaz               | 4061  | 4587                                 | 4764           | 14.6 65                 |
| Cargill                 | 618Y                | 4020  | -                                    | -              | 12.9 70                 |
| Pioneer Hi-Bred         | 8333                | 3863  | 4419                                 | 4578           | 12.6 66                 |
| Cargill                 | X15277              | 3850  | -                                    | -              | 13.9 65                 |
| Pioneer Hi-Bred         | 8313                | 3814  | -                                    | -              | 13.4 67                 |
| Hyperformer Seed        | HSC Cherokee        | 3806  | 4413                                 | 4537           | 13.9 70                 |
| New Northrup King       | KS 737              | 3773  | 3795                                 | 4021           | 15.3 63                 |
| Pioneer Hi-Bred         | 8230                | 3749  | 4399                                 | 4418           | 14.3 65                 |
| Delta and Pineland      | G1602               | 3463  | 3963                                 | 3865           | 13.9 69                 |
| Cargill                 | 575                 | 3385  | -                                    | -              | 13.6 70                 |
| Mean                    |                     | 4086  |                                      |                | 13.7 67                 |
| CV (%)                  |                     | 8.9   |                                      |                | 8.3                     |
| LSD (0.05)              |                     | 51.5  |                                      |                | NS                      |

Table 2. Performance of full-season, bird susceptible grain sorghum hybrids at the Rice Research Station, Crowley, LA. 1990.

| Company/Brand         | Hybrid     | Yield |                                      | Grain moisture | Heading date |
|-----------------------|------------|-------|--------------------------------------|----------------|--------------|
|                       |            | 1990  | 2-year average<br>----- (lb/A) ----- |                |              |
|                       |            |       | 3-year average                       | --- (%) ---    | (days)       |
| Dekalb Plant Genetics | DK56       | 4903  | -                                    | 12.6           | 48           |
| Delta and Pineland    | RA 787     | 4623  | 4393                                 | 13.3           | 50           |
| Asgrow Seed           | GS 712     | 4469  | 4421                                 | 12.8           | 50           |
| New Northrup King     | S9750      | 4451  | 4512                                 | 13.1           | 49           |
| Capehart Seed         | Challenger | 4342  | 4334                                 | 12.3           | 49           |
| Dekalb Plant Genetics | DK 64      | 4291  | 4439                                 | 13.5           | 52           |
| Cargill               | 6670       | 4288  | 4354                                 | 12.6           | 48           |
| Hyperformance Seed    | 1330DR     | 4128  | 4183                                 | 13.7           | 56           |
| Capehart Seed         | Champion   | 4032  | 4290                                 | 13.6           | 55           |
| Delta and Pineland    | G-1711     | 3706  | 3813                                 | 13.3           | 48           |
| Hyperformance Seed    | HSC Wings  | 3301  | 3503                                 | 13.1           | 46           |
| Dekalb Plant Genetics | DK 60      | 3002  | -                                    | 13.6           | 46           |
| Capehart Seed         | Cream      | 2401  | -                                    | 14.0           | 49           |
| Mean                  |            | 3995  |                                      | 13.2           | 49.7         |
| CV (%)                |            | 12.8  |                                      | 6.9            |              |
| LSD (0.05)            |            | 735   |                                      | NS             |              |

## OFF STATION VARIETY TEST

(Larry Lejeune Farm)

R.J. Habetz and B.G. Harville

Environmental conditions, soil type, disease and weed pressure vary at different locations. For these reasons, an off-station soybean variety test was conducted at the Larry Lejeune farm near Elton.

The test consisted of 23 recommended varieties for southwest Louisiana. Varieties were planted on May 21 at a seeding rate of 60 lb/A on a silty clay type soil. Plots were four 32-inch rows 30 feet in length. Fertilizer at a rate of 0-80-80 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) was banded on each side of the row at planting. A tank mix of linuron (Lorox) at 2.0 pt/A and metolachlor (Dual) at 2.0 pt/A was surface applied after planting. On June 8 chlorimuron (Classic) at 0.50 oz/A was applied overtop for further weed control. Varieties were combine harvested at maturity. Seed yield was calculated from yield per plot and adjusted to 13% moisture. Agronomic characteristics, including plant height and lower pod height, were measured. A randomized complete block design with four replications was used.

Thirteen varieties had a yield above 30 bushels with Asgrow 7986 (35.7 bu/A) yielding the highest, followed closely by Hartz 7126 (35.3 bu/A) and Hartz 6686 (35.1 bu/A) (Table 1). Soybean stands in all plots were adequate, with normal plant heights. With the exception of some dry conditions during plant maturity, conditions for plant growth were ideal.

Table 1. Performance of soybean varieties grown on a silty clay type soil at the Larry LeJeune Farm, Pine Island, LA. 1990.

| Variety/brand   | Yield<br>per<br>acre<br>(bu/A) | Date<br>matured | Plant<br>height<br>at<br>maturity<br>----- (in) ----- | Height of<br>lower pod<br>above<br>ground |
|-----------------|--------------------------------|-----------------|-------------------------------------------------------|-------------------------------------------|
| Asgrow 7986     | 35.7                           | 10/31           | 30                                                    | 4                                         |
| Hartz 7126      | 35.3                           | 10/28           | 32                                                    | 5                                         |
| Hartz 6686      | 35.1                           | 11/7            | 26                                                    | 4                                         |
| Pioneer 9791    | 34.5                           | 10/27           | 25                                                    | 4                                         |
| Davis           | 31.6                           | 9/26            | 34                                                    | 5                                         |
| S69-54          | 31.6                           | 10/30           | 25                                                    | 4                                         |
| Hutcheson       | 31.5                           | 9/18            | 21                                                    | 3                                         |
| Hartz 8112      | 31.4                           | 10/31           | 30                                                    | 5                                         |
| Coker 485       | 31.3                           | 9/19            | 26                                                    | 5                                         |
| Hartz 6200      | 31.2                           | 9/22            | 26                                                    | 4                                         |
| Agratech 700    | 31.2                           | 10/30           | 35                                                    | 6                                         |
| Buckshot 703    | 31.2                           | 10/31           | 33                                                    | 4                                         |
| Terra-Vig 515   | 30.6                           | 10/23           | 22                                                    | 4                                         |
| Rally           | 29.8                           | 10/26           | 30                                                    | 4                                         |
| Ring Around 606 | 29.4                           | 9/21            | 31                                                    | 5                                         |
| Riverside 577   | 29.0                           | 9/16            | 29                                                    | 4                                         |
| Coker 6995      | 28.5                           | 9/20            | 28                                                    | 4                                         |
| Deltapine 105   | 28.4                           | 9/17            | 29                                                    | 4                                         |
| Deltapine 415   | 28.4                           | 9/16            | 23                                                    | 3                                         |
| Pioneer 9641    | 27.9                           | 9/19            | 27                                                    | 4                                         |
| Terra Vig 505   | 27.8                           | 9/20            | 29                                                    | 4                                         |
| Wilstar 550     | 26.6                           | 9/21            | 28                                                    | 4                                         |
| Asgrow 6785     | 25.2                           | 10/10           | 26                                                    | 5                                         |
| CV (%)          | 9.8                            |                 |                                                       |                                           |
| LSD (0.05)      | 4.2                            |                 |                                                       |                                           |

## KENAF VARIETY TEST

R.J. Habetz

Location: Rice Research Station

Soil Type: Crowley silt loam

Planting Date: May 31, 1990

Row Spacing: 32 in

Fertilizer: 80-40-40 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) banded at planting; 68-0-0-(45%)  
topdress on June 29

Plot Size: 4 rows x 30 ft

Herbicide: 2 pt/A Dual

Rainfall: 1st week after planting .50 in; 2nd week, 1.19 in.; 3rd week, .05 in

Harvested: Oct 24

Experimental Design: Randomized complete block, 4 replications

Comments: Kenaf (Hibiscus cannabinus) is a fiber crop that can be used for manufacturing paper.

When kenaf is used for newsprint paper, there is a decrease in the amount of ink needed, less ink ruboff, stronger paper, and no yellowing of stored paper. One of the main factors of kenaf is that it is biodegradable.

In this test at the Rice Research Station, dry weather did not seem to affect the growth of the kenaf varieties. During the growing season, there was a severe drop in the normal amount of rainfall, but still there was as much as an 8- to 10-inch growth of plants within a 1-week period. Overall growth for most varieties at harvest was from 10 to 12 feet. An experimental variety 15-2 showed the highest dry matter yield of 10.6 tons/A (Table 1). There was no insect, disease or nematode problems. Nematodes are a major problem in the growth of this crop.

The seedling vigor of some of the varieties was low, resulting in thinner stands, but overall yield was not affected because it was found that the thinner the stand the larger the stems, resulting in about equal yields.

