85th Annual Research Report

RICE RESEARCH STATION

Crowley, Louisiana

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Louisiana State University Agricultural Center
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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 1993 rice research program included breeding, biotechnology, variety testing, production and distribution of foundation seed, fertilization, soil and water management, cultural practices, weed control, insect control, 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 1993 are presented in this report representing the 85th Annual Research Report of the Rice Research Station, Louisiana Agricultural Experiment Station, Louisiana State University 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 1993. Approximately 700 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 1993.

Projects at this station are conducted under the supervision of research scientists 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 1993 are listed.

This report of the annual research progress during 1993 is dedicated to the memory of Dr. Nelson Jodon. Dr. Jodon served as a rice breeder with the U.S.D.A. Agricultural Research Service from 1933 to 1973, and following his retirement, he served as a consulting professor until 1984 at the Rice Research Station. Altogether, Dr. Nelson Jodon served the Louisiana rice industry for over 50 years. Dr. Jodon was very active and attended meetings at the Rice Research Station until his death on January 4, 1993. We are proud to dedicate this report to his memory.

MONTHLY RAINFALL DATA
RICE RESEARCH STATION - CROWLEY, LA
1993

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR TOTAL
1					.10								
2			1.97		2.60				.11				
3			.33		.70				.68				
4				3.10							.08	.06	
5	.18			.32				.04			.11		
6		.20						.23					
7	.89												
8	2.69			4.28				.10		.15			
9				1.10				.20			.90		
10	.20				.13					.10	.07	1.83	
11	.30	.94					.60					.70	
12	1.21	.01	.02										
13			.80		.18		.10			1.67			
14							.31		.28	.21	.40	.69	
15	.32			1.04			.30				5.30		
16		.58	.85				.07				1.57		
17		.03	.61			.12	.50	.03			.15		
18						.20	.10						
19	.02				.60	.30	.40					.10	
20	4.30					2.90	1.03					.10	
21	2.60		.10			2.80		.20		.93			
22		.20				4.71						.14	
23			.40				.30					.41	
24	.10				.20	1.74		.30					
25			.03			.20							
26		1.80	.20			.30		.23					
27					.16	.20			1.80				
28						.80		.10					
29					.10					.65		.30	
30	.10			.02			.34			2.90			
31													
MONTH TOTAL	12.91	3.76	5.31	9.86	4.77	14.27	4.05	1.43	2.87	6.61	8.58	4.33	78.75
1992	11.05	7.36	2.05	4.52	4.75	6.41	7.74	8.11	4.71	2.84	8.68	3.96	72.18

RICE BREEDING

DEVELOPING SUPERIOR RICE VARIETIES FOR LOUISIANA[1]

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

The primary objective of the Rice Breeding project is the development of superior rice genotypes for the Louisiana rice industry. Two major types of rice predominant the industry within the state, conventional cooking long- and medium-grain types. Thus, the major emphasis within the program is on these types. However, there are a number of special purpose types that are becoming more important as the U.S. rice industry diversifies. Therefore, the Rice Breeding project has placed increased emphasis on the development of special purpose types to fill these needs.

One area of particular interest is the development of short- and medium-grain premium quality types that may be more acceptable in Japanese (and Korean) markets. This is an area of increased importance with the opening of Japanese markets to American rice. Currently, the Gulf South is at a disadvantage because of the lack of agronomically acceptable genotypes that possess the cooking quality type preferred in these markets. The Breeding project has greatly expanded work in this area and a number of these lines have displayed excellent agronomic characteristics. However, extensive additional cooking and quality evaluations will be necessary to determine if any of these lines meet required quality parameters. An additional complication in this area is the strong effect of growing environment on the cooking quality of these genotypes.

A secondary objective of the Rice Breeding project is to conduct other research studies that may have direct and/or indirect effects on varietal development efforts. Included here are studies on herbicide tolerance of rice genotypes, milling quality, mutation breeding, physiological characteristics associated with genetic gain, and evaluation of genetically engineered herbicide-resistant lines.

The 1993 rice breeding nursery included 52,620 breeding rows, 212 F_1 populations, 167 F_2 bulk populations, and 3,184 yield plots (on-station). Off-station testing added another 964 plots to the testing program.

The artificial hybridization program included 310 initial crosses and backcrosses for varietal improvement and/or genetic studies. Germplasm increase populations of 52 lines were grown for seed increase and purification. In cooperation with Dr. Ray McClain, 2,300 diverse germplasm lines were evaluated for crawfish forage potential.

[1] This project is supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

A field evaluation of genetically engineered herbicide (glufosinate)-resistant rice lines was conducted in cooperation with Dr. Michael Braverman. This work could lead to the development of rice genotypes that are resistant to herbicides that will kill red rice.

Anther culture was used for rapidly developing homozygous lines in over 100 populations by personnel in the Rice Tissue Culture laboratory in cooperation with Dr. Tim Croughan.

Pest evaluation of promising selections were conducted by cooperating research projects. Dr. Don Groth rated all on-station yield plots for the major rice diseases (blast and sheath blight). Dr. Bill Rice and Mr. George Trahan (USDA-ARS) evaluated all advanced breeding lines for susceptibility to damage by rice water weevil larvae.

Progress is being made in attempts to incorporate higher levels of disease resistance into advanced breeding lines. Of particular note are a number of experimentals in various stages of testing that have high levels of resistance to sheath blight. The source of this resistance is LSBR-5, a somaclone selection from Labelle that displays excellent tolerance to sheath blight. LSBR-5 is a selection from the biotechnology program of Dr. Chuck Rush, plant pathologist in the Department of Plant Pathology and Crop Physiology. A number of lines with good sheath blight resistance, as well as good yield potential, are in advanced stages of testing.

Off-station tests of advanced experimentals were conducted in East Carroll, Morehouse, Rapides, Tensas, and Vermilion parishes. These tests provide needed information on the performance of advanced experimental lines in different environments. Five advanced experimental lines were tested in nitrogen rate studies by the Rice Fertilization and Cultural Management project in cooperation with Dr. Pat Bollich. These included the long grains (LA 2031 and LA 2071), two medium grains (LA 2168 and LA 2192), and one aromatic long grain (LA 2085). LA 2031 has been released as a new variety for 1994 production and named 'Jodon.' The name is in honor of Dr. Nelson Jodon, a distinguished USDA rice breeder at Crowley for many years. Jodon is a very early, semidwarf long-grain variety with excellent yield potential (main and ratoon crop), very good seedling vigor, and fair milling quality.

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 locations in Arkansas, Louisiana, Mississippi, Texas, Florida, and California. The nurseries are used to test the adaptation of entries in the diverse rice growing environments of the U.S. The entries in the 1993 nursery included material from Arkansas, California, Louisiana, Mississippi, Texas, and some cultivars from foreign countries. Main and ratoon crop data were generated from the URN at the Rice Research Station and are presented in Tables 1-14. Information on performance characteristics from all states is compiled and stored in the Rice Data Bank by the Department of Experimental Statistics, LSU Agricultural Center.

Experiment: Uniform Regional Nursery - Group I

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 7 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, July 20; reflood, Aug 7; harvest drainage, Oct 1

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 6; ratoon crop, Oct 17

Experimental Design: Randomized complete block with four replications

Results: Tables 1 and 2

Table 1. Agronomic performance of 1993 uniform rice nursery, Group I. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
1	ALAN/TBNT	L	5	83	44	3	8926	A	59 - 72	3	0	0
8	MERC//MERC/KOSH	M	5	83	39	38	8646	AB	70 - 73	1	0	0
20	JACKSON	L	5	83	42	5	8629	AB	60 - 70	1	0	4
4	BN73*2/NV76//NWRX	L	6	84	42	0	8528	AB	57 - 68	13	2	1
14	8403113/3/KCAI/LEAH	L	4	80	39	0	8501	AB	58 - 71	5	1	4
16	ADAIR	L	6	87	45	0	8452	AB	59 - 70	6	1	1
10	LBNT/STBN//NWBT	L	6	85	43	0	8337	ABC	63 - 70	4	1	1
13	LBNT/9902/3/DAWN/...	L	6	81	41	0	8322	ABC	64 - 70	1	0	1
15	ALAN	L	4	85	41	0	8315	ABC	61 - 70	8	1	0
17	MAYBELLE	L	5	78	39	0	8265	ABC	61 - 68	21	1	2
5	SMARS/MARS//PCOS	M	5	88	38	0	8262	ABC	69 - 72	1	0	1
7	LBNT/STBN//NWBT	L	5	81	41	0	8251	ABC	54 - 67	30	2	2
11	L202/LMNT	L	6	85	37	0	8232	ABC	61 - 70	6	1	1
19	MILLIE	L	6	83	42	0	7997	BCD	60 - 69	1	0	1
2	SMARS/MARS//PCOS	M	4	89	37	5	7886	BCD	65 - 71	0	0	2
9	VSTA/LBNT//RSMT	L	7	84	37	0	7585	CD	61 - 71	1	0	1
12	KATY//GFMT/PCOS	L	6	89	50	48	7542	CD	63 - 70	4	1	1
18	ROSEMONT	L	7	84	36	0	7245	DE	58 - 69	13	1	1
6	VSTA/LBNT//RSMT	L	7	88	38	0	6805	E	63 - 71	0	0	2
3	GFMT*/I409	L	8	91	40	0	5385	F	58 - 73	5	1	1
C.V.			7.5	2.0	3.3	-	6.1		3.1-1. 3			

* L = Long grain, M = medium grain.
** 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.
[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 2. Performance of main and ratoon crops of 1993 uniform regional nursery, Group I. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
13	LBNT/9902/3/DAWN...		34	8322	4062	12383A
16	ADAIR	36	8452	3827	12279	AB
10	LBNT/STBN//NWBT	35	8337	3788	12126	ABC
4	BN73*2/NV76//NWRX	35	8528	3594	12122	ABC
19	MILLIE	33	7997	4049	12046	ABCD
7	LBNT/STBN//NWBT	32	8251	3436	11687	ABCDE
17	MAYBELLE	32	8265	3363	11628	ABCDE
9	VSTA/LBNT//RSMT	29	7585	3940	11525	BCDE
1	ALAN/TBNT	34	8926	2468	11394	CDE
18	ROSEMONT	28	7245	4076	11321	CDE
11	JODON	29	8232	3078	11310	CDE
14	8403113/3/KCAI/LEAH	33	8501	2749	11250	DE
5	SMARS/MARS//PCOS	27	8262	2979	11241	DE
8	MERC//MERC/KOSH	28	8646	2588	11234	DE
2	SMARS/MARS//PCOS	27	7886	3173	11059	E
15	ALAN	33	8315	2711	11026	E
20	JACKSON	34	8629	2265	10894	EF
12	KATY//GFMT/PCOS	39	7542	2727	10269	FG
6	VSTA/LBNT//RSMT	31	6805	3378	10183	G
3	GFMT*/I409	32	5385	3090	8475	H
C.V.		3.8	6.1	8.2	4.5	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group II

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 13 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 13; harvest drainage, Oct 20

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 12; ratoon crop, Oct 18

Experimental Design: Randomized complete block with four replications

Results: Tables 3 and 4

Table 3. Agronomic performance of 1993 uniform rice nursery, Group II. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
40	LAGRUE	L	5	82	42	3	8675	A	49 - 65	8	1	2
38	BENGAL	M	6	92	36	0	8528	AB	67 - 73	5	1	3
33	864142/8403113	L	5	82	42	0	8493	AB	58 - 67	13	2	5
21	LMNT/RA73	L	6	90	45	0	8285	ABC	61 - 69	6	1	0
24	LMNT/RA73	L	5	87	44	0	8212	ABC	60 - 69	5	1	1
25	MERC/RICO	M	5	88	38	3	8132	ABCD	66 - 71	0	0	2
27	LBNT/9902/3/DAWN/...	L	6	90	37	0	8085	ABCDE	59 - 70	14	2	1
36	8203035/GCHW	L	4	85	43	3	7976	BCDE	63 - 70	5	1	2
26	8303116/LMNT	L	7	94	42	0	7796	CDEF	56 - 69	4	1	1
37	ORION	M	4	91	41	3	7689	CDEF	61 - 71	0	0	2
22	RICO/MERC	M	5	87	41	18	7684	CDEF	61 - 70	3	1	0
28	RICO/MERC	M	5	87	43	10	7496	DEFG	59 - 71	0	0	0
39	MARS	M	4	91	44	25	7473	DEFG	66 - 70	0	0	0
23	8303116/LMNT	L	7	89	35	0	7472	DEFG	62 - 71	15	2	3
29	PCOS/LMNT//GFMT	L	7	93	38	0	7442	EFG	66 - 72	5	1	3
30	M201/KATY	L	5	89	43	3	7411	EFG	63 - 69	5	1	3
32	8003050/CA82Y24	L	6	89	40	0	7237	FGH	65 - 71	11	2	3
34	LMNT/DLLA(A)	L(A)	7	90	40	0	6971	GHI	67 - 72	0	0	2
35	GFMT*2/TQNG	L	8	92	40	0	6704	HI	58 - 72	0	0	4
31	DMSI/DLLAX2//LMNT(A)	L(A)	5	90	45	0	6546	I	62 - 72	8	2	2
C.V.			0.9	1.1	3.6	-	5.3		2.3-1.1			

* L = Long grain, M = medium grain, (A = aromatic).
** 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.
[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 4. Performance of main and ratoon crops of 1993 uniform regional nursery, Group II. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
40	LAGRUE	36	8675	2657	11332	A
36	8203035/GCHW	36	7978	3169	11146	AB
32	RU8003050/CA82Y24	31	7237	3697	10934	ABC
23	8303116/LMNT	27	7472	3374	10845	ABC
34	LMNT/DLLA (A)	32	6971	3629	10599	ABCD
28	RICO/MERC	31	7496	2996	10492	BCDE
24	LMNT/RA73	36	8212	2257	10469	BCDE
22	RICO/MERC	30	7684	2766	10450	BCDE
38	BENGAL	27	8528	1905	10433	BCDE
21	LMNT/RA73	37	8285	2107	10392	BCDE
33	864142/8403113	38	8493	1751	10244	CDE
26	8303116/LMNT	29	7796	2423	10218	CDE
37	ORION	29	7689	2485	10174	CDE
25	MERC/RICO	28	8132	1827	9959	DEF
39	MARS	32	7473	2457	9930	DEF
31	DMSI/DLLAX2//LMNT	38	6546	3168	9714	EF
35	GFMT*2/TQNG	32	6704	3000	9704	EF
27	LBNT/9902/3/DAWN...	29	8085	1120	9205	EFG
29	PCOS/LMNT//GFMT	30	7442	1746	9188	FG
30	M201/KATY	34	7411	1361	8772	G
C.V.		5.9	5.3	13.9	4.8	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group III

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 13 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 13; harvest drainage, Oct 20

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 12; ratoon crop, Oct 28

Experimental Design: Randomized complete block with four replications

Results: Tables 5 and 6

Table 5. Agronomic performance of 1993 uniform rice nursery, Group III. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
50	NWBT/KATY	L	5	88	43	0	8973	A	60 - 69	0	0	0
47	KAYBONNET	L	5	88	43	0	8669	AB	61 - 70	3	1	3
53	NWBT/KATY	L	5	88	44	5	8464	AB	64 - 70	0	0	5
59	CYPRESS	L	5	90	38	0	8464	AB	66 - 71	5	1	0
51	L202/LMNT//KATY	L	5	88	38	0	8428	AB	62 - 71	0	0	3
44	NWBT/KATY	L	5	89	44	0	8415	AB	64 - 71	0	0	0
41	KATY/STBN	L	5	86	44	3	8184	BC	59 - 68	4	1	3
60	NEWBONNET	L	5	93	44	0	8157	BCD	60 - 68	19	2	2
42	LMNT*2/L202	L	5	90	35	0	8102	BCD	65 - 71	8	1	2
54	864142/8403113	L	5	82	42	3	7752	CDE	54 - 66	13	2	2
56	GULFMONT	L	6	88	35	5	7707	CDE	65 - 71	5	1	2
58	KATY	L	5	90	45	5	7688	CDE	58 - 67	4	1	0
48	KATY/CPRS	L	5	94	38	0	7577	DE	65 - 72	0	0	0
45	KATY/CPRS	L	5	94	36	0	7572	DE	62 - 70	3	1	3
55	LEMONT	L	6	93	37	0	7445	E	64 - 71	9	1	1
57	LACASSINE	L	6	88	37	0	7425	E	58 - 69	14	2	2
52	PCOS/LMNT//GFMT	L	7	91	38	0	7299	E	64 - 72	8	1	1
46	8303181/CB801	L	7	93	36	0	7283	E	62 - 70	8	2	0
49	LBLE/7802003//GFMT	L	7	93	37	0	6568	F	63 - 70	4	1	1
43	GFMT*2/I409	L	9	04	37	0	5168	G	61 - 70	0	0	0
C.V.			6.9	1.1	3.1	-	4.8		2.9-1.4			

* L = Long grain, M = medium grain.

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 6. Performance of main and ratoon crops of 1993 uniform regional nursery, Group III. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
41	KATY/STBN	35	8184	3119	11303	A
59	CYPRESS	29	8464	2838	11302	A
42	LMNT*2/L202	28	8102	3164	11266	A
50	NWBT/KATY	34	8973	1794	10767	AB
47	KAYBONNET	34	8669	2036	10705	ABC
44	NWBT/KATY	35	8415	1887	10302	BCD
46	RU8303181/CB801	28	7283	2942	10225	BCDE
53	NWBT/KATY	37	8464	1742	10206	BCDE
56	GULFMONT	30	7707	2358	10065	BCDEF
52	PCOS/LMNT//GFMT	31	7299	2615	9914	CDEF
60	NEWBONNET	33	8157	1544	9701	DEFG
54	864142/8403113	36	7752	1938	9690	DEFG
51	L202/LMNT//KATY	33	8428	1026	9455	EFG
58	KATY	36	7688	1654	9342	FG
49	LBLE/7802003//GFMT	31	6568	2710	9277	FG
57	LACASSINE	32	7425	1847	9272	FG
48	KATY/CPRS	29	7577	1438	9014	GH
55	LEMONT	30	7445	1000	8445	H
45	KATY/CPRS	28	7572	835	8407	H
43	GFMT*2/I409	32	5168	1833	7001	HI
C.V.		3.9	4.8	16.3	5.1	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group IV

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 13 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 13; harvest drainage, Oct 20

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 12; ratoon crop, Oct 28

Experimental Design: Randomized complete block with four replications

Results: Tables 7 and 8

Table 7. Agronomic performance of 1993 uniform rice nursery, Group IV. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
79	RICO 1	M	7	93	45	0	8416	A	62 - 68	1	0	1
67	NWBT///LBNT/STBN	L	5	91	41	0	8306	AB	60 - 69	8	2	4
70	BP87/9902//LBNT/9957	L	5	92	43	3	8302	AB	57 - 67	4	1	3
68	L202/LMNT//KATY	L	6	90	37	5	8232	AB	60 - 69	23	2	4
65	KATY/CPRS	L	5	92	35	0	8098	ABC	65 - 71	1	0	3
76	LMNT//BN73*/NV76	L	6	92	38	0	8002	ABCD	59 - 71	5	1	3
62	LCSN/CPRS	L	6	89	37	5	7944	ABCDE	65 - 71	6	1	3
66	8303116/LMNT	L	7	94	40	0	7920	ABCDEF	63 - 70	5	1	1
78	LMNT/CB801//8703196	L	6	87	36	3	7877	ABCDEF	64 - 71	15	2	2
74	LCSN/KATY	L	5	93	49	3	7782	BCDEF	54 - 69	4	1	2
71	LMNT/LBLE SC-5	L	6	94	42	0	7745	BCDEF	59 - 69	0	0	1
64	BN73*2/NV66//TBNT	L	5	89	41	0	7542	CDEFG	61 - 70	1	1	2
77	GCHW/GFMT	L	5	90	35	0	7517	DEFG	64 - 71	19	2	4
80	TORO 2	L	6	91	41	0	7476	DEFG	64 - 71	6	1	1
73	L201//TBNT/BLMT	L	5	94	37	0	7427	DEFG	51 - 69	4	1	3
61	LMNT/RA73	L	5	92	44	0	7391	EFG	64 - 70	0	0	0
72	80030050/CA82Y24//LMNT	L	6	90	35	0	7361	FG	66 - 73	3	1	0
63	8003050/CA82Y24//LMNT	L	7	97	37	0	7106	G	61 - 69	1	0	0
75	LMNT/CB801//8703196	L	6	96	34	0	6608	H	56 - 70	6	1	1
69	GFMT*2/TQNG	L	7	97	39	0	6357	H	59 - 70	0	0	0
C.V.			8.7	1.1	3.4	-	4.5		2.6-1.3			

* L = Long grain, M = medium grain.

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 8. Performance of main and ratoon crops of 1993 uniform regional nursery, Group IV. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
62	LCSN/CPRS	28	7944	4135	12079	A
71	LMNT/LBLE SC-5	34	7745	3913	11657	AB
66	8303116/LMNT	29	7920	3150	11070	BC
65	KATY/CPRS	29	8098	2872	10970	BC
78	LMNT/CB801//8703196	30	7877	2815	10692	C
67	NWBT//LBNT/STBN	34	8306	1637	9943	D
61	LMNT/RA73	34	7391	2445	9836	DE
72	8003050/CA82Y24/LMNT	30	7361	2375	9736	DE
75	LMNT/CB801//8703196	27	6608	3073	9682	DEF
80	TORO 2	32	7476	1925	9401	DEFG
79	RICO 1	31	8416	909	9325	DEFG
73	L201//TBNT/BLMT	30	7427	1646	9073	EFGH
68	L202/LMNT//KATY	33	8232	734	8965	FGH
64	BN73*2/NV66//TBNT	35	7542	1387	8929	FGH
76	LMNT//BN73*/NV76	34	8002	847	8849	GHI
63	8003050/CA82Y24/LMNT	32	7106	1701	8807	GHI
69	GFMT*2/TQNG	31	6357	2443	8800	GHI
70	BP87/9902//LBNT/9957	33	8302	377	8679	GHI
77	GCHW/GFMT	31	7517	890	8408	HI
74	LCSN/KATY	38	7782	332	8114	I
C.V.		3.6	4.5	18.2	4.9	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group V

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 7 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 7; harvest drainage, Oct 1

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 6; ratoon crop, Oct 17

Experimental Design: Randomized complete block with two replications

Results: Tables 9 and 10

Table 9. Agronomic performance of 1993 uniform rice nursery, Group V. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
106	MERC//MERC/KOSH	M	3	88	39	5	8655	A	66 - 71	0	0	0
110	GCHW/SMARS*3	M	6	87	41	15	8435	AB	61 - 70	10	3	0
87	LBLE/L201//TBNT	L	6	89	43	0	8408	AB	65 - 72	3	1	0
115	MERC//M401/NTAI	M	4	83	39	5	8351	AB	64 - 71	3	1	0
81	ALAN/TBNT	L	4	88	44	0	7997	BC	67 - 72	0	0	0
84	ALAN/TBNT	L	5	91	44	0	7980	BCD	64 - 71	3	1	0
120	TEBONNET	L	6	87	51	0	7977	BCD	63 - 72	3	2	2
109	CPRS//LMNT*2/CR1113	L	5	87	40	0	7829	BCDE	61 - 69	15	3	2
114	CB801/8403113	L	5	81	42	5	7827	BCDE	54 - 66	5	1	0
91	CPRS/2146	L	5	87	34	0	7810	BCDE	65 - 71	8	1	6
94	CPRS//LMNT*2/CR1113	L	6	93	40	0	7621	CDEF	63 - 71	5	1	0
88	ALAN/MBLE	L	4	81	40	0	7577	CDEF	61 - 69	13	1	3
90	BRAZ/TBNT/3/164986-4...	L	6	83	41	0	7555	CDEF	66 - 69	0	0	0
108	BRAZ/TBNT/3/164986-4...	L	6	82	41	0	7541	CDEF	65 - 69	0	0	0
100	VSTA/LBNT//BLMT/3/...	L	6	87	37	0	7539	CDEF	68 - 72	5	1	2
103	LCSN/LMNT*2//82CAY83	L	6	93	35	0	7539	CDEF	66 - 71	3	1	1
97	CPRS//LMNT*2/CR1113	L	6	92	36	0	7521	CDEFG	62 - 70	3	1	0
119	L202	L	4	84	38	0	7484	CDEFGH	53 - 68	25	3	4
85	ALAN/MBLE	L	5	81	42	0	7411	CDEFGH	62 - 70	0	0	0
82	ALAN/MBLE	L	5	80	40	0	7389	CDEFGH	61 - 68	25	2	3
111	BRAZ/TBNT/3/164986-4...	M	5	79	42	0	7334	CDEFGHI	65 - 69	3	1	0
105	BRAZ/TBNT/3/164986-4...	M	5	80	42	0	7320	CDEFGHI	65 - 69	8	2	0
93	BRAZ/TBNT/3/164986-4...	M	6	82	42	0	7317	CDEFGHI	63 - 67	5	2	0
117	TEXMONT	L	7	87	38	0	7291	DEFGHIJ	58 - 68	33	2	0
102	VSNTLM//L201/9NRZ/...	L	6	85	35	0	7231	EFGHIJ	59 - 69	5	2	0
112	MERC//MERC/NANGHU	M	4	87	36	5	7038	FGHIJK	50 - 66	0	0	0
96	TBNT/KATY	L	5	90	48	0	7028	FGHIJK	66 - 72	5	1	0
95	8003050/CA82Y24//LMNT	L	7	91	37	0	6992	FGHIJK	63 - 72	0	0	0
118	LABELLE	L	7	88	51	0	6950	FGHIJK	66 - 71	3	1	2
89	VSTA/LBNT//RSMT	L	7	90	38	0	6839	GHIJK	64 - 72	3	1	0
113	GCHW/LMNT//CB801/3/LMNT	L	7	87	38	0	6800	HIJK	62 - 73	15	2	0
99	VSNTLM//L201/9NRZ/3/KATY	L	7	85	35	0	6661	IJKL	61 - 68	5	1	0

Continued.

Table 9. Continued.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
86	RSMT/8703196//TQNG	L	7	92	40	0	6628	JKL	60 - 70	3	1	0
98	LBLE/7802003//LEAH	L	7	89	40	0	6621	JKL	67 - 73	0	0	0
83	8203035/CB801	L	7	87	36	0	6369	KLM	63 - 72	13	2	0
116	GFMT*2/TQNG	L	7	92	38	0	6042	LM	63 - 72	5	1	1
92	LBLE-X2-2/BJ-1*F1/...	L	7	94	38	0	5795	M	68 - 72	0	0	0
104	GFMT*2/I409	L	8	98	40	0	5043	N	56 - 70	1	4	1
101	GFMT*2/I409	L	8	94	40	0	4315	O	63 - 73	10	2	0
107	GFMT*2/I409	L	8	98	39	0	4188	O	57 - 70	1	4	1
C.V.			7.3	1.5	4.3	-	4.0		2.2-1.1			

* L = Long grain, M = medium grain.

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 10. Performance of main and ratoon crops of 1993 uniform regional nursery, Group V. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
90	BRAZ/TBNT/3/164986-4...	33	7555	4168	11722	
114	CB801/8403113	33	7827	3860	11687	
108	BRAZ/TBNT/3/164986-4...	33	7539	4029	11568	
87	LBLE/L201//TBNT	36	8408	3131	11538	
93	BRAZ/TBNT/3/164986-4...	32	7317	4180	11497	
105	BRAZ/TBNT/3/164986-4...	30	7320	4044	11364	
91	CPRS/2146	27	7810	3426	11235	
102	VSNTLM//L201/9NRZ/3/...	28	7231	3974	11205	
119	L202	26	7484	3682	11166	
81	ALAN/TBNT	33	7997	3146	11143	
111	BRAZ/TBNT/3/164986-4...	33	7334	3794	11128	
100	VSTA/LBNT//BLMT/3/EB	31	7539	3490	11029	
117	TEXMONT	28	7291	3612	10903	
88	ALAN/MBLE	32	7577	3312	10889	
115	MERC//M401/NTAI	31	8351	2401	10751	
82	ALAN/MBLE	31	7389	3339	10727	
109	CPRS//LMNT*2//CR1113	32	7829	2651	10480	
85	ALAN/MBLE	30	7411	3047	10458	
96	TBNT/KATY	36	7028	3427	10455	
84	ALAN/TBNT	34	7980	2467	10447	
83	8203035/CB801	30	6369	4067	10436	
110	GCHW/SMARS*3	31	8435	1974	10409	
98	LBLE/7802003//LEAH	33	6621	3786	10406	
106	MERC//MERC/KOSH	31	8655	1720	10374	
118	LABELLE	38	6950	3418	10368	
120	TEBONNET	42	7977	2253	10230	
99	VSNTLM//L201/9NRZ/3/...	30	6661	3460	10121	
116	GFMT*2/TQNG	30	6042	3974	10016	
95	RU8003050/CA82Y241/LMNT	30	6992	2920	9911	
113	GCHW/LMNT//CB801	30	6800	3067	9867	
97	CPRS//LMNT*2/CR1113	30	7521	2197	9718	
94	CPRS//LMNT*2/CR1113	30	7621	2071	9692	
103	LCSN/LMNT*2//82CAY83	31	7539	2060	9599	

Continued.

Table 10. Continued.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
89	VSTA/LBNT//RSMT	30	6839	2615	9454	
86	RSMT/8703196//...	34	6628	2818	9446	
92	LBLE-X2-2/BJ-1*...	29	5795	3641	9436	
104	GFMT*2/I409	33	5043	2668	7711	
112	MERC//MERC/NANGH	27	7038	498	7536	
101	GFMT*2/I409	32	4315	2964	7279	
107	GFMT*2/I409	32	4188	2549	6737	
C.V.		3.6	4.0	10.5	4.2	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group VI

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 13 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 13; harvest drainage, Oct 20

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 12; ratoon crop, Oct 28

Experimental Design: Randomized complete block with two replications

Results: Tables 11 and 12

Table 11. Agronomic performance of 1993 uniform rice nursery, Group VI. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
124	ALAN/KATY	L	4	89	44	0	8334	A	60 - 72	18	2	4
121	9680/9841//LBNT/9957	L	5	88	45	10	8327	A	58 - 68	3	1	7
145	KATY/STBN	L	5	93	43	0	8297	AB	64 - 69	0	0	0
149	LBLE SC-5/LMNT	L	6	94	40	0	8225	AB	56 - 67	0	0	0
142	B737/265116//V6STL...	L	4	92	45	0	8182	ABC	66 - 71	10	3	0
134	MERC/KOSH/...	M	4	89	37	5	8064	ABCD	61 - 73	0	0	0
128	MERC/RICO	M	5	92	38	0	8046	ABCDE	63 - 72	0	0	6
144	8303181/CB801	L	7	89	34	0	7967	ABCDE	58 - 69	0	0	3
148	87309	L	4	93	47	0	7934	ABCDE	67 - 71	5	1	3
156	NWBT/KATY	L	4	82	42	0	7916	ABCDE	60 - 67	0	0	6
127	LBLE/L201//KATY	L	4	85	43	0	7857	ABCDEF	63 - 68	18	2	3
125	RICO/MERC	M	4	92	43	0	7850	ABCDEF	62 - 72	0	0	0
122	KCAI/LEAH//LEAH/3/...	L	5	84	39	0	7828	ABCDEFG	58 - 69	33	2	6
150	NWBT/RU8303181//CB801	L	6	92	37	0	7730	ABCDEFG	66 - 73	3	1	0
155	KATY/CPRS	L	4	93	48	5	7681	A-H	66 - 71	0	0	0
152	LMNT/86-20001-S	L	5	93	38	0	7663	A-H	57 - 68	0	0	0
151	88362	L	5	93	36	0	7652	A-H	63 - 69	0	0	0
137	A301/JSMN(A)	L(A)	6	93	44	5	7650	A-H	58 - 69	0	0	0
131	MERC/CAM9//MARS	L	4	90	39	5	7497	A-I	67 - 72	5	1	3
133	ALAN/TBNT	L	4	89	37	0	7475	A-I	67 - 73	0	0	5
153	LBLE-X2-2/BJ-1*F1/...	L	6	89	38	0	7469	A-I	62 - 71	30	3	3
141	8303116/LMNT	L	7	89	37	0	7390	A-J	61 - 70	8	2	3
139	LMNT/RA73	L	5	91	41	0	7339	A-J	66 - 71	15	2	2
157	DELLMONT(A)	L	6	94	40	0	7298	A-J	63 - 72	8	2	3
138	8003050/CA82Y24/LMNT	L	6	92	38	0	7287	A-J	64 - 71	8	1	3
136	LBLE/L201//KATY	L	5	91	40	0	7285	A-J	62 - 69	13	3	5
135	GCHW/LMNT//CB801	L	6	91	39	5	7258	B-J	65 - 71	13	2	2
143	DMSI/DLLAX2//LMNT/DLLA(A)	L	5	91	45	0	7161	C-K	64 - 71	0	0	0
147	8303116/LMNT	L	6	95	33	0	7106	D-K	66 - 71	0	0	3
132	GFMT*2/TQNG	L	7	91	39	0	7086	D-K	63 - 70	0	0	0
158	REXMONT	L	7	89	35	0	7066	D-K	59 - 68	10	2	4
154	L202/CR1113	L	5	80	40	0	6997	E-K	58 - 68	40	3	5

Continued.

Table 11. Continued.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
126	DLMT/B8462T3-710	L	6	88	37	0	6828	F-K	61 - 73	30	2	7
130	VSNTLM/9827	L	5	88	40	0	6783	G-K	64 - 70	28	3	8
129	TRO2/LMNT	L	6	94	32	0	6670	H-K	68 - 73	5	1	0
160	LEBONNET	L	6	93	53	0	6571	I-K	63 - 71	5	1	0
146	DMSI/L203//TTEP/...(A)	L	6	86	44	5	6360	J-L	46 - 71	15	2	4
123	DLMT/B8462T3-710	L(A)	6	90	36	0	6194	KL	64 - 73	8	1	0
159	DELLA(A)	L	6	96	55	5	5454	LM	62 - 70	3	1	0
140	A301/JSMN(A)	L(A)	8	98	43	0	5249	M	48 - 64	0	0	0
C.V.			8.4	1.0	3.3	-	5.8		3.0-1.4			

* L = Long grain, M = medium grain, (A = aromatic).

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 12. Performance of main and ratoon crops of 1993 uniform regional nursery, Group VI. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
122	KCAI/LEAH//LEAH/3/...	31	7828	4018	11846	A
149	LBLE SC-5/LMNT	30	8225	3598	11822	A
144	8303181/CB801	28	7967	3802	11769	AB
156	NWBT/KATY	35	7916	3635	11551	ABC
141	8303116/LMNT	30	7390	4156	11545	ABC
155	KATY/CPRS	36	7681	3825	11506	ABCD
152	LMNT/86-20001-S	28	7663	3536	11198	ABCDE
121	9680/9841//LBNT/3/...	34	8327	2785	11112	ABCDE
124	ALAN/KATY	33	8334	2744	11078	ABCDE
125	RICO/MERC	31	7850	3196	11046	ABCDE
147	8303116/LMNT	27	7106	3816	10922	ABCDE
153	LBLE-X2-2/BJ-1*F1//...	31	7469	3375	10844	ABCDE
134	MERC/KOSH/...	30	8064	2757	10821	ABCDE
143	DMSI/DLLAX2//LMNT...	36	7161	3613	10774	ABCDE
127	LBLE/L201//KATY	35	7857	2799	10655	ABCDEF
132	GFMT*2/TQNG	33	7086	3458	10544	ABCDEF
142	B737/265116//V6STL/...	35	8182	2321	10503	ABCDEFG
148	87309	33	7934	2563	10497	ABCDEFG
128	MERC/RICO	26	8046	2399	10445	ABCDEFGH
133	ALAN/TBNT	30	7475	2960	10435	ABCDEFGHI
136	LBLE/L201//KATY	32	7285	3047	10332	BCDEFGHIJ
138	8003050/CA82Y24//...	31	7287	2976	10263	CDEFGHIJ
154	L202/CR1113	32	6997	3163	10160	CDEFGHIJK
146	DMSI/L203//TTEP/3/...	31	6360	3757	10117	CDEFGHIJK
150	NWBT/RU8303181//...	29	7730	2343	10073	DEFGHIJKL
129	TRO2/LMNT	27	6670	3380	10049	EFGHIJKL
137	A301/JSMN (A)	33	7650	2313	9962	EFGHIJKL
145	KATY/STBN	34	8297	1660	9957	EFGHIJKL
158	REXMONT	28	7066	2878	9944	EFGHIJKL
126	DLMT/B8462T3-710	29	6828	2449	9277	FGHIJKL
130	VSNTLM/9827	34	6783	2316	9098	GHIJKLM
157	DELLMONT (A)	29	7298	1765	9063	HIJKLM
151	88362	29	7652	1408	9060	HIJKLM
135	GCHW/LMNT//CB801	32	7258	1753	9011	IJKLM

Continued.