Table 1. Performance of Kenaf varieties grown on a Crowley silt loam soil at the Rice Research Station, Crowley, LA. 1990.

| Variety       | Tons/A |
|---------------|--------|
| 15-2          | 10.6   |
| Everglades 71 | 7.8    |
| C-108         | 7.4    |
| Everglades 41 | 7.4    |
| Tainung 2     | 7.3    |
| 19-117-2      | 7.0    |
| Tainung 1     | 6.9    |
| 45-9          | 6.8    |
| Cubano        | 6.4    |
| 78-18RS10     | 6.2    |

## SOYBEAN PHYSIOLOGY TEST

R.J. Habetz and R.T. Dunand

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial, 50 lb/A

Planting Date: June 4, 1990

Row Spacing: 32 in

Fertilizer: 0-80-80 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) banded at planting

Plot Size: 4 rows x 30 ft

Treated: Early flower July 25, late flower Aug 2

Rates: Gibberellic acid, 3 oz, 12 oz; Command, 1.5 pt, 2.0 pt (applied PES)

Herbicide: 2.0 pt/A Dual, .5 lb/A Sencor applied PES to all except Command plots.

Rainfall: 1st week after planting, .50 in; 2nd week, .69 in;  
3rd week, .22 in

Harvested: Oct 16

Experimental Design: Randomized complete block, four replications

Comments: It is possible that about as many as one half of flowers produced by a soybean plant do not contribute to its potential yield. Many of these flowers abort at some time during the reproductive stage of growth. For this reason a test was initiated to apply a growth regulator at different rates and at various stages of soybean development to influence flower abortion, seed size and yield.

Plots were sprayed with gibberellic acid using CO<sub>2</sub> backpack sprayer. Seed yield was calculated from yield per plot and adjusted to 13% moisture. Agronomic characteristics, including plant height and lower pod height, were measured. Only the application of the high rate of gibberellic acid at the early flower stage of growth showed a yield increase above the check plot (Table 1). Yield data collected showed no significant difference in other rates and timing of application. Also, there was very little difference in mature plant height and lower pod height.



Table 1. The effect of gibberellic acid and Command on the yield of Centennial soybeans. Rice Research Station, Crowley, LA. 1990.

| Treatment        | Rate of application | Application time    | Mature plant height | Height of lower pod above ground | Yield  |
|------------------|---------------------|---------------------|---------------------|----------------------------------|--------|
|                  |                     |                     | -----               | (in)-----                        | (bu/A) |
| Gibberellic acid | 3 oz/A              | early flower        | 35                  | 5                                | 26.6   |
| Gibberellic acid | 3 oz/A              | late flower         | 35                  | 4                                | 26.4   |
| Gibberellic acid | 3 oz + 3 oz/A       | early + late flower | 36                  | 5                                | 29.5   |
| Command          | 1.5 pt/A            | PES                 | 34                  | 4                                | 27.9   |
| Gibberellic acid | 12 oz/A             | early flower        | 34                  | 5                                | 32.8   |
| Gibberellic acid | 12 oz/A             | late flower         | 37                  | 5                                | 30.1   |
| Gibberellic acid | 12 oz + 12 oz/A     | early + late flower | 36                  | 5                                | 28.1   |
| Command          | 2.0 pt/A            | PES                 | 36                  | 5                                | 32.0   |
| Check            | -                   | -                   | 36                  | 5                                | 32.1   |
| CV (%)           |                     |                     |                     |                                  | 18.8   |
| LSD (0.05)       |                     |                     |                     |                                  | 8.1    |

## SOYBEAN WEED CONTROL RESEARCH

R.J. Habetz

### INTRODUCTION

Southwest Louisiana has an abundance of weed species, some not commonly found in other areas of the state. Our climatic conditions are favorable to prolific weed growth and subsequent competition with crop species. We have a unique situation at the Rice Research Station in that a large portion of the soybean growers in the southwest drill-plant their soybeans. Also, some seasons, we receive large amounts of rainfall which can cause herbicide injury or dry conditions and have the expense of replanting.

Selected weed areas on the Rice Research Station were used and had uniform weed populations. Weed species evaluated for control were: pitted morningglory (*Ipomea lacunosa* L.), cocklebur (*Xanthium strumarium* L.), sicklepod (*Cassia obtusifolia* L.), redweed (*Melochia corchorifolia* L.), and annual grasses. Specific information on location, soil type, variety, row spacing, treatment data, sprayer type, etc., for each experiment is individually presented followed by a table of results.

Weed control and crop injury ratings for all experiments are based on a scale of 0 to 100%, where 0 equals no control or crop injury and 100 equals complete control or crop injury. In the crop tolerance test crop, yields were obtained and adjusted to 13% moisture.

Experiment: Soybean Tolerance to Pre- and Postemergence Herbicides

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial, 50 lb/A

Planting Date: June 4, 1990

Row Spacing: 32 in

Fertilizer: 0-80-80 banded at planting

Plot Size: 4 rows x 25 ft

Treated: June 4 (PES); June 26 (POT)

Crop Size: V3-V4 (10-12 in)

Sprayer: Tractor compressed air - 20 GPA, 11003 nozzles, 25 psi

Rated: July 17

Rainfall: 1st week after planting, .50 in; 2nd week, .69 in; 3rd week, .22 in

Experimental Design: Randomized complete block with four replications

Table 1. Soybean tolerance to pre- and postemergence herbicides. Rice Research Station, Crowley, LA. 1990.

| Treatment       | Rate of application<br>-(lb ai/A)- | Application time  | Phytotoxicity<br>7/17<br>------(%)----- | Mature plant height<br>-(in)- | Yield<br>(bu/A) |
|-----------------|------------------------------------|-------------------|-----------------------------------------|-------------------------------|-----------------|
| Command         | 1.00                               | PES               | 0                                       | 27                            | 35.7            |
| Lexone          | 0.56                               | PES               | 2                                       | 25                            | 37.9            |
| Scepter         | .125                               | PES               | 1                                       | 25                            | 34.8            |
| Scepter/Scepter | .125/.125                          | PES/POT           | 1                                       | 26                            | 35.8            |
| Scepter         | .125                               | POT               | 0                                       | 29                            | 37.4            |
| Canopy          | 0.56                               | PES               | 7                                       | 29                            | 34.5            |
| Canopy/Classic  | 0.56/.008                          | PES/POT           | 5                                       | 28                            | 34.0            |
| Classic         | .008                               | POT               | 3                                       | 28                            | 37.6            |
| Classic         | .012                               | POT               | 3                                       | 27                            | 35.7            |
| Cadre           | .032                               | POT               | 2                                       | 29                            | 33.2            |
| Cadre           | .016                               | POT               | 3                                       | 29                            | 37.4            |
| Cadre           | .008                               | POT <sup>1/</sup> | 5                                       | 29                            | 37.8            |
| Cobra           | 0.20                               | POT <sup>1/</sup> | 1                                       | 29                            | 36.8            |
| Blazer          | 0.50                               | POT <sup>1/</sup> | 5                                       | 31                            | 36.8            |
| Storm           | 0.75                               | POT <sup>1/</sup> | 3                                       | 28                            | 39.1            |
| Cobra + Classic | 0.15 + .008                        | POT               | 12                                      | 27                            | 36.8            |
| Check           |                                    |                   | 0                                       | 30                            | 37.8            |
| CV (%)          |                                    |                   | 2.2                                     | 2.4                           | 3.8             |
| LSD (0.05)      |                                    |                   | 56.4                                    | 6.1                           | 7.3             |

<sup>1/</sup> Agridex crop oil concentrate added at 1 pt/A; all other post overtop treatments had X-77 nonionic surfactant added at 0.25% (v/v).

Experiment: General Weed Control Test

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial, 50 bu/A

Planting Date: May 31, 1990

Row Spacing: 30 in

Fertilizer: None

Plot Size: 3 rows x 25 ft (treat 2 rows)

Treated: PES, May 31; EP (Early Post overtop), June 10; LP (late post), June 22

Weed Size: Early Post, 1 leaf; late post, 3-4 in

Crop Size: V2 - V3

Sprayer: Tractor compressed air - 20 GPA, 11003 nozzles, 25 psi

Rated: July 9

Rainfall: 1st week after planting, .40 in; 2nd week, 1.19 in; 3rd week, .05 in

Experimental Design: Randomized complete block, four replications.