Table 12. Continued.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
123	DLMT/B8462T3-710	30	6194	2808	9001	JKLM
131	MERC/CAM9//MARS	29	7497	1323	8819	KLM
139	LMNT/RA73	31	7339	1326	8665	LMN
160	LEBONNET	41	6571	1295	7865	MN
140	A301/JSMN (A)	31	5249	2175	7423	N
159	DELLA (A)	40	5454	386	5840	O
C.V.		3.5	5.8	13.0	5.8	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Uniform Regional Nursery - Group VII

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 5, 1993

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

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 13 (ratoon crop)

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flood, Apr 3; drain, Apr 9; reflood, Apr 13; harvest drainage, Aug 6; reflood, Aug 17; harvest drainage, Oct 22

Herbicides: Londax (bensulfuron) 1 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 18

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 18

Harvest: Aug 16; ratoon crop, Oct 30

Experimental Design: Randomized complete block with two replications

Results: Tables 13 and 14

Table 13. Agronomic performance of 1993 uniform rice nursery, Group VII. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
199	CONGUI	M	6	97	42	0	9756	A	49 - 73	5	1	2
192	RXCL	M	5	95	33	0	8662	B	65 - 69	0	0	2
200	TEQUING	M	7	02	46	0	8560	BC	46 - 69	3	1	1
174	MARS*2/L110/3/AKIK	M	5	89	33	0	8299	BCD	59 - 68	10	1	7
167	NWBT//LBNT/STBN	L	5	91	41	0	8251	BCD	58 - 69	30	2	5
165	902207X2(25KR)	L	5	91	37	0	8141	BCDE	67 - 72	18	2	8
172	RSMT/LMNT//TQNG	L	6	91	37	0	7984	BCDEF	57 - 68	30	2	4
186	GCHW/LMNT	L	5	93	42	0	7911	BCDEF	58 - 69	45	3	5
171	MERC/DLLA//MERC	M(A)	4	88	40	5	7877	BCDEF	67 - 72	38	2	5
189	LMNT/3/BP87/9902	L	4	90	32	0	7764	BCDEFG	62 - 70	33	2	5
179	LMNT/RA73	L	5	93	40	0	7738	BCDEFG	59 - 70	30	3	7
181	GFMT*2/TQNG	L	7	92	42	0	7667	BCDEFGH	58 - 72	8	2	3
194	L202/CR1113	L	4	82	39	0	7657	BCDEFGH	58 - 70	33	3	5
173	LMNT/8401164//KATY	L	5	90	43	0	7535	BCDEFGHI	66 - 73	43	2	4
170	RA73/LBNT//NWRX	L	6	91	36	0	7491	BCDEFGHI	61 - 70	63	3	5
188	L201/9NRZ//KATY	L	5	89	43	0	7474	BCDEFGHI	62 - 72	25	2	4
180	82CAY80/TBNT//LMNT	L	6	90	35	0	7400	CDEFGHIJ	61 - 71	10	2	6
193	GCHW/LMNT	L	4	93	42	0	7334	DEFGHIJK	55 - 68	48	3	6
183	LMNT*2/L202	L	6	92	32	0	7328	DEFGHIJK	44 - 70	15	2	5
198	A301(A)	L	6	93	38	0	7281	DEFGHIJK	55 - 69	30	2	3
162	LMNT*2/82CAY83	L	6	03	41	0	7219	DEFGHIJK	62 - 70	10	2	6
191	LMNT/8401164//KATY	L	5	89	38	0	7209	DEFGHIJK	60 - 70	40	3	4
164	86198	L	5	91	43	0	7166	DEFGHIJK	65 - 70	10	2	6
176	86179	L	5	94	45	0	7127	DEFGHIJK	65 - 70	5	1	4
178	LMNT/KATY	L	6	94	31	0	6976	EFGHIJK	60 - 71	35	2	5
168	LCSN/GCHW	L	6	93	34	0	6919	FGHIJK	65 - 72	20	2	5
182	LMNT/RA73	L	6	93	40	0	6870	FGHIJK	62 - 70	20	2	5
185	B737/N11//V6STL/3/...	L	6	92	33	0	6846	FGHIJKL	67 - 72	13	2	4
175	LMNT/KATY	L	6	93	35	0	6798	FGHIJKL	65 - 71	35	2	5
177	DMSI/DLLAX2//A301(A)	L(A)	6	91	41	0	6620	GHIJKL	57 - 71	0	0	4
163	PCOS/RU8703196//GFMT	L	7	93	38	0	6589	GHIJKL	64 - 72	13	2	5
166	LMNT/KATY	L	6	93	35	0	6578	GHIJKL	65 - 71	13	1	4

Continued.

Table 13. Continued.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
197	JASMINE 85(A)	L(A)	8	07	46	0	6492	HIJKL	57 - 68	0	0	2
161	LMNT/RA73	L	6	98	41	0	6491	HIJKL	59 - 69	20	2	8
169	PCOS/LMNT//GFMT	L	8	97	40	0	6402	IJKL	68 - 72	3	1	3
196	GCHW/LMNT//RXMT/3/...	L	7	95	39	0	6237	JKL	64 - 69	50	2	4
195	LBNTX2/3/82CAY..(G)	L	6	98	35	0	6182	KL	59 - 70	23	2	4
190	RU8003050/CA82Y24//...	L	7	92	33	0	5682	LM	66 - 73	30	2	3
184	LMNT*3/JSMN(A)	L(A)	8	06	43	0	5089	M	53 - 68	8	1	1
187	LMNT*3/JSMN(A)	L(A)	8	10	39	0	4053	N	49 - 68	0	0	0
C.V.			8.1	1.1	2.8	-	6.8		4.2-1.7			

* L = Long grain, M = medium grain, (A = aromatic).

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 14. Performance of main and ratoon crops of 1993 uniform regional nursery, Group VII. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
192	RXCL	27	8662	2372	11034	A
199	CONGUI	29	9756	1084	10840	AB
167	NWBT//LBNT/STBN	35	8251	2244	10495	ABC
194	L202/CR1113	33	7657	2736	10393	ABC
183	LMNT*2/L202	27	7328	2974	10302	ABCD
188	L201/9NRZ//KATY	31	7474	2821	10295	ABCD
173	LMNT/8401164//KATY	35	7535	2608	10142	ABCDE
169	PCOS/LMNT//GFMT	30	6402	3470	9872	ABCDEF
165	902207X2(25KR)	29	8141	1649	9790	ABCDEF
172	RSMT/LMNT//TQNG	33	7984	1622	9606	ABCDEFG
163	PCOS/RU8703196//...	28	6589	2899	9488	BCDEFGH
174	MARS*2/L110/3/AKIK	28	8299	1112	9410	BCDEFGHI
181	GFMT*2/TQNG	34	7667	1741	9407	BCDEFGHI
197	JASMINE (A)	27	6492	2852	9344	CDEFGHIJ
189	LMNT/3/BP87/9902	29	7764	1544	9308	CDEFGHIJ
164	86198	34	7166	2092	9258	CDEFGHIJ
171	MERC/DLLA//MERC	32	7877	1364	9241	CDEFGHIJ
186	GCHW/LMNT	34	7911	1235	9146	CDEFGHIJ
185	B737/N11//V6STL/3/...	27	6846	2251	9097	CDEFGHIJ
168	LCSN/GCHW	29	6919	2155	9074	CDEFGHIJ
162	LMNT*2/82CAY83	28	7219	1688	8907	DEFGHIJ
191	LMNT/8401164//KATY	29	7209	1654	8863	DEFGHIJ
190	8003050/CA82Y24//...	24	5682	3073	8755	EFGHIJ
200	TEQUING	28	8560	143	8703	EFGHIJ
193	GCHW/LMNT	33	7334	1338	8672	EFGHIJ
180	82CAY80/TBNT//LMNT	29	7400	1213	8613	FGHIJ
170	RA73/LBNT//NWRX	28	7491	1058	8549	FGHIJ
179	LMNT/RA73	33	7738	765	8503	FGHIJ
176	86179	34	7127	1309	8436	FGHIJK
178	LMNT/KATY	29	6976	1412	8387	FGHIJK
198	A301 (A)	29	7281	988	8268	GHIJKL
166	LMNT/KATY	26	6578	1660	8238	GHIJKL
184	LMNT*3/JSMN (A)	29	5089	3084	8173	GHIJKL
182	LMNT/RA73	34	6870	1293	8163	GHIJKL

Continued.

Table 14. Continued.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
175	LMNT/KATY	30	6798	1335	8132	GHIJKL
196	GCHW/LMNT//RXMT/...	31	6237	1854	8090	HIJKL
177	DMSI/DLLAX2//A301	32	6620	1303	7923	IJKL
195	LBNTX2/3/82CAY...	25	6182	1684	7866	JKL
161	LMNT/RA73	31	6491	516	7006	KL
187	LMNT*3/JSMN (A)	27	4053	2811	6864	L
C.V.		4.5	6.8	18.0	6.7	

* 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 these tests are the major commercial varieties and advanced experimental lines in final stages of testing before release from cooperating public and private breeding programs.

These tests were conducted at four locations in Louisiana in 1993. These included 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 conducted in cooperation with the Rice Fertilization and Cultural Management project under the direction of Dr. Pat Bollich. The Northeast Research Station location was conducted cooperatively with Dr. David Jordan, weed scientist at that location.

These tests included the following entries.

Entry	Grain type*	Source**
Very Early Group		
AB 869	M	Busch Ag.
Adair	L	AAES
Alan	L	AAES
Jackson	L	MAFES
Jodon	L	LAES
L-202	L	CCRRF
L-203	L	CCRRF
Labelle	L	TAES, USDA
LaGrue	L	AAES
Maybelle	L	TAES, USDA
Millie	L	AAES
Rosemont	L	TAES, USDA
RT 7015	L	RiceTec
Skybonnet	L	TAES, USDA
Tebonnet	L	AAES
Texmont	L	TAES, USDA

Continued.

Continued.

Entry	Grain type*	Source**
Early Group		
AB 647	M	Busch Ag.
Akitakomachi	S	Japan
AR 1133	L	AAES
Bengal	M	LAES
Cypress	L	LAES
Della	L (aromatic)	LAES
Dellmont	L (aromatic)	TAES, USDA
Gulfmont	L	TAES, USDA
Jasmine 85	L (low amylose aromatic)	TAES, USDA
Katy	L	AAES
Kaybonnet	L	AAES
LA 2071	L	LAES
LA 2085	L (aromatic)	LAES
LA 2168	M	LAES
LA 2192	M	LAES
Lacassine	L	LAES
Lemont	L	TAES, USDA
Mars	M	AAES
Mercury	M	LAES
Newbonnet	L	AAES
Orion	M	AAES
Rico 1	M	TAES, USDA
Saturn	M	LAES
Toro-2	L (low amylose)	LAES
TX 3069	M	TAES
V-4716	M	RiceTec

* Grain type: S = short, M = medium, L = long.

** Busch Ag., Jonesboro, AR; AAES, Rice Research and Extension Center, Arkansas Agricultural Experiment Station, Stuttgart, AR; MAFES, Delta Research and Extension Center, Mississippi Agricultural and Forestry Experiment Station, Stoneville, MS; LAES, Rice Research Station, Louisiana Agricultural Experiment Station, LSU Agricultural Center, Crowley, LA; CCRRF, Rice Experiment Station, California Cooperative Rice Research Foundation, Biggs, CA; TAES, USDA, Texas A & M Research and Education Center, Texas Agricultural Experiment Station, U.S. Department of Agriculture, Beaumont, TX; RiceTec, Alvin, TX.

Individual location data are presented in Tables 15 to 24. Summary data are presented in Tables 25 and 26.

Experiment: Commercial Variety Test - Very Early Group

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 2, 1993

Planting Method: Drill-seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 92 lb N/A, Apr 28; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 10

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, Apr 19; flood, Apr 28; harvest drainage, July 26; reflood, Aug 10; harvest drainage, Oct 5

Herbicides: Londax (bensulfuron) 1.5 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 12

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 26

Harvest: Aug 9; ratoon crop, Oct 12

Experimental Design: Randomized complete block with four replications

Results: Tables 15 and 16

Table 15. Agronomic performance of 1993 commercial varieties, very early group. Crowley, LA.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling % (Whl-Tot)
LAGRUE	5	92	42	0	8497	A	52 - 68
JODON	6	92	38	0	8435	A	60 - 70
ADAIR	5	92	45	0	8202	AB	59 - 69
ALAN	4	92	41	0	8047	ABC	63 - 70
JACKSON	5	92	40	0	8003	ABC	62 - 70
MAYBELLE	5	86	41	0	8002	ABC	60 - 68
AB869	5	94	39	0	7922	ABC	68 - 71
TEBONNET	6	93	54	0	7913	ABC	65 - 72
ROSEMONT	7	91	34	0	7731	BCD	57 - 68
MILLIE	5	93	41	0	7645	BCDE	64 - 71
RT 7015	5	90	36	0	7522	CDE	59 - 69
TEXMONT	8	92	36	0	7300	DEF	57 - 69
L-202	5	88	37	3	7108	EF	53 - 68
SKYBONNET	7	95	47	0	7085	EF	63 - 71
L-203	4	85	39	0	6776	F	49 - 66
LABELLE	7	93	51	0	6725	F	63 - 70
C.V.	6.9	0.8	3.2	-	4.9		2.7-1.3

* 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 16. Performance of main and ratoon crops of 1993 commercial variety test, very early group. Crowley, LA.

1993 entry	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
		----------(lb/A @ 12%)---------			
ADAIR	37	8202	3857	12059	A
ROSEMONT	31	7731	4187	11917	A
MILLIE	34	7645	4218	11863	A
ALAN	34	8047	3307	11353	AB
LAGRUE	37	8497	2689	11186	ABC
MAYBELLE	35	8003	2870	10873	BCD
JODON	29	8435	2237	10673	BCD
TEXMONT	28	7300	3251	10551	BCD
RT 7015	29	7522	2994	10516	BCD
AB869	27	7922	2553	10475	BCD
JACKSON	34	8003	2398	10401	BCD
SKYBONNET	38	7085	3176	10261	CD
L-202	29	7108	3110	10218	D
LABELLE	40	6725	3319	10044	D
TEBONNET	43	7913	2011	9923	D
L-203	26	6776	2310	9085	E
C.V.	3.6	4.9	11.5	5.4	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Commercial Variety Test - Early Group

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 2, 1993

Planting Method: Drill-seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 92 lb N/A, Apr 28; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 17

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, Apr 19; flood, Apr 28; harvest drainage, July 26; reflood, Aug 17; harvest drainage, Oct 20

Herbicides: Londax (bensulfuron) 1.5 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 12

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 26

Harvest: Aug 16; ratoon crop, Oct 30

Experimental Design: Randomized complete block with four replications

Results: Tables 17 and 18

Table 17. Agronomic performance of 1993 commercial varieties, early group. Crowley, LA.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling % (Whl-Tot)
AB 647	6	104	47	90	10104	A	53 - 71
ORION	5	96	44	13	8633	B	59 - 71
LA 2192	6	103	38	15	8566	BC	61 - 67
BENGAL	6	96	38	0	8565	BC	66 - 72
CYPRESS	5	97	39	0	8310	BCD	63 - 70
MARS	5	95	47	60	8259	BCD	64 - 71
KAYBONNET	5	95	43	10	8208	BCD	64 - 71
TX 3069	6	95	43	90	8110	BCDE	62 - 70
AR 1133	5	92	43	15	7971	BCDE	64 - 70
MERCURY	6	93	39	0	7963	BCDE	66 - 72
LA 2168	5	92	40	0	7952	BCDE	66 - 73
V-4716	6	94	37	0	7883	BCDEF	69 - 72
LA 2071	7	96	42	0	7869	BCDEF	58 - 70
SATURN	5	97	54	90	7817	CDEF	64 - 69
RICO 1	7	97	45	68	7786	CDEF	62 - 69
KATY	5	96	46	0	7639	DEFG	63 - 70
LACASSINE	7	96	40	3	7591	DEFG	60 - 71
LEMONT	6	98	39	0	7544	EFG	60 - 71
GULFMONT	7	96	38	0	7538	EFG	63 - 71
NEWBONNET	5	98	45	0	7342	FGH	58 - 68
DELLMONT	8	98	38	0	7115	GH	57 - 71
TORO 2	7	97	43	0	7022	H	65 - 72
LA 2085	8	95	43	5	6944	H	67 - 72
JASMINE 85	8	112	44	55	6762	HI	52 - 66
DELLA	6	98	56	63	6178	I	59 - 70
AKITAKOMACHI	7	84	40	90	5326	J	73 - 75
C.V.	6.9	0.8	3.0	-	6.1		2.6-1.1

* 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 18. Performance of main and ratoon crops of 1993 commercial variety test, very early group. Crowley, LA.

1993 entry	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
		----------(lb/A @ 12%)---------			
AB 647	29	10104	2031	12135	A
AR 1133	35	7971	2538	10509	B
V-4716	27	7883	2341	10224	BC
LA 2071	33	7869	2218	10087	BCD
MERCURY	29	7963	1983	9946	BCDE
LA 2168	28	7952	1852	9803	BCDE
CYPRESS	29	8310	1489	9799	BCDE
KAYBONNET	35	8208	1330	9538	CDEF
ORION	28	8633	877	9509	CDEFG
MARS	33	8259	1186	9445	CDEFG
LA 2192	26	8566	630	9196	DEFGH
BENGAL	27	8565	587	9152	EFGH
LA 2085	32	6944	2099	9042	EFGH
KATY	36	7639	1201	8839	FGH
TORO 2	31	7022	1721	8743	FGHI
GULFMONT	31	7538	1074	8612	GHIJ
LACASSINE	31	7591	826	8417	HIJK
RICO 1	31	7786	628	8413	HIJK
NEWBONNET	34	7342	1063	8404	HIJK
JASMINE 85	28	7018	1376	8394	HIJK
TX 3069	30	8110	268	8378	HIJK
SATURN	33	7817	103	7920	IJK
LEMONT	29	7544	258	7802	JK
DELLMONT	30	7115	578	7693	K
AKITAKOMACHI	27	5326	2199	7524	K
DELLA	38	6178	217	6395	L
C.V.	5.1	5.9	23.4	6.1	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Commercial Variety Test - Very Early Group

Location: Pine Island, Trahan Farm, Vermilion Parish

Seeding Rate/Date: 100 lb/A, Apr 24, 1993

Planting Method: Drill-seeded

Fertilization: 45 lb N/A, May 25; 39-39-39 lb/A ($N-P_2O_5-K_2O$) June 14

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, Apr 29; flood, May 28; harvest drainage, Aug 10

Herbicides: Arrosolo (propanil 3.0 lb ai/A + molinate 3.0 lb ai/A), May 25

Insecticides: Furadan (carbofuran) .5 lb ai/A, June 14

Harvest: Aug 25

Experimental Design: Randomized complete block with four replications

Results: Table 19

Table 19. Agronomic performance of 1993 commercial varieties, early group. Crowley, LA.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	SB[1]	RN[1]	SV[1]
JODON	5	97	38	0	5081	A	24	2	6
L-202	5	91	38	0	4982	AB	41	2	7
AB869	5	94	39	0	4979	AB	9	1	7
ADAIR	6	97	45	0	4806	AB	25	2	5
RT 7015	5	94	38	0	4610	ABC	31	2	6
TEXMONT	6	92	36	0	4564	BC	60	3	7
MAYBELLE	6	90	38	0	4497	BC	43	3	8
JACKSON	5	99	39	0	4232	CD	8	2	5
ALAN	6	98	43	0	4224	CD	11	2	6
ROSEMONT	6	96	34	0	4150	CD	53	2	6
MILLIE	5	97	44	0	3758	DE	13	2	5
LAGRUE	5	101	44	0	3596	E	11	2	4
SKYBONNET	6	100	42	0	3452	E	4	1	4
TEBONNET	6	99	50	0	3283	EF	6	2	6
LABELLE	5	87	38	0	3717	F	99	5	8
L-203	8	99	48	0	2973	F	13	2	5
C.V.	8.3	0.9	2.9	-	7.6		48	35	11

* 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. [1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Experiment: Commercial Variety Test - Early Group

Location: Pine Island, Trahan Farm, Vermilion Parish

Seeding Rate/Date: 100 lb/A, Apr 24, 1993

Planting Method: Drill-seeded

Fertilization: 45 lb N/A, May 25; 39-39-39 lb/A (N-P_2O_5-K_2O) June 14

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, Apr 29; flood, May 28; harvest drainage, Aug 17

Herbicides: Arrosolo (propanil 3.0 lb ai/A + molinate 3.0 lb ai/A), May 25

Insecticides: Furadan (carbofuran) .5 lb ai/A, June 14

Harvest: Sept 1

Experimental Design: Randomized complete block with four replications

Results: Table 20

Table 20. Agronomic performance of 1993 commercial varieties, early group. Pine Island, LA.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	SB[1]	RN[1]	SV[1]
AB 647	5	102	40	0	6324	A	0	0	5
LA 2192	5	99	38	0	5223	B	0	0	4
JASMINE 85	5	105	44	0	4932	BC	0	0	5
TX 3069	6	100	39	0	4809	BC	1	0	5
RICO 1	6	101	38	0	4752	BC	0	0	5
CYPRESS	5	102	38	0	4709	BCD	0	0	6
V-4716	5	99	36	0	4484	CDE	4	1	5
LACASSINE	5	103	37	0	4439	CDE	5	1	5
BENGAL	6	97	36	0	4411	CDE	1	0	6
SATURN	6	94	46	0	4392	CDE	11	2	8
KAYBONNET	6	101	41	0	4293	CDEF	0	0	6
NEWBONNET	6	100	43	0	4063	DEFG	11	2	6
AR 1133	5	102	44	0	4031	EFG	1	0	5
LA 2085	6	99	37	0	3917	EFG	4	1	6
MERCURY	6	95	35	0	3885	EFG	28	3	6
TORO 2	6	99	38	0	3728	FGH	6	1	4
LA 2168	6	95	36	0	3623	GH	6	1	7
MARS	6	97	41	0	3573	GH	13	2	6
LA 2071	6	103	40	0	3519	GHI	0	0	5
GULFMONT	5	102	36	0	3493	GHI	5	1	4
ORION	6	98	39	0	3451	GHI	0	0	6
LEMONT	5	105	35	0	3094	HIJ	3	1	5
DELLMONT	5	104	36	0	2921	IJ	0	0	5
KATY	5	105	41	0	2733	JK	0	0	4
DELLA	6	100	42	0	2727	JK	5	1	6
AKITAKOMACHI	7	91	37	0	2214	K	4	1	8
C.V.	8.1	1.1	4.8	-	10.2		93	89	12

* 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Experiment: Commercial Variety Test - Very Early Group

Location: Northeast Research Station, St. Joseph

Seeding Rate/Date: 100 lb/A, Apr 29, 1993

Planting Method: Drill-seeded

Fertilization: 17-50-50 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 29; 92 lb N/A, June 1

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, May 22, May 31, June 7, June 17; flood, July 2; harvest drainage, Aug 13

Herbicides: Facet (quinclorac) .375 lb ai/A + Basagran (bentazon) 1 lb ai/A, June 10; Ordram (molinate) 3 lb ai/A, July 5; Londax (bensulfuron) 1 oz ai/A, July 6

Harvest: Aug 26

Experimental Design: Randomized complete block with four replications

Results: Table 21

Table 21. Agronomic performance of 1993 commercial varieties, very early group. St. Joe, LA.

1993 entry	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test*
LAGRUE	92	44	0	6863	A
ADAIR	88	46	0	6625	A
JODON	89	38	0	6447	A
MILLIE	89	43	0	6191	AB
ROSEMONT	88	35	0	6094	ABC
RT 7015	86	36	0	5279	BCD
L-202	86	37	0	5106	BCD
JACKSON	88	41	0	4922	CD
ALAN	87	41	0	4920	CD
TEBONNET	88	51	0	4672	D
AB869	88	39	0	4617	D
SKYBONNET	89	43	0	4168	DE
TEXMONT	87	34	0	3410	EF
L-203	83	40	0	2831	FG
LABELLE	86	48	0	2518	FG
MAYBELLE	83	39	0	2166	G
C.V.	1.4	2.8	-	15.6	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Commercial Variety Test - Early Group

Location: Northeast Research Station, St. Joseph

Seeding Rate/Date: 100 lb/A, Apr 29, 1993

Planting Method: Drill-seeded

Fertilization: 17-50-50 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 29; 92 lb N/A, June 1

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, May 22, May 31, June 7, June 17; flood, July 2; harvest drainage, Aug 13

Herbicides: Facet (quinclorac) .375 lb ai/A + Basagran (bentazon) 1 lb ai/A, June 10; Ordram (molinate) 3 lb ai/A, July 5; Londax (bensulfuron) 1 oz ai/A, July 6

Harvest: Aug 26

Experimental Design: Randomized complete block with four replications

Results: Table 22

Table 22. Agronomic performance of 1993 commercial varieties, early group. St. Joe, LA.

1993 entry	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test*
TX 3069	91	41	0	7022	A
LA 2192	97	38	0	6990	A
AB 647	98	41	0	6872	AB
RICO 1	94	43	0	6822	ABC
KAYBONNET	91	43	0	6790	ABC
BENGAL	90	37	0	6554	ABC
V-4716	92	36	0	6351	BCD
AR 1133	93	45	0	6324	BCD
NEWBONNET	95	45	0	6202	CD
JASMINE 85	99	44	0	6196	CD
KATY	97	45	0	5905	DE
ORION	90	41	0	5904	DEF
LA 2071	96	41	0	5832	DEF
CYPRESS	96	37	0	5327	EFG
TORO 2	91	41	0	5283	FG
LACASSINE	94	37	0	5264	FG
MERCURY	91	36	0	5063	GH
DELLMONT	94	37	0	5032	GH
LA 2168	89	40	0	5026	GH
MARS	90	44	0	5023	GH
LEMONT	98	35	0	4928	GHI
LA 2085	91	38	0	4922	GHI
GULFMONT	96	36	0	4682	GHIJ
AKITAKOMACHI	89	41	0	4517	HIJ
DELLA	93	52	0	4349	IJ
SATURN	92	50	0	4212	J
C.V.	2.2	3.6	-	7.0	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Commercial Variety Test - Very Early and Early Groups

Location: Epps, Buford Perry Farm, East Carroll Parish

Seeding Rate/Date: 100 lb/A, May 19, 1993

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, July 1

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flush, May 22, May 31, June 7, June 17; flood, July 2; harvest drainage, Sept 13

Herbicides: Facet (quinclorac) .375 lb ai/A + Basagran (bentazon) 1 lb ai/A, June 10; Ordram (molinate) 3 lb ai/A, July 5; Londax (bensulfuron) 1 oz ai/A, July 6

Insecticides: Furadan (carbofuran) .5 lb ai/A, July 23

Fungicides: Tilt (propiconazole) .28 lb ai/A, Aug 6; Benlate (benomyl), Aug 21

Harvest: Sept 29

Experimental Design: Randomized complete block with four replications

Results: Tables 23 and 24

Table 23. Agronomic performance of 1993 commercial varieties, very early group. East Carroll Parish, LA.

1993 entry	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test*	Milling % (Whl-Tot)
LAGRUE	97	46	3	9796	A	62 - 70
ADAIR	91	45	43	8568	B	58 - 69
ROSEMONT	93	36	0	8398	BC	63 - 71
JODON	94	38	0	8258	BCD	65 - 71
JACKSON	93	42	0	7970	BCDE	64 - 72
TEXMONT	92	35	0	7856	BCDE	63 - 71
ALAN	94	42	20	7551	BCDEF	64 - 70
SKYBONNET	97	48	0	7391	CDEF	64 - 71
L-202	91	36	0	7145	DEF	58 - 70
TEBONNET	94	52	60	6897	EF	65 - 71
RT 7015	92	34	0	6872	EF	64 - 71
MILLIE	93	43	20	6872	EF	60 - 71
LABELLE	92	51	13	6697	F	64 - 70
AB869	89	40	0	6465	FG	65 - 70
MAYBELLE	85	38	0	6440	FG	61 - 70
AC LINE**	92	38	0	6099	G	67 - 72
L-203	84	38	0	5591	G	58 - 70
C.V.	0.9	4.2	-	9.2		3.8-1.0

* Numbers followed by the same letter are not significantly different at the 0.05 level.
** Additional experimental line added to test at this location.

Table 24. Agronomic performance of 1993 commercial varieties, early group. East Carroll Parish, LA.

1993 entry	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test*	Milling % (Whl-Tot)
LA 2192	95	39	0	11333	A	64 - 69
AB 647	96	39	53	9934	B	52 - 72
TX 3069	94	40	48	9532	B	67 - 73
RICO 1	96	43	25	9457	B	63 - 71
BENGAL	93	38	0	9350	B	63 - 73
KAYBONNET	96	46	5	8572	C	64 - 70
CYPRESS	99	40	0	8340	CD	67 - 71
NEWBONNET	95	44	0	8299	CD	65 - 70
JASMINE 85	102	46	48	7953	CDE	58 - 68
AR 1133	96	46	0	7943	CDE	65 - 70
V-4716	93	40	0	7865	CDEF	70 - 72
ORION	91	43	58	7597	DEFG	64 - 70
DELLMONT	100	38	0	7485	DEFG	60 - 73
MARS	92	44	65	7474	DEFG	67 - 69
LEMONT	99	36	0	7470	DEFG	65 - 72
SATURN	93	45	78	7470	EFG	67 - 70
TORO 2	94	43	45	7259	EFG	61 - 71
LACASSINE	99	37	0	7224	EFGH	65 - 72
LA 2071	100	44	0	7168	EFGH	59 - 67
LA 2168	92	39	0	7106	EFGH	66 - 71
KATY	100	46	3	7081	EFGH	65 - 70
GULFMONT	97	36	0	7010	FGH	64 - 72
LA 2085	95	38	0	6739	GH	64 - 71
MERCURY	93	39	0	6390	HI	63 - 69
DELLA	94	44	15	5782	I	54 - 69
AKITAKOMACHI	80	41	28	3624	J	65 - 70
C.V.	0.9	4.2	-	6.8		5.3-1.0

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Table 25. Agronomic performance of 1993 commercial varieties, very early group. Four location means, LA.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling %*** (Whl-Tot)
LAGRUE	5	95	44	1	7188	A	57 - 69
JODON	6	93	38	0	7055	A	63 - 70
ADAIR	5	92	45	11	7050	A	59 - 69
ROSEMONT	6	92	35	0	6593	AB	60 - 69
JACKSON	5	93	41	0	6282	BC	63 - 71
ALAN	5	93	42	5	6185	BCD	63 - 70
MILLIE	5	93	43	5	6116	BCD	62 - 71
L-202	5	89	37	1	6085	BCD	56 - 69
RT 7015	5	90	36	0	6071	BCD	62 - 70
AB869	5	91	39	0	5996	BCD	66 - 71
TEXMONT	7	90	35	0	5782	CDE	60 - 70
TEBONNET	6	93	53	19	5764	CDE	65 - 72
SKYBONNET	6	95	45	0	5525	DE	63 - 71
MAYBELLE	5	86	39	3	5277	EF	60 - 69
LABELLE	7	92	49	3	4728	FG	63 - 70
L-203	4	85	39	0	4530	G	54 - 68
C.V.	10.6	1.8	4.4	-	13.8		4.7-1.6

* 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.
*** Mean data from Rice Research Station and East Carroll locations.

Table 26. Agronomic performance of 1993 commercial variety tests, early group four location means.

1993 entry	Seedling vigor*	Days to 50% heading	Plant height (In)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling %*** (Whl-Tot)
AB 647	6	100	42	36	8308	A	53 - 72
LA 2192	6	98	38	4	8028	A	63 - 68
TX 3069	6	95	41	34	7368	B	65 - 71
BENGAL	6	94	37	0	7220	B	65 - 72
RICO	6	97	42	23	7204	B	63 - 70
KAYBONNET	5	96	43	4	6966	BC	64 - 71
CYPRESS	5	98	38	0	6672	CD	65 - 70
V-4716	6	94	37	0	6646	CDE	70 - 72
AR 1133	5	96	45	4	6567	CDEF	65 - 70
NEWBONNET	5	97	44	0	6476	CDEFG	62 - 69
JASMINE 85	6	04	45	26	6461	CDEFG	55 - 67
ORION	5	93	42	18	6396	DEFG	62 - 71
LACASSINE	6	98	38	1	6130	DEFGH	62 - 71
LA 2071	7	99	42	0	6097	EFGH	59 - 68
MARS	5	94	44	31	6082	FGH	65 - 70
SATURN	6	94	49	42	5972	GH	66 - 70
LA 2168	6	92	38	0	5927	GH	66 - 72
KATY	5	99	44	0	5839	H	64 - 70
MERCURY	6	93	37	0	5825	H	64 - 71
TORO 2	6	95	41	11	5823	H	63 - 72
LEMONT	6	99	36	0	5759	H	62 - 72
GULFMONT	6	98	37	0	5681	H	64 - 71
DELMOMT	6	99	37	0	5638	H	58 - 72
LA 2085	7	95	39	1	5630	H	65 - 71
DELLA	6	96	49	19	4759	I	56 - 70
AKITAKOMACHI	7	86	40	29	3920	J	69 - 72
C.V.	11.2	2.4	5.4	-	10.9		5.0-1.6

* 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.
*** Mean data from Rice Research Station and East Carroll locations.

ADVANCED YIELD TESTS

The Rice Breeding project annually conducts on-farm testing of advanced experimental lines to complement tests conducted on station. The goals of this program are to sample additional environments in yield testing of new promising selections from the varietal development 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 are essential to provide the information needed to make decisions relative to the release of new varieties.

These tests were conducted at the Rice Research Station and four on-farm locations in 1993. The on-farm locations were as follows:

East Carroll Parish (Epps, LA) - Buford Perry Farm
Morehouse Parish (Jones, LA) - Edmund and Kirk Zaunbrecher Farm
Rapides Parish (Cheneyville, LA)- Will Bollich Farm
Vermilion Parish (Gueydan, LA) - Errol Lounsberry Farm

Twenty-four experimentals and six checks were included in the 1992 testing program. Ratoon crop information was generated at the Rice Research Station and at the Vermilion Parish location. These tests were conducted in cooperation with Dr. Pat Bollich and the Rice Fertilization and Cultural Management Project.

Individual location data are presented in Tables 27 to 33. Summary data are presented in Table 34.

Experiment: Advanced Yield Test

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 2, 1993

Planting Method: Drill-seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O) preplant incorporated, Apr 1; 92 lb N/A, Apr 28; 21 lb N/A, May 26; 21 lb N/A, June 11; 69 lb N/A, Aug 18

Plot Size: 4.66 x 25 ft (116.5 ft^2)

Water Management: Flush, Apr 19; flood, Apr 28; harvest drainage, Aug 2; reflood, Aug 8

Herbicides: Londax (bensulfuron) 1.5 oz ai/A, May 12;
Ordram (molinate) 3 lb ai/A, May 12

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 26

Harvest: Aug 17

Experimental Design: Randomized complete block with four replications

Results: Tables 27 and 28

Table 27. Agronomic performance of 1993 advanced yield test. Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)	SB[1]	RN[1]	SV[1]
218	RXCL	M	7	102	38	10	8753	A	60 - 70	0	0	1
228	BENGAL	M	6	94	38	0	8221	B	55 - 73	11	1	5
227	ORION	M	5	95	43	0	8144	BC	48 - 72	8	1	5
225	LAGRUE	L	5	91	43	0	8088	BC	55 - 69	46	3	6
202	SMARS/MARS//PCOS	M	5	93	37	0	8004	BCD	69 - 72	14	2	6
229	CYPRESS	L	6	94	38	0	7937	BCD	66 - 71	15	2	5
221	MERC/RICO	M	6	94	39	0	7931	BCD	53 - 73	3	1	4
207	LMNTX2/L202	L	6	93	37	0	7878	BCDE	65 - 71	13	2	6
223	MERC/RICO1	M	6	90	39	0	7808	BCDE	64 - 73	5	1	6
208	KATY/CPRS	L	5	97	37	0	7786	BCDE	48 - 70	9	1	5
206	RICO1/MERC	M	6	92	43	0	7783	BCDE	45 - 71	13	1	5
214	L202/LMNT//KATY	L	6	94	38	0	7769	BCDE	56 - 71	10	2	7
205	RICO1/MERC	M	6	90	42	5	7724	BCDEF	52 - 71	3	1	6
212	LCSN/CPRS	L	6	92	37	0	7718	BCDEF	68 - 73	38	2	6
211	L202/LMNT//KATY	L	6	94	38	0	7709	BCDEF	60 - 71	14	2	6
216	LMNT/LBLE SC-5	L	7	97	41	0	7690	BCDEF	54 - 69	6	1	4
219	LCSN/KATY	L	6	97	51	3	7670	BCDEF	56 - 70	6	1	4
204	JODON	L	5	91	37	0	7634	CDEF	63 - 71	23	2	6
217	LMNT/86-20001-5	L	7	97	38	0	7524	DEF	50 - 67	5	1	3
203	MERC//MERC/KOSH	M	5	89	37	0	7514	DEF	69 - 73	11	2	6
201	SMARS/MARS//PCOS	M	6	93	35	0	7479	DEF	65 - 71	21	2	6
209	KATY/CPRS	L	6	97	38	0	7459	DEF	49 - 73	5	1	5
220	A301/JSMN	L	6	97	42	0	7440	DEF	49 - 70	8	1	5
213	KATY/CPRS	L	5	96	37	0	7438	DEF	66 - 71	23	1	6
215	LBLE SC-5/LMNT	L	6	96	40	0	7332	EF	55 - 68	3	1	3
230	RICO 1	M	7	95	45	3	7191	FG	61 - 70	5	1	4
226	DELLMONT	L	7	96	38	0	7184	FG	61 - 71	15	2	6
222	LMNT/DLLA	L	8	94	42	0	6800	GH	67 - 72	10	2	4
224	DMSI/DLLAX2//LMNT	L	7	94	48	0	6631	H	61 - 71	14	2	5
210	DMSI/DLLAX2//A301	L	7	96	44	8	5704	I	53 - 70	5	1	3
C.V.			7.1	0.8	3.1	-	4.3		6.6-1.1			

* L = Long grain, M = medium grain.

** 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.

[1] SB = sheath blight, 0-9 scale; RN = rotten neck blast, % infection; and SV = rotten neck blast severity, 0-9 scale.

Table 28. Performance of main and ratoon crops of 1993 advanced yield test. Crowley, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			------(lb/A @ 12%)------			
212	LCSN/CPRS	27	7718	2322	10040	A
207	LMNTX2/L202	27	7878	1814	9692	AB
218	RXCL	26	8753	477	9230	BC
221	MERC/RICO	25	7931	1268	9199	BC
216	LMNT/LBLE SC-5	32	7690	1500	9190	BC
206	RICO1/MERC	27	7783	1367	9150	BC
227	ORION	28	8144	858	9003	BCD
202	SMARS/MARS//PCOS	23	8004	967	8971	BCD
217	LMNT/86-20001-5	30	7524	1434	8957	BCD
215	LBLE SC-5/LMNT	30	7332	1610	8942	BCD
229	CYPRESS	29	7937	994	8931	BCD
225	LAGRUE	35	8088	771	8859	CDE
228	BENGAL	27	8221	544	8765	CDE
203	MERC//MERC/KOSH	26	7514	1235	8749	CDE
223	MERC/RICO1	26	7808	938	8745	CDE
205	RICO1/MERC	27	7724	1009	8733	CDE
201	SMARS/MARS//PCOS	23	7479	1150	8629	CDEF
204	JODON	28	7634	955	8589	CDEFG
213	KATY/CPRS	27	7438	975	8413	CDEFGH
222	LMNT/DLLA	30	6800	1510	8309	DEFGH
224	DMSI/DLLAX2//LMNT	33	6631	1671	8301	DEFGH
214	L202/LMNT//KATY	30	7769	335	8104	EFGH
208	KATY/CPRS	26	7786	318	8103	EFGH
211	L202/LMNT//KATY	31	7709	216	7925	FGH
220	A301/JSMN	29	7440	383	7823	GH
219	LCSN/KATY	34	7670	106	7776	H
209	KATY/CPRS	28	7459	293	7753	H
230	RICO 1	29	7191	442	7633	H
226	DELLMONT	29	7184	441	7624	H
210	DMSI/DLLAX2//A301	28	5704	467	6171	I
C.V.		5.7	4.3	36.4	5.6	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Advanced Yield Test

Location: Epps, Buford Perry Farm, East Carroll Parish

Seeding Rate/Date: 100 lb/A, May 19, 1993

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, July 1

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flush, May 22, May 31, June 7, June 17; flood, July 2; harvest drainage, Sept 13

Herbicides: Facet (quinclorac) .375 lb ai/A + Basagran (bentazon) 1 lb ai/A, June 10; Ordram (molinate) 3 lb ai/A, July 5; Londax (bensulfuron) 1 oz ai/A, July 6

Insecticides: Furadan (carbofuran) .5 lb ai/A, July 23

Fungicides: Tilt (propiconazole) .28 lb ai/A, Aug 6; Benlate (benomyl), Aug 21

Harvest: Sept 29

Experimental Design: Randomized complete block with four replications

Results: Table 29

Table 29. Agronomic performance of 1993 advanced yield test. East Carroll Parish, LA.

1993 entry	Pedigree	Grain type*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling % (Whl-Tot)
218	RXCL	M	95	39	0	11333	A	64 - 69
225	LAGRUE	L	97	46	3	9796	B	62 - 70
230	RICO 1	M	96	43	25	9457	BC	63 - 71
228	BENGAL	M	93	38	0	9350	BCD	63 - 73
217	LMNT/86-20001-5	L	98	40	0	8884	CDE	58 - 68
205	RICO1/MERC	M	91	43	28	8786	CDEF	65 - 70
220	A301/JSMN	L	94	39	33	8577	DEF	54 - 67
206	RICO1/MERC	M	91	42	18	8375	EFG	65 - 70
229	CYPRESS	L	99	40	0	8340	EFG	67 - 71
209	KATY/CPRS	L	100	38	0	8258	EFGH	66 - 72
204	JODON	L	94	38	0	8258	EFGH	65 - 71
201	SMARS/MARS//PCOS	M	91	38	0	8210	EFGH	67 - 70
208	KATY/CPRS	L	103	38	0	8024	EFGHI	62 - 71
215	LBLE SC-5/LMNT	L	99	43	0	7976	EFGHI	62 - 69
219	LCSN/KATY	L	100	52	25	7859	FGHI	63 - 71
207	LMNTX2/L202	L	97	38	0	7858	FGHI	66 - 71
213	KATY/CPRS	L	98	36	0	7599	GHIJ	68 - 72
227	ORION	M	91	43	58	7597	GHIJ	64 - 70
226	DELLMONT	L	100	38	0	7485	GHIJK	60 - 73
202	SMARS/MARS//PCOS	M	90	38	0	7475	GHIJK	67 - 71
221	MERC/RICO	M	94	39	0	7427	GHIJK	59 - 70
214	L202/LMNT//KATY	L	97	40	0	7371	HIJK	62 - 70
203	MERC//MERC/KOSH	M	88	37	0	7335	HIJK	68 - 71
211	L202/LMNT//KATY	L	98	40	0	7229	IJK	65 - 71
216	LMNT/LBLE SC-5	L	100	44	0	7168	IJK	59 - 67
223	MERC/RICO1	M	92	39	0	7106	IJK	66 - 71
222	LMNT/DLLA	L	95	38	0	6739	JKL	64 - 71
212	LCSN/CPRS	L	96	36	0	6592	KL	64 - 71
224	DMSI/DLLAX2//LMNT	L	90	43	40	6013	L	60 - 71
210	DMSI/DLLAX2//A301	L	92	36	0	4789	M	49 - 71
C.V.			1.2	4.2		7.1		4.4-1.1

* L = Long grain, M = medium grain.

** Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Advanced Yield Test

Location: Jones, Zaunbrecher Farm, Morehouse Parish

Seeding Rate/Date: 150 lb/A, May 19, 1993

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

Fertilization: 13.6 lb Zn/A preplant incorporated, May 18; 120 lb N/A, June 30

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flood, May 18; drain, May 21; Flush, May 28, June 3, June 11, June 17; flood, July 1; harvest drainage, Sept 10

Herbicides: Stam (propanil) 3.5 ai/A, June 1; Stam 4 lb ai/A + Basagran (bentazon) .7 lb ai/A, June 19; Ordram (molinate) 3.5 lb ai/A, July 3; Londax (bensulfuron) 1 oz ai/A, July 6

Insecticides: Furadan (carbofuran) .5 lb ai/A, July 19; Methyl parathion .25 lb ai/A, Aug 23

Fungicides: Tilt (propiconazole) .28 lb ai/A, Aug 5; Benlate (benomyl) .5 lb ai/A, Aug 19

Harvest: Sept 27

Experimental Design: Randomized complete block with four replications

Results: Table 30

Table 30. Agronomic performance of 1993 advanced yield test. East Carroll Parish, LA.

1993 entry	Pedigree	Grain type*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling % (Whl-Tot)
218	RXCL	M	90	36	0	11241	A	65 - 69
230	RICO 1	M	93	43	58	10895	A	66 - 72
225	LAGRUE	L	92	43	13	10078	B	63 - 71
204	JODON	L	92	36	5	9347	BC	67 - 71
228	BENGAL	M	89	35	3	9330	BC	70 - 73
229	CYPRESS	L	95	38	13	9089	CD	69 - 72
208	KATY/CPRS	L	98	37	0	9077	CD	65 - 71
205	RICO1/MERC	M	88	41	20	9024	CD	67 - 71
220	A301/JSMN	L	91	40	43	8907	CDE	57 - 68
209	KATY/CPRS	L	96	37	0	8828	CDEF	69 - 73
217	LMNT/86-20001-5	L	96	36	0	8793	CDEF	59 - 68
207	LMNTX2/L202	L	92	36	20	8792	CEF	70 - 72
206	RICO1/MERC	M	89	41	43	8669	CDEFG	67 - 72
219	LCSN/KATY	L	96	48	8	8475	CDEFGH	67 - 71
214	L202/LMNT//KATY	L	96	39	0	8358	DEFGH	69 - 72
211	L202/LMNT//KATY	L	97	39	0	8248	DEFGHI	68 - 72
215	LBLE SC-5/LMNT	L	97	40	0	8206	DEFGHI	64 - 69
216	LMNT/LBLE SC-5	L	97	42	0	8201	DEFGHI	62 - 69
223	MERC/RICO1	M	91	39	0	8191	DEFGHI	70 - 73
221	MERC/RICO	M	91	37	0	8072	EFGHI	67 - 73
212	LCSN/CPRS	L	93	35	0	8013	EFGHI	71 - 73
226	DELLMONT	L	98	35	0	7990	EFGHI	66 - 74
202	SMARS/MARS//PCOS	M	87	36	5	7921	FGHI	68 - 72
210	DMSI/DLLAX2//A301	L	90	40	8	7797	GHI	65 - 74
222	LMNT/DLLA	L	93	39	0	7796	GHI	70 - 73
213	KATY/CPRS	L	96	34	0	7759	GHI	71 - 73
227	ORION	M	88	38	8	7736	GHI	68 - 71
201	SMARS/MARS//PCOS	M	88	34	10	7561	HI	68 - 71
203	MERC//MERC/KOSH	M	86	35	0	7392	IJ	68 - 72
224	DMSI/DLLAX2//LMNT	L	89	45	58	6697	J	59 - 71
C.V.			1.1	4.1	-	6.4		3.0-1.0

* L = Long grain, M = medium grain.

** Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Advanced Yield Test

Location: Cheneyville, Will Bollich Farm, Rapides Parish

Seeding Rate/Date: 100 lb/A, May 31, 1993

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, July 5

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flush, June 1, June 10; flood, July 6; harvest drainage, Sept 23

Herbicides: Stam (propanil) 4 lb ai/A, June 15; Arrosolo (propanil 3 lb ai/A + molinate 3 lb ai/A), June 18; Londax (bensulfuron) 1 oz ai/A, July 14; Ordram (molinate) 3 lb ai/A, July 15

Insecticides: Furadan (carbofuran) .5 lb ai/A, Aug 1

Fungicides: Rovral (iprodione) .5 lb ai/A, Aug 15

Harvest: Oct 7

Experimental Design: Randomized complete block with four replications

Results: Table 31

Table 31. Agronomic performance of 1993 advanced yield test. Rapides Parish, LA.

1993 entry	Pedigree	Grain type*	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test**	Milling % (Whl-Tot)
218	RXCL	M	86	38	0	8756	A	65 - 69
230	RICO 1	M	83	42	4	8143	B	67 - 71
225	LAGRUE	L	87	45	2	7303	C	61 - 71
215	LBLE SC-5/LMNT	L	91	42	0	6733	D	61 - 68
208	KATY/CPRS	L	92	39	0	6567	DE	63 - 71
229	CYPRESS	L	89	43	1	6418	DEF	65 - 70
221	MERC/RICO	M	81	37	0	6405	DEF	66 - 70
217	LMNT/86-20001-5	L	90	40	0	6387	DEF	57 - 69
214	L202/LMNT//KATY	L	89	43	0	6365	DEFG	64 - 71
209	KATY/CPRS	L	90	40	0	6363	DEFG	63 - 70
211	L202/LMNT//KATY	L	91	43	0	6346	DEFG	65 - 72
205	RICO1/MERC	M	80	39	3	6309	DEFG	64 - 70
204	JODON	L	82	38	0	6224	DEFG	65 - 71
206	RICO1/MERC	M	80	41	2	6196	DEFG	61 - 71
219	LCSN/KATY	L	91	51	0	6087	EFG	62 - 69
216	LMNT/LBLE SC-5	L	88	44	0	6005	EFGH	59 - 70
220	A301/JSMN	L	84	43	6	5949	FGHI	54 - 67
207	LMNTX2/L202	L	86	40	5	5845	FGHIJ	65 - 70
228	BENGAL	M	82	36	1	5778	GHIJK	65 - 72
226	DELLMONT	L	91	38	0	5485	HIJKL	64 - 71
227	ORION	M	81	38	0	5468	HIJKL	53 - 70
223	MERC/RICO1	M	73	39	0	5406	IJKL	66 - 72
202	SMARS/MARS//PCOS	M	78	37	1	5350	JKL	54 - 71
203	MERC//MERC/KOSH	M	78	36	0	5229	KLM	66 - 70
222	LMNT/DLLA	L	84	39	0	5204	LMN	64 - 70
201	SMARS/MARS//PCOS	M	78	37	0	5156	LMN	51 - 69
213	KATY/CPRS	L	89	36	0	5032	LMN	63 - 70
212	LCSN/CPRS	L	86	37	0	4713	MNO	66 - 71
224	DMSI/DLLAX2//LMNT	L	81	45	6	4654	NO	58 - 69
210	DMSI/DLLAX2//A301	L	82	41	0	4306	O	45 - 70
C.V.			3.1	3.8	-	5.9		6.1-1.2

* L = Long grain, M = medium grain.

** Numbers followed by the same letter are not significantly different at the 0.05 level.

Experiment: Advanced Yield Test

Location: Gueydan, Errol Lounsberry Farm, Vermilion Parish

Seeding Rate/Date: 150 lb/A, Apr 2, 1993

Planting Method: Water-seeded

Fertilization: 90-45-45 lb/A (N-P_2O_5-K_2O) preplant incorporated, Mar 31; 72 lb N/A ratoon crop, Aug 9

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flood, Apr 1; drain, Apr 4; reflood, Apr 7; drain, Apr 8; reflood, Apr 13; harvest drainage, July 19; reflood, Aug 9 (ratoon crop); harvest drainage, Oct 8

Herbicides: Ordram (molinate) 3.5 lb ai/A + Londax (bensulfuron) 1 oz ai/A, Apr 21

Insecticides: Furadan (carbofuran) .5 lb ai/A, May 10

Fungicides: Benlate (benomyl) .75 lb ai/A, June 20

Harvest: Aug 4

Experimental Design: Randomized complete block with four replications

Results: Tables 32 and 33

Table 32. Agronomic performance of 1993 advanced yield test. Vermilion Parish, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
218	RXCL	M	6	94	40	-	9260	A	61 - 67
220	A301/JSMN	L	6	90	42	-	8837	AB	51 - 67
230	RICO 1	M	6	90	46	-	8615	BC	64 - 70
225	LAGRUE	L	5	83	43	-	8561	BCD	55 - 68
206	RICO1/MERC	M	5	85	43	-	8229	CDE	64 - 70
202	SMARS/MARS//PCOS	M	4	86	37	-	8146	CDEF	65 - 69
205	RICO1/MERC	M	5	85	43	-	8098	CDEF	63 - 69
203	MERC//MERC/KOSH	M	5	83	40	-	8017	DEFG	70 - 72
211	L202/LMNT//KATY	L	6	88	40	-	7738	EFGH	62 - 70
214	L202/LMNT//KATY	L	6	88	40	-	7721	EFGH	58 - 69
223	MERC/RICO1	M	5	86	41	-	7719	EFGH	65 - 70
207	LMNTX2/L202	L	6	90	38	-	7696	EFGH	62 - 69
228	BENGAL	M	6	91	37	-	7661	EFGH	64 - 70
215	SC-5/LMNT	L	6	90	41	-	7620	FGHI	60 - 69
204	JODON	L	5	83	38	-	7575	FGHI	58 - 68
201	SMARS/MARS//PCOS	M	4	86	35	-	7505	GHIJ	64 - 68
229	CYPRESS	L	5	90	37	-	7424	HIJK	60 - 68
221	MERC/RICO	M	5	91	41	-	7340	HIJK	65 - 71
219	LCSN/KATY	L	5	91	52	-	7207	HIJK	57 - 68
216	LMNT/LBLE SC-5	L	7	91	39	-	7205	HIJK	50 - 68
217	LMNT/86-20001-5	L	6	92	37	-	7080	IJKL	54 - 66
227	ORION	M	4	89	42	-	7058	IJKL	66 - 69
212	LCSN/CPRS	L	5	83	38	-	6969	JKLM	60 - 70
213	KATY/CPRS	L	5	89	36	-	6926	KLMN	62 - 70
208	KATY/CPRS	L	5	92	34	-	6856	KLMN	59 - 68
209	KATY/CPRS	L	5	91	37	-	6629	LMN	60 - 69
226	DELLMONT	L	7	91	36	-	6576	LMN	64 - 71
222	LMNT/DLLA	L	7	88	43	-	6456	MN	63 - 69
224	DMSI/DLLAX2//LMNT	L	6	88	48	-	6189	NO	58 - 70
210	DMSI/DLLAX2//A301	L	7	86	44	-	5860	O	49 - 69
C.V.			8.7	1.0	3.5		4.7		3.5-1.6

* L = Long grain, M = medium grain.

** 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. Performance of main and ratoon crops of 1993 advanced yield test. Vermilion Parish, LA.

1993 entry	Pedigree	Ratoon height (in)	Main crop yield	Ratoon crop yield	Total yield	Duncan's test*
			-------(lb/A @ 12%)------			
218	RXCL	32	9260	4411	13671	A
206	RICO1/MERC	32	8229	4050	12278	B
228	BENGAL	31	7661	4469	12131	BC
225	LAGRUE	38	8561	3497	12058	BCD
215	LBLE SC-5/LMNT	33	7620	4375	11995	BCD
216	LMNT/LBLE SC-5	35	7205	4780	11985	BCD
205	RICO1/MERC	32	8098	3764	11862	BCDE
220	A301/JSMN	34	8837	2969	11806	BCDEF
202	SMARS/MARS//PCOS	28	8146	3258	11404	BCDEFG
223	MERC/RICO1	32	7719	3605	11324	CDEFGH
207	LMNTX2/L202	31	7696	3517	11213	CDEFGH
204	JODON	31	7575	3571	11147	DEFGH
229	CYPRESS	32	7424	3620	11044	EFGH
217	LMNT/86-20001-5	35	7080	3907	10987	EFGH
203	MERC//MERC/KOSH	28	8017	2951	10968	EFGH
230	RICO 1	36	8615	2263	10878	FGHI
221	MERC/RICO	31	7340	3500	10840	GHI
214	L202/LMNT//KATY	33	7721	3112	10833	GHI
212	LCSN/CPRS	31	6969	3579	10547	GHIJ
201	SMARS/MARS//PCOS	28	7505	3017	10522	GHIJ
213	KATY/CPRS	31	6926	3520	10446	GHIJ
211	L202/LMNT//KATY	33	7738	2667	10405	HIJ
227	ORION	32	7058	3303	10361	HIJ
209	KATY/CPRS	30	6629	3371	10000	IJ
222	LMNT/DLLA	33	6456	3528	9984	IJ
208	KATY/CPRS	29	6856	2938	9793	JK
219	LCSN/KATY	41	7207	2555	9761	JK
224	DMSI/DLLAX2//LMNT	35	6189	2843	9032	KL
226	DELLMONT	31	6576	2303	8879	L
210	DMSI/DLLAX2//A301	33	5860	1780	7640	M
C.V.		4.0	4.7	11.4	5.3	

* Numbers followed by the same letter are not significantly different at the 0.05 level.

Table 34. Agronomic performance of 1993 advanced yield test. Five location mean, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
218	RXCL	M	4	93	38	3	9869	A	63 - 69
230	RICO 1	M	5	91	44	36	8860	B	64 - 71
225	LAGRUE	L	3	90	44	8	8765	B	59 - 70
228	BENGAL	M	4	90	37	2	8068	C	64 - 72
205	RICO1/MERC	M	4	87	42	21	7988	CD	62 - 70
220	A301/JSMN	L	4	91	41	56	7942	CD	53 - 68
206	RICO1/MERC	M	4	87	42	19	7850	CDE	60 - 71
229	CYPRESS	L	3	93	39	6	7842	CDE	65 - 70
204	JODON	L	3	88	38	1	7808	CDE	63 - 70
217	LMNT/86-20001-5	L	4	94	38	0	7733	CDEF	56 - 68
208	KATY/CPRS	L	3	96	37	0	7662	CDEFG	59 - 70
207	LMNTX2/L202	L	4	91	38	18	7614	CDEFG	66 - 71
215	LBLE SC-5/LMNT	L	4	95	41	0	7573	DEFGH	60 - 69
214	L202/LMNT//KATY	L	4	93	40	0	7517	DEFGH	62 - 71
209	KATY/CPRS	L	4	95	38	0	7507	DEFGH	61 - 71
219	LCSN/KATY	L	4	95	51	9	7459	EFGH	61 - 70
211	L202/LMNT//KATY	L	4	93	40	0	7454	EFGH	64 - 71
221	MERC/RICO	M	4	90	39	0	7435	EFGH	62 - 71
202	SMARS/MARS//PCOS	M	3	87	37	4	7379	EFGHI	65 - 71
216	LMNT/LBLE SC-5	L	5	94	42	0	7254	FGHIJ	57 - 69
223	MERC/RICO1	M	4	86	40	0	7246	GHIJ	66 - 72
227	ORION	M	3	89	41	21	7201	GHIJ	60 - 70
201	SMARS/MARS//PCOS	M	3	87	36	3	7182	GHIJ	63 - 70
203	MERC//MERC/KOSH	M	3	84	37	0	7097	HIJ	68 - 72
213	KATY/CPRS	L	3	94	36	0	6951	HIJK	66 - 71
226	DELLMONT	L	5	95	37	0	6944	HIJK	63 - 72
212	LCSN/CPRS	L	4	90	36	0	6801	JK	66 - 72
222	LMNT/DLLA	L	5	91	40	0	6599	K	65 - 71
224	DMSI/DLLAX2//LMNT	L	4	88	46	39	6037	L	59 - 70
210	DMSI/DLLAX2//A301	L	5	89	41	4	5691	L	52 - 71
C.V.			14.8	2.7	5.2	-	8.6		7.3-1.4

* L = Long grain, M = medium grain.

** 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 experimental lines in field plots. The 1992 program included 490 experimental lines and representative checks. The more promising selections will be advanced for further testing. Entries 926-990 were returned from the spring 1993 nursery in Puerto Rico.

Experiment: Preliminary Yield Test - Entries 501-925

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 21, 1993

Planting Method: Drill-seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O), Apr 21; 92 lb N/A, May 26; 21 lb N/A, June 11; 21 lb N/A, June 20

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flood, May 27; harvest drainage, Aug 18

Herbicides: Stam (propanil) 3 lb ai/A, May 12, May 26

Insecticides: Furadan (carbofuran) .5 lb ai/A, June 11

Harvest: Entries 501-700, Sept 3; entries 701-825, Sept 6; entries 826-900, Sept 7; entries 901-925, Sept 8

Experimental Design: Randomized complete block with two replications

Results: Tables 35-51

Table 35. Agronomic and milling performance of 1993 preliminary yield tests, Group I. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
524	JODON	L	5	91	40	0	8022	A	60 - 69
501	2207//LMNTX2/CR1113	L	5	93	43	0	7751	AB	61 - 70
525	MAYBELLE	L	5	82	42	0	7487	ABC	60 - 69
508	NWBT/LMNT//82CAY21	L	6	95	40	0	7468	ABC	61 - 69
513	MBLE//82CAY21/LMNT	L	5	84	37	0	7083	BCD	59 - 68
510	LBLE/L201//MBLE	L	4	83	43	0	6942	BCDE	60 - 70
509	LBLE/L201//MBLE	L	4	82	46	0	6920	BCDE	53 - 69
502	82CAY21/LMNT//AS35	L	7	97	40	0	6901	BCDE	60 - 69
517	MERC//MERC/KOSHIHI	M	5	87	44	15	6845	BCDEF	64 - 71
521	82CAY21/LMNT//DLLA	L	6	95	49	0	6805	BCDEF	60 - 70
519	MERC//M401/NTAI	M	7	88	42	0	6650	CDEFG	61 - 70
518	1711X2/MARS//MERC	M	6	88	42	0	6642	CDEFG	68 - 71
511	LBLE/L201//MBLE	L	4	82	46	25	6588	CDEFG	51 - 70
505	82CAY80/TBNT//LMNT	L	6	94	39	0	6587	CDEFG	61 - 69
516	RADIATED MERC/MERC	M	7	90	36	0	6545	CDEFG	65 - 71
514	MERC/1711X2	M	6	91	39	0	6447	DEFG	62 - 70
523	90 JSMN X2	L	6	90	46	40	6346	DEFG	59 - 67
503	LMNT R2/L202	L	7	97	39	0	6323	DEFG	64 - 70
515	RICO1/MERC	M	7	92	39	0	6292	DEFG	62 - 69
507	MERC/AKIHIKARI	M	6	84	37	0	6286	DEFG	68 - 73
520	DMSI/DLLAX2//L...	L	6	91	50	0	6150	DEFG	54 - 71
512	2207//LBNT/L201	L	5	92	47	10	6029	EFG	65 - 70
504	82CAY21/LMNT//AS35	L	5	89	38	0	6016	EFG	59 - 69
506	LMNT/NWBT//TBNT	L	7	96	37	0	5865	FG	64 - 71
522	DMSI/DLLAX2//L...	L	6	91	48	0	5695	G	51 - 68
C.V.			8.1	1.6	2.7	-	6.0		2.7-1.1

* L = Long grain, M = medium grain.

** 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 and milling performance of 1993 preliminary yield tests, Group II. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
545	2207//L201/7402003	L	5	95	41	0	8054	A	60 - 68
550	CYPRESS	L	5	94	41	0	7943	AB	66 - 70
533	82CAY21//LMNT/LEAH	L	6	99	40	0	7712	ABC	63 - 69
537	2207/LMNT*2//CR1113	L	6	97	38	0	7620	ABCD	60 - 70
549	2201/KATY	L	6	95	37	0	7496	ABCD	60 - 69
546	2201//LMNT*/82CAY8	L	6	98	39	0	7431	ABCD	62 - 70
542	V7817//82CAY21/LMNT	L	5	96	40	0	7159	ABCDE	59 - 70
548	2201/KATY	L	7	97	40	0	7039	ABCDE	62 - 70
529	82CAY21//LMNT/LEAH	L	6	99	39	0	7011	ABCDE	66 - 71
540	2210/KATY	L	5	95	36	0	6760	BCDEF	59 - 69
547	LMNT*2/82CAY21//LEAH	L	6	97	42	0	6754	BCDEF	56 - 71
534	82CAY21//LMNT/LEAH	L	7	94	39	0	6732	BCDEFG	65 - 70
526	L202/LMNT	L	7	95	39	0	6715	BCDEFGH	63 - 69
532	LMNT/3/82CAY21//LMNT	L	6	98	42	0	6603	CDEFGH	64 - 70
528	82CAY21//LMNT/LEAH	L	7	96	41	0	6599	CDEFGH	66 - 71
544	82CAY21//LMNT/LEAH	L	6	96	38	0	6405	DEFGHI	55 - 68
541	LEAH/MBLE	L	5	97	38	0	6393	DEFGHI	56 - 69
530	82CAY21//LMNT/LEAH	L	5	99	39	0	6378	DEFGHI	63 - 71
543	TBNT//LMNT*2/CR1113	L	7	96	41	0	6037	EFGHI	60 - 71
531	82CAY21//LMNT/LEAH	L	7	101	41	0	5978	EFGHI	62 - 69
539	CB801/3/9881/33158	L	5	91	38	0	5588	FGHI	62 - 71
538	CB801/3/9881/33158	L	7	97	40	0	5524	FGHI	56 - 70
536	82CAY21//LMNT/LEAH	L	6	101	37	0	5480	GHI	65 - 72
527	NWBT/LMNT//TBNT/3/...	L	6	96	38	0	5466	HI	63 - 71
535	82CAY21//LMNT/LEAH	L	7	101	41	0	5191	I	61 - 72
C.V.			9.8	1.7	2.8	-	7.8		3.3-1.0

* L = Long grain.

** 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 and milling performance of 1993 preliminary yield tests, Group III. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
552	82CAY21/LMNT//L202	L	5	91	38	0	7651	A	60 - 70
560	2207/LMNT*2//CR1113	L	5	94	40	0	7551	AB	60 - 68
572	82CAY21/LMNT//LMNT	L	6	92	41	0	7361	ABC	59 - 70
558	2201/KATY	L	6	97	24	0	7344	ABC	58 - 69
574	LACASSINE	L	6	95	38	0	7331	ABC	61 - 71
571	82CAY21//LMNT/LEAH	L	7	97	41	0	7185	ABCD	58 - 68
559	82CAY21//LMNT/LEAH	L	5	96	42	0	7148	ABCD	59 - 68
568	2207/LMNT*2//CR1113	L	5	97	39	0	7023	ABCD	63 - 70
566	82CAY21/TBNT/3/...	L	5	94	41	0	6933	ABCDE	57 - 68
575	LMNT	L	6	97	37	0	6872	ABCDEF	60 - 70
570	LMNT*2/82CAY21//LEAH	L	5	97	42	0	6763	ABCDEF	59 - 70
573	NWBT/LMNT//82CAY21	L	7	93	40	0	6599	ABCDEF	57 - 70
555	NWBT/LMNT//82CAY21	L	7	99	41	0	6463	ABCDEF	61 - 70
567	82CQY21//LMNT/LEAH	L	6	92	37	0	6453	ABCDEF	51 - 69
564	82CAY21/LMNT//GFMT	L	6	94	39	0	6438	ABCDEF	62 - 71
563	2201/KATY	L	7	98	38	0	6405	ABCDEF	60 - 69
556	LMNT/4/82CAY21//TTEP	L	5	98	40	0	6285	ABCDEF	61 - 69
565	LMNT//82CAY21/LMNT	L	5	95	43	0	6224	BCDEF	61 - 69
553	LMNT*2/CR1113//TORO	L	8	100	40	0	6140	CDEF	62 - 70
561	TBNT//LMNT*2/CR1113	L	6	93	37	0	6074	CDEF	66 - 71
562	LMNT*2/82CAY21//LEAH	L	6	95	37	0	6000	CDEF	60 - 70
551	LMNT//82CAY21/LMNT	L	6	102	39	0	5953	CDEF	65 - 70
569	TBNT//LMNT*2/CR1113	L	6	95	40	0	5837	DEF	64 - 69
554	NWBT/LMNT//TBNT/3/...	L	6	96	39	0	5543	EF	64 - 72
557	2207//CI11048/LEAH	L	6	94	36	0	5519	F	55 - 70
C.V.			9.4	1.8	11.3	-	8.7		3.2-1.0

* L = Long grain.
** 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 and milling performance of 1993 preliminary yield tests, Group IV. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
578	2207/LMNT*2//CR1113	L	5	95	41	0	8078	A	64 - 70
600	LAGRUE	L	4	90	46	0	7997	A	49 - 69
596	2207/LMNT*2//CR1113	L	5	91	41	0	7823	AB	59 - 69
577	2207/LMNT*2//CR1113	L	6	95	38	0	7321	ABC	58 - 69
590	LMNT/TORO2	L	6	92	47	0	7270	ABCD	56 - 68
598	NWBT/LMNT//82CAY21	L	6	92	39	0	6991	ABCDE	64 - 70
585	2207/LMNT*2//CR1113	L	5	96	40	0	6990	ABCDE	62 - 70
599	KATY	L	4	93	47	0	6953	ABCDEF	63 - 69
584	V7817//82CAY21/LMNT	L	6	97	42	0	6714	ABCDEFG	55 - 71
597	TBNT//NWBT/LMNT	L	6	96	39	0	6560	BCDEFG	66 - 72
592	LMNT*2/82CAY21//LEAH	L	6	95	37	0	6468	BCDEFG	55 - 70
594	LMNT/TORO2	L	6	94	37	0	6424	BCDEFG	51 - 69
595	82CAY21/LEAH//TORO	L	6	95	46	0	6399	CDEFG	58 - 70
580	LMNT/TORO2	L	6	97	37	0	6224	CDEFG	49 - 68
588	LEAH/MBLE	L	5	98	42	0	6189	CDEFG	57 - 69
583	NWBT/LMNT//TBNT/3/...	L	7	98	38	0	6094	CDEFGH	58 - 70
591	NWBT/LMNT//82CAY21	L	7	99	44	0	6088	CDEFGH	64 - 70
581	LMNT//82CAY21/TORO	L	6	101	40	0	6081	CDEFGH	57 - 67
579	CB801/3/NWBT/LMNT/...	L	7	103	41	0	5954	CDEFGH	53 - 70
582	CB801/3/NWBT/LMNT/...	L	7	107	39	0	5920	CDEFGH	54 - 69
587	2207//LEAH/7802010	L	5	98	40	0	5865	DEFGH	62 - 69
589	LEAH/MBLE	L	5	95	39	0	5796	EFGH	50 - 70
593	BP87/9902//LMNT/3/...	L	6	98	36	0	5519	FGH	50 - 71
586	TBNT//LMNT*2/CR1113	L	7	99	40	0	5368	GH	57 - 69
576	NWBT/LMNT//82CAY21	L	8	101	39	0	4710	H	58 - 69
C.V.			8.9	2.1	2.9	-	9.1		3.2-1.0

* L = Long grain.

** 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 and milling performance of 1993 preliminary yield tests, Group V. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
625	CYPRESS	L	5	95	41	0	8126	A	65 - 70
606	2207/LMNT*2//CR1113	L	6	94	40	0	7729	AB	64 - 70
615	82CAY21/TBNT/3/82CAY21...	L	5	94	39	0	7722	AB	55 - 67
609	2201//LMNT*/82CAY81	L	7	98	38	0	7618	ABC	62 - 70
612	2201//LMNT*/82CAY81	L	7	97	40	0	7536	ABCD	62 - 70
622	LEAH/MBLE	L	5	95	42	0	7426	ABCDE	49 - 70
617	82CAY21/LEAH	L	5	92	35	0	7338	ABCDEF	53 - 70
616	2201/3/82CAY21//TTEP	L	7	96	42	0	7306	BCDEF	59 - 69
619	LMNT//82CAY21/TORO	L	5	97	38	0	7288	BCDEF	60 - 70
605	L202/TORO2	L	6	91	37	0	7202	BCDEF	57 - 67
604	SKBT//LMNT*2/CR1113	L	7	96	38	0	7164	BCDEF	64 - 71
613	LMNT/3/82CAY21//LMNT	L	5	101	38	0	7138	BCDEF	59 - 69
610	LMNT/4/82CAY21//TTEP	L	6	98	39	0	7052	BCDEF	62 - 70
621	MBLE//8003050/CA82	L	5	97	39	0	7028	BCDEF	58 - 68
614	LMNT//82CAY21/LMNT	L	6	94	38	0	6858	CDEFG	64 - 69
601	2207/LMNT*2//CR1113	L	6	93	43	0	6809	CDEFG	59 - 68
624	NWBT	L	4	94	45	0	6771	DEFG	58 - 68
608	2207//LEAH/7802010	L	5	95	36	0	6762	DEFG	58 - 67
603	LMNT/4/82CAY21//TTEP	L	6	99	39	0	6736	DEFG	59 - 69
618	82CAY21//LMNT/LEAH	L	6	102	39	0	6707	EFG	65 - 70
602	82CAY21/LMNT//GFMT	L	6	95	41	0	6607	EFG	62 - 70
607	LMNT*2/82CAY21//LEAH	L	6	97	35	0	6538	FG	59 - 71
623	NWRX/2207	L	6	95	41	0	6534	FG	61 - 69
620	TBNT//LMNT*2/CR1113	L	7	99	39	0	6163	G	60 - 69
611	TBNT//LMNT*2/CR1113	L	8	101	39	0	6158	G	62 - 70
C.V.			7.8	1.5	3.2	-	4.8		4.9-1.2

* L = Long grain.
** 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 and milling performance of 1993 preliminary yield tests, Group VI. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
643	2207//L201/7402003	L	5	93	46	0	8151	A	56 - 68
636	LMNT//82CAY21/TDCN	L	7	96	39	0	7800	AB	51 - 71
628	82CAY21//LMNT/LEAH	L	6	95	40	0	7644	ABC	52 - 67
634	2207//2201/7402003	L	5	93	42	0	7638	ABC	62 - 70
648	2207//2201/7402003	L	6	94	49	0	7493	ABCD	60 - 68
633	2207/LMNT*2//CR1113	L	5	94	43	0	7248	ABCDE	58 - 68
635	LMNT//82CAY21/LMNT	L	6	96	39	0	7176	BCDEF	60 - 70
646	82CAY21/LMNT//LMNT	L	6	93	40	0	6855	CDEFG	60 - 69
649	MILLIE	L	4	89	45	0	6702	CDEFGH	64 - 70
647	82CAY21/TBNT/3/...	L	6	99	39	0	6604	DEFGH	60 - 67
644	LBNT/L201//TBNT	L	5	91	46	0	6555	DEFGH	60 - 69
630	2207//LEAH/7802010	L	5	96	35	0	6553	DEFGH	53 - 68
639	LEAH/MBLE	L	5	91	39	0	6524	EFGH	50 - 69
640	NWBT/LMNT//82CAY21	L	7	104	40	0	6447	EFGHI	50 - 67
642	BP87/9902//LMNT/3/...	L	5	98	39	0	6263	FGHI	53 - 69
626	NWRX/2207	L	7	99	41	0	6224	FGHI	59 - 69
631	MBLE//8003050/CA82	L	6	99	42	0	6216	FGHI	57 - 68
638	LEAH/MBLE	L	5	97	41	0	6156	GHI	50 - 70
627	KATY//8303116/LMNT	L	7	100	37	0	6091	GHI	58 - 67
629	SKBT//LMNT*2/CR1113	L	7	98	40	0	6064	GHI	59 - 69
645	LEAH/MBLE	L	6	95	40	0	5995	GHI	51 - 67
650	ROSEMONT	L	5	89	36	0	5978	GHI	55 - 67
641	SKBT//82CAY21/TBNT	L	6	96	36	0	5802	HI	64 - 70
637	TBNT//LMNT*2/CR1113	L	7	99	42	0	5478	I	56 - 70
632	9881/331581//L201/...	L	5	101	30	0	3229	J	65 - 71
C.V.			8.3	1.8	5.3	-	6.1		8.5-2.1

* L = Long grain.
** 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 and milling performance of 1993 preliminary yield tests, Group VII. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
652	82CAY21/TBNT/3/...	L	5	92	41	0	7508	A	61 - 68
674	LACASSINE	L	5	97	38	0	7249	AB	57 - 69
666	2201//LMNT*/82CAY81	L	6	98	41	0	7208	AB	63 - 71
671	LMNT/3/82CAY21//LMNT	L	6	93	35	0	7142	AB	64 - 71
660	82CAY21/TBNT/3/...	L	5	99	40	0	7056	AB	58 - 68
651	LMNT/NWBT//8OY50/...	L	7	96	41	0	7019	AB	61 - 71
661	NWBT/LMNT//82CAY21	L	6	101	42	0	7015	AB	60 - 68
675	GULFMONT	L	5	95	37	0	6949	AB	60 - 70
657	LMNT*2/CR1113//LBLE	L	7	94	35	0	6816	ABC	59 - 69
655	82CAY21/LEAH//TORO	L	5	94	39	0	6754	ABC	56 - 69
670	MBLE/3/LMNT//82CAY...	L	4	85	45	0	6689	ABCD	49 - 71
665	CB801/3/9881/33158	L	5	94	37	0	6656	ABCD	62 - 71
658	82CAY21/TBNT/3/82C...	L	5	91	36	0	6635	ABCD	58 - 67
669	SKBT//82CAY21/TBNT	L	5	89	36	0	6626	ABCD	65 - 71
662	82CAY21//LMNT/LEAH	L	6	103	40	0	6597	ABCD	64 - 69
653	2207//LEAH/7802010	L	5	95	42	0	6554	ABCD	54 - 68
654	2201//LMNT*/82CAY81	L	6	101	40	0	6465	BCD	62 - 70
659	LMNT//80Y50/LBLE	L	6	103	41	0	6457	BCD	61 - 70
672	NWBT/LMNT//TBNT/3/...	L	7	101	40	0	6429	BCD	59 - 69
668	NWBT/LMNT//82CAY21	L	7	102	39	0	6262	BCDE	57 - 68
663	2207//LEAH/7802010	L	5	95	42	0	6246	BCDE	60 - 70
673	SKBT//82CAY21/TBNT	L	6	93	34	0	5883	CDE	67 - 72
656	NWBT/LMNT(8502201)	L	6	101	34	0	5706	DE	61 - 68
667	CB801//82CAY21/LMNT	L	6	110	40	0	5423	E	60 - 69
664	GFMT/NWBT	L	7	104	42	0	5388	E	60 - 69
C.V.			5.7	1.8	2.3	-	6.3		2.1-1.2

* L = Long grain.