Table 2. Annual grasses (AG), cocklebur (CB), and pitted morningglory (PMG) control, and soybean injury (I) using pre- and postemergence herbicides. Rice Research Station, Crowley, LA. 1990.

| Treatment            | Rate of<br>application<br>-(lb ai/A)- | Application<br>time   | Weed control<br>phytotoxicity |     |     |      |
|----------------------|---------------------------------------|-----------------------|-------------------------------|-----|-----|------|
|                      |                                       |                       | 7/9                           |     |     |      |
|                      |                                       |                       | AG                            | CB  | PMG | I    |
|                      |                                       |                       | ------(%)-----                |     |     |      |
| Dual/Canopy          | 2.00/0.38                             | PES/PES               | 98                            | 85  | 85  | 2    |
| Dual/Scepter         | 2.00/.125                             | PES/PES               | 90                            | 91  | 81  | 1    |
| Dual/Sencor          | 2.00/0.38                             | PES/PES <sup>2/</sup> | 98                            | 76  | 82  | 0    |
| Dual/Blazer          | 2.00/0.19                             | PES/EP <sup>2/</sup>  | 98                            | 84  | 87  | 1    |
| Dual/Blazer          | 2.00/0.38                             | PES/LP <sup>3/</sup>  | 97                            | 86  | 88  | 0    |
| Dual/Cobra           | 2.00/0.10                             | PES/EP                | 98                            | 84  | 84  | 1    |
| Dual/Cobra           | 2.00/0.20                             | PES/LP                | 98                            | 87  | 84  | 1    |
| Dual/Scepter         | 2.00/0.06                             | PES/EP                | 98                            | 89  | 83  | 2    |
| Dual/Scepter         | 2.00/.125                             | PES/LP                | 98                            | 86  | 79  | 1    |
| Dual/Classic         | 2.00/.004                             | PES/EP                | 98                            | 86  | 87  | 1    |
| Dual/Classic         | 2.00/.008 <sup>1/</sup>               | PES/LP                | 97                            | 84  | 84  | 1    |
| Dual/Reflex          | 2.00/.188 <sup>1/</sup>               | PES/EP                | 98                            | 88  | 86  | 1    |
| Dual/Reflex          | 2.00/.375 <sup>1/</sup>               | PES/LP                | 98                            | 86  | 86  | 0    |
| Fusilade 2000/Reflex | .063/.188 <sup>1/</sup>               | EP/EP                 | 71                            | 82  | 82  | 0    |
| Fusilade 2000/Reflex | .125/.375 <sup>1/</sup>               | LP/LP                 | 69                            | 75  | 80  | 0    |
| Dual/Storm           | 2.00/0.38 <sup>1/</sup>               | PES/EP                | 96                            | 91  | 86  | 0    |
| Dual/Storm           | 2.00/0.75 <sup>1/</sup>               | PES/LP                | 90                            | 86  | 83  | 0    |
| Dual/Cobra/Classic   | 2.00/.075/.004                        | PES/EP/EP             | 98                            | 88  | 86  | 2    |
| Dual/Cobra/Classic   | 2.00/.15/.008                         | PES/LP/LP             | 98                            | 87  | 87  | 4    |
| CV (%)               |                                       |                       | 5.5                           | 5.5 | 5.6 | 1.3  |
| LSD (0.05)           |                                       |                       | 4.3                           | 4.8 | 4.9 | 14.8 |

<sup>1/</sup> Agridex crop oil concentrate added at 1 pt/A; all other post overtop herbicides had X-77 nonionic surfactant added at 0.25% (v/v).

<sup>2/</sup> EP (early post) = post overtop treatment applied 7 days after weed emergence.

<sup>3/</sup> LP (late post) = post overtop treatment applied 12 days after early post.

Experiment: Sicklepod control study

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial, 50 lb/A

Planting Date: May 31, 1990

Row Spacing: 30 in

Fertilizer: None

Plot Size: 3 rows x 25 ft (treat 2 rows)

Treated: PES, May 31; POT 1, June 12; POT 2, June 19

Weed Size: POT 1, 1-2 leaf; POT 2, 3-4 leaf

Crop Size: POT 1 (V2-4 in); POT 2 (V4)

Sprayer: Tractor compressed air - 20 GPA, 11003 nozzles, 25 psi

Rated: July 9

Rainfall: 1st week after planting, .40 in; 2nd week, 1.19 in; 3rd week, .05 in

Experimental Design: Randomized complete block, four replications.

Table 3. Annual grasses (AG), sicklepod (SP) control, and soybean injury (I) using pre- and postemergence herbicides. Rice Research Station, Crowley, LA. 1990.

| Treatment <sup>1/</sup> | Rate of application<br>-(lb ai/A)- | Application time       | Weed control<br>phytotoxicity |      |       |
|-------------------------|------------------------------------|------------------------|-------------------------------|------|-------|
|                         |                                    |                        | 7/9                           |      |       |
|                         |                                    |                        | AG                            | SP   | I     |
|                         |                                    |                        | ------(%)-----                |      |       |
| Lexone/Classic          | 0.38/.008                          | PES/POT1 <sup>2/</sup> | 91                            | 87   | 1     |
| Scepter/Scepter         | .125/.125                          | PES/POT1               | 93                            | 82   | 2     |
| Lexone/Scepter          | 0.38/.125                          | PES/POT1               | 96                            | 90   | 2     |
| Scepter/Classic         | .125/.008                          | PES/POT1               | 92                            | 82   | 3     |
| Lexone/Blazer           | 0.38/0.50                          | PES/POT1               | 93                            | 82   | 1     |
| Lexone/Reflex           | 0.38/.375                          | PES/POT1               | 92                            | 73   | 0     |
| Lexone/Cobra            | 0.38/0.20                          | PES/POT1               | 90                            | 83   | 0     |
| Cadre                   | .008                               | POT1                   | 82                            | 82   | 5     |
| Cadre                   | .016                               | POT1                   | 84                            | 68   | 1     |
| Cadre                   | .032                               | POT1                   | 91                            | 88   | 6     |
| Cadre                   | .008                               | POT2 <sup>3/</sup>     | 80                            | 79   | 4     |
| Cadre                   | .016                               | POT2                   | 88                            | 85   | 4     |
| Cadre                   | .032                               | POT2                   | 93                            | 92   | 4     |
| Check                   |                                    |                        | 0                             | 0    | 0     |
| CV (%)                  |                                    |                        | 27.4                          | 34.6 | 4.4   |
| LSD (0.05)              |                                    |                        | 32.2                          | 31.9 | 133.9 |

<sup>1/</sup> X-77 nonionic surfactant added at 0.25% (v/v).

<sup>2/</sup> POT1 = post overtop treatment applied at the 1-2 leaf stage of sicklepod.

<sup>3/</sup> POT2 = post overtop treatment applied at the 3-4 leaf stage of sicklepod.



Experiment: Stale Seedbed Test

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial, 50 lb/A

Planting Date: July 5

Row Spacing: 30 in

Fertilizer: None

Plot Size: 3 rows x 25 ft (treated 2 rows)

Treated: July 5 (PES, burndown); July 30 (POT)

Crop Size: V2 - when pot applied

Weed Size: Redweed (RW) 4 in, annual grasses (AG) 3-4 in

Sprayer: Tractor compressed air - 20 GPA; 11003 nozzles, 25 psi

Rated: Aug 20

Rainfall: 1st week after planting, .25 in; 2nd week, 1.67 in; 3rd week 1.61 in

Experimental Design: Randomized complete block, four replications

Table 4. Annual grasses (AG), redweed (RW) control, and soybean injury (I) using pre- and postemergence herbicides in a stale seedbed. Rice Research Station, Crowley, LA. 1990.

| Treatment                          | Rate of<br>application<br>-(lb ai/A)- | Application<br>time | Weed control<br>Phytotoxicity<br>8/20 |      |      |
|------------------------------------|---------------------------------------|---------------------|---------------------------------------|------|------|
|                                    |                                       |                     | AG                                    | RW   | I    |
|                                    |                                       |                     | ------(%)-----                        |      |      |
| Gramoxone Super/Dual               | 0.38/2.00                             | PES                 | 60                                    | 18   | 1    |
| Gram. Sup./Dual/Canopy             | 0.38/2.00/0.56                        | PES                 | 61                                    | 96   | 2    |
| Gram. Sup./Dual/Scepter            | 0.38/2.00/.125                        | PES                 | 69                                    | 52   | 1    |
| Gram. Sup./Dual/Sencor             | 0.38/2.00/0.56                        | PES                 | 62                                    | 89   | 3    |
| Gram. Sup./Fusilade 2000/Reflex    | 0.38/.188/0.38                        | PES/POT/POT         | 86                                    | 72   | 0    |
| Gram. Sup./Dual/Storm <sup>1</sup> | 0.38/2.00/0.75                        | PES/PES/POT         | 78                                    | 89   | 1    |
| Roundup/Dual                       | 1.00/2.00                             | PES                 | 76                                    | 20   | 0    |
| Roundup/Dual/Canopy                | 1.00/2.00/0.56                        | PES                 | 67                                    | 94   | 5    |
| Roundup/Dual/Scepter               | 1.00/2.00/.125                        | PES                 | 71                                    | 45   | 2    |
| Roundup/Dual/Sencor                | 1.00/2.00/0.56                        | PES                 | 69                                    | 64   | 1    |
| Roundup/Fusilade 2000/Reflex       | 1.00/.188/0.38                        | PES/POT/POT         | 67                                    | 48   | 0    |
| Roundup/Dual/Storm <sup>1</sup>    | 1.00/2.00/0.75                        | PES/PES/POT         | 68                                    | 78   | 1    |
| Ignite/Dual                        | 0.75/2.00                             | PES                 | 62                                    | 33   | 0    |
| Ignite/Dual/Canopy                 | 0.75/2.00/0.56                        | PES                 | 74                                    | 96   | 1    |
| Ignite/Dual/Scepter                | 0.75/2.00/.125                        | PES                 | 70                                    | 66   | 0    |
| Ignite/Dual/Sencor                 | 0.75/2.00/0.56                        | PES                 | 78                                    | 80   | 0    |
| Ignite/Fusilade 2000/Reflex        | 0.75/.188/0.38                        | PES/POT/POT         | 82                                    | 42   | 0    |
| Ignite/Dual/Storm <sup>1</sup>     | 0.75/2.00/0.75                        | PES/PES/POT         | 71                                    | 78   | 1    |
| CV (%)                             |                                       |                     | 12.6                                  | 17.2 | 80.9 |
| LSD (0.05)                         |                                       |                     | 11.8                                  | 15.0 | 1.3  |

<sup>1</sup>/ Agridex crop oil concentrate added at 1 pt/A; all other treatments had X-77 nonionic surfactant added at 0.25% (v/v).

## AQUACULTURE RESEARCH

W.R. McClain, K.R. Taylor, S.B. Dailey, and J.J. Sonnier

The aquaculture research program at the Rice Research Station has been reinstated under LAES Project LAB02855 entitled "Characterization and Evaluation of Forage-Based Food Systems for Crawfish Production." The objectives of this project are:

1. To characterize nutritional and cultural conditions necessary for efficient utilization of forage-based food systems by crawfish.
2. To evaluate methods for improving crawfish size and yield in traditional mono- and double-cropped production systems.
3. To evaluate alternative management strategies (such as transferring or restocking crawfish) for increasing profit margins in crawfish production.

### INTRODUCTION AND JUSTIFICATION

Louisiana leads the nation in crawfish production with approximately 1,800 producers and 125,000 acres under cultivation. The Louisiana crawfish industry is considered the only large-scale crustacean aquaculture industry in the United States. However, the method by which crawfish are cultivated is considered more extensive in comparison with the more intensive culture methods of some other aquatic species such as catfish and shrimp. For instance, crawfish are not routinely fed a formulated and prepared feed but must rely on an established forage-based food system.

The most dependable and reliable forage-type food source for the commercial production of Procambarus spp. is the use of planted crops. However, this presumably acts more as a feed delivery system than as a direct feed since nutrients probably are cycled through one or more trophic levels prior to substantial use by crawfish. There is limited documentation on how crawfish are able to utilize this complex feed delivery system, the conditions necessary to achieve maximum nutritional gain from it and the limitations of this system for optimum crawfish production.

This research project focuses on these concerns and is committed to achieving a better understanding of the "total picture" of forage-based food systems for crawfish production and developing better management strategies for their use by addressing the stated objectives.

## APPROACH

Both laboratory and field experiments will be conducted to characterize attributes of forage-based systems necessary for proper crawfish utilization and growth. Additional field experiments will be conducted to evaluate the effects of specified management practices on crawfish production, crawfish size and variability, and economic returns under commercial culture conditions. Field studies will be conducted primarily at the south unit of the Rice Research Station utilizing approximately 5 hectares of land divided into various sized plots (0.16 to 0.81 ha). Additionally, 140 small-mesh (5 mm) wire enclosures (0.5 m<sup>2</sup> surface area) will be used inside research plots to contain crawfish subjected to various growth study treatments.

## PROGRESS REPORT

Rice, sorghum-sudangrass hybrid and grain sorghum were planted and cultivated in crawfish ponds during the summer of 1990. Ponds were flooded in October 1990 and managed to simulate commercial crawfish production ponds. The research has been initiated and some data have been generated which will be summarized in the 83rd Annual Research Report (1991).

## FORAGE CROPS BIOTECHNOLOGY RESEARCH

### BERMUDAGRASS IMPROVEMENT THROUGH TISSUE CULTURE

S.S. Croughan

#### Production of Regenerated Plants

S.S. Croughan and J.T. Simons

Research was continued on increasing the frequency of regeneration from immature inflorescences of Coastal bermudagrass. Immature inflorescences of Brazos and Coastal were collected from the Hill Farm Research Station on May 14, June 26, and August 13, 1990. Coastal regeneration rates were compared to those of Brazos, a variety that regenerates well. The parameters tested were inflorescence size (0.1 - 0.5 cm, 0.6 - 1.0 cm, 1.1 - 1.5 cm, and 1.6 - 2.0 cm); pretreatment (none, room temperature with and without water, and cold storage with and without water); and media sequence treatment (high and low sucrose with gradual or rapid decrease of auxin).

Over half the Brazos inflorescences had callus that regenerated, while only a third of the Coastal inflorescences had callus that regenerated. Brazos had the highest regeneration rates in the 0.6 - 1.0 cm inflorescence size group and Coastal in the 0.1 - 0.5 cm size group. Rates of regeneration were best in Coastal when the inflorescences were plated immediately without a pretreatment. Brazos inflorescences could be plated immediately or stored at room temperature with water and high regeneration rates obtained. Brazos inflorescences had higher regeneration rates when plated on media with the higher sucrose concentration and a rapid sequence of decreasing auxin, while Coastal had higher regeneration rates on the lower sucrose media when the auxin was gradually decreased.

#### Evaluation of Regenerated Bermudagrass Plants

P.D. Colyer, S.S. Quisenberry, M.M. Eichhorn, Jr., J.T. Simons, and S.S. Croughan

Regenerated bermudagrass plants continue to be screened for resistance to fall armyworm (Spodoptera frugiperda). Several mass screenings were conducted to identify somaclonal variants for advanced tests. Leaf samples are also being evaluated for secondary products responsible for insect resistance. Isolates of fungi involved in leaf spot disease in bermudagrass were evaluated for toxin production, and culture conditions for optimal toxin production were established. Work on toxin isolation and identification are continuing.

Field evaluations of bermudagrass lines at the Rice Research and Hill Farm Research stations were continued. Several more lines were established in the field for evaluation. Data on yield and quality were collected. One somaclonal line has been identified for potential release as germplasm.

## SOYBEAN BIOTECHNOLOGY RESEARCH

### SOYBEAN IMPROVEMENT THROUGH TISSUE CULTURE

S.S. Croughan

#### Regeneration of Soybean Somaclones

S.S. Croughan, J.T. Simons, and B. Marquis

Immature cotyledons were used to produce soybean somaclonal variants. All varieties and breeding lines tested produced embryos at a high frequency. The limiting factor has been the germination and survival of the embryos into normal plants. This year emphasis was placed on improving the methods to increase the survival rate of regenerated embryos. Factors which lead to improved survival included: change of agar source and potassium level in nutrient medium used for embryo germination; change in light quality for developing plantlets; change in soil and the use of a "humidity chamber" for initial potting of plantlet; and increased nutrients provided to the developing plantlet. Regenerated plants are being grown to maturity and seeds collected.

New media strategies were also evaluated to improve the overall health and development of the embryos. A different hormone (1-naphthaleneacetic acid [NAA] instead of 2,4-dichlorophenoxyacetic acid [2,4-D]) was tested for embryo initiation, and different methods of desiccation for embryo maturation were tested. Data suggests that NAA produces more normal embryos and the best method for desiccation is 10% sucrose.

#### Soybean Anther Culture

S.S. Croughan, B.L. Tillman, J.T. Simons, and B. Marquis

An anther culture system was initiated for the development of plants from soybeans. Factors which were evaluated at the Rice Research Station included: basal nutrient media, sucrose levels, hormone levels and combinations, orientation of the anther on the medium, and cold pre-treatments. Callus was obtained at a high frequency and histological examination revealed that pollen grains were the source of cell growth for a large number of the cultures. Regeneration was attempted, and to date, early stages of differentiation have been observed, but no plantlet formation has occurred.