** 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 and milling performance of 1993 preliminary yield tests, Group VIII. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
691	2207//2201/7402003	L	5	92	45	0	8467	A	58 - 68
699	LAGRUE	L	4	92	47	0	8239	AB	46 - 68
697	TXMT/3/LBNT//9881/...	L	5	98	43	0	8232	AB	56 - 70
679	82CAY21/LMNT//L202	L	6	96	39	0	8098	ABC	60 - 67
686	LMNT//82CAY21/TDCN	L	5	96	45	0	7962	ABCD	44 - 67
676	2207/3/GCHW/LMNT//...	L	5	93	40	0	7782	ABCDE	61 - 70
681	LMNT*2/CR1113//L201	L	6	94	43	0	7701	ABCDE	55 - 68
690	2207//LEAH/7802010	L	6	97	42	0	7620	ABCDEF	53 - 68
680	82CAY21/TBNT/3/82C...	L	6	94	39	0	7551	ABCDEFG	62 - 70
685	LMNT*2/82CAY21//LEAH	L	6	94	41	0	7536	ABCDEFG	53 - 69
682	82CAY21/LEAH	L	6	95	36	0	7473	ABCDEFG	54 - 70
698	LMNT//82CAY21/LMNT	L	6	93	42	0	7431	BCDEFG	58 - 69
687	LMNT/AS3510	L	6	97	37	0	7348	BCDEFG	65 - 70
683	82CAY21//LMNT/LEAH	L	5	97	40	0	7241	BCDEFGH	63 - 70
700	LEMONT	L	5	99	39	0	7197	CDEFGH	63 - 71
684	TBNT/3/LMNT//82CAY...	L	6	101	44	0	7022	DEFGHI	61 - 68
678	82CAY21//LMNT/LEAH	L	6	98	41	0	6936	EFGHI	63 - 69
696	2207//LBNT/L201	L	5	91	32	0	6884	EFGHI	66 - 72
689	LMNT//NWBT/LMNT	L	6	102	39	0	6673	FGHI	65 - 70
693	TBNT//NWBT/LMNT	L	7	102	42	0	6656	FGHI	61 - 69
692	82CQY21//LMNT/LEAH	L	5	94	46	0	6611	GHI	54 - 68
695	GUILUAI#8/LMNT	L	7	95	42	0	6605	GHI	65 - 71
694	2207//LEAH/7802010	L	5	96	41	0	6323	HI	61 - 70
688	LMNT/NWBT//82CAY21	L	7	104	42	0	6183	I	59 - 68
677	82CAY21/LEAH//LMNT	L	7	102	37	0	6044	I	65 - 70
C.V.			11.1	1.8	2.4	-	5.7		3.3-1.2

* L = Long grain.
** 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 and milling performance of 1993 preliminary yield tests, Group IX. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
718	90 2207 X2 (25KR)	L	5	93	41	0	8840	A	65 - 71
722	82CAY21/LMNT(87022...	L	6	94	39	0	7989	B	55 - 71
725	CYPRESS	L	4	92	41	0	7906	BC	65 - 71
709	82CAY21/LMNT//KATY	L	5	95	40	0	7803	BCD	64 - 70
707	KATY/2207	L	4	94	48	0	7712	BCD	64 - 69
706	KATY/2207	L	4	93	52	0	7700	BCD	63 - 68
710	LMNT*2/CR1113//BP8...	L	4	93	41	0	7670	BCD	63 - 72
719	90 2207 X2 (25KR)	L	5	93	40	0	7525	BCDE	67 - 71
703	2207//82CAY21/TBNT	L	5	92	40	5	7385	BCDEF	63 - 71
724	KATY	L	4	94	49	0	7352	BCDEF	63 - 70
708	KATY/2207	L	4	94	50	5	7271	CDEF	63 - 70
723	2201/GCHW	L	5	95	38	0	7249	DEF	64 - 71
714	86-20001-5X LEMONT	L	4	102	43	0	7172	DEF	46 - 69
712	LMNT R2/L202	L	6	94	36	0	7151	DEF	61 - 70
711	LMNT R2/L202	L	6	94	35	0	6983	EF	65 - 71
720	SKBT//82CAY21/TBNT	L	6	92	35	0	6953	EF	67 - 72
717	LMNT//NWBT/LEAH	L	6	98	40	0	6836	FG	60 - 70
702	SKBT//82CAY21/TBNT	L	5	94	38	0	6800	FG	66 - 70
721	82CAY21/LMNT(87022...	L	6	95	37	0	6781	FG	67 - 73
705	LMNT//82CAY21/TDCN	L	7	99	53	0	6744	FG	54 - 70
701	SKBT//82CAY21/TBNT	L	5	93	38	0	6260	GH	67 - 70
713	86-20001-5X LEMONT	L	5	97	42	0	5757	HI	53 - 67
716	86-20001-5 X LEMONT	L	6	101	43	0	5507	IJ	60 - 66
704	LMNT/NWBT//TBNT	L	7	97	37	0	5368	IJ	60 - 71
715	86-20001-5X LEMONT	L	6	100	40	0	4955	J	59 - 67
C.V.			10.0	1.1	2.9	-	3.9		5.0-0.9

* L = Long grain.

** 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 and milling performance of 1993 preliminary yield tests, Group X. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
732	RICO1/V4716	M	5	93	46	5	8028	A	63 - 72
727	90RICOX2(25KR) X4	M	5	93	44	0	7848	AB	63 - 70
731	RICO1/V4716	M	6	94	38	0	7709	ABC	64 - 70
726	RICO 1/MERC	M	4	88	48	0	7666	ABC	65 - 70
737	RICO1/V4716	M	5	93	45	0	7612	ABCD	60 - 73
745	RICO1/MERC	M	6	92	44	5	7564	ABCD	62 - 70
729	RICO1/V4716	M	5	93	46	5	7417	BCDE	60 - 71
750	RICO 1	M	5	94	46	0	7391	BCDEF	62 - 70
741	SMARS/MARS//MARS/3	M	6	93	42	5	7323	BCDEFG	53 - 67
743	MERC/RICO//BNGL	M	5	94	37	0	7277	BCDEFG	50 - 69
740	SMARS/MARS//MARS/3	M	5	92	45	0	7265	BCDEFG	62 - 69
735	SMARS/MARS//MARS/3	M	5	93	46	5	7227	CDEFGH	59 - 69
738	V4916/MARS	M	5	92	40	0	7193	CDEFGH	60 - 69
730	RICO1/MERC	M	6	93	43	0	7118	CDEFGH	51 - 69
749	BENGAL	M	5	92	37	0	7033	DEFGHI	64 - 71
748	RICO1/MERC	M	6	92	44	0	6905	EFGHI	65 - 70
744	RICO1/V4718	M	6	94	40	0	6873	EFGHI	67 - 71
734	90RICOX2(20KR)	M	6	91	39	0	6871	EFGHI	65 - 71
733	RICO1/MERC	M	6	91	39	5	6780	FGHI	57 - 71
728	RICO1//82CAY21/LMNT	M	5	92	44	0	6758	GHI	60 - 68
746	RICO1/MERC	M	6	93	38	0	6723	GHI	63 - 72
739	SMARS/MARS//MARS/3	M	5	91	45	0	6720	GHI	55 - 70
747	MERC?????/V4716	M	5	90	38	0	6642	HI	58 - 71
742	RICO1/MERC	M	6	93	44	0	6486	I	63 - 71
736	RICO1/MERC	M	6	93	38	0	6436	I	58 - 71
C.V.			8.1	0.7	2.9	-	3.6		6.6-1.3

* M = Medium grain.
** 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 and milling performance of 1993 preliminary yield tests, Group XI. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
766	2214/RICO1	M	5	91	45	0	8189	A	43 - 70
767	2214/RICO1	M	5	92	45	5	8091	AB	48 - 70
759	STRN/3/MARS/M201//...	M	5	94	53	55	8079	AB	38 - 70
757	MERC/RICO//2214	M	5	93	44	0	7677	ABC	53 - 69
761	2214/RICO1	M	5	92	45	0	7592	ABCD	33 - 71
753	MERC/BNGL	M	5	89	45	5	7591	ABCD	60 - 70
771	RICO1/V4718	M	5	88	47	75	7586	ABCD	58 - 70
769	SMARS/MARS//MARS/3	M	5	93	47	0	7410	BCDE	60 - 70
751	SMARS/MARS//MARS/3	M	5	91	46	0	7386	BCDEF	62 - 69
755	V4916/MARS	M	5	92	40	0	7347	CDEF	61 - 70
770	SMARS/MARS//MARS/3	M	5	93	46	0	7226	CDEF	58 - 71
758	MERC/RICO//2214	M	5	93	34	0	7122	CDEFG	55 - 69
765	MERC/RICO//2214	M	4	92	46	0	7054	CDEFG	47 - 70
762	SMARS/MARS//MARS/3	M	6	97	34	0	7021	CDEFG	52 - 69
773	2214/RICO1	M	4	88	45	0	7009	CDEFG	66 - 70
756	EMERC/STRNX2(E)	M	5	94	42	0	6930	DEFGH	68 - 72
775	ORIN	M	4	88	44	0	6786	EFGH	62 - 70
763	SMARS/MARS//MARS/3	M	5	92	46	0	6669	FGH	64 - 72
752	M203//MERC/RICO	M	5	85	36	0	6666	FGH	58 - 67
768	2214/RICO1	M	6	93	38	0	6496	GH	61 - 68
764	SMARS/MARS//MARS/3	M	6	94	44	0	6474	GH	63 - 69
760	SMARS/MARS//MARS/3	M	5	88	42	0	6420	GH	65 - 72
774	MARS	M	4	91	47	0	6277	H	63 - 68
772	2214/RICO1	M	4	93	45	90	6274	H	41 - 71
754	MERC/RICO/BNGL	M	5	93	32	0	5056	I	60 - 72
C.V.			9.6	0.8	2.3	-	4.2		8.5-0.8

* M = Medium grain.

** 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 46. Agronomic and milling performance of 1993 preliminary yield tests, Group XII. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
800	8902192 (RAX CLEAR)	M	5	95	40	0	8724	A	61 - 68
784	PCOS/MERC	M	5	86	40	35	7562	B	60 - 69
785	PCOS/MERC	M	5	90	44	0	6990	C	65 - 70
777	2214/RICO1	M	5	88	43	0	6837	CD	67 - 72
796	MERC/PCOS//MERC	M	5	86	41	0	6746	CDE	67 - 70
786	M203//MERC/RICO	M	5	89	40	0	6729	CDEF	61 - 67
779	PCOS/3/MARS//CAM9/...	M	5	85	45	30	6584	CDEFG	66 - 69
798	SMARS/MARS//PCOS	M	6	86	38	0	6535	CDEFG	67 - 70
789	PCOS/3/MARS//CAM9/...	M	5	85	46	90	6468	CDEFGH	67 - 71
795	NTAI/NVDE//M401/3/...	M	5	93	37	0	6300	DEFGHI	60 - 71
799	MERC/BNGL	M	5	91	42	0	6225	EFGHIJ	63 - 70
787	PCOS/MERC	M	5	85	46	0	6184	FGHIJK	68 - 70
776	2214/RICO1	M	5	92	45	5	6127	GHIJK	45 - 71
788	PCOS/3/MARS//CAM9/...	M	5	90	45	75	6124	GHIJK	54 - 69
781	PCOS/MERC	M	4	85	45	15	6113	GHIJK	67 - 70
780	PCOS/MERC	M	5	86	43	15	6089	GHIJK	69 - 71
782	PCOS/MERC	M	4	85	43	15	5969	HIJKL	67 - 71
792	RICO1/MERC	M	5	87	39	0	5938	HIJKL	65 - 70
791	MERC/BNGL	M	5	91	41	0	5924	HIJKL	62 - 69
793	MERC/NANGHU//MERC	M	6	89	37	0	5868	IJKLM	61 - 72
783	PCOS/MERC	M	6	87	42	0	5687	JKLM	66 - 72
794	MERC/3/SMARS/MARS/...	M	5	92	41	0	5626	KLM	65 - 69
790	MERC//MERC/GUICHOW	M	5	94	39	0	5531	LM	67 - 71
778	M203/3/CI11048/LEAH	M	6	85	42	0	5373	M	67 - 71
797	MERC/AS3058	M	7	90	38	0	4333	N	61 - 67
C.V.			9.2	1.6	2.3	-	3.7		4.3-1.0

* M = Medium grain.

** 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 and milling performance of 1993 preliminary yield tests, Group XIII. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
821	MARSX2/V4716	M	5	93	40	0	8469	A	64 - 71
819	LBLE/L201//MBLE	L	7	107	42	0	8073	AB	62 - 69
809	MERC/V4716	M	4	87	36	0	7893	ABC	62 - 72
823	MERC/RICO 1	M	6	93	47	0	7606	BCD	67 - 72
817	MERC//MERC/NANGHU(...	M	5	86	38	0	7336	CDE	53 - 72
811	TXMT/3/LBNT//9881/...	L	6	99	39	0	7329	CDE	51 - 69
825	9302022 (RICO1/MERC	M	4	88	45	0	7194	CDEF	62 - 69
824	MERC/V4716	M	5	88	41	0	7188	CDEF	62 - 70
810	TXMT/3/LBNT//9881/...	L	6	99	40	0	7000	DEFG	57 - 68
818	SMARS/MARS//PCOS	M	5	86	38	15	6969	DEFG	67 - 69
808	MERC//MERC/NAMGHO	M	5	88	37	0	6965	DEFG	51 - 68
815	MERC/RICO 1	M	6	93	36	0	6886	DEFG	52 - 70
816	MERC/RICO 1	M	5	94	37	0	6880	DEFG	59 - 70
822	MERC//M401/NTAI	M	5	92	36	0	6683	EFGH	68 - 70
813	MERC/PCOS//MERC	M	4	88	43	0	6584	FGH	62 - 71
804	MERC/RICO//BNGL	M	5	88	40	0	6566	FGH	60 - 71
814	MERC/CAM9/MARS	M	6	92	39	0	6550	FGH	65 - 71
820	BRAZ/T487//MARS	M	6	91	41	0	6527	FGH	69 - 72
806	MERC/3/SMARS/MARS/...	M	6	91	43	0	6506	FGH	58 - 69
802	RICO1/MERC	M	5	95	39	0	6335	GHI	61 - 70
801	MERC/3/SMARS/MARS/...	M	5	93	37	0	6281	GHI	58 - 69
807	MERC/RICO1	M	5	93	43	0	5914	HIJ	54 - 70
812	MERC/NANGHU//MERC	M	5	90	37	0	5654	IJ	60 - 73
803	LMNT/NWBT//82CAY21	L	7	102	38	0	5389	J	57 - 69
805	88Y271/3/MARS/...	M	6	86	42	0	3076	J	50 - 65
C.V.			8.2	1.2	4.3	-	4.7		7.2-1.1

* L = Long grain; M = medium grain.

** 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 48. Agronomic and milling performance of 1993 preliminary yield tests, Group XIV. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
848	TXMT/3/LBNT//9881/...	L	5	94	39	0	8125	A	53 - 69
844	TXMT/3/LBNT//9881/...	L	5	97	40	0	7956	A	57 - 58
850	CYPRESS	L	5	94	40	0	7871	A	66 - 70
845	TXMT/3/LBNT//9881/...	L	5	99	38	0	7865	A	49 - 70
847	TXMT/3/LBNT//9881/...	L	5	99	40	0	7438	AB	48 - 70
846	TXMT/3/LBNT//9881/...	L	6	100	41	0	7351	AB	48 - 69
849	TXMT/3/LBNT//9881/...	L	5	97	38	0	7286	ABC	47 - 70
843	LMNT/LBLE-SC33	L	7	103	46	0	6342	BCDE	55 - 68
832	LBLE/SC-33	L	6	101	40	0	6080	CDE	53 - 68
837	SC-5/LMNT	L	6	111	40	0	5980	DEF	53 - 63
834	SC-33/LMNT	L	8	96	44	0	5944	DEF	46 - 67
828	LBLE/SC-33	L	8	96	47	0	5791	DEFG	46 - 67
826	LBLE/SC-33	L	8	101	48	0	5380	DEFGH	57 - 66
835	SC-33/LMNT	L	7	99	39	0	5216	DEFGH	42 - 69
827	LBLE/SC-33	L	7	102	44	0	5015	DEFGH	51 - 67
833	SC-33/LMNT	L	8	103	40	0	4980	EFGH	42 - 69
841	LMNT/SC-5	L	6	103	48	0	4869	EFGH	47 - 61
830	LBLE/SC-33	L	7	101	55	0	4683	FGH	56 - 66
836	SC-5/LMNT	L	6	101	35	0	4673	FGH	37 - 69
838	SC-5/LMNT	L	7	103	42	0	4585	GH	52 - 67
842	LMNT/LBLE-SC33	L	6	111	37	0	4483	GH	57 - 69
829	LBLE/SC-33	L	8	103	45	0	4454	GH	53 - 66
840	LMNT/SC-5	L	7	100	39	0	4431	GH	59 - 68
839	SC-5/LMNT	L	8	106	44	0	4381	H	53 - 68
831	LBLE/SC-33	L	7	99	42	0	4301	H	44 - 67
C.V.			6.7	3.3	4.0	-	9.7		13.9-5.0

* L = Long grain.
** 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 49. Agronomic and milling performance of 1993 preliminary yield tests, special purpose group. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
869	JSMN/3/82CAY21//LMNT	L	6	103	40	0	8089	A	59 - 69
853	RED BRAN	L	5	103	42	0	7758	AB	45 - 67
874	CYPRESS	L	5	95	40	0	7732	AB	65 - 70
868	JSMN/3/82CAY21//LMNT	L	6	104	38	0	7642	AB	52 - 68
871	JSMN/3/82CAY21//LMNT	L	6	103	41	0	7057	BC	47 - 70
851	RED BRAN	L	5	102	42	0	7049	BC	47 - 68
872	A301/JSMN	L	6	96	41	0	6661	CD	55 - 68
870	JSMN/3/82CAY21//LMNT	L	5	99	44	0	6635	CD	58 - 66
873	A301/JSMN	L	6	104	46	0	6397	CDE	53 - 70
860	JSMN/3/92CAY21//LMNT/LEAH	L	6	103	41	0	6279	CDEF	52 - 67
856	LEAH/DLLA	L	5	100	45	0	6233	CDEFG	59 - 70
854	JSMN/3/82CAY21//LMNT	L	5	94	37	0	6136	CDEFG	59 - 67
863	A301/JSMN	L	7	100	41	0	6017	DEFG	58 - 67
857	82CAY21/LEAH//TORO	L	6	95	33	0	5906	DEFG	63 - 71
852	RED BRAN	L	5	106	43	0	5879	DEFG	51 - 65
867	82CAY21/LMNT//DLLA	L	6	91	37	0	5837	DEFG	64 - 70
855	82CAY21/LMNT//DLLA	L	6	98	37	0	5723	DEFGH	56 - 70
875	TORO 2	L	6	96	40	0	5472	EFGH	65 - 71
858	82CAY21/LEAH//TORO	L	6	94	39	0	5433	EFGHI	65 - 71
862	DMSI//LMNT/NWBT	L	6	96	46	0	5319	FGHIJ	52 - 70
859	TORO2/A301	L	7	99	40	0	5289	GHIJ	48 - 70
865	A301/JSMN	L	6	104	40	0	4799	HIJK	60 - 71
866	A301/JSMN	L	6	103	47	0	4518	IJK	51 - 67
861	DMSI//LMNT/NWBT	L	6	91	47	0	4441	JK	50 - 68
864	A301/JSMN	L	6	97	40	0	3916	K	59 - 69
C.V.			10.0	1.8	2.8	-	6.6		4.5-1.5

* L = Long grain.

** 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 50. Agronomic and milling performance of 1993 preliminary yield tests, special purpose group. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
899	JSMN 85	L	5	103	44	15	8479	A	52 - 68
880	90 JSMNX2	L	5	86	40	90	7800	AB	63 - 68
892	A301/BNGL	M	5	92	40	0	7486	BC	61 - 71
891	A301/BNGL	M	5	88	39	0	7015	BCD	60 - 71
881	V7713/JSMN	L	5	94	50	0	6905	CD	60 - 66
894	DMSI/A301	L	5	92	42	0	6716	CDE	50 - 69
898	LMNT/DLLA//82CAY21	L	6	91	38	0	6577	CDEF	60 - 70
897	MARS/CM101	M	6	97	37	0	6577	DEF	64 - 72
890	DMSI/DLLAX2//A301	L	6	94	44	0	6434	DEFG	56 - 69
878	90 JSMNX2	L	5	87	43	25	6417	DEFG	60 - 65
879	90 JSMNX2	L	5	97	44	0	6309	DEFG	58 - 64
876	A301/JSMN	L	6	104	44	0	6184	DEFG	51 - 69
885	CPRS/ESD	L	6	93	39	0	6157	DEFG	56 - 68
877	LBNTX2/3/82CAY21//...	L	6	103	37	0	6133	DEFG	63 - 68
900	DELLA	L	6	93	55	0	6068	DEFG	59 - 73
896	MARS/CM101	M	7	99	40	0	5941	EFGH	52 - 68
893	DMSI/DLLAX2//....	L	6	92	43	0	5923	EFGH	54 - 70
888	DMSI/DLLAX2//A301	L	6	93	44	0	5827	EFGH	57 - 71
887	DMSI/DLLAX2//A301	L	5	92	45	0	5771	EFGH	47 - 69
883	DMSI/DLLAX2//A301	L	6	94	43	0	5762	EFGH	56 - 71
886	DMSI/DLLAX2//A301	L	6	93	44	0	5745	FGH	53 - 71
889	DMSI/DLLAX2//A301	L	6	92	43	0	5591	GH	53 - 70
884	V7713/JSMN	L	6	102	44	0	5478	GH	46 - 67
895	2207/E. LONG SD	L	7	101	37	0	5033	H	55 - 69
882	A301/JSMN	L	5	98	45	25	4992	H	59 - 68
C.V.			8.6	1.3	3.9	-	6.3		3.5-2.3

* L = Long grain; M = medium grain.

** 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 51. Agronomic and milling performance of 1993 preliminary yield tests, special purpose group. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
918	22D-12 PANICLE ROW	L	5	103	42	85	8794	A	50 - 70
909	RED B.	L	5	100	41	0	8299	AB	57 - 67
916	TORO2/JSMN	L	5	100	42	0	7565	BC	52 - 66
911	RED B.	L	5	99	46	0	7256	CD	53 - 68
910	RED B.	L	5	100	48	0	7221	CD	48 - 68
924	DELLMONT	L	5	97	38	0	6834	CDE	62 - 72
903	82CAY21/LMNT//DLLA	L	7	98	38	0	6650	CDEF	57 - 70
913	DMSI//LMNT/NWBT/3/...	L	5	92	44	0	6531	DEFG	32 - 68
920	A301/JSMN	L	5	97	42	0	6355	DEFG	54 - 70
922	JSMN/3/82CAY21//LMNT	L	7	102	39	0	6328	DEFG	55 - 69
915	JSMN/3/92CAY21//LMNT	L	5	92	38	0	6313	DEFG	57 - 66
914	DMSI/DLLAX2//A301	L	6	94	39	0	6285	DEFG	54 - 69
919	SKBT/TORO2	L	6	101	40	0	6193	EFG	60 - 70
907	LBLE/SC-33 (TT)	L	6	90	39	0	6081	EFGH	63 - 68
917	DMSI/DLLAX2//A301	L	6	92	42	0	6076	EFGH	56 - 71
901	82CAY21/LMNT//DLLA	L	6	92	37	0	5869	EFGHI	62 - 69
902	82CAY21/LMNT//DLLA	L	6	92	36	0	5768	FGHI	63 - 71
906	LBLE/SC-33 (TT)	L	6	90	44	0	5646	FGHI	54 - 68
921	BSMT 802	L	6	110	61	90	5526	GHI	26 - 68
923	DMSI/DLLAX2//A301	L	6	93	41	0	5526	HIJ	57 - 71
908	LBLE/SC-33 (TT)	L	7	95	39	0	5193	HIJK	63 - 69
904	A301/3/DMSI/DLLAX2	L	6	95	41	0	4968	IJK	52 - 71
925	BSMT 5875	L	5	104	63	90	4604	JK	34 - 67
912	DMSI//LMNT/NWBT/3/...	L	5	87	48	35	4451	K	54 - 70
905	DMSI/L202	L	6	91	39	0	3050	L	46 - 70
C.V.			7.4	2.0	2.8	-	6.8		7.2-1.2

* L = Long grain.

** 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 926-990

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, May 26, 1993

Planting Method: Drill-seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O), May 26; 92 lb N/A, June 11; 21 lb N/A, June 28

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flush, May 31; flood, June 12; harvest drainage, Aug 9

Herbicides: Ordram (molinate) 3 lb ai/A, June 6

Insecticides: Furadan (carbofuran) .5 lb ai/A, June 28

Harvest: Sept 26

Experimental Design: Randomized complete block with two replications

Results: Tables 52-54

Table 52. Agronomic and milling performance of 1993 preliminary yield tests, Puerto Rico entries. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
949	ORION	M	4	78	47	17	8188	A	58 - 72
946	KATY/CPRS (9202644)	L	5	84	40	0	7902	AB	61 - 72
948	CYPRESS	L	4	77	41	80	7713	ABC	65 - 71
942	LMNT*2/CR1113//BP87/(9202660)	L	6	82	42	11	7649	ABCD	64 - 72
950	BENGAL	M	4	77	40	0	7625	ABCD	63 - 72
944	CPRS//8002610/CICA (9202558)	L	6	77	35	0	7542	ABCD	66 - 71
930	MERC/3/NTAI/NVDF//M401(9202843)	M	7	82	39	38	7359	ABCDE	46 - 72
933	MERC//MERC/GCHW//MERC (9202833)	M	6	80	39	0	7349	ABCDE	66 - 71
943	LEAH/MBLE	L	5	82	39	0	7335	ABCDE	61 - 72
936	MERC/KOSHIHIKARI// (9202581)	M	8	79	38	0	7316	ABCDEF	41 - 71
938	MERC/LMNT/MERC (9202844)	M	6	82	41	0	7174	ABCDEFG	56 - 73
945	KATY/CPRS (9202643)	L	5	83	47	47	7168	ABCDEFG	66 - 70
927	CPRS//8002610/CICA (9202558)	L	6	77	35	0	7082	ABCDEFGH	67 - 72
937	CPRS//8002610/CICA (9202558)	L	6	79	35	0	6918	ABCDEFGH	67 - 72
935	LCSN/LMNT*2/82CAY83 (9202665)	L	7	82	37	0	6732	ABCDEFGH	68 - 72
928	CPRS//8002610/CICA (9202558)	L	6	75	34	0	6539	ABCDEFGHI	65 - 71
929	82CAY21/LMNT//KATY (9202651)	L	6	83	37	0	6184	BCDEFGHI	64 - 71
940	CPRS//LMNTX2/CR1113 (9202544)	L	6	79	40	95	5985	CDEFGHI	62 - 69
926	CPRS//8002610/CICA (9202558)	L	6	78	34	0	5936	DEFGHI	65 - 71
939	KATY/CPRS (9202667)	L	5	86	36	0	5738	EFGHI	63 - 71
932	KATY/CPRS (9202667)	L	6	88	35	0	5710	EFGHI	63 - 71
934	RICO/MERC (9202839)	L	8	81	43	42	5586	FGHI	62 - 71
931	KATY/CPRS (9202667)	L	5	87	34	0	5509	GHI	63 - 71
941	KATY/CPRS (9202667)	L	6	85	35	0	5414	HI	64 - 71
947	KATY/CPRS (9202667)	L	6	87	34	0	4899	I	63 - 71
C.V.			10.1	1.8	4.2	-	10.6		7.3-1.0

* L = Long grain; M = medium grain.

** 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 53. Agronomic and milling performance of 1993 preliminary yield tests, Puerto Rico entries. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
974	RICO 1	M	5	80	46	90	7637	A	62 - 71
954	SMARS/MARS//PCOC (9202791)	M	6	80	38	17	7597	A	60 - 72
959	CPRS//LMNTX2/CR1113 (9202543)	L	5	79	42	84	7501	A	65 - 72
958	RICO/MERC (9202839)	M	6	79	48	48	7497	A	65 - 71
970	KATY/CPRS (9202644)	L	5	85	41	0	7394	AB	66 - 72
975	JODON	L	4	75	40	0	7293	AB	62 - 70
968	KATY/CPRS (9202645)	L	5	85	38	0	7228	AB	64 - 71
971	KATY/CPRS (9202645)	L	5	82	38	32	7212	AB	64 - 71
957	CPRS//LMNTX2/CR1113 (9202627)	L	6	81	39	0	7118	AB	63 - 71
965	MERC/CAM9/MARS (9202795)	M	7	80	41	95	6989	ABC	66 - 73
963	KATY/CPRS (9202645)	L	5	85	39	0	6942	ABC	64 - 71
969	LMNT/3/BP87/9902//...(9202611)	L	6	87	34	0	6878	ABCD	66 - 72
966	RICO/MERC (9202839)	M	7	78	44	42	6584	ABCD	65 - 70
967	L202/MBLE	L	5	74	39	0	6500	ABCD	61 - 69
964	KATY/CPRS (9202644)	L	6	88	38	0	6469	ABCD	57 - 73
973	RICO/MERC (9202839)	M	8	79	45	0	6382	ABCD	59 - 71
960	MERC//MERC/GCHW//...(9202592)	M	7	80	40	0	6065	ABCD	63 - 70
951	LEAH/MBLE	L	6	79	42	0	6042	ABCD	48 - 70
972	RICO/MERC (9202839)	M	7	79	43	0	5855	ABCD	65 - 70
956	LCSN/LMNT*2/82CAY83 (9202665)	L	6	84	36	0	5622	ABCD	68 - 72
962	MERC//MERC/GCHW//...(9202592)	M	6	79	39	0	5426	BCD	64 - 70
961	RICO/MERC (9202839)	M	7	79	42	0	5334	BCD	59 - 71
955	82CAY21/LMNT//KATY (9202654)	L	6	85	38	0	5037	CD	64 - 71
952	LCSN/KATY (9202665)	L	7	85	33	0	4894	D	67 - 71
953	RICO/MERC (9202839)	M	8	79	39	0	4840	D	57 - 71
C.V.			12.2	1.4	3.9	-	12.9		6.9-0.8

* L = Long grain; M = medium grain.

** 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 54. Agronomic and milling performance of 1993 preliminary yield tests, Puerto Rico entries, special purpose group. Rice Research Station, Crowley, LA.

1993 entry	Pedigree	Grain type*	Seedling vigor**	Days to 50% heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Duncan's test***	Milling % (Whl-Tot)
989	JASMINE 85	L	4	88	47	95	7847	A	43 - 71
984	JSMN/3/82CAY21//LMNT/...	L	7	83	36	21	6879	AB	60 - 71
990	DELLMONT	L	5	82	38	0	6684	ABC	63 - 72
988	A301/JSMN	L	5	83	43	27	6081	ABC	56 - 70
981	JSMN/3/82CAY21//LMNT/...	L	7	85	34	0	5510	ABC	64 - 72
982	A301/JSMN	L	7	90	43	0	5493	ABC	47 - 68
985	JSMN/3/82CAY21//LMNT/...	L	6	94	37	0	5219	ABC	50 - 68
987	BNGL/CM101	M	6	75	38	0	5112	ABC	53 - 69
986	DMSI/DLLAX2//A301	L	6	87	40	0	4927	BC	45 - 66
977	JSMN/3/82CAY21//LMNT/...	L	7	95	32	0	4787	BC	54 - 70
983	MERC/DLLA/MERC	M	6	80	37	0	4577	BC	66 - 72
976	JSMN/3/82CAY21//LMNT/...	L	8	92	33	0	4083	BC	50 - 70
978	DMSI/DLLAX2//A301	L	6	83	35	0	3932	C	51 - 69
979	JSMN/3/82CAY21//LMNT/...	L	8	92	35	0	3874	C	51 - 70
980	DMSI/DLLAX2//A301	L	7	83	35	0	3811	C	54 - 68
C.V.			5.2	1.9	8.1	-	22.7		7.6-1.8

* L = Long grain; M = medium grain.

** 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.

NON-REPLICATED PRELIMINARY YIELD TESTS

INTRODUCTION

The non-replicated preliminary yield tests provide initial yield and quality testing of lines with limited seed supply. These tests also include advanced selections from the Rice Experiment Station at Biggs, CA. Entries 301-320 were returned from the spring 1993 nursery in Puerto Rico.

Experiment: Non-replicated preliminary yield test (Entries 1-300)

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, May 17

Planting Method: Drill seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O), May 17; 92 lb N/A, June 8; 21 lb N/A, June 11; 21 lb N/A, June 28

Plot Size: 4.66 x 16 ft^2 (74.5 ft^2)

Water Management: Flushed, May 26; flooded, June 8; harvest drainage, Aug 20

Herbicide: Stam (propanil 4 lb ai/A), June 6

Insecticide: Furadan (carbofuran) 0.5 lb ai/A, June 28

Harvest: Entries 1-200, Sept 8; Entries 201-300, Aug 20

Experimental Design: Single plot test

Results: Table 55

Table 55. Agronomic and milling performance of 1993 non-replicated preliminary yield test. Rice Research Station, Crowley, LA.

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl-Tol)	
190	1142	L	5	74	49	0	8882	64	69
285		L	6	84	41	0	8839	63	67
197	TXMT/3/LBNT//9881/331581/...	L	5	79	43	0	8774	50	69
225		L	6	80	46	0	8750	56	65
196	TXMT/3/LBNT//9881/331581/...	L	5	78	42	0	8678	50	69
113	V4716//82CAY21/LMNT	M	5	78	43	0	8652	69	70
184	2214/RICO1	M	5	76	47	100	8631	63	71
284		L	4	87	47	0	8589	60	70
121	RICO1/V4716	M	5	77	48	0	8583	63	70
200	1133	L	5	74	49	0	8495	63	68
145	2201/3/82CAY21//TTEP/IR-8	L	6	83	43	0	8469	63	70
201	TXMT/3/LBNT//9881/331581/...	L	5	80	39	0	8408	46	69
198	TXMT/3/LBNT//9881/331581/...	L	5	78	41	0	8407	54	68
283		L	5	85	44	0	8324	49	69
186	SMARS/MARS//MARS/3/RICO1	M	6	77	37	0	8315	65	69
178	LMNT/4/82CAY21//TTEP...	L	6	80	40	0	8299	55	68
125	NWBT/LMNT//TBNT/3/LMNT*2/CR1	L	7	77	39	0	8287	54	68
149	2201/3/82CAY21//TTEP/IR-8	L	6	79	42	0	8285	60	69
249	JSMN/3/82CAY21//LMNT/...	L	7	91	39	0	8264	59	71
62	NWBT/LMNT//82CAY21/LMNT	L	5	79	44	0	8229	55	67
115	82CAY21/LMNT//MERC	L	4	73	39	0	8190	58	68
46	82CAY80/TBNT//LBLE	L	5	75	42	0	8180	61	69
154	2201//LMNT*/82CAY83	L	6	78	41	0	8167	59	69
141	V4916/MARS	M	5	78	45	0	8144	62	71
137	V4916/MARS	M	4	77	40	0	8088	66	70
47	82CAY80/TBNT//LMNT*2/CR1113	L	5	74	43	0	8075	61	70
112	82CAY21//LMNT/LEAH/3/TTEP/4*	L	5	76	41	0	8069	58	67
155	2201/KATY	L	7	81	39	0	8058	62	71
199	TXMT/3/LBNT//9881/331581/...	L	6	79	41	0	8042	46	69
153	2201//LMNT*/82CAY83	L	6	81	41	0	8040	61	71
180	RICO	M	6	80	48	40	7990	63	70
45	82CAY80/TBNT//LBLE	L	5	74	41	0	7983	60	69
139	V4916/MARS	M	5	76	39	0	7963	66	70
144	2201/3/82CAY21//TTEP/IR-8	L	6	82	40	0	7961	59	69
296	90 JSMNX2	L	5	70	44	100	7957	57	64
129	2207/LMNT*2//CR1113	L	5	78	44	0	7923	51	67
231	RED BRAN	L	6	96	44	0	7922	54	68
147	2201/3/82CAY21//TTEP/IR-8	L	6	81	43	0	7916	57	67
111	82CAY21//LMNT/LEAH/3/TTEP/4*	L	6	76	45	0	7913	43	63
150	AB869	M	4	72	43	0	7909	57	69
143	V4916/MARS	M	5	80	43	0	7894	62	72
248	JSMN/3/82CAY21//LMNT/...	L	7	82	42	0	7880	58	69
252	JSMNX2	L	4	70	41	100	7848	64	68
90	JODON	L	4	73	40	0	7843	50	64
146	2201/3/82CAY21//TTEP/IR-8	L	7	80	37	0	7813	56	66
54	TTEP/5*LMNT//L202	L	4	79	43	0	7805	54	69
70	ORIN	M	4	77	44	0	7779	61	69
58	80CAY50/LBLE//82CAY21/LMNT	L	6	79	36	0	7748	63	71
128	2207/LMNT*2//CR1113	L	6	79	43	0	7738	49	65
110	ADAIR	L	4	72	50	10	7725	44	63
173	MERC/BNGL	M	4	74	50	70	7714	62	69
223		L	7	85	43	0	7709	61	69
152	2201//LMNT*/82CAY83	L	5	79	43	0	7701	57	69
119	SKBT//LMNT*2/CR1113	L	6	77	36	0	7688	60	69
132	82CAY21/LMNT//GFMT	L	6	74	41	0	7676	57	67
53	82CAY21/LMNT//L202	L	6	77	41	0	7672	61	70
157	V7817/3/9881/331581//L201	L	6	84	43	0	7663	53	66
118	SKBT//LMNT*2/CR1113	L	6	77	39	0	7656	56	68
127	2207/LMNT*2//CR1113	L	5	78	43	0	7643	47	64
158	CB801/3/NWBT/LMNT//TBNT	L	7	85	43	0	7636	52	66
148	2201/3/82CAY21//TTEP/IR-8	L	5	81	43	0	7630	58	69
140	AB647	M	6	79	44	50	7628	49	72

Continued.

Table 55. Continued

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl -Tol)	
169	RICO1/V4716	M	5	71	48	90	7610	63	70
109	82CAY21//LMNT/LEAH/3/TTEP/4*	L	5	81	39	0	7605	51	64
86	LMNT/3/82CAY21//LMNT/LEAH	L	5	77	36	0	7591	45	61
183	2214/RICO1	M	5	74	46	90	7586	58	79
176	2207//2201/7402003	L	4	74	52	70	7581	51	65
251	JSMN/3/82CAY21//LMNT/...	L	6	86	41	0	7575	54	69
126	2207/LMNT*2//CR1113	L	7	82	36	0	7554	59	67
188	MERC/RICO//2214	M	5	77	52	80	7551	64	89
286		L	5	89	43	0	7542	60	70
57	MERC/1711X2	M	6	74	42	0	7524	59	70
88	LMNT/3/82CAY21//LMNT/LEAH	L	6	81	44	0	7501	57	66
85	82CAY21//LMNT/LEAH/3/82CAY/	L	6	77	40	0	7487	55	68
179	LMNT/4/82CAY21//TTEP...	L	6	77	42	0	7487	57	67
124	NWBT/LMNT//TBNT/3/LMNT*2/CR1	L	7	79	38	0	7475	47	83
117	SKBT//LMNT*2/CR1113	L	5	74	41	0	7471	54	66
195	KATY//8303116/LMNT	L	6	81	32	0	7469	59	70
161	NWBT/LMNT//TBNT/3/V7817	L	7	88	44	0	7441	54	68
162	NWBT/LMNT//TBNT/3/V7817	L	7	77	43	0	7441	56	67
220	CFRS	L	5	77	41	0	7441	64	70
103	82CAY21/TBNT/3/82CAY21//LMNT	L	5	72	37	0	7431	61	69
131	82CAY21/LMNT//GFMT	L	6	76	41	0	7416	58	67
177	2207//2201/7402003	L	6	76	44	0	7416	64	68
74	82CAY21//LMNT/LEAH/3/TBNT	L	6	77	36	0	7415	55	66
170	MILL	L	4	72	47	0	7410	59	69
44	82CAY21/LMNT//AS3510	L	6	71	35	0	7405	61	70
101	82CAY21/TBNT/3/82CAY21//LMNT	L	6	75	38	0	7393	57	69
214		L	7	78	46	0	7338	55	68
160	ALAN	L	4	72	44	0	7333	52	64
172	SKBT//82CAY21/TBNT	L	5	74	43	0	7324	62	69
99	MERC//82CAY21/TBNT	M	5	72	39	70	7317	50	68
174	2207//82CAY21/TBNT	L	6	78	43	0	7310	64	70
142	V4916/MARS	M	6	81	45	0	7308	62	71
108	82CAY21//LMNT/LEAH/3/TTEP/4*	L	5	78	42	0	7302	49	65
151	2201//LMNT*/82CAY83	L	6	78	40	0	7302	59	70
10	KATY	L	4	78	48	0	7274	61	67
52	82CAY21/LMNT//L202	L	4	74	39	0	7229	58	68
114	82CAY21/LMNT//MERC	L	6	72	39	0	7218	59	69
156	V7817/3/9881/331581//L201	L	7	80	41	0	7215	56	67
72	LMNT//LMNT*2/CR1113	L	5	77	41	0	7213	60	70
89	LMNT/3/82CAY21//LMNT/LEAH	L	7	76	40	0	7211	49	66
189	PCOS/3/MARS//CAM9/NKSL	M	6	71	47	0	7189	61	68
76	82CAY21//LMNT/LEAH/3/TBNT	L	4	74	44	0	7158	58	67
194	9881/331581//L201/3/LEAH	L	6	79	36	0	7137	57	71
120	JACKSON	L	5	72	46	0	7120	55	66
65	NWBT/LMNT//82CAY21/LMNT	L	4	76	39	0	7115	59	68
138	V4916/MARS	M	4	76	41	0	7100	63	71
206		L	7	82	37	0	7096	56	69
236	82CAY21/LEAH//TORO2	L	6	76	47	0	7096	56	68
193	PCOS/MERC	M	7	74	39	0	7087	64	70
116	SKBT//LMNT*2/CR1113	L	6	76	39	0	7086	55	67
87	LMNT/3/82CAY21//LMNT/LEAH	L	6	79	44	0	7085	58	67
51	NWBT/LMNT//LBLE	L	5	75	40	0	7082	61	69
166	82CAY21//LMNT/LEAH//LMNT	L	5	77	39	0	7080	58	71
78	82CAY21//LMNT/LEAH/3/TBNT	L	6	85	41	0	7067	57	66
167	82CAY21//TTEP/IR-8//TTEP/5*L	L	6	75	37	0	7055	61	70
107	MERC/V4716	M	4	73	41	0	7039	56	65
192	PCOS/3/MARS//CAM9/NKSL	M	6	73	47	100	7010	61	69
50	LCSN	L	6	80	41	0	6989	60	71
77	82CAY21//LMNT/LEAH/3/TBNT	L	4	76	43	0	6977	56	65
289		L	6	85	50	0	6972	61	69
168	82CAY21/LMNT//LMNT*2/CR1113	L	5	75	42	0	6969	61	71
79	82CAY21//LMNT/LEAH/3/TBNT	L	5	74	46	0	6962	57	65
134	LMNT*2/82CAY21//LEAH	L	6	77	38	0	6951	55	68

Continued.

Table 55. Continued.

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl-Tol)	
69	LMNT/NWBT//82CAY21/LEAH	L	7	81	40	0	6845	47	69
49	NWBT/LMNT//LBLE	L	5	75	38	0	6938	62	71
185	2214/RICO1	M	6	78	47	90	6921	52	65
48	NWBT/LMNT//LBLE	L	5	74	38	0	6901	57	68
66	NWBT/LMNT//82CAY21/LMNT	L	6	76	39	0	6877	56	67
136	2207//LEAH/7802010	L	6	82	33	0	6859	57	68
264	CFRS/ESD	L	6	78	43	0	8857	63	69
181	CB801/3/9881/331581//L201	L	6	72	45	0	8825	47	67
43	82CAY21/LMNT//AS3510	L	6	72	37	0	6820	55	68
256	A301//82CAY21/LMNT	L	5	82	51	0	6820	40	71
61	TBNT//LMNT*2/CR1113	L	6	77	46	0	6811	56	67
216		L	7	78	43	0	6810	59	67
37	A301	L	5	77	42	0	6799	57	68
41	LBLE//TTEP/4*LMNT	L	5	74	43	0	6797	59	70
60	LMNT	L	6	81	38	0	6795	58	69
291		L	6	87	48	0	6785	58	65
100	LGRU	L	4	74	46	0	6754	38	64
68	LMNT/NWBT//80CAY50/LBLE	L	6	80	39	0	6752	57	68
92	LMNT//LMNT*2/CR1113	L	6	80	39	0	6749	51	67
91	LMNT/3/82CAY21//LMNT/LEAH	L	7	81	38	0	6738	52	67
238	LEAH/DLLA	L	5	81	48	0	6705	33	70
71	LMNT//LMNT*2/CR1113	L	6	77	41	0	6692	53	66
259	DMSI//LMNT/NWBT/3/LMNT/DLLA	L	5	77	45	0	6690	40	65
80	MARS	M	4	77	48	0	6685	60	65
165	MERC/AKIHIKARI	M	6	72	43	10	6682	66	71
39	LMNT*2/CR1113//LBLE	L	6	77	37	0	6881	66	71
102	82CAY21/TBNT/3/82CAY21//LMNT	L	5	76	34	0	6631	60	69
265	DMSI/DLLAX2//A301	L	6	79	48	0	6612	57	70
135	2207//LEAH/7802010	L	5	77	46	0	6607	55	70
123	SKBT//NWBT/LMNT	L	6	79	36	0	6605	48	64
164	RADIATED MERC/MERC	M	6	76	41	0	6590	57	69
122	TBNT//LMNT*2/CR1113	L	7	78	42	0	6588	62	70
213		L	7	79	41	0	6584	82	68
40	BNGL	M	5	76	38	0	6580	63	69
106	82CAY21/TBNT/3/82CAY21//LMNT	L	5	79	38	0	6575	53	63
64	NWBT/LMNT//82CAY21/LMNT	L	6	79	41	0	6574	53	66
235	82CAY21/LEAH//TORO2	L	6	77	47	0	8567	60	68
237	V7713/JASMINE	L	6	78	41	0	6567	59	69
171	82CAY21/TBNT/3/82CAY21//LMNT	L	5	77	40	0	6565	57	68
239	MERC/DLLA//MERC	M	4	74	43	0	6565	61	69
96	LMNT//NWBT/LMNT	L	6	83	37	0	6562	43	67
82	82CAY21//LMNT/LEAH/3/TBNT	L	5	78	41	0	6528	57	68
215		L	6	84	43	0	6515	52	66
56	LMNT/AS3510	L	5	67	36	0	6512	57	68
288		L	6	88	54	0	6484	60	69
20	CFRS	L	5	77	41	0	6464	56	66
75	82CAY21//LMNT/LEAH/3/TBNT	L	5	78	41	0	6462	56	68
105	82CAY21/TBNT/3/82CAY21//LMNT	L	4	76	39	0	6460	56	67
250	MBLE	L	4	64	43	0	6456	62	69
187	MERC/RICO//2214	M	6	76	47	90	6442	58	69
204		L	7	78	50	0	6430	50	66
219		L	7	81	43	0	6428	57	66
42	LBLE//TTEP/4*LMNT	L	6	76	36	0	6409	56	69
230	BNGL	M	5	76	41	0	6405	59	67
266	DMSI/DLLAX2//A301	L	6	80	48	0	6378	52	69
63	NWBT/LMNT//82CAY21/LMNT	L	6	78	43	0	6372	54	67
2	S201	S	5	74	42	0	6367	58	69
73	82CAY21/LEAH//LMNT	L	5	78	36	0	6351	58	68
222		L	7	84	39	0	6350	58	67
210	92B6865	L	6	78	39	0	6320	62	72
282		L	7	72	41	0	6320	63	68
268	2207/E. LONG SD	L	6	84	38	0	6316	55	71
294	A301/JSMN	L	5	85	47	0	6299	58	69

Continued.

Table 55. Continued.

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl -Tol)	
81	82CAY21//LMNT/LEAH/3/TBNT	L	5	82	39	0	6298	56	68
281		L	5	70	39	0	6286	57	68
263	A301/JSMN	L	6	84	48	0	6269	52	70
254	90 JSMNX2	L	5	70	41	90	6261	55	65
228		L	7	82	37	0	6242	59	68
267	DMSI/DLLAX2//A301	L	7	77	43	0	6233	52	68
59	NWBT/LMNT//NWBT	L	6	85	39	0	6225	54	68
83	82CAY21//LMNT/LEAH/3/TBNT	L	5	79	38	0	6225	48	67
130	RT 7015	L	5	71	40	0	6225	46	62
25	91Y381	M	5	74	44	0	6221	57	68
38	TTEP/4*LMNT//LBLE	L	6	72	33	0	6209	61	72
241	MERC/DLLA//MERC	M	6	77	44	0	6182	60	68
98	TBNT/3/LMNT//82CAY21/CICA8	L	6	80	42	0	6179	49	67
93	LMNT//82CAY21/TBNT	L	4	82	44	0	6153	52	65
182	LBLESC163/3/82CAY21/...	L	6	65	50	90	6153	52	67
191	PCOS/3/MARS//CAM9/NKSL	M	6	72	38	0	6128	57	71
94	LMNT//NWBT/LMNT	L	6	84	40	0	6124	50	66
97	TBNT//NWBT/LMNT	L	5	79	42	0	6108	55	66
104	82CAY21/TBNT/3/82CAY21//LMNT	L	5	76	39	0	6101	58	68
253	MERC/DLLA/MERC	M	6	76	46	0	6095	68	70
207		L	8	80	34	0	6083	55	67
28	S301	S	5	74	44	70	6077	63	69
221		L	8	85	40	0	6062	60	67
227		L	6	77	39	0	6030	54	66
133	82CAY21/LMNT//GFMT	L	7	78	41	0	6029	47	65
5	92Y188	S	4	64	38	0	6019	47	67
269	MARS/CM101	M	6	80	44	0	6013	54	68
275	A301/3/DMSI/DLLAX2//A301	L	7	77	46	0	5992	55	70
55	LMNT/AS3510	L	5	66	39	0	5989	57	69
234	LEAH/DLLA	L	5	81	50	70	5952	58	67
280	A301	L	6	78	42	0	5923	52	68
159	CB801//82CAY21/LMNT	L	6	85	38	0	5922	58	70
175	MARS/3/CI11048/LEAH...	M	4	77	46	0	5914	59	66
279		L	7	74	39	0	5912	59	66
211		L	6	78	41	0	5911	58	66
232	LEAH/DLLA	L	6	81	53	0	5901	46	68
278		L	5	79	48	0	5881	60	63
163	80CAY50/LBLE//SKBT	L	5	81	39	0	5860	55	69
240	LCSN	L	6	79	41	0	5850	55	69
217		L	6	79	43	0	5783	59	67
208		L	5	78	41	0	5737	55	64
30	MBLE	L	4	64	41	0	5643	49	62
1	CM101	S	6	72	42	0	5633	54	68
95	LMNT//NWBT/LMNT	L	6	81	36	0	5632	49	65
84	82CAY21//LMNT/LEAH/3/TBNT	L	5	79	41	0	5626	49	68
229		L	7	84	35	0	5567	45	68
262	DMSI/203/TTEP/....	L	7	73	44	0	5525	37	69
245	DMSI//LMNT/NWBT(AC)	L	5	74	49	90	5504	63	70
274	82CAY21/LMNT//DLLA	L	6	76	41	0	5501	60	69
287		L	6	86	53	0	5486	57	68
255	LBNT/3/82CAY21//LMNT/LEAH	L	6	84	37	0	5476	56	67
261	DMSI/203/TTEP/4*LMNT	L	5	81	57	60	5469	56	68
243	MERC/DLLA//MERC	L	5	76	48	0	5460	63	70
209		L	6	83	45	0	5450	59	67
205		L	8	72	42	0	5429	47	67
246	DMSI/203/TTEP/...	L	7	79	43	0	5418	41	68
8	M103	M	5	69	40	0	5413	60	68
224		L	8	83	41	0	5401	50	67
16	L202	L	4	72	39	0	5345	36	60
277	DMSI/L202	L	6	76	46	0	5295	60	71
258	DMSI/DLLAX2//A301	L	7	77	47	0	5291	54	69
202		L	8	76	38	0	5277	55	66

Continued.

Table 55. Continued.

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl	Tol)
293	LMNT/DLLA	L	6	76	43	0	5240	62	69
218		L	7	78	41	0	5238	60	67
32	90Y686	M	5	77	44	0	5224	57	66
203		L	8	78	52	0	5222	62	68
34	92Y106	M	6	68	39	80	5193	56	67
260	DLLA	L	6	77	41	0	5189	50	65
226		L	7	85	40	0	5168	56	68
6	89Y103	S	5	63	36	0	5148	46	63
212		L	6	78	41	0	5125	59	66
247	DMSI/DLLAX2//L...	L	6	77	51	0	5056	60	69
67	MERC/AS3058	M	6	73	35	0	5033	49	64
3	91Y171	S	5	69	34	0	4945	40	67
276	DMSI/L202	L	5	74	45	0	4940	63	72
242	MERC/DLLA//MERC	M	5	77	43	0	4911	64	66
297	DLMT	L	6	83	40	0	4804	52	69
14	91Y208	L	5	65	40	0	4794	51	62
295	A301/JSMN	L	6	82	42	0	4775	55	67
35	M401	M	5	79	43	0	4662	51	64
257	DMSI/DLLAX2//A301	L	8	79	45	0	4565	54	68
292		L	7	86	45	0	4537	60	68
23	91Y332	S	4	70	37	0	4485	50	65
272	LMNT/DLLA//82CAY21/LMNT	L	7	74	38	0	4481	54	67
18	89Y103	S	5	63	34	0	4400	47	62
271	LMNT/DLLA//82CAY21/LMNT	L	6	76	39	0	4347	49	67
273	82CAY21/LMNT//DLLA	L	6	80	40	0	4265	52	66
233	LEAH/DLLA	L	5	77	53	0	4212	41	67
29	89Y103	S	6	62	34	0	4137	43	61
13	91Y253	M	5	66	37	0	4047	44	63
244	DMSI//LMNT/NWBT(AC)	L	7	73	55	0	3969	62	70
270	MARS/CM101	M	6	76	48	70	3918	60	69
12	M204	M	5	69	37	0	3732	40	60
27	90Y253	M	5	65	37	0	3340	37	56
19	92Y328	M	5	67	37	0	3283	31	64
298	BSMT6311	L	5	82	57	100	3214	33	67
22	92Y077	M	5	63	35	0	3121	46	62
17	L203	L	4	67	38	0	2933	13	47
9	M201	M	4	66	33	0	2907	38	58
300	BSMT802	L	5	91	53	90	2863	40	67
299	BSMT5875	L	5	84	57	100	2777	36	66
11	M202	M	4	67	40	0	2759	29	51
31	91Y581	S	5	71	36	0	2711	32	61
7	M203	M	4	66	38	0	2574	31	61
15	91Y408	M	4	64	37	0	2564	28	52
26	91Y413	M	4	65	35	0	2396	46	59
290	JSMN 85	L	5	88	50	80	1843	53	70
21	92Y075	M	5	67	33	0	1821	28	54
33	92Y585	M	5	69	36	0	1616	28	57
24	93Y059	M	5	62	31	0	1017	18	50
36	91Y208	M	5	70	33	0	963	21	52
4	92Y295	S	4	66	35	0	334	0	0

*L = Long grain, M = Medium grain, S = Short grain.
**Subjective rating 1 to 9, where 1 = excellent, 9 = poor.

Experiment: Non-replicated preliminary yield test (Entries 301-320)

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, May 26

Planting Method: Drill seeded

Fertilization: 14-42-42 lb/A (N-P_2O_5-K_2O), May 26; 92 lb N/A, June 11; 21 lb N/A, June 28

Plot Size: 4.66 x 16 ft^2 (74.5 ft^2)

Water Management: Flushed, May 31; flooded, June 12; harvest drainage, Sept 9

Herbicide: Ordram (molinate) 3 lb ai/A, June 6

Insecticide: Furadan (carbofuran) 0.5 lb ai/A, June 28

Harvest: Sept 26

Experimental Design: Randomized complete block with two replications

Results: Table 56

Table 56. Agronomic and milling performance of 1993 non-replicated preliminary yield test. Puerto Rico entries.

Plot	Pedigree	Grain type*	Seedling vigor**	Days to 50 % heading	Plant height (in)	Lodging (%)	Yield (lb/A @ 12%)	Milling % (Whl -Tol)
307	CFRS//LMNTX2/CR1113	L	5	79	43	80	7409	67 - 71
301	KATY/CFRS	L	5	86	42	.	7354	66 - 72
303	MERC/PCOS	L	6	78	40	.	7257	70 - 74
306	KATY/CFRS	L	5	85	37	.	7245	68 - 70
304	CFRS//LMNTX2/CR1113	L	5	79	42	100	6933	53 - 71
308	KATY/CFRS	L	5	82	46	50	6892	68 - 70
302	MERC/NANGHU/MERC	M	6	78	36	.	6860	68 - 72
315	A301/JSMN	L	4	82	44	80	6858	67 - 71
309	KATY/CFRS	L	6	83	51	.	6839	67 - 69
312	KATY/CFRS	L	5	85	47	20	6558	66 - 69
305	KATY/CFRS	L	6	83	47	90	6514	67 - 70
310	LCSN/KATY	L	6	85	50	.	6464	69 - 71
313	KATY/CFRS	L	5	87	43	.	5818	64 - 72
311	KATY/CFRS	L	5	82	51	.	5639	67 - 69
317	JSMN/3/82CAY21//LMNT/.	L	7	85	32	.	5546	65 - 72
318	DMSI/LMNT/NWBT...	L	6	80	43	.	5028	64 - 70
320	A301/JSMN	L	6	84	41	.	4553	61 - 70
316	A301/JSMN	L	7	90	37	.	3475	52 - 66
314	JSMN/3/82CAY21//LMNT/.	L	9	93	34	.	2881	62 - 70
319	A301/JSMN	L	7	96	40	.	2469	54 - 66

*L = Long grain; M = Medium grain.
**Subjective rating 1 to 9, where 1 = excellent, 9 = poor.

MULTIPLE GENERATION RICE BREEDING NURSERY[1,2]

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

A winter nursery facility is an essential and integral feature of a modern rice breeding program. The nursery allows the production of additional generations of breeding material per year, thus, decreasing the amount of time required to develop new varieties.

The agricultural experiment stations of Arkansas, Louisiana, Texas, and Puerto Rico have a cooperative agreement to operate a year around rice nursery on the University of Puerto Rico Experiment Station located at Lajas for the purpose of advancement, selection, and seed increase of breeding lines. This cooperative venture facilitates efficient utilization of nursery area, equipment, and labor and is allowing these breeding programs to grow a large number of breeding liens to expedite the development and release of improved rice varieties for the southern U.S. rice growing area.

1993 Activities

A nursery planted in September 1992 was harvested in January 1993. This nursery contained 4200 rows and included F_2 bulk populations, advanced panicle rows, and purification and increase rows. A January nursery was planted (4500 rows) and included turnover material of the previous nursery and some additional lines from the Rice Research Station. The nursery was harvested in May, and the seed returned to Crowley and planted in late May at the Rice Research Station.

The fall 1993 nursery was planted on September 7. The nursery contained 4500 rows and included primarily F_2 populations. The nursery was harvested in early January 1994, and the spring nursery was planted on January 8.

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[1] Cooperative investigators, Louisiana Agricultural Experiment Station, Crowley, LA; University of Puerto Rico Agricultural Experiment Station, Lajas, PR; Texas Agricultural Experiment Station and USDA-AR, Beaumont, TX; and Arkansas Agricultural Experiment Station, Stuttgart, AR

[2] This research is supported in part by funding provided by rice producers through the Louisiana Rice Research Board.

FIELD EVALUATION OF GENETICALLY ENGINEERED GLUFOSINATE-RESISTANT RICE LINES

S.D. Linscombe, P. Christou, M.P. Braverman, and F. Jodari

INTRODUCTION

A study was conducted in 1993 to field evaluate rice lines that had been genetically engineered to contain the BAR gene, which imparts resistance to the herbicide glufosinate. This is a non-selective, contact herbicide that has activity on non-transformed rice, as well as on red rice and most other rice weeds. Since rice and red rice are very closely related genetically, no herbicide is currently available that will selectively control red rice in an established rice crop. Glufosinate is very efficacious on red rice and the concept this research is exploring could lead to the development of glufosinate-resistant rice varieties on which the herbicide could be used to selectively kill red rice without damage to the commercial crop.

The genetic engineering was accomplished by Dr. Paul Christou with Agracetus, Inc., Madison, Wisconsin. Glufosinate is a registered product of Agrevo.

The transgenic lines evaluated in the study were derived from Gulfmont (a semidwarf southern long grain) and Koshihikari (a Japanese premium quality medium grain).

Experiment: Transgenic (glufosinate resistance) Study

Location: Rice Research Station

Seeding Rate/Date: 90 lb/A, June 4, 1993

Planting Method: Hand planted

Fertilization: 98-49-49 lb/A (N-P_2O_5-K_2O) preplant incorporated, June 4

Plot Size: Single row - 6 ft

Water Management: Flushed, June 7; flooded, June 28; harvest drainage, Sept 9

Rice Lines:

Transgenic Gulfmont-derived lines

1. GFMT 517-1-R1
2. GFMT 517-2-R1
3. GFMT 517-3-R1
4. GFMT 517-5-R1
5. GFMT 517-7-R1
6. GFMT 526-1

Transgenic Koshihikari-derived lines

7. KOSH 495-1-R1
8. KOSH 495-1-R2
9. KOSH 496-1-R1
10. KOSH 496-1-R2
11. KOSH 496-2-R1
12. KOSH 496-3-R1
13. KOSH 496-3-R2
14. KOSH 496-4-R1
15. KOSH 496-4-R2

Non-transformed lines

16. Bengal
17. Cypress
18. Gulfmont
19. Katy
20. Koshihikari
21. Jodon
22. LA 10501-BK
23. LA 2192
24. Lemont

Herbicide Treatments:

Glufosinate 1 lb ai/A
Glufosinate 2 lb ai/A
Control

Harvest: Sept 27

Experimental Design: Randomized complete block with a split-plot arrangement of treatments; main plots, herbicide treatments; split plots, rice lines

Results: Tables 1-5. Data are presented for variables grain yield, days from emergence to 50% heading, and plant height. Data from only transgenic lines were analyzed over herbicide treatments because other plots were lost from spray treatments. Data from control treatments (0 lb/A glufosinate) were analyzed for all entries.

There were significant differences among herbicide treatments and among lines for the variable days to 50% heading; however, the interaction between the two variables was not significant (Table 1). Table 2 shows days to 50% heading averaged over rice lines for the three herbicide treatments. The 2 lb/A treatment significantly delayed heading when compared with the 1 and 0 lb/A treatment. This indicates the higher rate of glufosinate can increase days to 50% heading; however, the small increase, although statistically significant, is probably not agronomically significant. For the variable plant height, there were significant differences among herbicide treatments and among lines, as well as a significant interaction between the two variables (Table 1). Table 3 shows the effects of herbicide treatment on each transgenic line for the variable plant height. All transgenic Gulfmont lines, as well as KOSH 495-1-R and KOSH 496-2-R1 had no significant effects on plant height due to glufosinate treatments. The other Koshihikari-derived lines had a significant reduction in plant height from either or both glufosinate treatments. The Gulfmont-derived transgenic lines displayed no injury symptoms after herbicide

treatments. All Koshihikari lines displayed initial yellowing and some stunting after treatment. The yellowing had disappeared by 7 days after treatment; however, the stunting on some of the Koshihikari lines was evident at harvest maturity.

Table 4 shows analysis of variance summaries for the variables days to 50% heading, plant height, and grain yield for the 24 rice lines (untreated). There were highly significant differences among rice lines for each of these variables (Table 5). Since these analyses contain only untreated lines, any differences are primarily genetic in nature and not influenced by herbicide treatments. For the variable days to 50% heading, three Gulfmont-derived lines (GFMT 517-1-R1, GFMT 517-3-R1, and GFMT 526-1) and one Koshihikari-derived line (KOSH 495-1-R2) were significantly different from their original parental line. In the case of the GFMT-derived lines, they were earlier than the parental line while KOSH 495-1-R2 was later than the Koshihikari check. For the variable plant height, GFMT 517-5-R1 was significantly shorter than Gulfmont and four Koshihikari lines (KOSH 496-3-R1, KOSH 496-3-R2, KOSH 495-1-R1, and KOSH 495-1-R2) were significantly taller than the Koshihikari check.

Two Gulfmont-derived lines (GFMT 517-7-R1 and 526-1) were significantly higher in grain yield than the Gulfmont check. All Koshihikari-derived lines except KOSH 496-3-R1 were significantly higher in grain yield than the Koshihikari check. The plot size (one 6-ft row per plot) was limited because of the limited availability of seed for some of the transgenic lines. This was reflected in the high coefficient of variation for the variable grain yield (Table 5). More valid yield comparisons will be made in future testing where ample seed will be available.

These data do suggest that there are some differences in these transformed lines other than resistance to glufosinate. These changes are apparently slight and, in some cases, may be favorable; however, this suggests that more extensive agronomic evaluation of transformed lines is warranted.

This study does demonstrate that rice lines can be genetically engineered to be resistant to glufosinate applications. Glufosinate has been shown to be very effective in controlling red rice at the 1 lb/A rate when applied at the 3- to 4-leaf stage.

The development of agronomically sound glufosinate resistance rice lines could provide a very effective means of control of red rice in established commercial rice fields.

Table 1. Analysis of variance summary for days to 50% heading and plant height of transformed lines. Rice Research Station, Crowley, LA. 1993.

Source of variation	df	Days to 50% heading	Plant height
Herbicide treatment (H)	2	19.57**	193.27**
Rep x H	6	2.71	14.76
Line (L)	14	223.99**	103.23**
H x L	28	2.94	27.70**

** Mean square significant at P<0.01.

Table 2. Days to 50% heading averaged over transformed rice lines for three herbicide treatments. Rice Research Station, Crowley, LA. 1993.

Glufosinate treatment ---------(lb/A)---------	Days to 50% heading
2	68.4 a*
1	67.6 b
0	67.3 b

*Means followed by the same letter are not significantly different at the 0.05 probability level based on Duncan's multiple range test.

Table 3. Effects of herbicide treatments on plant height of transgenic rice lines. Rice Research Station, Crowley, LA. 1993.

	Herbicide treatment ---------(lb/A)---------				Herbicide treatment ----------(lb/A)----------		
	1	2	0		1	2	0
Entry	----------(in)----------			Entry	----------(in)----------		
GFMT-517-7-R1	35[a*]	36[a]	36[a]	KOSH 495-1-R2	35[a]	33[b]	36[a]
GFMT-526-1	34[a]	34[a]	34[a]	GFMT-517-5-R1	33[a]	34[a]	32[a]
KOSH-496-1-R2	32[ab]	31[b]	35[a]	KOSH-496-4-R2	32[b]	31[b]	34[a]
GFMT-517-3-R1	34[a]	34[a]	33[a]	KOSH-495-1-R1	35[a]	34[a]	36[a]
GFMT-517-1-R1	34[a]	34[a]	34[a]	KOSH-496-2-R1	33[a]	32[a]	33[a]
KOSH-496-1-R1	33[b]	30[c]	35[a]	KOSH-496-3-R2	34[b]	35[ab]	36[a]
KOSH-496-4-R1	32[ab]	32[b]	35[a]	KOSH-496-3-R1	35[ab]	34[a]	36[a]
GFMT-517-2-R1	35[a]	35[a]	35[a]				

CV (%) = 3.8

*Means within rows followed by the same letters are not significantly different at the 0.05 probability

Table 4. Analysis of variance summaries for days to 50% heading, plant height, and grain yield of 24 rice lines (untreated). Rice Research Station, Crowley, LA. 1993.

Source of variation	df	Days to 50% heading	Plant height	Grain yield
Line	23	1979.74**	1388.49**	408753**

**Mean square significant at P<0.01.

Table 5. Days to 50% heading, plant height, and grain yield of transgenic and check lines (untreated). Rice Research Station, Crowley, LA. 1993.

Entry	Days to 50% heading	Plant height (in)	Grain yield (lb/6 ft row)
LA 2192	77 A*	34 EFGH	.87 A
LA 10501-BK	74 BC	35 CDEFG	.70 B
GFMT 517-7-R1	72 BCD	36 BCDE	.62 BC
JODON	65 FG	34 DEFGH	.62 BC
CYPRESS	74 BC	37 AB	.60 BC
GFMT 526-1	70 DE	34 DEFGH	.58 BCD
KOSH 496-1-R2	64 FG	35 CDEFG	.57 BCDE
GFMT 517-3-R1	71 DE	33 HI	.54 BCDEF
LEMONT	64 FG	34 DEFGH	.52 CDEFG
GFMT 517-1-R1	72 CDE	34 FGHI	.52 CDEFGH
BENGAL	70 E	34 EFGH	.48 CDEFGHI
KATY	74 BC	39 A	.47 CDEFGHI
KOSH-496-1-1	6 G	35 CDEF	.47 CDEFGHI
KOSH 496-4-R1	64 FG	35 CDEF	.41 DEFGHI
GFMT 517-2-R1	74 BC	35 CDEF	.41 EFGHI
KOSH 495-1-R2	66 F	36 BCD	.39 EFGHI
GFMT 517-5-R1	73 BC	32 I	.39 FGHI
GULFMONT	74 B	34 DEFGH	.38 FGHI
KOSH 496-4-R2	63 G	34 FGHI	.36 GHI
KOSH 495-1-R1	65 FG	36 BCDE	.35 GHI
KOSH 496-2-R1	65 FG	33 GHI	.35 GHI
KOSH 496-3-R2	64 FG	36 BC	.34 HI
KOSH 496-3-R1	65 FG	36 BCDE	.31 IJ
KOSHIHIKARI	63 G	34 FGHI	.19 J
CV (%)	2.2	3.3	21.6

*Means within columns followed by the same letters are not significantly different at the 0.05 probability level based on Duncan's multiple range test.

RICE GENETICS AND GERMPLASM DEVELOPMENT

J.H. Oard, S.D. Linscombe, D.E. Groth, M.C Rush, T.P. Croughan

SUMMARY

New sources of sheath blight resistance previously identified from the wild rice Oryza rufipogon were advanced through F_2, F_3, and BC_1F_2 generations in 16 populations and evaluated in inoculated field plots at the Rice Research Station near Crowley. From these wide crosses, individuals were identified in five populations that exhibited good agronomic traits and high levels of sheath blight resistance. Two sources of resistance from somaclones (developed by M.C. Rush) have been combined for greater levels of tolerance to sheath blight. The male sterile trait from mutant lines was successfully transferred to F_2 material, and phytochrome was identified as an important factor that controls expression of this character. Gene conversion was identified in formal genetic experiments as the principal mechanism that produces homozygous somaclonal variants for disease resistance, pollen fertility, and anthocyanin pigmentation. The immature panicle was identified in tissue culture experiments as the preferred explant source to produce rapid diploid callus growth and high plant regeneration rates.

OBJECTIVES

1. Develop sheath blight resistant germplasm by introgression from the wild rice Oryza rufipogon.

2. Develop marker-assisted selection schemes for disease using PCR and RFLP techniques.

3. Evaluate and transfer male sterile and pollinator traits from California material to adapted Louisiana lines as tools for population improvement.

4. Develop protocols for efficient transfer of cloned genes of agronomic importance to Louisiana rice.

RESULTS AND DISCUSSION

1. Development of Sheath Blight Resistant Germplasm Derived from the Wild Rice O. rufipogon.

For this project, 26 O. rufipogon lines were previously inoculated with the sheath blight fungus Rhizoctonia solani and evaluated for resistance. After the inoculation screen, four individual O. rufipogon lines were selected that exhibited desirable agronomic traits and significantly higher levels of sheath blight resistance as compared with the

susceptible controls. This material was used as pollen parents in crosses to susceptible cultivars Cypress, Lacassine, Lemont, and the resistant E734. Seven F_1 plants were identified with high levels of resistance similar to the parental O. rufipogon lines. The selected F_1 plants were used as parents in backcrosses to Cypress or Lacassine and selfed to produce 16 F_2 populations.

The backcross and F_2 material were evaluated in inoculated field plots in cooperation with Dr. Groth at the Rice Research Station. Most of the material was tall and late with a tendency to lodge. Certain individuals from each population, however, were identified that exhibited good height, maturity, and lodging characteristics, along with high levels of sheath blight resistance. The panicle types are fair, but need improvement, so backcrosses to Cypress and other cultivars are currently being made.

We have also identified a PI from China that is resistant to leaf blast, rotten neck, and panicle blast as judged by 2 years of field trials at Crowley. This material may prove valuable as a future source of resistance to the current races of blast in Louisiana.

2. Development of Marker-assisted Selection Schemes Using RFLP and RAPD Techniques.

The principal goal for this research is the development and application of molecular techniques, such as RAPDs and RFLPs, to complement traditional breeding approaches for effective and rapid germplasm improvement in rice. A major effort has been placed in identifying RFLP DNA markers that are genetically linked to a previously characterized single gene for sheath blight resistance (Xie et al. 1990. In Pest Management in Rice) and a single gene from Oryza rufipogon. We believe linked molecular markers can serve as a valuable tool for both plant breeders and geneticists in crop improvement. Research of this type can rarely be undertaken by a single individual. For that reason, a breeder (Steve Linscombe), pathologists (Don Groth and M.C. Rush), and geneticist (James Oard) are cooperating as a team to maximize the likelihood of success. To achieve this research goal, a series of studies were conducted during the 1993 calendar year. Progress made in these experiments are described below.

RFLP Mapping Efforts for Sheath Blight Resistance from Somaclones

Xie et al. have previously identified a somaclonal variant that is resistant to sheath blight. This resistance is conferred by a single recessive gene. The resistant somaclone SBR5 was used as a parent in crosses to the susceptible Lemont cultivar, and F_2 individuals were inoculated with R. solani in the greenhouse at Crowley. Each F_2 plant was scored for resistance based on the 0-9 scale and leaf material was harvested from each individual. Total genomic DNA has been extracted from each F_2 plant and the two parents. Approximately 120 mapped RFLP clones have been obtained and characterized from Tankesly's Cornell lab. We are also requesting 100 additional cDNA markers from the Rice Genome Project in Japan. More clones will be requested as we identify initial linked markers. The genomic and cDNA clones from Cornell contain the proper inserts as judged by restriction analysis and PCR analysis. For this material we are currently optimizing PCR conditions to amplify inserts for labelled probes. RFLP analysis by

Southern blotting will be initiated by screening for polymorphic markers between the resistant and susceptible parents. This ongoing work is being conducted by Mr. Benxu Cheng in Dr. Oard's lab.

Leaf material for RAPD detection of linked markers to sheath blight has also been collected. These results are being compared with markers obtained from an F_6 inbred population. Collaborative efforts with Dr. Gary Hanning of Anheuser-Busch are being carried out to determine if putative linked RAPD markers to sheath blight from somaclone SBR5 can be used in other populations. One difficulty we have encountered is reproducibility of low-copy RAPD band patterns between our two laboratories. This problem may be due to different DNA isolation techniques, different thermocyclers, and subtle differences in components of the PCR amplification process. Recent improvements in this area should allow us to efficiently compare data in the future.