Table 1. Average number of embryos per plated cotyledons from immature seeds from greenhouse-grown soybean plants. Rice Research Station, Crowley, LA. 1990.

| Variety                    | Average number<br>of embryos<br>per plated cotyledon |
|----------------------------|------------------------------------------------------|
| <u>Maturity Group IV</u>   |                                                      |
| Crawford                   | 2.75                                                 |
| Williams                   | 3.93                                                 |
| Pioneer 9442               | 3.08                                                 |
| <u>Maturity Group V</u>    |                                                      |
| Bay                        | 2.68                                                 |
| Forrest                    | 1.11                                                 |
| Bedford                    | 0.87                                                 |
| <u>Maturity Group VI</u>   |                                                      |
| Centennial                 | 1.36                                                 |
| Asgrow 6785                | 0.98                                                 |
| Coker 686                  | 2.21                                                 |
| Hartz 6686                 | 1.13                                                 |
| Hartz 6200                 | 1.33                                                 |
| LA77-9729                  | 1.61                                                 |
| <u>Maturity Group VII</u>  |                                                      |
| Hartz 7126                 | 0.96                                                 |
| Asgrow 7986                | 1.17                                                 |
| Coker 6847                 | 1.85                                                 |
| Coker 6727                 | 1.59                                                 |
| Braxton                    | 2.14                                                 |
| LA79-11123                 | 1.34                                                 |
| Deltapine 417              | 2.57                                                 |
| <u>Maturity Group VIII</u> |                                                      |
| Hartz 8122                 | 0.65                                                 |

## BEEF CATTLE NUTRITION RESEARCH

### INFLUENCE OF FISH MEAL AND SUPPLEMENTAL FAT IN DIETS FOR FINISHING STEERS

T.W. White, F.G. Hembry, L.S. Sticker,  
L.D. Bunting, and A. Saxton

#### INTRODUCTION

Dietary protein entering the rumen is degraded and utilized by the microorganisms or escapes into the abomasum and lower gastrointestinal tract where it is degraded to amino acids that are absorbed. Some proteins are degraded less than others in the rumen and, therefore, may be of greater nutritional value. Fish meal is a ruminal by-pass protein available in Louisiana that has received limited attention as a ruminant protein source. Supplemental fat is an economical energy source that may enhance the effectiveness of by-pass protein. This experiment was initiated to study the influence of supplemental fat in finishing beef diets containing soybean meal or fish meal.

#### MATERIALS AND METHODS

Forty-eight Hereford x Angus crossbred steers averaging 650 lb were blocked by weight into 8 groups in each of 2 trials. One steer from each weight group was randomly assigned to each of six treatments. Steers were fed in pens of 4 and 2 in trials 1 and 2, respectively. The experimental diets contained soybean meal or fish meal with 0, 2.5, or 5% added fat (Table 1). The diets were formulated to provide 17 kcal of net energy for maintenance per kg of crude protein.

All steers were implanted with 36 mg Zeranol when the trials were initiated. The steers were denied feed and water for 18 hours prior to weighing initially and at 28-day intervals. After 112 and 140 days on feed in trials 1 and 2, respectively, steers were slaughtered and carcass characteristics evaluated by USDA graders and longissimus muscle area and fat thickness were measured on the cut surface at the 12th rib 48 hours after slaughter.

During the last 28 days of trial 1, four steers (two steers in each of two 14-day periods) from each treatment were individually fed ad libitum. Daily fecal samples were collected and composited on individual steer bases and dried at 50°C. Analysis was conducted according to AOAC (1989) procedures except that fat was extracted using acidified ether.

A randomized block design was used, with years and weight groups as blocks. Treatments were a factorial of protein source and fat level. Block by treatment interactions were examined for possible use as error terms, but were found to be non-significant and were pooled into sampling error (pens). Orthogonal polynomial contrasts were used to test differences in fat level and these were compared between protein sources (SAS, 1988).



Table 1. Percent Ingredient Composition and Proximate Analysis of Experimental Diets (Rice Research Station, Crowley, La. 1990).

| Item                       | Soybean meal |      |      | Fish meal   |      |      |
|----------------------------|--------------|------|------|-------------|------|------|
|                            | Percent fat  |      |      | Percent fat |      |      |
|                            | 0            | 2.5  | 5    | 0           | 2.5  | 5    |
| Ingredients                |              |      |      |             |      |      |
| Hay                        | 20           | 20   | 20   | 20          | 20   | 20   |
| Corn                       | 65           | 60   | 55.5 | 66          | 62   | 58   |
| Molasses                   | 10           | 10   | 10   | 10          | 10   | 10   |
| Soybean meal               | 3            | 5.5  | 7.5  |             |      |      |
| Fat                        |              | 2.5  | 5    |             | 2.5  | 5    |
| Fish meal                  |              |      |      |             | 2    | 3.5  |
| Urea                       | .5           | .5   | .5   | .5          | .5   | .5   |
| Salt,<br>trace mineralized | .5           | .5   | .5   | .5          | .5   | .5   |
| Dicalcium phosphate        | 1            | 1    | 1    | 1           | 1    | 1    |
| Vitamin A, IU/lb           | 1000         | 1000 | 1000 | 1000        | 1000 | 1000 |
| Dry matter analysis        |              |      |      |             |      |      |
| Crude protein              | 10.0         | 10.6 | 11.5 | 9.8         | 10.4 | 11.5 |
| ADF                        | 15.5         | 15.2 | 15.8 | 15.8        | 15.9 | 17.8 |
| NDF                        | 27.4         | 26.2 | 28.0 | 27.8        | 30.1 | 30.8 |
| Ether extract              | 2.2          | 4.7  | 7.2  | 2.2         | 4.5  | 6.9  |
| Ash                        | 6.6          | 6.4  | 6.4  | 6.2         | 6.6  | 6.6  |

## RESULTS AND DISCUSSION

Feedlot performance of steers fed corn-based diets containing soybean meal or fish meal with 0, 2.5 or 5% added fat is shown in Table 2. Protein sources had similar influence on feedlot and carcass traits.

Adding fat to the diets that contained fish meal resulted in a linear decrease ( $P<.05$ ) in feed consumption. There was a similar trend when diets contained soybean meal. A quadratic response ( $P<.05$ ) to fat was observed on gain of steers fed diets containing fish meal with a similar trend when diets contained soybean meal. It appears that 2.5% fat, even though slightly reducing intake, provided extra energy to slightly improve gains. Feed efficiency tended to improve, and there were general trends suggesting that carcasses were fatter, when fat was added to the diet.

Ruminal pH, ammonia and plasma urea nitrogen was higher ( $P<.05$ ) in steers fed diets containing soybean meal than when diets contained fish meal (Table 3). Other ruminal parameters were not influenced by protein source. Adding fat to diets containing soybean meal and fish meal resulted in a linear increase in ruminal pH and isovalerate and a decrease in butyrate. Propionate increased linearly ( $P<.01$ ) with increasing levels of fat in soybean meal diets. Increasing the fat level resulted in a linear decline in acetate:propionate ratios ( $P<.05$ ) and plasma urea nitrogen ( $P<.01$ ) when soybean meal diets were fed. Acetate:propionate ratios responded quadratically ( $P<.05$ ) to fat when fish meal diets were fed.

Apparent digestibility of crude protein and acid detergent fiber (ADF) was higher ( $P<.05$ ) in diets containing soybean meal than fish meal (Table 4). Adding fat to the soybean meal diets resulted in a linear decline ( $P<.01$ ) in dry matter, ADF and neutral detergent fiber (NDF) digestibilities. There was also a quadratic response ( $P<.05$ ) to fat in the soybean meal diets on ADF and NDF digestibilities. It appears that fish meal alleviated the depression in NDF digestibility observed with 5% fat in the soybean meal diets. Fat and crude protein digestibilities increased linearly ( $P<.01$ ) with fat level in soybean meal and fish meal diets. There was also a quadratic response ( $P<.05$ ) to fat level in the soybean meal diets on fat digestibility and in the fish meal diets on crude fiber digestibility.

## SUMMARY

Soybean meal and fish meal appear equivalent as protein sources for finishing steers. Adding fat to the diets of finishing steers appears beneficial at the 2.5% level. At the 5% level fat appeared to reduce feed intake and depressed gains. Some differences in ruminal fluid and blood parameters were observed due to protein source and fat level. Differences existed in nutrient digestibilities due to protein source and fat level.

Table 2. Performance of Finishing Steers Supplemented with Soybean Meal or Fish Meal and Three Levels of Fat (Rice Research Station, Crowley, La. 1990).

| Item                                         | Soybean meal |      |      | Fish meal   |      |      |
|----------------------------------------------|--------------|------|------|-------------|------|------|
|                                              | Percent fat  |      |      | Percent fat |      |      |
|                                              | 0            | 2.5  | 5    | 0           | 2.5  | 5    |
| No. steers                                   | 16           | 16   | 16   | 16          | 16   | 16   |
| Initial weight, lb                           | 650          | 651  | 650  | 647         | 651  | 654  |
| Days on feed                                 | 126          | 126  | 126  | 126         | 126  | 126  |
| Dry feed intake, lb <sup>a</sup>             | 25.4         | 24.2 | 23.2 | 25.0        | 24.2 | 22.1 |
| Daily gain, lb <sup>b</sup>                  | 2.88         | 2.99 | 2.89 | 2.81        | 2.95 | 2.67 |
| Feed:gain                                    | 9.0          | 8.2  | 8.1  | 8.9         | 8.2  | 8.4  |
| Carcass weight, lb                           | 605          | 612  | 613  | 603         | 616  | 601  |
| Marbling score                               | 7.5          | 7.6  | 8.2  | 7.8         | 8.5  | 7.9  |
| Quality grade                                | 9.4          | 9.6  | 10.1 | 9.8         | 10.4 | 9.9  |
| Fat thickness, mm                            | 7.3          | 9.1  | 10.4 | 8.8         | 10.6 | 9.1  |
| Kidney, heart and pelvic fat, % <sup>c</sup> | 2.0          | 2.1  | 2.4  | 2.2         | 2.2  | 2.2  |
| Longissimus muscle area, in <sup>2</sup>     | 10.7         | 10.8 | 10.4 | 10.9        | 10.7 | 10.7 |

<sup>a</sup>Linear response to fat ( $P < .05$ ) in fish meal diets that did not differ ( $P > .71$ ) from response in soybean meal diets.