A second population for RFLP mapping of sheath blight resistance involves an F_2 population derived from a cross with the Oryza rufipogon line DG67-3. As in the material discussed above, the F_2's were inoculated and scored for resistance in the greenhouse. Leaf material and DNA have been harvested and screening of polymorphic RFLP probes is currently being conducted by Mr. Dadong Chen in Dr. Oard's laboratory.

3. **Evaluate and transfer male sterile and pollinator traits from California material to adapted Louisiana lines as tools for population improvement.**

Over 30 F_2 populations developed from crosses of genetic male steriles were evaluated for fertility levels in field trials at the Rice Research Station. Male sterility in most of the populations appeared to be controlled by two recessive nuclear genes. As expected from the California-derived male steriles, the F_2 progeny were susceptible at varying levels to the rice blast disease. For this reason, selected F_2's are being used in crosses to Katy and other sources to incorporate blast resistance.

Greenhouse and growth room experiments were conducted to determine the possible role of phytochrome in expression of male sterility in a selected mutant line. The male sterile line ST1 and the normal, parental cultivar M-201 were planted 3 March 1993 in the greenhouse under normal sunlight conditions. At the panicle initiation (green ring) stage in June, normal and mutant plants were placed 12 days in a growth room with a 10-hr daylength and low light intensity. Immediately after the short-day treatment, plants were exposed to 5 minutes of red or (red + far-red) or (red + far-red + red) light regimes, 3 hours after initiation of the dark period. Pollen fertility of the normal M-201 plants was > 90% across all light treatments. In contrast, a 30-fold drop in fertility to 2.9% for the red + far-red treatment was observed, while high pollen fertility of 94% was seen when plants were exposed only to red light. The low fertility induced by the red + far-red lights could be restored to high levels (89.7%) for ST1 when exposed to the red + far-red + red treatment. These results indicate that phytochrome is involved in the expression of male sterility in the ST1 line. The data have practical and fundamental implications for future use and study of this material. Thanks is given to Dr. Jim Board for help in set-up of the red and far-red lights.

4. Development of Protocols For Efficient Gene Transfer to Rice

Transfer of certain cloned genes to elite cultivars may improve agronomic characters that would benefit the rice producers in Louisiana. One example is tolerance to the broad-spectrum herbicide Ignite. Agracetus, Inc. has transferred the cloned gene for tolerance to Ignite into the Texas cultivar Gulfmont and the Japanese cultivar Koshihikari. Steve Linscombe has evaluated these Ignite-tolerant lines in field trials this year at the Rice Research Station. Grain yield for sprayed material was equal to unsprayed controls, so these experiments will be repeated next year under increased acreage at the Rice Research Station.

We are also attempting to develop an efficient gene delivery system for transfer of agronomically important genes to Louisiana cultivars. For efficient gene transfer, laboratory conditions must be optimized, and that is the subject of the M.S. thesis research by Ms. Indira Ratnayaka. Postdoctoral researcher Q.J. Xie in Dr. Rush's lab has made substantial contributions to this work as well. To date, we have determined that hygromycin is the preferred selection agent for stable transformants and that more than one selection cycle is required to significantly reduce false positives. At this time, several lines that may carry the Ignite gene are being evaluated *in vitro* and in the greenhouse.

SUMMARY OF PROGRESS FOR THIS RESEARCH

1. Sixteen genetic populations derived from crosses with wild rice accessions were planted and evaluated for sheath blight resistance during the 1993 field season at the Rice Research Station.

2. Five of the populations described above contained individuals with good agronomic traits and high levels of sheath blight resistance. Backcrosses to adapted Louisiana cultivars were made and will be evaluated in 1994 field/greenhouse studies.

3. Genetic male sterility that is responsive to varying daylengths was transferred through the F_2 to Louisiana cultivars. Phytochrome was found to condition the level of pollen fertility in the male steriles.

4. RFLP and RAPD techniques have been utilized to begin mapping two distinct nuclear genes for sheath blight resistance. Initial work to determine degree of linkage between a recessive nuclear gene for resistance and three RAPD markers has begun.

5. Conditions for optimal culture of callus material in gene transfer experiments were investigated. The immature panicle was identified as the best explant source for rapid callus growth and high regeneration rates in elite Louisiana cultivars.

SPECIAL PURPOSE RICE BREEDING

F. Jodari, S.D. Linscombe, K. Cadwallader, and K. Bett

Certain special purpose rice varieties continue to be in increasing demand as the consumption and market for these types in the U.S. continues to expand. Recent changes in the rice export market are also adding to this demand to a certain extent. Part of the objectives of state project 2925, which was initiated in January 1992, is to develop specialty rice varieties that are adapted to Louisiana's environment and possess superior agronomic, milling, cooking, and specific specialty qualities. The major emphasis is being placed on breeding for Jasmine, Della, Basmati, and waxy types.

During 1993, a total of 97 crosses with at least one specialty parent was made. Part of these crosses will be used for a new diallel study designed to investigate the inheritance of aroma components in rice. The early generation specialty nursery included 55 F_1 populations, 47 F_2 populations, 8200 progeny rows, and 1200 anther culture-derived breeding rows. A total of 600 specialty lines were selected and screened for various agronomic, quality, and specialty traits.

The preliminary yield trials included 90 specialty lines. Fifteen of these lines were selections from the 1993 spring nursery in Puerto Rico. The agronomic practices used for preliminary yield trials were similar to other drill-seeded trials explained earlier in the general breeding section. The results are reported in Tables 35-54, pages 66-94. An additional 80 selections were included in non-replicated standard size plots for observation and initial estimates of agronomic and milling performance. A combination of various specialty and cooking types was tested in these trials. Several Jasmine selections have shown significant improvements in yield and milling potential and cooking qualities. Further selections and crossings are being made to improve grain whiteness and straw strength among Jasmine-type lines.

A number of Della-type aromatic, short and medium grain, waxy and basmati-type lines have shown good agronomic and quality potential and were advanced to regional and statewide trials. Basmati selections, in general, have somewhat less yield potential than other specialty types. A number of the basmati selections with superior specialty qualities and slightly less yield potential have also been maintained and advanced.

Nine specialty breeding lines were tested in the uniform regional nursery trials in 1993. These consisted of 3 Della-type, 2 Jasmine-type, 3 elongating Basmati-type, 1 medium-grain aromatic, and 1 waxy type lines (Tables 3, 11, and 13, pages 9, 23-24, and 28-29). In addition, 2 Della-, 1 Jasmine-, and 1 Basmati-type lines were also tested in statewide advanced yield trials.

A major phase of selection and breeding for specialty rice is the evaluation and screening of the breeding lines for their cooking attributes and specialty qualities. Standardized cooking procedures have been developed in the breeding program and are being routinely used for subjective evaluation of cooked rice attributes, such as firmness, cohesiveness, adhesiveness, general appearance, whiteness, aroma, flavor, and elongation. A total of 173 lines from preliminary, regional, and advanced trials were tested for these attributes in 1993.

Rice aroma studies continued in 1993. Three aroma evaluation procedures were compared, including analytical measurements of 2-Acetyl-1-pyrroline (AP), standardized cooking tests, and trained sensory panel evaluations. The results of evaluations of eight selected lines are reported in Tables 1-4. Additional data are being generated for statistical correlation of the results of the three methods. Comparing the ranking of the genotypes indicate that the sensory panel and cooking test results were in closer agreement with each other than with AP concentration values. Experimental line 9102085 was found to have AP and sensory panel values equal to Della. The cooking test, however, indicated a slight but significant difference between the two genotypes. Similar results obtained in earlier studies suggest the possibility of involvement of other volatile compounds in addition to AP in the typical Della-type aroma. Higher or lower concentrations of these compounds may be influencing the expression of the original Della-type aroma, and if so, other genes are likely controlling these compounds and the overall Della-type aroma.

Currently, all three procedures are in the process of being refined and modified. All three procedures are very useful and complement each other in aromatic rice breeding efforts. Both sensory procedures need to be capable of detecting smaller differences among genotypes. The level of contribution of other volatile compounds into the overall Della-, Jasmine-, or Basmati-type aroma and flavor need to be examined through analytical procedures. Trained sensory panel evaluations are very valuable for detailed and conclusive evaluation of smaller numbers of advanced experimental aromatic lines.

Table 1. Concentrations of 2-Acetyl-1-pyrroline (ng g^{-1}) compound among aromatic rice selections. 1993. Department of Food Science, LSU Agricultural Center. Baton Rouge, LA.

Genotype ID	Type	Mean	Standard Deviation
9202515	Della t.	657	± 7.8%
9202854	Della t.	813	± 5.1%
9202858	Della t.	850	± 4.9%
9202864	Della t.	897	± 8.9%
9202995	Jsmn. t.	963	± 3.5%
9102085	Della t.	931	± 6.6%
9202224	Bsmt. t.	901	± 6.6%
Della		918	± 5.4%

Table 2. Means of rice aroma and flavor ratings using standardized cooking procedures among aromatic rice selections. Rice Research Station, Crowley, LA. 1993.

Genotype ID	Type	Description	Mean
9202515	Della t.	Aroma	4.0
		Flavor	8.5
9202854	Della t.	Aroma	4.2
		Flavor	8.0
9202858	Della t.	Aroma	4.8
		Flavor	9.5
9202864	Della t.	Aroma	4.0
		Flavor	9.0
9202995	Jsmn. t	Aroma	4.6
		Flavor	9.0
9102085	Della t.	Aroma	4.6
		Flavor	9.0
9202224	Bsmt. t.	Aroma	4.4
		Flavor	9.0
Della		Aroma	5.0
		Flavor	9.0
LSD		Aroma	0.3
		Flavor	0.5

Table 3. Means and standard deviations of rice aroma and flavor ratings by sensory panel among aromatic rice selections. 1993. USDA Southern Regional Research Center, New Orleans, LA.

Genotype ID	Type	Description	Mean	Std. Dev.	Min.	Max.
9202515	Della t.	Aroma	1.02	0.09	0.94	1.13
		Flavor	1.01	0.02	0.99	1.03
9202854*	Della t.	Aroma	0.98			
		Flavor	0.94			
9202858	Della t.	Aroma	0.99	0.10	0.92	1.06
		Flavor	0.99	0.05	0.96	1.03
9202864	Della t.	Aroma	1.14	0.12	1.00	1.22
		Flavor	1.12	0.09	1.05	1.22
9202995	Jsmn t.	Aroma	1.06	0.08	1.00	1.12
		Flavor	1.12	0.05	1.08	1.15
9102085	Della t.	Aroma	1.06	0.09	1.00	1.12
		Flavor	1.05	0.09	0.98	1.16
9202224	Bsmt. t.	Aroma	1.07	0.07	1.00	1.14
		Flavor	1.08	0.13	0.99	1.23
Della		Aroma	1.02	0.09	0.94	1.13
		Flavor	1.01	0.02	0.99	1.03

* Not replicated due to low seed source.

Table 4. Concentrations of 2-Acetyl-1-Pyrroline (ng g^{-1}) compound among selected aromatic rice lines. Crowley, LA. 1993.

Genotype ID	Mean	Std. Dev.
9202516	1770	± 3.2%
9202868	1340	± 0.1%
92SP311	1160	± 3.7%
9202990	1160	± 1.0%
Della	998	± 7.0%
9202506	986	± 1.0%
9202995	963	± 3.5%
9202854	904	± 1.4%
9202865	897	± 8.9%
92SP257	777	± 1.1%
92SP292	713	± 12.4%
9202879	157	± 8.4%
9202986	9	

GRAIN FISSURING AND MILLING YIELDS OF RICE GENOTYPES AS INFLUENCED BY HARVEST MOISTURE

F. Jodari and S.D. Linscombe

Milling quality directly influences the economic value of rice in many countries, especially in the United States. Obtaining a high milling quality is a major objective in rice variety development. As part of the objectives of state project 2925, newly released rice varieties and advanced experimental and breeding lines are being continuously evaluated at the Rice Research Station for their milling qualities.

Twelve genotypes were tested in 1992 and 1993. A randomized complete block design experiment with four replications was used. Varieties included 'L202,' 'Tebonnet,' 'Lacassine,' 'Cypress,' 'Leah,' 'Lemont,' and 'Bengal.' Experimental lines were 'LA 031,' 'LA 146,' 'LA 085,' and 'LA 115' for 1992 and LA 031, 'LA 192,' 'LA 071,' LA 085, and 'LA 155' for 1993. 'Maybelle' was also tested for 1 year during 1992. Entries were all drill seeded at a 100 lb/A rate. Experimental plots were 5 feet wide and 25 feet long. All agronomic practices used were similar to preliminary yield trials described earlier for 1992 and 1993.

Prior to maturity, a 3 x 4 square foot area of each plot was harvested for milling and fissuring measurements at time intervals. Sampling was initiated when grain moisture had reached 28% (280 g kg^{-1}). Subsequent samples were taken at 2- to 3-day intervals until grain moisture content decreased to about 13% (130 g kg^{-1}).

Samples were threshed in the field and taken to the lab for harvest moisture measurements. After slowly drying rough rice to 12% moisture, milling yields were determined using standard milling procedures. Sixty mature rough rice kernels were hand shelled at each harvest moisture to determine the percentage of fissured grain. Fissured grain counts after milling were also measured. Relative humidity and temperature were continuously monitored during the sampling period using a hygrothermograph located adjacent to the plots. Hourly rainfall data during the test period were also recorded.

Grain dimensions of brown rice for seven cultivars are shown in Table 1. The values for length/width ratio indicate significant differences between L202 (long, slender), Lemont (bold), and other long-grain cultivars. Bengal with a length/width ratio of 2.34 is considered as a bold medium-grain type.

Weather patterns during the grain maturity period were markedly different between 1992 and 1993. The total rainfall during the last 20 days of the sampling period, which was the beginning of fissuring among varieties, was 199 mm in 1992 and 45 mm in 1993. Daily minimum relative humidity and maximum temperatures (Figures 1 and 2) indicate that drying conditions during this period were considerably more severe in 1993 as compared with 1992. As a result, grain fissuring was considerably higher among varieties (Figures 1 and 2). Minimum daytime relative humidities of 35% are not uncommon in south Louisiana conditions. Maximum daily relative humidities range between 96 to 100%. A 65% fluctuation in daily high and low relative humidity observed in 1993 resulted in significant fissuring and consequent reduction in milling yield among susceptible varieties such as Leah and Lemont. Under these conditions, maximum milling yields are obtained at higher than average harvest moistures.

A significantly slower rate of reduction in grain moisture observed among certain varieties, such as Cypress and Bengal, in both years may be partially responsible for their fissuring resistance. Further investigation of this characteristic will continue.

Experimental line 2031 (released as Jodon) tested in 1992 and 1993 showed a relatively good resistance to fissuring (Table 2). Two experimental lines 2155 and 2115 (Tables 3 and 4) showed high milling yields at 66% (660 mg g^{-1}) head rice yield. Experimental 2115, however, showed a significantly higher fissuring resistance than line 2155.

Maximum head rice yields were obtained at harvest moistures of 16.5% (165 mg g^{-1}) for LA 2115 and 20.7% (207 mg g^{-1}) for LA 2155.

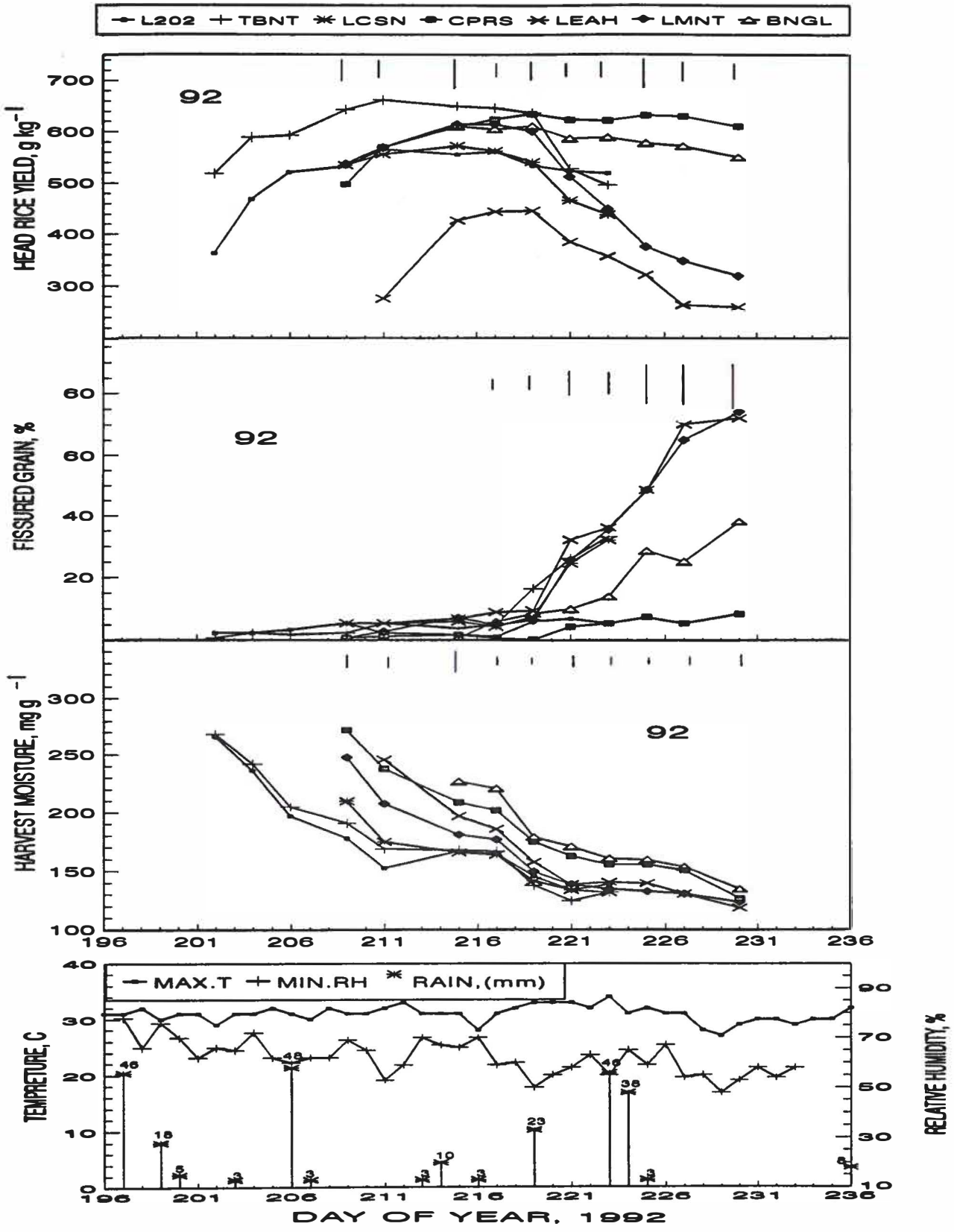


Figure 1. Changes in mean head rice yields, grain fissuring, grain moisture content, minimum relative humidity, and maximum temperatures by day. Vertical lines indicate LSD (0.05) values for each sampling period. 1992.

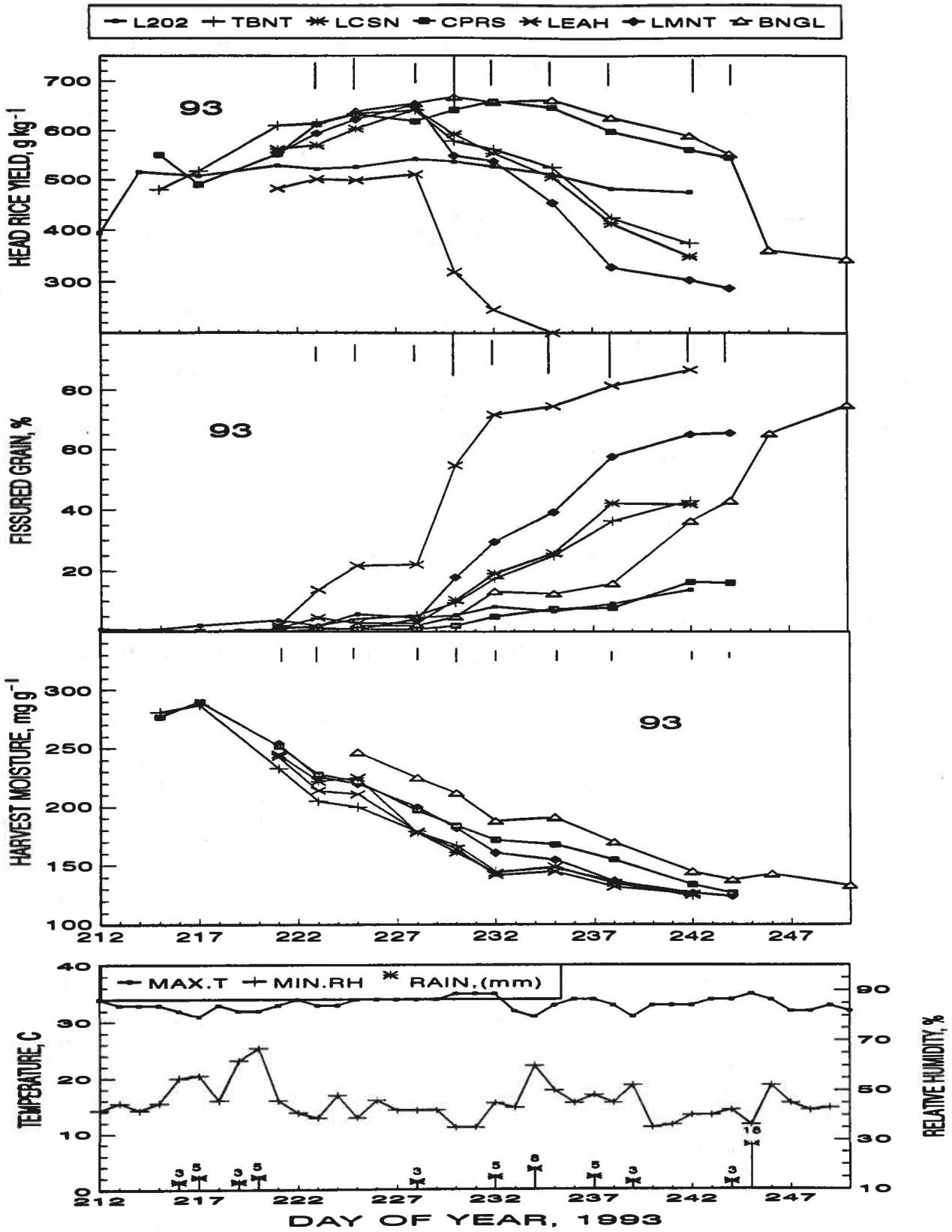


Figure 2. Changes in mean head rice yields, grain fissuring, grain moisture content, minimum relative humidity, and maximum temperatures by day. Vertical lines indicate LSD (0.05) values for each sampling period. 1993.

Table 1. Grain dimensions of brown rice among seven cultivars. Rice Research Station, Crowley, LA. 1993.

Cultivar	Grain Dimension			
	Length	Width	Thickness	L/W Ratio
	(mm)			
L202	8.11	2.26	1.83	3.59
Tebonnet	7.33	2.22	1.79	3.30
Lemont	7.42	2.37	1.83	3.13
Cypress	7.31	2.25	1.81	3.25
Lacassine	7.49	2.27	1.84	3.31
Leah	7.88	2.38	1.85	3.32
Bengal	6.20	2.65	1.98	2.34
LSD (0.05)	0.13	0.17	0.06	0.07
CV (%)	0.9	2.7	3.1	2.1

Table 2. Head rice yield and fissuring of experimental LA 2031 (Jodon) at decreasing harvest moisture, 1992 and 1993. Rice Research Station, Crowley, LA.

	1992			1993		
	HM[1]	HR[2]	FG[3]	HM	HR	FG
	mg g^{-1}		-%-	mg g^{-1}		-%-
	354	395	1.3	287	473	0.6
	271	514	3.0	277	534	0.0
	233	566	1.5	245	578	1.3
	207	610	2.0	217	588	1.3
	187	619	2.0	213	585	2.1
	171	618	2.0	191	591	4.6
	173	614	4.5	179	577	6.3
	150	611	2.5	163	567	7.5
	140	584	15.0	159	570	10.4
	142	564	10.5	143	513	10.0
	142	569	13.0	125	461	22.9
	133	541	18.5			
LSD (0.05)	15	21	10	17	17	6
CV (%)	6	8	9	8	6	11

[1] HM = harvest grain moisture. [2] HR = head rice yield.
[3] FG = Fissured grain count.

Table 3. Head rice yield and fissuring of experimental LA 2155 at decreasing harvest moisture. Rice Research Station, Crowley, La. 1993.

	HM[1]	HR[2]	FG[3]
	mg g^{-1}		--%--
	266	615	4.2
	253	638	5.8
	244	630	5.8
	224	655	1.3
	207	664	3.3
	184	591	20.4
	179	604	20.4
	159	611	30.4
	145	565	31.3
	135	534	38.3
	138	366	70.4
LSD (0.05)	15	19	8
CV (%)	7	6	14

[1] HM = harvest grain moisture. [2] HR = head rice yield.
[3] FG = Fissured grain count.

Table 4. Head rice yield and fissuring of experimental LA 2115 at decreasing harvest moisture. Rice Research Station, Crowley, LA. 1993.

	HM[1]	HR[2]	FG[3]
	mg g^{-1}		--%--
	304	415	0.5
	254	476	2.0
	220	594	1.0
	213	644	0.5
	190	646	2.0
	182	643	3.0
	165	666	3.5
	160	654	2.0
	165	655	5.0
	142	653	3.0
	134	615	8.0
	137	603	10.5
LSD (0.05)	18	16	5
CV (%)	9	6	13

[1] HM = harvest grain moisture. [2] HR = head rice yield.
[3] FG = Fissured grain count.

CEREAL CROPS AND COASTAL EROSION CONTROL BIOTECHNOLOGY RESEARCH

RICE AND WHEAT IMPROVEMENT THROUGH BIOTECHNOLOGY[1]

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INTRODUCTION

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. Losses to red rice are significant in U.S. rice production. Providing an effective method for controlling red rice during the commercial rice crop 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. This would also give growers the flexibility to crop rice without intervening rotation crops to control red rice.

Developing the capability to conduct effective *in vitro* screening, using both suspension cells and protoplasts, provides a tool for developing useful new germplasm for varietal development purposes. An example of what might be accomplished through this technology is the development of more nutritious rice through cellular level selection of the overproduction of lysine. Protoplasts can further be used for genetic engineering of plants with introduced characteristics of breeding value. Overall, genetic engineering technology offers the opportunity to develop plants with characteristics unobtainable by traditional plant breeding techniques. The capability to conduct such work with rice germplasm adapted to Louisiana's conditions offers the potential for direct benefits to Louisiana producers from this new technology.

MATERIALS AND METHODS

RICE - Over 28,000 rows of biotechnology-derived rice lines were sprayed to screen for herbicide-resistant mutants during the summer of 1993. Three foot long rows planted 14 inches apart were sprayed with 15 gallons per acre of spray solution. Herbicides used were Pursuit and Accent. In 1991, this approach was effective in identifying a mutant rice with resistance to the herbicide Pursuit. Further evaluations in 1992 showed that this herbicide resistant line had a good yield potential along with improved resistance to Accent, Scepter, and Pursuit. More extensive testing was conducted with the herbicide resistant line in 1993. Several herbicides were evaluated for their effects on the herbicide

[1] This research is supported in part by funds provided by producers through the Louisiana Rice Research Board and the Louisiana Soybean and Grain Research and Promotion Board.

resistant line and the check variety Lemont. Additional field tests evaluated the effect of Pursuit, Scepter, and Accent applications at different maturity stages, planting densities, and nitrogen fertility levels. Also, 35 million M_2 seedlings were sprayed with Accent and Pursuit herbicides in the field to screen for herbicide resistant mutants. Concurrently, rice suspension cells were exposed to high concentrations of herbicides in the suspension medium to conduct cellular level selection for mutant cells from which herbicide resistant plants might be developed.

WHEAT - Wheat somaclones were produced from the wheat varieties Florida 302, Florida 303, Florida 304, Wakefield, and Madison, along with eight advanced breeding lines from the Louisiana wheat breeding program. The nutrient medium used for somaclone production was a modified Murashige and Skoog medium. A total of 42,300 wheat anthers from the Louisiana wheat breeding program germplasm were plated during 1993.

RESULTS AND DISCUSSION

RICE - The results of the field evaluations are presented in Tables 1-5. Wet weather delayed planting 5 weeks in 1993, and yields were considerably lower than in 1992. Besides reducing yields in 1993, the delay in planting that year also increased herbicide injury because of the high temperatures at the time of herbicide application. Treating with herbicides reduced yields of both the herbicide-resistant line and Lemont, but had a much greater effect on Lemont.

Screening mutagenized rice for herbicide resistance identified one plant which exhibitied no injury symptoms from a 2X Pursuit treatment (0.125 lb ai/A). This line appears to have a high level of resistance to several AHAS-inhibiting herbicides. A greenhouse seed increase of this material is in progress.

A plant developed through cellular level selection survived a 2X Pursuit application (0.125 lb ai/A) with no symptoms of injury. Crosses were made between the herbicide resistant lines and with several leading varieties in 1993, providing material that can be rapidly advanced and purified through anther culture in 1994.

WHEAT - During 1993, progeny seed from 1,655 new wheat somaclones was produced and provided to Dr. Harrison. Seed from an additional 1438 R_1 (somaclone) progeny rows was also provided to the wheat breeding program. Dr. Harrison will evaluate the 3,093 lines in his breeding nursery for improvements and seed from superior individuals will be saved for further testing. This technique has proved successful in producing lines with improved disease resistance in previous research in this program.

Seed from 43 field-grown anther culture lines developed through anther culture was harvested and provided to Dr. Harrison for evaluation. An additional 138 dishes of new anther culture plants were developed in 1993. Fifty six of the dishes contained plants suitable for planting to produce seed and were provided to Dr. Harrison. This material was derived from a total of 15 of Dr. Harrison's wheat breeding stocks.

Test 1. Planting density X nitrogen fertility X herbicide treatment test with herbicide resistant line and Lemont check.

-	Seeding rates:	50 lb/A 100 lb/A 150 lb/A
-	Top dress N rates: (28-84-84 w/Z ppi)	100 lb/A 150 lb/A 200 lb/A
-	Herbicide trtmts: (32 days after planting; treated w/Arrosolo at 27 d)	No herbicide Accent - 1X Pursuit - 1X Scepter - 1X
-	Genotypes:	Herbicide-resistant line Lemont
-	Replicates:	3

NOTES

1. Top dressed with nitrogen pre-flood.

2. Dimensions of test:

    1. plot length: 18 feet
    2. plot width: 4.7 feet
    3. space between 24 plots in tier: 4 feet
    4. space between 3 tiers in rep: 10 feet
    5. space between reps: 20 feet
    6. total size of test was 57,680 sq. ft. (about 1.4 acre)

TABLE 1A. Planting density X nitrogen fertility X herbicide treatment of herbicide resistant line and Lemont check with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
ACCENT 1.0X	50	100	RES LINE	214	6018	22	6123
				214	5477	21	5594
				215	4726	19	4961
			Mean =	214	5407	21	5559
ACCENT 1.0X	50	100	LEMONT	235	0	0	0
				231	38	0	49
				237	0	0	0
			Mean =	234	13	0	16
ACCENT 1.0X	50	150	RES LINE	214	6122	22	6173
				214	6427	22	6522
				215	6000	22	6034
			Mean =	214	6183	22	6243
ACCENT 1.0X	50	150	LEMONT	235	0	0	0
				233	0	0	0
				235	0	0	0
			Mean =	234	0	0	0
ACCENT 1.0X	50	200	RES LINE	215	5731	23	5757
				215	6267	22	6327
				216	4741	22	4805
			Mean =	215	5580	22	5630
ACCENT 1.0X	50	200	LEMONT	235	0	0	0
				229	0	0	0
				230	0	0	0
			Mean =	231	0	0	0
ACCENT 1.0X	100	100	RES LINE	214	6557	22	6595
				213	6348	22	6426
				212	5375	20	5587
			Mean =	213	6093	21	6203
ACCENT 1.0X	100	100	LEMONT	231	136	0	176
				220	558	17	599
				227	217	0	281
			Mean =	226	304	6	352
ACCENT 1.0X	100	150	RES LINE	214	6804	22	6870
				214	6678	23	6664
				215	5735	22	5775
			Mean =	214	6406	22	6436
ACCENT 1.0X	100	150	LEMONT	235	0	0	0
				235	0	0	0
				233	0	0	0
			Mean =	234	0	0	0

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
ACCENT 1.0X	100	200	RES LINE	214	6209	22	6261
				215	6510	23	6497
				217	4015	21	4090
			Mean =	215	5578	22	5616
ACCENT 1.0X	100	200	LEMONT	231	36	0	47
				233	184	0	238
				231	343	19	359
			Mean =	232	188	6	215
ACCENT 1.0X	150	100	RES LINE	213	6579	21	6711
				212	6808	21	6944
				216	4578	17	4937
			Mean =	214	5988	20	6197
ACCENT 1.0X	150	100	LEMONT	235	695	0	901
				229	1326	19	1385
				221	193	0	250
			Mean =	228	738	6	845
ACCENT 1.0X	150	150	RES LINE	215	6378	21	6572
				213	6665	23	6695
				216	5047	20	5233
			Mean =	215	6030	21	6167
ACCENT 1.0X	150	150	LEMONT	220	272	16	295
				233	45	0	58
				233	0	0	0
			Mean =	229	106	5	118
ACCENT 1.0X	150	200	RES LINE	215	6860	23	6864
				215	6163	22	6270
				214	6290	21	6424
			Mean =	215	6438	22	6519
ACCENT 1.0X	150	200	LEMONT	217	2004	16	2177
				235	138	0	179
				237	0	0	0
			Mean =	230	714	5	785
PURSUIT 1.0X	50	100	RES LINE	220	1533	17	1649
				226	1306	20	1358
				221	2546	18	2716
			Mean =	222	1795	18	1908
PURSUIT 1.0X	50	100	LEMONT	220	34	0	44
				235	0	0	0
				235	112	0	145
			Mean =	230	49	0	63

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
PURSUIT 1.0X	50	150	RES LINE	227	1012	20	1055
				221	1556	18	1652
				225	640	20	664
			Mean =	224	1069	19	1124
PURSUIT 1.0X	50	150	LEMONT	235	0	0	0
				237	0	0	0
				230	0	0	0
			Mean =	234	0	0	0
PURSUIT 1.0X	50	200	RES LINE	227	1111	16	1204
				218	3972	17	4293
				221	1110	17	1193
			Mean =	222	2064	17	2230
PURSUIT 1.0X	50	200	LEMONT	235	0	0	0
				231	104	0	135
				225	0	0	0
			Mean =	230	35	0	45
PURSUIT 1.0X	100	100	RES LINE	221	2940	16	3197
				221	3331	18	3553
				221	1719	18	1831
			Mean =	221	2663	17	2860
PURSUIT 1.0X	100	100	LEMONT	237	0	0	0
				235	0	0	0
				237	0	0	0
			Mean =	236	0	0	0
PURSUIT 1.0X	100	150	RES LINE	219	3061	16	3329
				222	3554	17	3832
				221	2124	18	2263
			Mean =	221	2913	17	3141
PURSUIT 1.0X	100	150	LEMONT	235	0	0	0
				225	58	0	75
				235	0	0	0
			Mean =	232	19	0	25
PURSUIT 1.0X	100	200	RES LINE	221	2188	17	2342
				219	3166	16	3443
				225	1481	21	1511
			Mean =	222	2278	18	2432
PURSUIT 1.0X	100	200	LEMONT	235	0	0	0
				233	89	0	115
				240	0	0	0
			Mean =	236	30	0	38

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
PURSUIT 1.0X	150	100	RES LINE	223	2040	18	2157
				218	4233	22	4257
				226	1991	17	2134
			Mean =	222	2755	19	2849
PURSUIT 1.0X	150	100	LEMONT	235	62	0	80
				235	155	0	201
				240	0	0	0
			Mean =	237	72	0	94
PURSUIT 1.0X	150	150	RES LINE	223	2880	18	3061
				221	3813	17	4082
				218	3398	20	3532
			Mean =	221	3364	18	3558
PURSUIT 1.0X	150	150	LEMONT	235	0	0	0
				233	88	0	114
				231	162	0	210
			Mean =	233	83	0	108
PURSUIT 1.0X	150	200	RES LINE	217	4800	22	4828
				220	3560	17	3853
				221	3572	18	3810
			Mean =	219	3977	19	4164
PURSUIT 1.0X	150	200	LEMONT	232	84	0	109
				237	89	0	115
				235	49	0	64
			Mean =	235	74	0	96
SCEPTER 1.0X	50	100	RES LINE	227	856	17	917
				224	537	17	578
				223	1305	19	1370
			Mean =	225	899	18	955
SCEPTER 1.0X	50	100	LEMONT	233	129	0	167
				235	0	0	0
				233	0	21	0
			Mean =	234	43	7	56
SCEPTER 1.0X	50	150	RES LINE	221	1561	17	1681
				229	287	17	308
				221	1918	17	2061
			Mean =	224	1255	17	1350
SCEPTER 1.0X	50	150	LEMONT	235	47	0	61
				240	0	0	0
				235	45	0	58
			Mean =	237	31	0	40

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
SCEPTER 1.0X	50	200	RES LINE	227	570	19	599
				221	517	18	551
				225	482	18	510
			Mean =	224	523	18	553
SCEPTER 1.0X	50	200	LEMONT	235	80	0	104
				235	0	0	0
				233	0	0	0
			Mean =	234	27	0	35
SCEPTER 1.0X	100	100	RES LINE	225	734	18	779
				221	2563	16	2780
				218	2967	18	3153
			Mean =	221	2088	17	2237
SCEPTER 1.0X	100	100	LEMONT	235	154	0	200
				229	82	0	106
				240	0	0	0
			Mean =	235	79	0	102
SCEPTER 1.0X	100	150	RES LINE	227	627	19	657
				225	1045	15	1150
				223	1511	16	1643
			Mean =	225	1061	17	1150
SCEPTER 1.0X	100	150	LEMONT	235	72	0	93
				235	0	0	0
				233	89	0	115
			Mean =	234	54	0	69
SCEPTER 1.0X	100	200	RES LINE	222	1534	16	1668
				221	2578	17	2763
				225	439	17	471
			Mean =	223	1517	17	1634
SCEPTER 1.0X	100	200	LEMONT	231	210	0	272
				231	260	0	337
				230	271	17	291
			Mean =	231	247	6	300
SCEPTER 1.0X	150	100	RES LINE	224	1913	20	1996
				221	2593	17	2806
				218	2514	16	2747
			Mean =	221	2340	17	2516
SCEPTER 1.0X	150	100	LEMONT	231	182	0	236
				231	300	18	320
				233	148	0	192
			Mean =	232	210	6	248

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
SCEPTER 1.0X	150	150	RES LINE	224	1580	17	1704
				225	1186	17	1277
				225	1390	19	1452
			Mean =	225	1385	18	1478
SCEPTER 1.0X	150	150	LEMONT	235	96	0	124
				235	76	0	99
				233	131	0	170
			Mean =	234	101	0	131
SCEPTER 1.0X	150	200	RES LINE	225	1218	17	1315
				225	1089	19	1149
				225	1064	16	1153
			Mean =	225	1124	17	1206
SCEPTER 1.0X	150	200	LEMONT	233	284	23	285
				233	239	0	310
				235	91	0	118
			Mean =	234	205	8	238
CHECK 1	50	100	RES LINE	208	8338	20	8634
				207	8506	20	8853
				207	6852	21	7060
			Mean =	207	7899	20	8182
CHECK 2	50	100	LEMONT	207	8196	15	9029
				210	216	16	8236
				208	8399	14	9394
			Mean =	208	5604	15	8886
CHECK 3	50	150	RES LINE	208	8259	22	8328
				207	8209	19	8575
				209	6773	20	7031
			Mean =	208	7747	21	7978
CHECK 4	50	150	LEMONT	210	7693	16	8355
				210	7306	17	7821
				212	7789	17	8339
			Mean =	211	7596	17	8172
CHECK 5	50	200	RES LINE	209	8226	22	8295
				208	7712	21	7926
				210	7066	21	7235
			Mean =	209	7668	21	7819
CHECK 6	50	200	LEMONT	209	7613	17	8199
				210	8348	18	8872
				212	7125	20	7434
			Mean =	210	7695	18	8168

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK 7	100	100	RES LINE	207	7805	19	8214
				207	8804	22	8877
				206	7503	17	8081
			Mean =	207	8037	19	8391
CHECK 8	100	100	LEMONT	206	6550	15	7241
				207	8026	16	8748
				207	7915	14	8822
			Mean =	207	7497	15	8270
CHECK 9	100	150	RES LINE	208	8082	20	8359
				207	7855	21	8083
				207	7785	20	8042
			Mean =	207	7907	20	8161
CHECK 10	100	150	LEMONT	210	7720	18	8185
				208	8037	16	8802
				212	7518	17	8117
			Mean =	210	7758	17	8368
CHECK 11	100	200	RES LINE	209	7901	22	7946
				208	8330	22	8464
				209	7381	23	7414
			Mean =	209	7871	22	7941
CHECK 12	100	200	LEMONT	209	7107	17	7627
				211	7488	18	7948
				212	7704	17	8277
			Mean =	211	7433	17	7951
CHECK 13	150	100	RES LINE	207	8667	21	8852
				206	7905	19	8258
				206	7975	19	8341
			Mean =	206	8182	20	8484
CHECK 14	150	100	LEMONT	206	7365	15	8076
				206	8000	15	8824
				207	7866	13	8880
			Mean =	206	7744	14	8593
CHECK 15	150	150	RES LINE	208	8329	22	8474
				208	8153	22	8221
				207	7923	20	8194
			Mean =	208	8135	21	8296
CHECK 16	150	150	LEMONT	208	6496	16	7106
				207	7227	14	8083
				219	5926	22	6021
			Mean =	211	6550	17	7070

Continued.

TABLE 1A. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK 17	150	200	RES LINE	212	7456	24	7393
				209	8206	23	8179
				209	7408	22	7451
			Mean =	210	7690	23	7674
CHECK 18	150	200	LEMONT	211	7562	16	8243
				210	8158	17	8818
				211	7553	19	7978
			Mean =	211	7758	17	8346

TABLE 1B. Planting density X nitrogen fertility X herbicide treatment of herbicide resistant line and Lemont check with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A at 12% moisture)
ACCENT 1.0X	50	100	RES LINE	214n-q	5407g	21ab	5559e
ACCENT 1.0X	50	100	LEMONT	234a-d	13o	0c	16pq
ACCENT 1.0X	50	150	RES LINE	214n-q	6183d-g	22ab	6243de
ACCENT 1.0X	50	150	LEMONT	234a-d	0o	0c	0q
ACCENT 1.0X	50	200	RES LINE	215mno	5580g	22ab	5630e
ACCENT 1.0X	50	200	LEMONT	231a-e	0o	0c	0q
ACCENT 1.0X	100	100	RES LINE	213o-s	6093efg	21ab	6203de
ACCENT 1.0X	100	100	LEMONT	226e-k	304no	6c	352n-q
ACCENT 1.0X	100	150	RES LINE	214n-q	6406c-g	22ab	6436de
ACCENT 1.0X	100	150	LEMONT	234a-d	0o	0c	0q
ACCENT 1.0X	100	200	RES LINE	215mno	5578g	22ab	5616e
ACCENT 1.0X	100	200	LEMONT	232a-e	188o	6c	215opq
ACCENT 1.0X	150	100	RES LINE	214n-r	5988fg	20ab	6197de
ACCENT 1.0X	150	100	LEMONT	228d-j	738mno	6c	845l-q
ACCENT 1.0X	150	150	RES LINE	215nop	6030efg	21ab	6167de
ACCENT 1.0X	150	150	LEMONT	229d-i	106o	5c	118opq
ACCENT 1.0X	150	200	RES LINE	215nop	6438c-g	22ab	6519de

Continued.

TABLE 1B. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A at 12% moisture)
ACCENT 1.0X	150	200	LEMONT	230c-h	714mno	5c	785m-q
PURSUIT 1.0X	50	100	RES LINE	222jkl	1795j-n	18ab	1908i-l
PURSUIT 1.0X	50	100	LEMONT	230b-g	49o	0c	63pq
PURSUIT 1.0X	50	150	RES LINE	224g-l	10691-o	19ab	11241-q
PURSUIT 1.0X	50	150	LEMONT	234a-d	0o	0c	0q
PURSUIT 1.0X	50	200	RES LINE	222kl	2064i-m	17ab	2230h-k
PURSUIT 1.0X	50	200	LEMONT	230a-g	35o	0c	45pq
PURSUIT 1.0X	100	100	RES LINE	221klm	2663h-k	17ab	2860ghi
PURSUIT 1.0X	100	100	LEMONT	236ab	0o	0c	0q
PURSUIT 1.0X	100	150	RES LINE	221klm	2913hij	17ab	3141gh
PURSUIT 1.0X	100	150	LEMONT	232a-e	19o	0c	25pq
PURSUIT 1.0X	100	200	RES LINE	222kl	2278i-l	18ab	2432hij
PURSUIT 1.0X	100	200	LEMONT	236abc	30o	0c	38pq
PURSUIT 1.0X	150	100	RES LINE	222jkl	2755h-k	19ab	2849ghi
PURSUIT 1.0X	150	100	LEMONT	237a	72o	0c	94opq
PURSUIT 1.0X	150	150	RES LINE	221klm	3364hi	18ab	3558fg
PURSUIT 1.0X	150	150	LEMONT	233a-d	83o	0c	108opq
PURSUIT 1.0X	150	200	RES LINE	219lmn	3977h	19ab	4164f
PURSUIT 1.0X	150	200	LEMONT	235a-d	74o	0c	96opq
SCEPTER 1.0X	50	100	RES LINE	225f-l	8991-o	18ab	9551-q
SCEPTER 1.0X	50	100	LEMONT	234a-d	43o	7c	56pq
SCEPTER 1.0X	50	150	RES LINE	224h-l	1255k-o	17ab	1350k-n
SCEPTER 1.0X	50	150	LEMONT	237a	31o	0c	40pq
SCEPTER 1.0X	50	200	RES LINE	224g-l	523no	18ab	553m-q
SCEPTER 1.0X	50	200	LEMONT	234a-d	27o	0c	35pq
SCEPTER 1.0X	100	100	RES LINE	221kl	2088i-m	17ab	2237h-k
SCEPTER 1.0X	100	100	LEMONT	235a-d	79o	0c	102opq
SCEPTER 1.0X	100	150	RES LINE	225f-l	10611-o	17ab	11501-p
SCEPTER 1.0X	100	150	LEMONT	234a-d	54o	0c	69opq
SCEPTER 1.0X	100	200	RES LINE	223i-l	1517j-o	17ab	1634j-m
SCEPTER 1.0X	100	200	LEMONT	231a-f	247o	6c	300n-q

Continued.

TABLE 1B. Continued.

Treatment	Seeding Rate (lb/A)	Nitrogen Rate (lb/A)	Genotype	Julian Date of 50% Heading	Plot Weight in Grams	Percent Moisture	Yield (lb/A at 12% moisture)
SCEPTER 1.0X	150	100	RES LINE	221klm	2340i-l	17ab	2516hij
SCEPTER 1.0X	150	100	LEMONT	232a-e	210o	6c	249n-q
SCEPTER 1.0X	150	150	RES LINE	225f-l	1385k-o	18ab	1478j-m
SCEPTER 1.0X	150	150	LEMONT	234a-d	101o	0c	131opq
SCEPTER 1.0X	150	200	RES LINE	225f-l	11241-o	17ab	1206k-o
SCEPTER 1.0X	150	200	LEMONT	234a-d	205o	8c	238opq
CHECK 1	50	100	RES LINE	207st	7899abc	20ab	8182ab
CHECK 2	50	100	LEMONT	208q-t	5604g	15b	8886a
CHECK 3	50	150	RES LINE	208rst	7747abc	21ab	7978abc
CHECK 4	50	150	LEMONT	211o-t	7596a-d	17ab	8172ab
CHECK 5	50	200	RES LINE	209p-t	7668abc	21ab	7819abc
CHECK 6	50	200	LEMONT	210o-t	7695a-d	18ab	8168ab
CHECK 7	100	100	RES LINE	207t	8037ab	19ab	8391ab
CHECK 8	100	100	LEMONT	207t	7497a-e	15ab	8270ab
CHECK 9	100	150	RES LINE	207st	7907abc	20ab	8161ab
CHECK 10	100	150	LEMONT	210o-t	7758abc	17ab	8368ab
CHECK 11	100	200	RES LINE	209p-t	7871abc	22ab	7941abc
CHECK 12	100	200	LEMONT	211o-t	7433a-f	17ab	7951abc
CHECK 13	150	100	RES LINE	206t	8182a	20ab	8484ab
CHECK 14	150	100	LEMONT	206t	7744abc	14b	8593ab
CHECK 15	150	150	RES LINE	208rst	8135a	21ab	8296ab
CHECK 16	150	150	LEMONT	211o-t	6550b-g	17ab	7070cd
CHECK 17	150	200	RES LINE	210o-t	7690abc	23a	7674bc
CHECK 18	150	200	LEMONT	211o-t	7758abc	17ab	8346ab
	LSD (.05) =			5	1271	6	920
	Standard Dev.=			3.1827	786.33	4.0182	569.1
	CV =			1.43	24.73	32.00	16.88

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05)

TABLE 1C. Planting density X nitrogen fertility X herbicide treatment of herbicide resistant line and Lemont check with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Analysis of Variance for Julian Date of 50% Heading

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	215	22967.32			
BLOCK	2	19.56	9.78	0.966	0.3832
TREATMENT	71	21509.32	302.94	29.907	0.0001
ERROR	142	1438.43	10.12		

Analysis of Variance for Plot Weight in Grams

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	215	2262780483.33			
BLOCK	2	4254948.77	2127474.38	3.441	0.0347
TREATMENT	71	2170722889.33	30573561.82	49.445	0.0001
ERROR	142	87802645.22	618328.48		

Analysis of Variance for Percent Moisture

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	215	17929.20			
BLOCK	2	0.94	0.47	0.029	0.9713
TREATMENT	71	15635.51	220.21	13.639	0.0001
ERROR	142	2292.75	16.14		

Analysis of Variance for Yield in lb/A at 12% Moisture

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	215	2479170792.64			
BLOCK	2	6805377.56	3402688.78	10.506	0.0001
TREATMENT	71	2426374809.31	34174293.08	105.516	0.0001
ERROR	142	45990605.76	323877.50		

Test 2. Herbicide treatment of resistant line and Lemont at various maturity stages with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

- Seeding rate: 100 lb/A
- Top dress N rate: (28-84-84 w/Z ppi) 125 lb/A
- Herbicide trtmts: (treated with Arrosolo 27 days after planting)
  - No herbicide
  - Accent - 1X
  - Pursuit - 1X
  - Scepter - 1X
- Treatment times:
  - Pre-flood
  - Green ring stage
  - Mid boot stage
- Genotypes:
  - Herbicide resistant line
  - Lemont
- Replicates: 4

NOTES

1. Dimensions of test:
   1. plot length: 18 feet
   2. plot width: 4.7 feet
   3. space between plots within tier: 4 feet
   4. space between tiers: 10 feet
   5. Total size of test was 30,360 sq. ft. (about 0.7 acre).

TABLE 2A. Herbicide treatment of resistant line and Lemont at various maturity stages with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Treatment Name	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Julian Date of 50% Heading	Percent Moisture	Yield (lb/A @ 12% moisture)
PRE FLOOD		6212.0	214	21.70	6304
ACCENT 1.0 X	0.031	5801.0	214	20.30	5992
RESISTANT LINE		4828.0	214	17.60	5156
		5427.0	211	18.70	5718
	Mean =	5567.0	213	19.58	5793
PRE FLOOD		12.0	233	21.70	12
ACCENT 1.0 X	0.031	165.0	-	25.00	160
LEMONT		109.0	-	25.00	106
		242.0	-	25.00	235
	Mean =	132.0	233	24.17	128
PRE FLOOD		1769.0	222	18.90	1859
PURSUIT 1.0 X	0.063	2879.0	222	18.30	3049
RESISTANT LINE		2125.0	221	15.40	2330
		2949.0	222	16.50	3191
	Meen =	2430.5	222	17.27	2607
PRE FLOOD		0.0	-	0.00	0
PURSUIT 1.0 X	0.063	0.0	-	0.00	0
LEMONT		0.0	-	0.00	0
		180.0	-	25.00	175
	Mean =	45.0	-	6.25	44
PRE FLOOD		3723.0	220	17.00	4005
SCEPTER 1.0 X	0.125	2936.0	218	15.00	3234
RESISTANT LINE		3395.0	218	15.60	3714
		3311.0	217	16.00	3605
	Mean =	3341.3	218	15.90	3640
PRE FLOOD		830.0	229	19.30	868
SCEPTER 1.0 X	0.125	1386.0	-	21.30	1414
LEMONT		533.0	-	18.30	564
		237.0	-	25.00	230
	Mean =	746.5	229	20.97	769
CHECK		7466.0	208	21.20	7625
RESISTANT LINE		7561.0	207	21.20	7722
		6942.0	207	19.40	7252
		6893.0	207	20.90	7067
	Mean =	7215.5	207	20.68	7417

Continued.

TABLE 2A. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Julian Date of 50% Heading	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK		8283.0	208	14.80	9146
LEMONT		7563.0	207	12.70	8557
		6429.0	207	13.50	7208
		8110.0	206	12.80	9166
	Mean =	7596.3	207	13.45	8519
CHECK		7839.0	208	21.20	8006
RESISTANT LINE		7928.0	207	19.30	8292
		7449.0	207	19.90	7733
		6757.0	207	18.70	7120
	Mean =	7493.3	207	19.78	7788
CHECK		8403.0	208	15.20	9235
LEMONT		7966.0	207	14.00	8879
		6308.0	210	13.50	7072
		7646.0	206	12.60	8661
	Mean =	7580.8	208	13.83	8462
CHECK		7681.0	207	21.40	7825
RESISTANT LINE		7294.0	207	20.70	7497
		6940.0	207	20.10	7187
		6469.0	207	19.80	6724
	Mean =	7096.0	207	20.50	7308
CHECK		8223.0	208	15.00	9059
LEMONT		7038.0	207	14.70	7781
		7258.0	207	13.10	8175
		7474.0	206	13.60	8369
	Mean =	7498.3	207	14.10	8346
CHECK		8027.0	207	20.10	8312
RESISTANT LINE		6908.0	206	19.50	7207
		6790.0	207	17.70	7243
		6669.0	207	16.90	7183
	Mean =	7098.5	207	18.55	7486
CHECK		8075.0	208	14.40	8959
LEMONT		8049.0	207	14.90	8878
		6677.0	208	13.20	7512
		6782.0	208	12.80	7665
	Mean =	7395.8	208	13.82	8254
CHECK		7300.0	207	20.10	7560
RESISTANT LINE		7052.0	207	20.60	7257
		6733.0	207	20.20	6964
		6046.0	207	16.50	6543
	Mean =	6782.8	207	19.35	7081

Continued.

TABLE 2A. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Julian Date of 50% Heading	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK		8602.0	207	15.20	9454
LEMONT		7485.0	207	12.70	8469
		7598.0	207	12.90	8577
		7446.0	207	13.50	8348
	Mean =	7782.8	207	13.57	8712
GREEN RING STAGE		7463.0	207	21.90	7554
ACCENT 1.0 X	0.031	7344.0	207	19.80	7634
RESISTANT LINE		7143.0	207	20.10	7397
		7292.0	207	18.10	7740
	Mean =	7310.5	207	19.97	7581
GREEN RING STAGE		7820.0	207	14.30	8686
ACCENT 1.0 X	0.031	8136.0	207	13.70	9100
LEMONT		6599.0	208	13.90	7364
		7556.0	206	13.10	8510
	Mean =	7527.8	207	13.75	8415
GREEN RING STAGE		2540.0	223	23.30	2525
PURSUIT 1.0 X	0.063	2900.0	223	22.00	2932
RESISTANT LINE		2996.0	222	22.30	3017
		3234.0	222	21.40	3294
	Mean =	2917.5	223	22.25	2942
GREEN RING STAGE		1348.0	-	25.00	1310
PURSUIT 1.0 X	0.063	1145.0	-	25.00	1113
LEMONT		2077.0	-	23.60	2057
		1777.0	-	25.00	1727
	Mean =	1586.8	-	24.65	1552
GREEN RING STAGE		3778.0	222	21.60	3839
SCEPTER 1.0 X	0.125	3748.0	223	21.20	3828
RESISTANT LINE		3651.0	221	19.90	3790
		3933.0	222	20.30	4063
	Mean =	3777.5	222	20.75	3880
GREEN RING STAGE		3560.0	222	22.10	3594
SCEPTER 1.0 X	0.125	3106.0	225	23.10	3096
LEMONT		2912.0	223	22.60	2921
		3046.0	218	21.00	3119
	Mean =	3156.0	222	22.20	3183
CHECK		7533.0	207	21.30	7684
RESISTANT LINE		7538.0	207	21.00	7718
		7993.0	207	19.20	8370
		7057.0	207	19.40	7372
	Mean =	7530.3	207	20.23	7786

Continued.

TABLE 2A. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Julian Date of 50% Heading	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK		8136.0	207	13.90	9079
LEMONT		8291.0	207	14.90	9145
		7609.0	207	12.70	8609
		6828.0	207	12.90	7708
	Mean =	7716.0	207	13.60	8635
MID BOOT		2858.0	224	25.00	2778
ACCENT 1.0 X	0.031	3219.0	225	23.10	3208
RESISTANT LINE		2948.0	221	22.70	2953
		3084.0	222	23.50	3058
	Mean =	3027.3	223	23.58	2999
MID BOOT		210.0	-	25.00	204
ACCENT 1.0 X	0.031	288.0	-	25.00	280
LEMONT		278.0	-	25.00	270
		554.0	226	25.00	539
	Mean =	332.5	226	25.00	323
MID BOOT		1618.0	-	25.00	1573
PURSUIT 1.0 X	0.063	1688.0	-	25.00	1641
RESISTANT LINE		1529.0	-	23.80	1510
		2061.0	-	25.00	2003
	Mean =	1724.0	-	24.70	1682
MID BOOT		65.0	-	25.00	63
PURSUIT 1.0 X	0.063	109.0	-	25.00	106
LEMONT		98.0	-	25.00	95
		72.0	-	25.00	70
	Mean =	86.0	-	25.00	84
MID BOOT		2455.0	-	24.50	2402
SCEPTER 1.0 X	0.125	2772.0	-	25.00	2695
RESISTANT LINE		2842.0	226	25.00	2763
		2676.0	226	23.60	2650
	Mean =	2686.3	226	24.52	2628
MID BOOT		181.0	-	25.00	176
SCEPTER 1.0 X	0.125	110.0	-	25.00	107
LEMONT		271.0	-	25.00	263
		345.0	226	25.00	335
	Mean =	226.8	226	25.00	220
CHECK		7602.0	207	21.10	7774
RESISTANT LINE		7565.0	207	20.20	7824
		6464.0	207	16.90	6962
		7017.0	207	18.40	7421
	Mean =	7162.0	207	19.15	7495

Continued.

TABLE 2A. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Julian Date of 50% Heading	Percent Moisture	Yield (lb/A @ 12% moisture)
CHECK		8019.0	207	13.70	8969
LEMONT		6990.0	207	13.40	7846
		7407.0	206	12.70	8381
		5707.0	209	13.50	6398
	Mean =	7030.8	207	13.32	7899

TABLE 2B. Herbicide treatment of resistant line and Lemont at various maturity stages with Accent, Pursuit, and Scepter. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Treatment Name	Herbicide Rate (lb ai/A)	Yield in Grams	Percent Moisture	Yield (lb/A @ 12% Moisture
PRE FLOOD ACCENT 1.0 X RESISTANT LINE	0.031	5567.0c	19.58e-h	5793g
PRE FLOOD ACCENT 1.0 X LEMONT	0.031	132.0h	24.17a-d	1281
PRE FLOOD PURSUIT 1.0 X RESISTANT LINE	0.063	2430.5f	17.27ghi	2607j
PRE FLOOD PURSUIT 1.0 X LEMONT	0.063	45.0h	6.25j	441
PRE FLOOD SCEPTER 1.0 X RESISTANT LINE	0.125	3341.3de	15.90hi	3640hi
PRE FLOOD SCEPTER 1.0 X LEMONT	0.125	746.5h	20.97a-g	7691
CHECK RESISTANT LINE	0	7215.5ab	20.68b-g	7417ef
CHECK LEMONT	0	7596.3a	13.45i	8519abc
CHECK RESISTANT LINE	0	7493.3ab	19.78e-h	7788c-f
CHECK LEMONT	0	7580.8a	13.83i	8462abc
CHECK RESISTANT LINE	0	7096.0ab	20.50c-g	7308ef

Continued.

TABLE 2B. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Yield in Grams	Percent Moisture	Yield (lb/A @ 12% Moisture
CHECK LEMONT	0	7498.3ab	14.10i	8346abc
CHECK RESISTANT LINE	0	7098.5ab	18.55fgh	7486ef
CHECK LEMONT	0	7395.8ab	13.82i	8254a-d
CHECK RESISTANT LINE	0	6782.8b	19.35fgh	7081f
CHECK LEMONT	0	7782.8a	13.57i	8712a
GREEN RING STAGE ACCENT 1.0 X RESISTANT LINE	0.031	7310.5ab	19.97efg	7581def
GREEN RING STAGE ACCENT 1.0 X LEMONT	0.031	7527.8ab	13.75i	8415abc
GREEN RING STAGE PURSUIT 1.0 X RESISTANT LINE	0.063	2917.5ef	22.25a-f	2942ij
GREEN RING STAGE PURSUIT 1.0 X LEMONT	0.063	1586.8g	24.65ab	1552k
GREEN RING STAGE SCEPTER 1.0 X RESISTANT LINE	0.125	3777.5d	20.75b-g	3880h
GREEN RING STAGE SCEPTER 1.0 X LEMONT	0.125	3156.0de	22.20a-f	3183ij
CHECK RESISTANT LINE	0	7530.3ab	20.23d-g	7786c-f
CHECK LEMONT	0	7716.0a	13.60i	8635ab
MID BOOT ACCENT 1.0 X RESISTANT LINE	0.032	3027.3ef	23.58a-e	2999ij
MID BOOT ACCENT 1.0 X LEMONT	0.031	332.5h	25.00a	3231
MID BOOT PURSUIT 1.0 X RESISTANT LINE	0.063	1724.0g	24.70ab	1682k
MID BOOT PURSUIT 1.0 X LEMONT	0.063	86.0h	25.00a	841

Continued.

TABLE 2B. Continued.

Treatment Name	Herbicide Rate (lb ai/A)	Yield in Grams	Percent Moisture	Yield (lb/A @ 12% Moisture
MID BOOT SCEPTER 1.0 X RESISTANT LINE	0.125	2686.3ef	24.52abc	2628j
MID BOOT SCEPTER 1.0 X LEMONT	0.125	226.8h	25.00a	2201
CHECK RESISTANT LINE	0	7162.0ab	19.15fgh	7495ef
CHECK LEMONT	0	7030.8ab	13.32i	7899b-e
LSD (.05) =		634.7	3.48	661
Standard Dev.=		453.33	2.4885	472.38
CV =		9.70	13.07	9.47

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

TABLE 2C. Herbicide treatment of resistant line and Lemont at various maturity stages with Accent, Pursuit, and Scepter at 1 X. Herbicide rates are Accent: 0.031 lb ai/A; Pursuit: 0.063 lb ai/A; and, Scepter: 0.126 lb ai/A. 1993, Rice Research Station, Crowley, LA.

Analysis of Variance for Plot Weight in Grams

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	127	1114540484.99			
BLOCK	3	4455276.58	1485092.19	7.226	0.0002
TREATMENT	31	1090972459.74	35192659.99	171.243	0.0001
ERROR	93	19112748.66	205513.42		

Analysis of Variance for Percent Moisture at Harvest

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	127	3358.04			
BLOCK	3	26.05	8.68	1.402	0.2471
TREATMENT	31	2756.07	88.90	14.357	0.0001
ERROR	93	575.92	6.19		

Analysis of Variance for Yield in lb/A Converted to 12% Moisture

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	127	1335769338.96			
BLOCK	3	3314568.59	1104856.19	4.951	0.0031
TREATMENT	31	1311702322.96	42312978.16	189.621	0.0001
ERROR	93	20752447.40	223144.59		

Test 3. Herbicide treatment of resistant line and Lemont with various AHAS inhibiting herbicides. 1993, Rice Research Station, Crowley, LA.

- Seeding rate: 100 lb/A
- Top dress N rate: 125 lb/A
  (28-84-84 w/Z ppi)
- Herbicide trtmts: Plots treated with Arrosolo 27 days after planting and various AHAS inhibiting herbicides 32 days after planting as indicated.
- Treatment time: Pre-flood
- Genotypes: Herbicide-resistant line
  Lemont
- Replicates: 4

NOTES

1. Dimensions of test:

    1. plot length: 28 feet
    2. plot width: 4.7 feet
    3. space between plots in tier: 4 feet
    4. space between tiers: 10 feet
    5. Total size of test was 22,660 sq. ft. (about 0.6 acre).

Table 3A. Herbicide treatment of resistant line and Lemont with various AHAS inhibiting herbicides. 1993, Rice Research Station, Crowley, LA.

Treatment	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
1X PURSUIT - LMNT	0.063	45.0	20.00	30
		386.0	22.20	250
		473.0	22.60	305
	Mean =	301.3	21.60	195
1X PURSUIT - IR	0.063	6810.0	17.50	4681
		9028.0	22.00	5867
		7411.0	15.60	5211
	Mean =	7749.7	18.37	5253
0.5X PURSUIT - LMNT	0.032	559.0	19.30	376
		396.0	20.30	263
		246.0	21.00	162
	Mean =	400.3	20.20	267
0.5X PURSUIT - IR	0.032	8616.0	21.70	5621
		9765.0	22.20	6329
		9038.0	21.70	5896
	Mean =	9139.7	21.87	5949
0.5X PURSUIT - LMNT	0.032	0.0	0.00	0
ARSENAL	0.006	0.0	0.00	0
		0.0	0.00	0
	Mean =	0.0	0.00	0
0.5X PURSUIT - IR	0.032	5686.0	23.40	3629
ARSENAL	0.006	3903.0	20.30	2592
		6325.0	22.80	4068
	Mean =	5304.7	22.17	3430
ARSENAL - LMNT	0.006	6916.0	22.40	4471
		6875.0	23.30	4393
		3909.0	22.90	2511
	Mean =	5900.0	22.87	3792
ARSENAL - IR	0.006	11285.0	21.70	7362
		10297.0	21.70	6717
		8526.0	22.20	5526
	Mean =	10036.0	21.87	6535
CADRE - LMNT	0.006	9530.0	20.70	6296
		8454.0	21.60	5522
		8109.0	21.80	5283
	Mean =	8697.7	21.37	5700
CADRE - IR	0.006	13155.0	21.90	8560
		12814.0	21.30	8402
		11105.0	22.20	7198
	Mean =	12358.0	21.80	8053

Continued.

Table 3A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
ACCENT - LMNT	0.032	0.0	0.00	0
		174.0	21.00	115
		198.0	21.00	130
	Mean =	124.0	14.00	82
ACCENT - IR	0.032	11727.0	21.30	7689
		9663.0	22.40	6247
		11601.0	22.10	7529
	Mean =	10997.0	21.93	7155
CK#1-ARROSOLO - LMNT	4	12649.0	16.00	8852
		13312.0	15.70	9349
		12448.0	16.10	8701
	Mean =	12803.0	15.93	8967
CK#1-ARROSOLO - IR	4	14830.0	20.30	9847
		15197.0	21.70	9914
		13598.0	20.80	8972
	Mean =	14541.7	20.93	9578
CK#2-ARROSOLO - LMNT	4	13089.0	14.70	9302
		12717.0	17.50	8741
		13489.0	15.60	9485
	Mean =	13098.3	15.93	9176
CK#2-ARROSOLO - IR	4	14589.0	20.50	9663
		14014.0	21.20	9200
		14779.0	21.50	9666
	Mean =	14460.7	21.07	9510
SCEPTER - LMNT	0.126	322.0	22.70	207
		145.0	21.00	95
		76.0	21.00	50
	Mean =	181.0	21.57	117
SCEPTER - IR	0.126	4875.0	18.60	3306
		3874.0	23.60	2466
		6036.0	23.00	3872
	Mean =	4928.3	21.73	3215
ACCENT+FERT. - LMNT	0.032	708.0	22.90	455
		272.0	22.50	176
		2479.0	22.80	1594
	Mean =	1153.0	22.73	742
ACCENT+FERT. - IR	0.032	12879.0	22.20	8348
		12385.0	23.50	7894
		13069.0	22.80	8406
	Mean =	12777.7	22.83	8216

Continued.

Table 3A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Plot Yield in Grams	Percent Moisture	Yield (lb/A @ 12% moisture)
PURSUIT+FERT. - LMNT	0.063	0.0	0.00	0
		0.0	0.00	0
		0.0	0.00	0
	Mean =	0.0	0.00	0
PURSUIT+FERT. - IR	0.063	5869.0	18.70	3975
		6132.0	19.70	4102
		5214.0	19.90	3479
	Mean =	5738.3	19.43	3852
SCEPTER+FERT. - LMNT	0.126	0.0	0.00	0
		0.0	0.00	0
		0.0	0.00	0
	Mean =	0.0	0.00	0
SCEPTER+FERT. - IR	0.126	967.0	19.80	646
		1405.0	23.50	895
		508.0	21.30	333
	Mean =	960.0	21.53	625

Table 3B. Herbicide treatment of resistant line and Lemont with various AHAS inhibiting herbicides. 1993, Rice Research Station, Crowley, LA.

Treatment Name	Herbicide Rate (lb/A)	Yield in Grams	Percent Moisture	Yield (lb/A @ 12% Moisture)
1X PURSUIT - LMNT	0.063	301.3g	21.60a	195h
1X PURSUIT - IR	0.063	7749.7e	18.37abc	5253f
0.5X PURSUIT - LMNT	0.032	400.3g	20.20ab	267h
0.5X PURSUIT - IR	0.032	9139.7de	21.87a	5949ef
0.5X PURSUIT - LMNT ARSENAL	0.032 0.006	0.0g	0.00d	0h
0.5X PURSUIT - IR ARSENAL	0.032 0.006	5304.7f	22.17a	3430g
ARSENAL - LMNT	0.006	5900.0f	22.87a	3792g
ARSENAL - IR	0.006	10036.0cd	21.87a	6535de
CADRE - LMNT	0.006	8697.7de	21.37a	5700ef
CADRE - IR	0.006	12358.0b	21.80a	8053c

Continued.

Table 3B. Continued.

Treatment Name	Herbicide Rate (lb/A)	Yield in Grams	Percent Moisture	Yield (lb/A @ 12% Moisture)
ACCENT - LMNT	0.032	124.0g	14.00c	82h
ACCENT - IR	0.032	10997.0c	21.93a	7155d
CK#1-ARROSOLO - LMNT	4.0	12803.0b	15.93bc	8967ab
CK#1-ARROSOLO - IR	4.0	14541.7a	20.93ab	9578a
CK#2-ARROSOLO - LMNT	4.0	13098.3b	15.93bc	9176a
CK#2-ARROSOLO - IR	4.0	14460.7a	21.07a	9510a
SCEPTER - LMNT	0.126	181.0g	21.57a	117h
SCEPTER - IR	0.126	4928.3f	21.73a	3215g
ACCENT+FERT. - LMNT	0.032	1153.0g	22.73a	742h
ACCENT+FERT. - IR	0.032	12777.7b	22.83a	8216bc
PURSUIT+FERT. - LMNT	0.063	0.0g	0.00d	0h
PURSUIT+FERT. - IR	0.063	5738.3f	19.43ab	3852g
SCEPTER+FERT. - LMNT	0.126	0.0g	0.00d	0h
SCEPTER+FERT. - IR	0.126	960.0g	21.53a	625h
LSD (.05) =		1332.7	4.52	866
Standard Dev.=		807.64	2.739	524.51
CV =		12.78	15.23	12.54

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 3C. Herbicide treatment of resistant line and Lemont with various AHAS inhibiting herbicides. 1993, Rice Research Station, Crowley, LA.

ANALYSIS OF VARIANCE FOR YIELD, LB/ACRE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	71	915678644.61			
TREATMENT	23	902473107.94	39237961.21	142.624	0.0001
ERROR	48	13205536.67	275115.34		

Test 4. Herbicide treatment of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at early maturity stages with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA.

- Seeding rate: 100 lb/A
- Plot length: 20 feet
- Plot width: 4.7 feet
- Genotypes: Herbicide-resistant line
  Lemont
  (three rows of each per plot)
- Replicates: 4

Table 4A. Herbicide treatment of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at early maturity stages with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
SPIKING RICE		80	10	20	5
ACCENT - 0.25 X	0.008	60	50	80	20
		90	70	40	15
		75	40	40	5
	Mean =	76	43	45	11
SPIKING RICE		95	65	75	10
ACCENT - 0.5 X	0.016	90	50	70	20
		95	75	85	35
		90	80	80	25
	Mean =	93	68	78	23
SPIKING RICE		98	90	90	45
ACCENT - 1 X	0.031	95	75	95	25
		95	85	95	40
		98	80	80	35
	Mean =	97	83	90	36
SPIKING RICE		80	65	55	10
PURSUIT - 0.25 X	0.015	95	85	85	85
		80	80	75	40
		70	65	45	25
	Mean =	81	74	65	40

Continued.

Table 4A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
SPIKING RICE		95	95	95	70
PURSUIT - 0.5 X	0.031	95	95	95	80
		90	85	95	90
		85	90	90	65
	Mean =	91	91	94	76
SPIKING RICE		95	95	100	90
PURSUIT - 1 X	0.063	98	98	98	98
		98	98	98	95
		95	98	98	90
	Mean =	97	97	99	93
SPIKING RICE		80	85	85	30
SCEPTER - 0.25 X	0.032	90	85	80	65
		80	75	75	60
		90	75	40	30
	Mean =	85	80	70	46
SPIKING RICE		98	98	98	70
SCEPTER - 0.5 X	0.063	95	95	95	75
		95	90	95	85
		95	95	95	75
	Mean =	96	95	96	76
SPIKING RICE		100	100	100	90
SCEPTER - 1 X	0.125	98	98	98	98
		98	98	98	98
		98	98	98	98
	Mean =	99	99	99	96
SPIKING RICE		0	0	0	0
UNTREATED CHECK		0	0	0	0
		0	0	0	0
		0	0	0	0
	Mean =	0	0	0	0
TWO LEAF RICE		85	85	85	20
ACCENT - 0.25 X	0.008	85	75	90	40
		40	90	90	25
		80	80	80	20
	Mean =	73	83	86	26
TWO LEAF RICE		90	95	95	55
ACCENT - 0.5 X	0.016	85	95	95	55
		90	90	95	60
		90	90	95	75
	Mean =	89	93	95	61
TWO LEAF RICE		98	95	95	75
ACCENT - 1 X	0.031	95	90	98	85
		95	95	98	50
		95	98	98	90
	Mean =	96	95	97	75

Continued.

Table 4A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
TWO LEAF RICE		80	95	95	85
PURSUIT - 0.25 X	0.015	40	65	50	65
		60	50	90	70
		75	80	95	90
	Mean =	64	73	83	78
TWO LEAF RICE		95	98	98	85
PURSUIT - 0.5 X	0.031	85	95	98	98
		95	98	98	95
		80	98	98	95
	Mean =	89	97	98	93
TWO LEAF RICE		98	98	98	98
PURSUIT - 1 X	0.063	98	98	98	95
		95	95	98	95
		95	98	98	98
	Mean =	97	97	98	97
TWO LEAF RICE		85	85	80	70
SCEPTER - 0.25 X	0.032	30	80	90	35
		40	30	90	70
		95	95	95	60
	Mean =	63	73	89	59
TWO LEAF RICE		98	98	98	90
SCEPTER - 0.5 X	0.063	30	90	90	75
		90	85	90	90
		95	98	95	95
	Mean =	78	93	93	88
TWO LEAF RICE		100	100	98	90
SCEPTER - 1 X	0.125	99	99	99	99
		90	95	95	95
		98	98	98	98
	Mean =	97	98	98	96
FOUR LEAF RICE		0	0	0	0
.25X CADRE(3 ML/GAL)		0	0	0	0
		0	0	0	0
		0	0	0	0
	Mean =	0	0	0	0
FOUR LEAF RICE		0	0	0	0
ACCENT - 0.25 X	0.008	0	0	0	0
		75	25	25	10
		0	0	0	0
	Mean =	19	6	6	3
FOUR LEAF RICE		75	65	95	15
ACCENT - 0.5 X	0.016	80	80	90	5
		95	85	95	10
		95	85	99	30
	Mean =	86	79	95	15

Continued.