<sup>b</sup>Quadratic response to fat ( $P < .05$ ) in fish meal diets that did not differ ( $P > .21$ ) from response in soybean meal diets.

<sup>c</sup>Quadratic response to fat ( $P < .01$ ) in soybean meal diets that did not differ ( $P > .08$ ) from response in fish meal diets.

Table 3. Influence of Fat Level in Soybean Meal and Fish Meal Diets on Ruminal pH, Ammonia, Molar Proportions (mol/100 mol) and Total Concentrations (mM) of Volatile Fatty Acids and Plasma Urea Nitrogen (mg/dl) (Rice Research Station, Crowley, La. 1990).

| Item                    | Soybean meal |       |       |                |                | Fish meal   |       |       |                |                | Difference |     |
|-------------------------|--------------|-------|-------|----------------|----------------|-------------|-------|-------|----------------|----------------|------------|-----|
|                         | Percent fat  |       |       | L <sup>a</sup> | Q <sup>a</sup> | Percent fat |       |       | L <sup>a</sup> | Q <sup>a</sup> |            |     |
|                         | 0            | 2.5   | 5     |                |                | 0           | 2.5   | 5     |                |                |            |     |
| pH                      | 6.44         | 6.64  | 6.96  | .01            | .24            | 6.34        | 6.49  | 6.78  | .01            | .55            | .23        | .65 |
| Ammonia, mM             | 2.87         | 2.50  | 3.92  | .06            | .15            | 2.41        | 2.46  | 2.30  | .72            | .81            | .10        | .37 |
| Acetate                 | 63.30        | 63.72 | 63.00 | .75            | .99            | 63.01       | 62.12 | 64.66 | .05            | .11            | .20        | .27 |
| Propionate              | 18.32        | 19.41 | 23.42 | .01            | .97            | 17.96       | 21.14 | 20.39 | .56            | .10            | .10        | .28 |
| Butyrate                | 16.44        | 14.41 | 10.05 | .01            | .52            | 17.01       | 14.33 | 11.92 | .01            | .63            | .21        | .43 |
| Isovalerate             | .62          | .91   | 1.78  | .01            | .05            | .64         | 1.03  | 1.50  | .01            | .93            | .15        | .14 |
| Valerate                | 1.12         | 1.08  | 1.20  | .35            | .26            | 1.17        | 1.08  | 1.27  | .50            | .14            | .83        | .85 |
| Acetate:<br>propionate  | 3.70         | 3.32  | 2.90  | .05            | .50            | 3.79        | 3.16  | 3.54  | .75            | .05            | .05        | .34 |
| Total VFA               | 87.76        | 83.02 | 75.84 | .11            | .76            | 90.56       | 86.68 | 74.51 | .04            | .41            | .75        | .74 |
| Plasma urea<br>nitrogen | 14.51        | 16.56 | 22.25 | .10            | .20            | 14.68       | 16.45 | 17.60 | .10            | .73            | .01        | .24 |

<sup>a</sup>Probability level for linear (L) and quadratic (Q) response to fat level and differences in response to protein sources.

Table 4. Nutrient Digestibility of Diets Containing Soybean Meal or Fish Meal with Three Levels of Fat (Rice Research Station, Crowley, La. 1990).

| Item                    | Soybean meal |      |      |                |                | Fish meal   |      |      |                |                | Difference     |                |
|-------------------------|--------------|------|------|----------------|----------------|-------------|------|------|----------------|----------------|----------------|----------------|
|                         | Percent fat  |      |      |                |                | Percent fat |      |      |                |                |                |                |
|                         | 0            | 2.5  | 5    | L <sup>a</sup> | Q <sup>a</sup> | 0           | 2.5  | 5    | L <sup>a</sup> | Q <sup>a</sup> | L <sup>a</sup> | Q <sup>a</sup> |
| Dry matter              | 72.8         | 72.1 | 68.7 | .01            | .28            | 70.2        | 71.2 | 72.4 | .15            | .92            | .01            | .40            |
| Fat                     | 35.1         | 66.3 | 64.1 | .01            | .03            | 28.5        | 56.0 | 70.4 | .01            | .29            | .22            | .25            |
| Crude protein           | 57.6         | 61.2 | 62.5 | .01            | .21            | 56.9        | 56.3 | 60.3 | .01            | .03            | .30            | .02            |
| Acid detergent fiber    | 61.7         | 56.0 | 55.4 | .01            | .04            | 57.7        | 54.9 | 55.8 | .14            | .10            | .03            | .68            |
| Neutral detergent fiber | 50.5         | 51.4 | 39.4 | .01            | .03            | 49.2        | 48.7 | 52.0 | .34            | .46            | .01            | .04            |

<sup>a</sup>Probability level for linear (L) and quadratic (Q) responses to fat levels and differences in response to protein sources.

## INTERNATIONAL RICE TRAINING PROGRAM

Maurice F. Miller

The Rice Research Station has cooperated for a number of years with the Foreign Training Division of the International Agricultural Development Service by providing an information training program for international leaders, government officials, farmers, students, and others interested in the production, processing, and marketing of rice.

Data regarding the classification of visitors according to countries are presented in Table 1. A total of 108 participants, representing 24 countries, were guests at the Rice Research Station in 1990. This was a decrease of 43 participants compared to 1989. Belgium provided the largest number of visitors (42).

Table 1. Number of participants according to country. Rice Research Station, Crowley, LA. 1990.

| Country    | Number of participants |
|------------|------------------------|
| Argentina  | 3                      |
| Belgium    | 42                     |
| Brazil     | 1                      |
| Cameroon   | 1                      |
| Costa Rica | 1                      |
| Egypt      | 1                      |
| England    | 3                      |
| Ethiopia   | 1                      |
| France     | 1                      |
| Gambia     | 1                      |
| Hungary    | 2                      |
| India      | 3                      |
| Iraq       | 4                      |
| Japan      | 21                     |
| Madagascar | 1                      |
| Myanmar    | 1                      |
| Pakistan   | 6                      |
| Rwanda     | 2                      |
| Senegal    | 3                      |
| Sri Lanka  | 1                      |
| Sweden     | 1                      |
| Swaziland  | 1                      |
| Togo       | 1                      |
| Wales      | 6                      |
| (24)       | Total 108              |

Table 2 presents information regarding the number of participants according to sponsoring organizations. The largest number was self sponsored.

Subject matter of interest to the participants varied from general rice production practices to specific interests, such as plant breeding, water management, processing, marketing, control of rice diseases, insects, and weeds. There was also interest in biotechnology, rice genetics, milling, and grading.

Table 2. Number of visitors according to sponsoring organizations. Rice Research Station, Crowley, LA. 1990.

| Sponsoring organization  | Number sponsored |
|--------------------------|------------------|
| British Technology Group | 3                |
| FAO                      | 2                |
| Governments (Foreign)    | 3                |
| IFDC                     | 6                |
| Private Companies        | 11               |
| Rotary International     | 6                |
| Self                     | 55               |
| UNOP                     | 1                |
| USAID                    | 6                |
| US Rice Council          | 12               |
| World Bank               | 3                |
| (11)                     |                  |
| Total                    | 108              |

ECONOMICS OF ENTERPRISE SELECTION AND WHOLE FARM  
DECISION MAKING IN THE LOUISIANA RICE GROWING AREAS \*

Arthur M. Heagler and Brian E. McManus \*\*

Enterprise budget projections for 1991 were developed for rice, soybeans, milo, corn, wheat, and wheat-soybean double cropping systems. A summary of the enterprise budgeting analysis for Southwest Louisiana is presented in Table 1. Budgeting results for rice production in Northeast and Central Louisiana are shown in Table 2. Owner-operator and tenant-operator situations were budgeted for each enterprise, and other than for rice, all enterprises were valued at a projected market price. Rice income was calculated by adding the product of the loan price of \$6.50 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying the area average proven yield times the difference between the target price and the loan value, \$4.21 per hundredweight. Under these assumptions, sufficient revenue was available to cover direct expenditures for all but the soybean tenant-operator situations. Direct expenditures were defined to be seed, fuel, fertilizer, labor, chemicals, maintenance on equipment, and interest on operating capital. Total specified expenses include direct expenditures, the annualized cost of replacing capital assets, and interest on non-operating capital. Those enterprises that did not generate sufficient income to cover total specified expenses were the soybean enterprises, the milo, corn, and wheat tenant situations, and the rice second cutting enterprise.

Detailed enterprise budgets and supporting data were published in A.E.A. Research Report Number 89, January, 1991.

Service enterprise budgets were prepared for several alternative rice irrigation systems in Louisiana. For Southwest Louisiana, cost estimates were developed for diesel, electric, and natural gas power systems. Deep well and surface water sources for each of the above power systems were evaluated. Per acre inch direct irrigation costs for a deep well water source were estimated to be approximately \$2.71, \$2.76, and \$1.54 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for a deep well water source were estimated to be approximately \$4.07, \$3.78, and \$2.76 for diesel, electric, and natural gas systems, respectively. Per acre inch direct irrigation costs for a surface irrigation water source were estimated to be approximately \$1.17, \$1.05, and \$0.67 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for a surface water source were estimated to be approximately \$1.87, \$1.62, and \$1.35 for diesel, electric, and natural gas systems, respectively.

---

\* Research supported in part by funds provided by Louisiana rice producers through the Louisiana Rice Research Board.

\*\* Associate Professor and Research Associate, respectively, Department of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana.



For Northeast Louisiana, cost estimates were developed for diesel and electric power systems for both deep well and surface water sources. Per acre inch direct irrigation costs for a deep well water source were estimated to be approximately \$0.67 and \$0.86 for diesel and electric systems, respectively. Total per acre inch irrigation costs for a deep well water source were estimated to be approximately \$1.43 and \$1.30 for diesel and electric systems, respectively. Per acre inch direct irrigation costs for a surface water source were estimated to be approximately \$ 0.72 and \$0.53 for diesel and electric systems, respectively. Total per acre inch irrigation costs for a surface water source were estimated to be approximately \$1.09 and \$0.78 for diesel and electric systems, respectively. For Central Louisiana, cost estimates were developed for a diesel power system for a deep well water source. Per acre inch direct and total irrigation costs for this system were \$1.46 and \$2.16, respectively.

Detailed results of the irrigation cost analysis are reported in A.E.A. Research Report Number 89, January 1991.

At the request of several rice producer groups, Louisiana rice cost of production estimates were compared with estimates calculated by the Economic Research Service (ERS) of the United States Department of Agriculture. A summary of this comparison was presented as a part of testimony at a hearing before the U.S. House Agriculture Committee, Rice, Cotton, and Sugar Subcommittee, in Monroe, Louisiana, January 1990. In November 1989, a meeting was held in Washington D.C. with ERS and agricultural economists from land grant institutions representing the five major rice producing states, Arkansas, California, Louisiana, Mississippi, and Texas. As a result of this meeting, a summary paper of the meeting was prepared, including a discussion of the major differences in cost estimation between ERS and the land grant universities. This paper was approved by the economists and administrations of all five land grant institutions and released in February 1990.

Table 1. A Summary of Projected Costs and Returns per Acre for Rice, Soybeans,  
Corn, Milo, Wheat, and Wheat-Soybean Double Crop, Southwest Louisiana, 1991. <sup>a/</sup>

| Crop Description                  | Yield<br>Per Acre | Unit | Total<br>Income | Direct<br>Expenses | Returns | Fixed<br>Expenses | Total<br>Expenses | Returns |
|-----------------------------------|-------------------|------|-----------------|--------------------|---------|-------------------|-------------------|---------|
| Dollars per Acre                  |                   |      |                 |                    |         |                   |                   |         |
| <u>Rice Enterprises:</u>          |                   |      |                 |                    |         |                   |                   |         |
| Water Plant, Owner <sup>b/</sup>  | 46.10             | cwt. | 479.25          | 396.08             | 83.17   | 95.13             | 491.21            | -11.96  |
| Water Plant, Tenant <sup>c/</sup> | 27.66             | cwt. | 287.55          | 234.87             | 52.68   | 51.75             | 286.62            | 0.93    |
| Drill Plant, Owner <sup>b/</sup>  | 48.55             | cwt. | 495.17          | 376.71             | 118.46  | 99.13             | 475.84            | 19.33   |
| Drill Plant, Tenant <sup>c/</sup> | 29.13             | cwt. | 297.10          | 221.75             | 75.35   | 55.75             | 277.50            | 19.60   |
| Second Cutting <sup>d/</sup>      | 12.00             | cwt. | 78.00           | 75.10              | 2.90    | 17.83             | 92.93             | -14.93  |
| <u>Soybean Enterprises:</u>       |                   |      |                 |                    |         |                   |                   |         |
| 6-Row, Owner <sup>b/</sup>        | 24.50             | bu.  | 134.75          | 123.71             | 11.04   | 38.01             | 161.72            | -26.97  |
| 6-Row, Tenant <sup>c/</sup>       | 19.60             | bu.  | 107.80          | 122.33             | -14.53  | 38.01             | 160.34            | -52.54  |
| Drill Plant, Owner <sup>b/</sup>  | 27.00             | bu.  | 148.50          | 130.36             | 18.14   | 36.85             | 167.21            | -18.71  |
| Drill Plant, Tenant <sup>c/</sup> | 21.60             | bu.  | 118.80          | 128.78             | -9.98   | 36.85             | 165.63            | -46.83  |
| <u>Corn Enterprises:</u>          |                   |      |                 |                    |         |                   |                   |         |
| 6-Row, Owner <sup>b/</sup>        | 100.00            | bu.  | 230.00          | 178.21             | 51.79   | 41.72             | 219.93            | 10.07   |
| 6-Row, Tenant <sup>c/</sup>       | 80.00             | bu.  | 184.00          | 174.41             | 9.59    | 41.72             | 216.13            | -32.13  |
| <u>Milo Enterprises:</u>          |                   |      |                 |                    |         |                   |                   |         |
| Drill Plant, Owner <sup>b/</sup>  | 44.43             | cwt. | 155.51          | 116.83             | 38.68   | 30.59             | 147.42            | 8.08    |
| Drill Plant, Tenant <sup>c/</sup> | 35.54             | cwt. | 124.40          | 116.83             | 7.57    | 30.59             | 147.42            | -23.02  |

(Continued)

Table 1. (Continued)

| Crop Description                    | Yield<br>Per Acre | Unit | Total<br>Income | Direct<br>Expenses | Returns | Fixed<br>Expenses | Total<br>Expenses | Returns |
|-------------------------------------|-------------------|------|-----------------|--------------------|---------|-------------------|-------------------|---------|
| <div>Dollars per Acre</div>         |                   |      |                 |                    |         |                   |                   |         |
| <u>Wheat Enterprises:</u>           |                   |      |                 |                    |         |                   |                   |         |
| Drill Plant, Owner <sup>b/</sup>    | 45.00             | bu.  | 146.25          | 91.84              | 54.41   | 28.18             | 120.02            | 26.23   |
| Drill Plant, Tenant <sup>c/</sup>   | 36.00             | bu.  | 117.00          | 91.84              | 25.16   | 28.18             | 120.02            | -3.02   |
| <u>Wheat-Soybean Double Crop:</u>   |                   |      |                 |                    |         |                   |                   |         |
| Wheat-Soybean, Owner <sup>b/</sup>  | 45+25             | bu.  | 283.75          | 153.19             | 130.56  | 49.64             | 202.83            | 80.92   |
| Wheat-Soybean, Tenant <sup>c/</sup> | 45+25             | bu.  | 227.00          | 153.62             | 73.38   | 49.64             | 203.26            | 23.74   |

<sup>a/</sup> Income for rice was calculated by adding the product of the loan price of \$6.50 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying proven yield times the difference between the target price and the loan value, \$4.21 per hundredweight. Crop prices used were \$5.50 per bushel for soybeans, \$2.30 per bushel for corn, \$3.50 per hundredweight for milo, and \$3.25 per bushel for wheat.

<sup>b/</sup> Land costs are not included for the owner-operator.

<sup>c/</sup> Rental arrangements for rice were 1/5 crop share for land and 1/5 crop share for water with both landlord and waterlord each paying 1/5 of fertilizer, chemicals, and drying and storage costs and the waterlord paying all of the irrigation fuel. Rental arrangements for soybeans, corn, milo, and wheat were 1/5 crop share for land with the landlord paying 1/5 of any drying and storage costs.

<sup>d/</sup> Rice was valued at the loan rate of \$6.50 per hundredweight.

Table 2. A Summary of Projected Costs and Returns per Acre for Rice Production,  
Northeast and Central Areas, Louisiana, 1991. <sup>a/</sup>

| Crop Description                  | Yield<br>Per Acre | Unit | Total<br>Income | Direct<br>Expenses | Returns | Fixed<br>Expenses | Total<br>Expenses | Returns |
|-----------------------------------|-------------------|------|-----------------|--------------------|---------|-------------------|-------------------|---------|
| <hr/>                             |                   |      |                 |                    |         |                   |                   |         |
| <div>Dollars per Acre</div> <hr/> |                   |      |                 |                    |         |                   |                   |         |
| <u>Northeast Louisiana:</u>       |                   |      |                 |                    |         |                   |                   |         |
| Water Plant, Owner <sup>b/</sup>  | 48.60             | cwt. | 477.10          | 294.95             | 182.15  | 72.12             | 367.07            | 110.03  |
| Water Plant, Tenant <sup>c/</sup> | 29.16             | cwt. | 286.26          | 230.91             | 55.35   | 51.70             | 282.61            | 3.65    |
| Drill Plant, Owner <sup>b/</sup>  | 48.60             | cwt. | 477.10          | 292.58             | 184.52  | 77.64             | 370.22            | 106.88  |
| Drill Plant, Tenant <sup>c/</sup> | 29.16             | cwt. | 286.26          | 225.36             | 60.90   | 57.22             | 282.58            | 3.68    |
| <br><u>Central Louisiana:</u>     |                   |      |                 |                    |         |                   |                   |         |
| Water Plant, Owner <sup>b/</sup>  | 43.50             | cwt. | 444.41          | 319.59             | 124.82  | 71.55             | 391.14            | 53.27   |

<sup>a/</sup> Income for rice was calculated by adding the product of the loan price of \$6.50 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying proven yield times the difference between the target price and the loan value, \$4.21 per hundredweight.

<sup>b/</sup> Land costs are not included for the owner-operator.

<sup>c/</sup> Rental arrangements for rice in Northeast Louisiana were 1/5 crop share for land and 1/5 crop share for water with the waterlord paying all irrigation fuel costs and both the landlord and waterlord each paying 1/5 of the drying and storage costs.

S T A T I O N   P E R S O N N E L

Joseph A. Musick - - - - - Resident Director  
Professor

Mary Baronet  
Typist Clerk II

Carol L. Bastian  
Secretary

Teresa H. Malbrough  
Custodian I

Darlene M. Regan  
Word Processor Op. Spec.

Patrick K. Bollich - - - - - Rice Fertilization  
Assistant Professor

William J. Leonards, Jr.  
Research Associate

Ora J. Primeaux  
Research Farm Specialist II

Gerardo R. Romero<sup>1/</sup>  
Research Associate

Douglas M. Walker  
Research Associate

Suzan S. Croughan - - - - - Forage Crops Tissue Culture  
Associate Professor

Anna L. Marquis  
Research Farm Specialist I

Janet T. Simons<sup>2/</sup>  
Research Associate

1/ Transferred from Beef Cattle Project 11/90  
2/ Appointed 03/02/90

Timothy P. Croughan - - - - - Rice Tissue Culture  
Associate Professor

Mona M. Meche  
Research Associate

Ronald P. Regan  
Research Associate

Dannell B. Trumps  
Lab Tech Asst-Agribusiness

Xin Hua Wang  
Research Associate

Richard T. Dunand - - - - - Rice Physiology  
Associate Professor

Raymond R. Dilly, Jr.  
Research Associate

Gregory A. Meche  
Research Associate

Wayne C. Faulk - - - - - Farm Manager  
Instructor

Brian D. Broussard  
Research Farm Specialist II

Jeffery L. Jackson  
Research Farm Specialist II

Timothy C. Miller  
Research Farm Specialist II

Randal K. Morgan  
Research Farm Specialist II

Ronald J. Pellerin  
Research Farm Specialist II

Ovrilien J. Primeaux  
Research Farm Manager I

Oday Sonnier  
Research Farm Specialist II

Andrus Stutes  
Research Farm Specialist II

Kenneth J. Trahan  
Research Farm Specialist II

Donald E. Groth - - - - - Plant Pathology  
Associate Professor

Marty J. Frey  
Research Associate

Joseph Nugent  
Lab Tech Asst-Agribusiness

Robert J. Habetz - - - - - Soybean Research  
Research Associate

Steven D. Linscombe - - - - - Rice Breeding  
Assistant Professor

Andre P. Fabacher  
Research Associate

Rachel P. Frey<sup>3/</sup>  
Research Farm Assistant I

Christopher G. Gravot  
Research Farm Assistant I

Robert J. Guidry  
Lab Tech Asst-Agribusiness

Herman L. Hoffpauir<sup>4/</sup>  
Research Farm Specialist II

Farman Jodari  
Instructor

W. Ray McClain<sup>5/</sup> - - - - - Aquaculture  
Assistant Professor

Scott B. Dailey<sup>6/</sup>  
Research Farm Assistant I

Kelly Taylor<sup>7/</sup>  
Research Associate

---

3/ Appointed 07/30/90

4/ Transferred from Rice Genetics Project 07/15/89

5/ Appointed 04/01/90

6/ Appointed 12/01/90

7/ Appointed 10/08/90

M. Fred Miller - - - - - Rice Processing  
Assistant Professor

Vacant - - - - - Rice Insects  
Research Entomologist (USDA)

Patricia A. Bollich  
Research Farm Assistant I

George B. Trahan  
Agricultural Research Technician (USDA)

Donnie R. Stutes - - - - - Shop  
Research Farm Maintenance Manager

James J. Borne  
Research Farm Maintenance Spec. I - Equipment

Michael D. Dronet<sup>8/</sup>  
Research Farm Maintenance Repairer

Melvin Lawrence  
Research Farm Maintenance Repairer

Lawrence M. White, III - - - - - Foundation Seed Rice  
Research Associate



Cooperating personnel responsible for research projects at the Rice Station include the following campus staff.

Lucas Aviles ----- Rice Research  
University of Puerto Rico  
Lajas, PR

John B. Baker ----- Weed Control  
Plant Pathology & Crop Physiology Department  
Louisiana State University Agricultural Center

Richard L. Bengtson ----- Water Quality  
Agricultural Engineering Department  
Louisiana State University Agricultural Center

David J. Boethel ----- Soybean Entomology  
Entomology Department  
Louisiana State University Agricultural Center

Marc A. Cohn ----- Red Rice Control  
Plant Pathology & Crop Physiology Department  
Louisiana State University Agricultural Center

Patrick D. Colyer ----- Bermudagrass and Alfalfa Diseases  
Red River Research Station

Marcus M. Eichhorn, Jr. ----- Forage Crops  
Hill Farm Research Station

Sam E. Feagley ----- Water Quality  
Agronomy Department  
Louisiana State University Agricultural Center

James R. Fuxa ----- Insect Biocontrol  
Entomology Department  
Louisiana State University Agricultural Center

Steve A. Harrison ----- Wheat Research  
Agronomy Department  
Louisiana State University Agricultural Center

Bob G. Harville ----- Soybean Research  
Agronomy Department  
Louisiana State University Agricultural Center

Arthur M. Heagler ----- Economics  
Agricultural Economics Department  
Louisiana State University Agricultural Center

Clayton A. Hollier ----- Plant Pathology  
Louisiana Cooperative Extension Service  
Louisiana State University Agricultural Center

Jesse M. Jaynes ----- Biochemistry  
Biochemistry Department  
Louisiana State University Agricultural Center

Seth J. Johnson ----- Insect Migration  
 Entomology Department  
 Louisiana State University Agricultural Center

David B. Jones ----- Rice Breeding  
 Visiting Associate Professor  
 Ag. Res. & Education Center, Belle Glade, FL

Manjit S. Kang ----- Grain Sorghum Research  
 Agronomy Department  
 Louisiana State University Agricultural Center

Brian McManus ----- Economics  
 Agricultural Economics Department  
 Louisiana State University Agricultural Center

Dolen R. Morris ----- Forage Quality  
 Southeast Research Station

Sharron S. Quisenberry ----- Forage Insect Control  
 Entomology Department  
 Louisiana State University Agricultural Center

James L. Rabb ----- Alfalfa Research  
 Red River Research Station

Milton C. Rush ----- Rice Diseases  
 Plant Pathology & Crop Physiology Department  
 Louisiana State University Agricultural Center

Dearl E. Sanders ----- Weed Control  
 Louisiana Cooperative Extension Service

Raymond W. Schneider ----- Rice Diseases  
 Plant Pathology & Crop Physiology Department  
 Louisiana State University Agricultural Center

Johnnie P. Snow ----- Soybean Disease  
 Plant Pathology & Crop Physiology Department  
 Louisiana State University Agricultural Center

E. Allen Wilson ----- Bird Control  
 USDA Animal Damage Control

The Rice Station is especially indebted to Mr. H. F. Morris, Jr., Feed and Fertilizer Laboratory, for the chemical analyses of research samples. Dr. L. LaMotte, Department of Experimental Statistics, and his staff aided in the research program through their help in the planning and statistical analyses of research data.