Table 4A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
FOUR LEAF RICE		95	90	99	20
ACCENT - 1 X	0.031	95	90	99	25
		98	90	95	50
		99	95	99	35
	Mean =	97	91	98	33
CHECK		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
	Mean =	0	0	0	0
FOUR LEAF RICE		5	5	5	5
PURSUIT - 0.5 X	0.031	10	30	50	50
		10	10	50	50
		10	10	50	50
	Mean =	9	14	39	39
FOUR LEAF RICE		5	5	5	5
PURSUIT - 1 X	0.063	80	80	95	80
		95	95	99	80
		60	60	85	85
	Mean =	60	60	71	63
CHECK		0	0	0	0
		0	0	0	0
		0	0	0	0
		0	0	0	0
	Mean =	0	0	0	0
FOUR LEAF RICE		5	5	5	5
SCEPTER - 0.5 X	0.063	10	10	50	50
		20	20	50	50
		80	80	80	60
	Mean =	29	29	46	41
FOUR LEAF RICE		10	50	50	50
SCEPTER - 1 X	0.125	20	20	50	50
		85	85	95	80
		90	90	99	90
	Mean =	51	61	74	68
FOUR LEAF RICE		0	0	0	0
3 QTS/A PROPANIL		0	0	0	0
		0	0	0	0
		0	0	0	0
	Mean =	0	0	0	0
COMBO:SPIKE & 4 LEAF		97	95	99	20
ACCENT - 0.25 + .5 X	0.008	99	95	99	25
		99	99	99	35
		95	99	99	20
	Mean =	98	97	99	25

Continued.

Table 4A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
COMBO:SPIKE & 4 LEAF		99	99	99	25
ACCENT - 0.5 + O.5 X	0.016	99	98	99	25
		99	99	99	25
		99	99	99	60
	Mean =	99	99	99	34
COMBO:SPIKE & 4 LEAF		99	99	99	50
ACCENT - 1 X + O.5 X	0.031	99	99	99	65
		99	99	99	95
		99	99	99	65
	Mean =	99	99	99	69
COMBO:SPIKE & 4 LEAF		90	99	99	95
PURSUIT - 0.25 + .5 X	0.015	98	99	99	95
		95	99	99	99
		95	99	99	99
	Mean =	95	99	99	97
COMBO:SPIKE & 4 LEAF		99	99	99	99
PURSUIT - 0.5 + 0.5 X	0.031	80	99	99	99
		99	99	99	90
		99	99	99	99
	Mean =	94	99	99	97
COMBO:SPIKE & 4 LEAF		100	100	100	100
PURSUIT - 1 X + 0.5 X	0.063	98	99	99	99
		99	99	99	99
		99	99	99	99
	Mean =	99	99	99	99
COMBO:SPIKE & 4 LEAF		99	99	99	90
SCEPTER - 0.25 + .5 X	0.032	99	99	99	80
		90	85	85	45
		90	95	99	80
	Mean =	95	95	96	74
COMBO:SPIKE & 4 LEAF		99	99	99	95
SCEPTER - 0.5 + O.5 X	0.063	90	95	99	70
		99	99	99	80
		98	98	99	98
	Mean =	97	98	99	86
COMBO:SPIKE & 4 LEAF		100	100	100	100
SCEPTER - 1 X + 0.5 X	0.125	100	100	100	100
		99	99	99	99
		99	99	99	99
	Mean =	100	100	100	100
COMBO: 4 LEAF		90	90	85	15
O.25 X CADRE-3ML/GAL		50	50	90	30
+0.25X ACCENT-.97g/G		20	20	80	25
		20	20	50	50
	Mean =	45	45	76	30

Table 4B. Herbicide treatment of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at early maturity stages with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
SPIKING RICE ACCENT - 0.25 X	0.008	76a-d	43ef	45f	11lmn
SPIKING RICE ACCENT - 0.5 X	0.016	93a	68d	78a-e	23j-m
SPIKING RICE ACCENT - 1 X	0.031	97a	83a-d	90a-d	36ijk
SPIKING RICE PURSUIT - 0.25 X	0.015	81abc	74bcd	65e	40hij
SPIKING RICE PURSUIT - 0.5 X	0.031	91a	91abc	94abc	76b-e
SPIKING RICE PURSUIT - 1 X	0.063	97a	97ab	99a	93abc
SPIKING RICE SCEPTER - 0.25 X	0.032	85abc	80a-d	70de	46f-i
SPIKING RICE SCEPTER - 0.5 X	0.063	96a	95abc	96ab	76b-e
SPIKING RICE SCEPTER - 1 X	0.125	99a	99a	99ab	96abc
SPIKING RICE UNTREATED CHECK		0h	0h	0g	0n
TWO LEAF RICE ACCENT - 0.25 X	0.008	73a-d	83a-d	86a-d	26i-l
TWO LEAF RICE ACCENT - 0.5 X	0.016	89ab	93abc	95abc	61efg
TWO LEAF RICE ACCENT - 1 X	0.031	96a	95abc	97ab	75b-e
TWO LEAF RICE PURSUIT - 0.25 X	0.015	64b-e	73cd	83a-e	78a-e
TWO LEAF RICE PURSUIT - 0.5 X	0.031	89ab	97ab	98ab	93abc
TWO LEAF RICE PURSUIT - 1 X	0.063	97a	97ab	98ab	97ab
TWO LEAF RICE SCEPTER - 0.25 X	0.032	63b-e	73cd	89a-d	59e-h
TWO LEAF RICE SCEPTER - 0.5 X	0.063	78abc	93abc	93abc	88a-d
TWO LEAF RICE SCEPTER - 1 X	0.125	97a	98a	98ab	96abc
FOUR LEAF RICE .25X CADRE(3 ML/GAL)		0h	0h	0g	0n

Continued.

Table 4B. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
FOUR LEAF RICE ACCENT - 0.25 X	0.008	19gh	6h	6g	3mn
FOUR LEAF RICE ACCENT - 0.5 X	0.016	86abc	79a-d	95abc	15k-n
FOUR LEAF RICE ACCENT - 1 X	0.031	97a	91abc	98ab	33i-l
CHECK		0h	0h	0g	0n
FOUR LEAF RICE PURSUIT - 0.5 X	0.031	9gh	14gh	39f	39hij
FOUR LEAF RICE PURSUIT - 1 X	0.063	60cde	60de	71de	63ef
CHECK		0h	0h	0g	0n
FOUR LEAF RICE SCEPTER - 0.5 X	0.063	29fg	29fg	46f	41g-j
FOUR LEAF RICE SCEPTER - 1 X	0.125	51def	61de	74cde	68de
FOUR LEAF RICE 3 QTS/A PROPANIL		0h	0h	0g	0n
COMBO:SPIKE & 4 LEAF ACCENT - 0.25 + .5 X	0.008	98a	97ab	99a	25i-l
COMBO:SPIKE & 4 LEAF ACCENT - 0.5 + 0.5 X	0.016	99a	99a	99a	34ijk
COMBO:SPIKE & 4 LEAF ACCENT - 1 X + 0.5 X	0.031	99a	99a	99a	69de
COMBO:SPIKE & 4 LEAF PURSUIT - 0.25 + .5X	0.015	95a	99a	99a	97ab
COMBO:SPIKE & 4 LEAF PURSUIT - 0.5 + 0.5X	0.031	94a	99a	99a	97ab
COMBO:SPIKE & 4 LEAF PURSUIT - 1 X + 0.5X	0.063	99a	99a	99a	99a
COMBO:SPIKE & 4 LEAF SCEPTER - 0.25 + .5X	0.032	95a	95abc	96ab	74cde
COMBO:SPIKE & 4 LEAF SCEPTER - 0.5 + 0.5X	0.063	97a	98ab	99a	86a-d
COMBO:SPIKE & 4 LEAF SCEPTER - 1 X + 0.5X	0.125	100a	100a	100a	100a
COMBO: 4 LEAF 0.25 X CADRE-3ML/GAL +0.25X ACCENT-.97g/G		45ef	45ef	76b-e	30i-l
LSD (.05) =		23	20	18	19
Standard Dev.=		16.244	13.973	12.826	13.292
CV =		22.99	19.99	17.31	24.86

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 4C. Herbicide treatment of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at early maturity stages with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA.

Analysis of Variance for Overal Weed Control as Percent of Check Plots

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	159	225606.09			
BLOCK	3	969.32	323.11	1.224	0.3040
TREATMENT	39	193763.34	4968.29	18.828	0.0001
ERROR	117	30873.43	263.87		

Analysis of VAriance for Percent Red Rice Control

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	159	221651.59			
BLOCK	3	266.77	88.92	0.455	0.7140
TREATMENT	39	198540.34	5090.77	26.073	0.0001
ERROR	117	22844.48	195.25		

Analysis of Variance for Percent Lemont Control

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	159	209364.77			
BLOCK	3	1036.92	345.64	2.101	0.1039
TREATMENT	39	189077.77	4848.14	29.467	0.0001
ERROR	117	19250.07	164.53		

Analysis of Variance for Percent Resistant Line Control

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	159	210389.90			
BLOCK	3	2490.25	830.08	4.698	0.0039
TREATMENT	39	187226.40	4800.67	27.169	0.0001
ERROR	117	20673.25	176.69		

Test 5. Various AHAS - inhibiting herbicide treatments of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at 5-leaf maturity stage with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA. Ratings made 21 days after treatment.

- Seeding rate: 100 lb/A
- Plot length: 20 feet
- Plot width: 4.7 feet
- Genotypes: Herbicide resistant line
  Lemont
  (three rows of each per plot)
- Replicates: 4

Table 5A. Various AHAS - inhibiting herbicide treatments of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at 5-leaf maturity stage with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA. Ratings made 21 days after treatment.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
ACCENT	0.031	95	80.0	45.0	5.0
		90	80.0	95.0	0.0
		90	70.0	75.0	10.0
	Mean =	92	76.7	71.7	5.0
ACCENT + SURFACTANT	0.031	95	95.0	98.0	15.0
		95	95.0	95.0	35.0
		85	90.0	95.0	20.0
	Mean =	92	93.3	96.0	23.3
ACCENT + SURF & FERT	0.031	95	95.0	98.0	35.0
		95	95.0	95.0	20.0
		90	95.0	98.0	55.0
	Mean =	93	95.0	97.0	36.7
SCEPTER	0.125	50	95.0	90.0	40.0
		40	95.0	50.0	25.0
		50	95.0	60.0	50.0
	Mean =	47	95.0	66.7	38.3
SCEPTER + SURFACTANT	0.125	60	95.0	95.0	70.0
		90	95.0	95.0	70.0
		75	90.0	60.0	45.0
	Mean =	75	93.3	83.3	61.7
SCEPTER + SURF & FER	0.125	60	95.0	95.0	70.0
		80	95.0	80.0	45.0
		60	95.0	95.0	90.0
	Mean =	67	95.0	90.0	68.3
PURSUIT	0.063	60	90.0	95.0	35.0
		65	90.0	90.0	35.0
		50	90.0	90.0	80.0
	Mean =	58	90.0	91.7	50.0
PURSUIT + SURFACTANT	0.063	90	85.0	99.0	85.0
		95	95.0	95.0	90.0
		70	90.0	90.0	40.0
	Mean =	85	90.0	94.7	71.7
PURSUIT + SURF & FER	0.063	85	85.0	85.0	40.0
		70	85.0	85.0	60.0
		95	95.0	95.0	90.0
	Mean =	83	88.3	88.3	63.3

Continued.

Table 5A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
0.5X CADRE	0.016	40	80.0	50.0	15.0
		10	10.0	10.0	10.0
		10	10.0	10.0	10.0
	Mean =	20	33.3	23.3	11.7
0.5X CADRE + S & F	0.016	90	80.0	50.0	20.0
		80	85.0	95.0	30.0
		60	50.0	70.0	30.0
	Mean =	77	71.7	71.7	26.7
1X CADRE	0.032	90	80.0	50.0	10.0
		80	80.0	80.0	20.0
		85	85.0	60.0	35.0
	Mean =	85	81.7	63.3	21.7
1X CADRE + S & F	0.032	95	85.0	95.0	35.0
		95	95.0	95.0	40.0
		90	90.0	90.0	45.0
	Mean =	93	90.0	93.3	40.0
0.5X CADRE + S & F	0.016	98	95.0	99.0	20.0
0.5X ACCENT + S & F	0.015	95	95.0	95.0	30.0
		95	95.0	95.0	25.0
	Mean =	96	95.0	96.3	25.0
0.5X CADRE + S & F	0.016	95	95.0	99.0	65.0
0.5X PURSUIT + S & F	0.032	90	90.0	90.0	40.0
		95	95.0	95.0	60.0
	Mean =	93	93.3	94.7	55.0
0.5X CADRE + S & F	0.016	95	95.0	95.0	80.0
0.5X SCEPTER + S & F	0.063	95	95.0	95.0	50.0
		90	95.0	95.0	85.0
	Mean =	93	95.0	95.0	71.7
ARSENAL	0.012	40	40.0	10.0	5.0
		0	0.0	0.0	0.0
		0	0.0	0.0	0.0
	Mean =	13	13.3	3.3	1.7
ARSENAL + S & F	0.012	50	75.0	20.0	5.0
		30	30.0	30.0	5.0
		10	10.0	10.0	10.0
	Mean =	30	38.3	20.0	6.7
2/3 X ARSENAL	0.008	30	90.0	10.0	5.0
		0	0.0	0.0	0.0
		30	10.0	10.0	10.0
	Mean =	20	33.3	6.7	5.0

Continued.

Table 5A. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
2/3 X ARSENAL + S&F	0.008	40	50.0	50.0	30.0
		10	75.0	15.0	5.0
		10	10.0	10.0	10.0
	Mean =	20	45.0	25.0	15.0
0.5 X PURSUIT	0.032	80	75.0	40.0	10.0
3 QT/A PROPANIL	3.0	75	85.0	70.0	20.0
		75	75.0	40.0	10.0
	Mean =	77	78.3	50.0	13.3
1 X PURSUIT	0.063	95	95.0	75.0	35.0
3 QT/A PROPANIL	3.0	95	95.0	95.0	30.0
		95	90.0	60.0	40.0
	Mean =	95	93.3	76.7	35.0
CHECK		0	0.0	0.0	0.0
		0	0.0	0.0	0.0
		0	0.0	0.0	0.0
	Mean =	0	0.0	0.0	0.0
0.5X CADRE + S & F	0.016	95	90.0	95.0	15.0
0.5X ARSENAL + S & F	0.016	85	85.0	60.0	25.0
		85	85.0	85.0	40.0
	Mean =	88	86.7	80.0	26.7
0.5 X CADRE + S & F	0.016	95	95.0	95.0	15.0
0.5 X ACCENT + S & F	0.015	95	95.0	95.0	20.0
		90	85.0	85.0	15.0
	Mean =	93	91.7	91.7	16.7
1X ARSENAL + S & F	0.012	98	98.0	95.0	5.0
0.5X ACCENT + S & F	0.015	95	95.0	90.0	10.0
		85	85.0	90.0	5.0
	Mean =	93	92.7	91.7	6.7
0.5X ARSENAL + S & F	0.006	95	90.0	90.0	10.0
0.5X ACCENT + S & F	0.015	95	95.0	90.0	10.0
		90	90.0	85.0	25.0
	Mean =	93	91.7	88.3	15.0

Table 5B. Various AHAS - inhibiting herbicide treatments of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at 5-leaf maturity stage with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA. Ratings made 21 days after treatment.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
ACCENT	0.031	92abc	76.7a	71.7a-d	5.0ij
ACCENT + SURFACTANT	0.031	92abc	93.3a	96.0a	23.3e-j
ACCENT + SURF & FERT	0.031	93abc	95.0a	97.0a	36.7c-g
SCEPTER	0.125	47f	95.0a	66.7bcd	38.3c-f
SCEPTER + SURFACTANT	0.125	75cd	93.3a	83.3abc	61.7ab
SCEPTER + SURF & FER	0.125	67de	95.0a	90.0ab	68.3a
PURSUIT	0.063	58ef	90.0a	91.7a	50.0a-d
PURSUIT + SURFACTANT	0.063	85abc	90.0a	94.7a	71.7a
PURSUIT + SURF & FER	0.063	83a-d	88.3a	88.3ab	63.3a
0.5X CADRE	0.016	20g	33.3bc	23.3e	11.7hij
0.5X CADRE + S & F	0.016	77bcd	71.7a	71.7a-d	26.7d-i
1X CADRE	0.032	85abc	81.7a	63.3cd	21.7e-j
1X CADRE + S & F	0.032	93abc	90.0a	93.3a	40.0b-e
0.5X CADRE + S & F 0.5X ACCENT + S & F	0.016 0.015	96a	95.0a	96.3a	25.0e-j
0.5X CADRE + S & F 0.5X PURSUIT + S & F	0.016 0.032	93abc	93.3a	94.7a	55.0abc
0.5X CADRE + S & F 0.5X SCEPTER + S & F	0.016 0.063	93abc	95.0a	95.0a	71.7a
ARSENAL	0.012	13gh	13.3cd	3.3ef	1.7ij
ARSENAL + S & F	0.012	30g	38.3bc	20.0ef	6.7ij
2/3 X ARSENAL	0.008	20g	33.3bc	6.7ef	5.0ij
2/3 X ARSENAL + S&F	0.008	20g	45.0b	25.0e	15.0f-j
0.5 X PURSUIT 3 QT/A PROPANIL	0.032 3.0	77bcd	78.3a	50.0d	13.3g-j
1 X PURSUIT 3 QT/A PROPANIL	0.063 3.0	95ab	93.3a	76.7abc	35.0c-h
CHECK		0h	0.0d	0.0f	0.0j
0.5X CADRE + S & F 0.5X ARSENAL + S & F	0.016 0.016	88abc	86.7a	80.0abc	26.7d-i
0.5 X CADRE + S & F 0.5 X ACCENT + S & F	0.016 0.015	93abc	91.7a	91.7a	16.7e-j

Continued.

Table 5B. Continued.

Treatment	Herbicide Rate (lb ai/A)	Percent Overall Weed Control	Percent Red Rice Control	Percent Lemont Control	Percent Resistant Line Control
1X ARSENAL + S & F 0.5X ACCENT + S & F	0.012 0.015	93abc	92.7a	91.7a	6.7ij
0.5X ARSENAL + S & F 0.5X ACCENT + S & F	0.006 0.015	93abc	91.7a	88.3ab	15.0f-j
LSD (.05) =		16	25.4	20.9	20.9
Standard Dev.=		9.7153	15.532	12.786	12.779
CV =		14.01	20.55	18.66	42.51

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 5C. Various AHAS - inhibiting herbicide treatments of the herbicide resistant line, Lemont check, and weed infestations in plots in red rice infested soil at 5-leaf maturity stage with 0.25x, 0.5X, and 1.0X Accent, Pursuit, and Scepter. 1993, South Farm Unit, Rice Research Station, Crowley, LA. Ratings made 21 days after treatment.

ANALYSIS OF VARIANCE FOR PERCENT OVERALL WEED CONTROL, 21 DAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	80	81082.00			
BLOCK	2	1207.18	603.59	6.395	0.0033
TREATMENT	26	74966.66	2883.33	30.548	0.0001
ERROR	52	4908.14	94.38		

ANALYSIS OF VARIANCE FOR PERCENT RED RICE CONTROL, 21 DAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	80	76075.55			
BLOCK	2	2314.29	1157.14	4.796	0.0123
TREATMENT	26	61216.22	2354.47	9.759	0.0001
ERROR	52	12545.03	241.25		

ANALYSIS OF VARIANCE FOR PERCENT LEMONT CONTROL, 21 DAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	80	92350.17			
BLOCK	2	601.95	300.97	1.841	0.1689
TREATMENT	26	83246.17	3201.77	19.583	0.0001
ERROR	52	8502.04	163.50		

ANALYSIS OF VARIANCE FOR PERCENT RESISTANT LINE CONTROL, 21 DAT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	P(F)
TOTAL	80	50674.69			
BLOCK	2	891.35	445.67	2.729	0.0746
TREATMENT	26	41291.35	1588.12	9.725	0.0001
ERROR	52	8491.97	163.30		

BIOTECHNOLOGY APPLICATIONS TO COASTAL EROSION CONTROL[2]

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INTRODUCTION

Coastal erosion causes losses of as much as 40 to 50 square miles a year in Louisiana. Natural processes, such as subsidence and soil compaction, and human activities, such as oil and gas exploration, have substantially affected the Gulf Coast wetlands. Wave action from boat traffic has increased erosion. Sediment deposition by the Mississippi River, which used to enhance the wetlands, has been essentially eliminated through levee construction that channels river flow to the edge of the continental shelf in the Gulf of Mexico. These human factors have exacerbated the natural destruction of coastal marshes attributable to rising sea levels and hurricanes.

Preventing the loss of coastal wetlands is important for several reasons. Louisiana's coastal marshlands and water bodies are a productive estuarine system that supports abundant populations of fish, crustaceans, and wildlife. Louisiana's coastal estuarine systems annually supply 30% of the nation's commercial fisheries and 40% of its wild furs. These systems overwinter 66% of the migratory birds that use the Mississippi Flyway and generate 11.4 million person-days of sport fishing and wildlife recreation. The value of these resources is estimated at over one billion dollars annually. The marshes provide a buffer that serves to protect major cities, such as New Orleans and Lake Charles, from hurricanes. From a tax base perspective, coastal erosion can alter state boundary lines, of particular importance to Louisiana because of petroleum resources along the coast.

Efforts to reduce coastal wetland losses have primarily focussed on the construction of water control structures and protection levees. While effective, these structures are expensive to construct and maintain. An alternative is the use of vegetation as an adjunct approach to coastal erosion control. Spartina alterniflora, a plant native to Louisiana marshes, has been identified by the Soil Conservation Service as possessing traits unique to the needs of controlling wetlands loss.

Also known as smooth cordgrass, Spartina alterniflora is a vigorous grass species chiefly inhabiting salt marshes along the coast. Smooth cordgrass establishes quickly and spreads vegetatively, creating dense protective canopies and extensive root systems that hold soil. Canopies produced by this plant are sufficiently thick to reduce wave action. In the calm water that results, soil particles suspended in the water settle out,

[1] This research is supported in part by funds from the United States Department of Agriculture Soil Conservation Service.

depositing soil and building the marsh. Spartina alterniflora is a facultative halophyte, and tolerates but does not require salt for growth. Smooth cordgrass grows on a wide range of substrate textures from coarse sands to highly organic soils. It is well adapted to anaerobic substrates characteristic of coastal wetlands and is considered a dominant vascular plant in salt marshes in the southeastern United States. Smooth cordgrass is a perennial grass, forming stands that cover extensive areas. Vegetative reproduction is accomplished by extensive rhizome growth.

Two important traits of Spartina alterniflora are its resistance to salinity and tolerance of fluctuating water depths. The encroachment of saline water does not significantly reduce the species' vigorous growth. The opportunity, therefore, exists to utilize this plant to control erosion in freshwater areas threatened by the future encroachment of saline waters.

No other marsh species possesses this combination of desirable traits. The only weakness of the species is its shortcoming with respect to seed production. Some sexual reproduction is exhibited by smooth cordgrass; however, poor seed set and low viability are characteristics of the species. Because seed production is limited, hand transplanting of material developed through vegetative cuttings is the prevailing method for establishing smooth cordgrass. Hand transplanting is both costly and laborious, and is practical for only a part of the marsh, since limited areas are accessible for this approach.

This project is attempting to develop an artificial seed system with which this plant can be propagated. This approach entails the establishment of a cloning system through which laboratory-cultured cells are induced to develop into small plantlets. The small plantlets substitute for the embryo of a normal seed.

To produce artificial seed, embryos or small plantlets are typically coated with a protective material to prevent drying or desiccation. Unfortunately, coating materials which sufficiently protect the plantlet create a barrier which the plantlets typically have difficulty penetrating. Artificial seeds of smooth cordgrass would not need such a restrictive coating to prevent desiccation since they would be utilized in an aquatic or semi-aquatic environment where desiccation would not pose a problem. Instead of a restrictive coating, artificial seed of smooth cordgrass could be made using relatively soft gels containing dilute fertilizer and fungicide to help in plant establishment. In short, the use of artificial seed is a viable option for smooth cordgrass, a poor seed producer inhabiting a wetlands environment. With a working seed-based system, aerial seeding of remote areas of the marsh becomes practical, greatly increasing the land area accessible for the introduction of smooth cordgrass.

Studies were conducted to optimize growth and plant regeneration rates from cultured cells. Studies were also initiated on evaluating protoplasts for use in mass producing Spartina alterniflora and developing artificial seed.

MATERIALS AND METHODS

To improve cell growth and plant regeneration rates from callus and suspension cultures, nutrient media modifications were evaluated, including altered concentrations of growth regulators and sucrose. Specifically, concentrations of naphthaleneacetic acid (NAA), 2,4-dichlorophenoxyacetic acid (2,4-D), and sucrose were altered.

Protoplasts were derived from suspension cells, utilizing a protoplast protocol described as follows. Calli were initiated from immature panicles. Immature panicles 1 - 5 cm long were removed from sterilized boots, cut into approximately 0.5 cm pieces, and plated on Murashige and Skoog (MS) medium supplemented with 4 ppm 2,4-D and 1% agar. Plates were incubated at 25°C in the dark.

Two-month old calli were used to initiate suspension cultures. Two suspension media were used. One medium was MS4 medium consisting of MS basic salts, 1 mg/l vitamin B1, 0.5 mg/l vitamin B6, 0.5 mg/l nicotinic acid, 2.0 mg/l glycine, 100 mg/l inositol, 2 g/l casein hydrolysate (CH), 4 mg/l 2,4-D, and 30 g/l sucrose. The other was MR2 medium consisting of R2 inorganic salts, B5 vitamins, 3 g/l CH, 2 mg/l 2,4-D, and 30 g/l sucrose. The pH of both media were adjusted to 5.8 before autoclaving. Calli were cultured in 125-ml flasks containing 20 ml medium. The cultures were incubated at 25°C on a gyratory shaker at 80 rpm. Cultures were subcultured every week.

Protoplasts were isolated from calli suspended for 2 to 3 months. About 3 grams fresh weight of calli were suspended in a 100 x 15 mm plastic petri dish with 20 ml enzyme mixture containing 2% (w/v) Cellulase "Onozuka" RS and 0.2% Pectolyase Y-23 dissolved in CPW solution supplemented with 0.4 M sucrose. The plates were incubated in the dark at 32°C in an environmental incubator rotary shaker at 30 rpm for about 3 hours. After incubation, 25 ml KMC solution was added to the enzyme mixture and the mixed solution was passed through a 30 um mesh nylon screen. After centrifugation for 10 minutes at 100 x g, protoplasts were collected and washed twice in 15 ml KMC solution by resuspension and centrifugation for 5 minutes. The protoplasts were then suspended in liquid protoplast culture medium.

The protoplast culture medium consisted of R2 inorganic salts, 1 mg/l vitamin B1, 0.5 mg/l vitamin B6, 0.5 mg/l nicotinic acid, 2 mg/l glycine, 100 mg/l inositol, 2 mg/l 2,4-D, and 0.4 M sucrose. The pH was adjusted to 5.8 before autoclaving. Four ml of protoplast suspension was mixed with an equal volume of protoplast culture medium containing 2.4% (w/v) Sea Plaque agarose in a 100 x 15 mm plastic petri dish. The final protoplast density was adjusted to 5 x 105 protoplasts/ml. The solidified agarose medium containing protoplasts was cut into 16 beads from each plate and 5 to 6 beads were placed in petri dishes containing 20 ml of liquid protoplast culture medium and 0.3 ml of a nurse cell suspension. The protoplast beads were incubated at 25°C in the dark with

nurse cells in an environmental incubator rotary shaker at 30 rpm. After 10 days, the nurse cells were washed off the beads twice using liquid medium. The beads were resuspended in 20 ml fresh liquid medium.

At various stages of growth, colonies that formed were transferred to regeneration medium consisting of MS basic salts, 1 mg/l vitamin B1, 0.5 mg/l vitamin B6, 0.5 mg/l nicotinic acid, 2 mg/l glycine, 100 mg/l inositol, 0.5 g/l CH, 0.5 mg/l IAA, and 0.8 mg/l BA.

RESULTS AND DISCUSSION

A working protoplast system for Spartina alterniflora has been developed. Colony formation by protoplasts has been obtained at high frequencies, and embryos, plantlets, and plants have been obtained in large numbers from protoplast-derived calli. Highly embryogenic suspensions cultures are currently being established to provide suitable cell lines for mass propagation and artificial seed production from suspension cells and protoplasts.

RICE FERTILIZATION AND CULTURAL MANAGEMENT[1]

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

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

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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-one rice varieties and/or advanced experimental lines were grouped by maturity for testing. Each entry is followed by a short agronomic description and its origination.

The very early entries were:

Maybelle (MBLE)- short statured, long-grain Texas variety with very good yield potential, good straw strength, excellent ratoon potential, moderately resistant to straighthead, matures 8 to 10 days earlier than Tebonnet.

Alan- tall, long-grain Arkansas variety with good yield potential in the main and ratoon crop, moderately resistant to lodging, moderately susceptible to straighthead, 2 to 3 days earlier in maturity than Tebonnet.

Jackson (JKSN)- long-grain Texas variety very similar to Maybelle in yield potential, slightly taller and 7 to 10 days later in maturity than Maybelle, moderately resistant to lodging, moderately resistant to straighthead.

RT 7015 (7015)- long-grain, semidwarf Rice Tec variety, good yield potential in the main and ratoon crop, resistant to lodging, moderately resistant to straighthead.

Jodon (JODN)- long-grain, semidwarf Louisiana line with excellent yield potential in the main and ratoon crop, resistant to lodging, susceptible to straighthead in preliminary testing.

Adair (ADAR)- tall, long-grain Arkansas variety being tested in variety by N trials for the second year, possesses high yield potential, moderately susceptible to lodging and straighthead in preliminary testing.

The early entries were:

Lemont (LMNT)- long-grain, semidwarf Texas variety with very good main crop and average ratoon crop potential, poor seedling vigor, resistant to lodging, moderately susceptible to straighthead.

Mars- tall, medium-grain Arkansas variety with good yield potential in the main and ratoon crop, good seedling vigor, moderately susceptible to lodging, susceptible to straighthead.

Lacassine (LCSN)- long-grain, semidwarf Louisiana variety with very good main crop and good ratoon potential, poor seedling vigor, resistant to lodging, moderately susceptible to straighthead.

Orion (ORIN)- tall, medium-grain Arkansas variety similar in yield potential to Mars, moderately susceptible to lodging, susceptible to straighthead.

Rico I (RICO)- tall, medium-grain Texas release with very high yield potential at low rates of fertilizer N, resistant to straighthead.

Cypress (CPRS)- long-grain, semidwarf Louisiana variety with excellent yield potential in the main and ratoon crop, good seedling vigor, resistant to lodging, moderately susceptible to straighthead.

Bengal (BNGL)- medium-grain, semidwarf Louisiana variety with excellent main crop and good ratoon crop potential, moderately resistant to lodging, susceptible to straighthead.

2168- medium-grain, semidwarf Louisiana entry in its second year of testing in variety by N trials.

LaGrue (LGRU)- tall, long-grain Arkansas line in its second year of testing in variety by N trials, moderately susceptible to lodging, high main crop yield potential, good ratoon potential.

2071- tall, long-grain Louisiana entry in its initial year of testing in variety by N trials, a somaclone possessing high levels of sheath blight resistance.

2192- conventional stature, medium-grain Louisiana entry in its initial year of testing in variety by N trials, a selection from the RAX hybrids, high yield potential.

1133- tall, long-grain Arkansas entry in its initial year of testing in variety by N trials.

Kaybonnet (KBNT)- tall, long-grain Arkansas entry in its initial year of testing in variety by N trials.

Dellmont (DLMT)- long-grain, semidwarf, aromatic Texas variety with good yield potential, resistant to lodging, moderately susceptible to straighthead.

2085- long-grain, semidwarf, aromatic Louisiana entry in its second year of testing in a variety by N trial, yield potential similar to Lemont.

Varieties and advanced experimental lines in the very early and early maturity groups were tested in five different locations. The aromatic variety Dellmont and the experimental line 2085 were tested at the Rice Research Station in a separate variety trial. Lemont was included in this evaluation for comparison purposes. In Pine Island, Vermilion Parish, only medium-grain entries were evaluated. This was the only location

where Mars and Rico I were evaluated. Experiments at the Rice Research Station and in Vermilion Parish were water seeded in a pinpoint flood cultural system. The trials in Morehouse Parish were water seeded in a delayed flood cultural system. Evaluations in East Carroll and Rapides parishes and Pine Island were drill seeded. 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 at the Rice Research Station and in Vermilion and Morehouse parishes. In Rapides and East Carroll parishes, N rates ranged from 90 to 180 lb/A in 30 lb/A increments. Medium-grain entries at Pine Island were tested at N rates of 0, 30, 60, 90, and a 40-20 split.

Fertilizer N as ammonium sulfate was banded approximately 2 inches deep 1 to 2 days prior to flooding in the water-seeded, pinpoint flood experiments. On soils requiring P and K, approximately 45 lb/A P_2O_5 and K_2O were also banded. In drill-seeded experiments and in the water-seeded, delayed flood experiment, basal N treatments (urea) were applied as a single broadcast application prior to establishment of the permanent flood. At Pine Island, in the split N treatment, the remaining 20 lb N was applied at PI.

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 the water-seeded, delayed flood experiment, the entries were seeded at a rate of 150 lb/A with presoaked seed, drained after 4 days, and flushed periodically until permanent flood establishment. 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, and grain yield were measured.

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.

Sixty-one entries were screened in 1993 for reaction to arsenic (As)-induced straighthead. Included in the nursery were 36 commercial varieties, both public and private, and 23, 1, and 1 advanced experimental lines from the rice varietal development programs of Louisiana, Texas, and Arkansas, respectively.

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 4 lb As/A, and the test area was flooded. The test was water seeded in a pinpoint flood cultural system. Evaluation for straighthead reaction was 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 18.

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 19-24).

Experiment: Very early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 5.9; O.M.: 1.29%; extractable nutrients (mg/kg): P-47, Na-83, K-68, Ca-1129, Mg-213, Zn-1.29, S-8.73, As-2.17, Fe-92.88

Variety/Seeding Rate: MBLE, ALAN, JKSN, ADAR, RT 7015, JODN, 150 lb/A

Planting Method/Date: Water-seeded, Apr 6

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A; 0.54 lb/A zinc (foliar), May 12

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MBLE, RT 7015, Apr 15; JKSN, ADAR, JODN, Apr 16; ALAN, Apr 17

Water Management: Flooded, Apr 3; drained, Apr 10; reflooded, Apr 13; harvest drainage, July 19; second crop flooded, Aug 4; harvest drainage, Oct 14

Herbicides: 1.0 oz ai/A Londax (bensulfuron), May 4; 3.5 lb ai/A Ordram (molinate), May 5

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 18

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 29

Harvest: Main crop, Aug 3; ratoon crop, Oct 28

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

Comments: All entries emerged over a 3-day period. Differences in days to 50% heading across all entries were significant (Table 1). Adair was much later than the other entries. Main crop grain yields were good to excellent with all entries yielding in excess of 8000 lb/A with the exception of RT 7015. All entries required 120 to 150 lb N/A for optimum yield. Excellent ratoon yields were produced by Jodon, Adair, and Jackson (Table 2). Ratoon yields of Maybelle, Alan and RT 7015 were similar. Total grain yields of Jackson, Adair, and Jodon were in excess of 12,000 lb/A.

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. 1993.

	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)				
Maybelle	77	78	78	78	78	88	90	96	98	93	0/0	0/0	0/0	0/0	7293	8374	8972	9335	8494
Alan	81	81	82	82	82	86	86	93	98	91	0/0	0/0	0/0	0/0	7730	8062	8434	8837	8268
Jackson	81	82	83	83	82	87	92	98	101	95	0/0	0/0	0/0	0/0	7883	8682	9270	9318	8738
Adair	85	85	88	86	86	100	102	109	108	105	0/0	0/0	0/0	0/0	7426	8552	8777	8539	8323
RT 7015	79	79	80	81	80	78	80	82	86	81	0/0	0/0	0/0	0/0	7624	7802	8330	8075	7958
Jodon	80	80	82	82	81	79	82	84	88	83	0/0	0/0	0/0	0/0	7869	8269	8917	8933	8497
N																			
Mean	81	81	82	82		86	89	94	97						7804	8290	8783	8839	
C.V., %			1.07					2.89									4.26		
LSD (0.01):																			
Nitrogen			1					6									726		
Variety			1					2									336		
V within N			-					-									671		
V across N			-					-									944		

* 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. 1993.

Variety	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Maybelle	7293	8373	8972	9335	8494	2937	2954	2839	3157	2972	10231	11328	11811	12492	11465
Alan	7730	8062	8434	8837	8266	3437	3387	3192	3105	3280	11167	11449	11626	11942	11546
Jackson	7683	8682	9270	9318	8738	3477	3452	3546	3612	3522	11159	12134	12816	12930	12260
Adair	7426	8552	8777	8539	8323	4517	4319	4166	4046	4262	11943	12871	12943	12585	12586
RT 7015	7624	7802	8330	8075	7958	3277	3196	3264	3330	3267	10900	10997	11595	11406	11224
Jodon	7869	8269	8917	8933	8497	3956	3714	3691	3774	3784	11825	11983	12608	12707	12281
N															
Mean	7604	8290	8783	8839		3600	3504	3450	3504		11204	11794	12233	12344	
C.V., %			4.26					6.97					3.66		
LSD (0.01):															
Nitrogen			726					ns					973		
Variety			336					230					409		
V within N			671					461					818		
V across N			944					596					1208		

Experiment: Early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.2; O.M.: 1.17%; extractable nutrients (mg/kg): P-35, Na-73, K-53, Ca-1093, Mg-192, Zn-1.03, S-7.58, As-2.11, Fe-69.52

Variety/Seeding Rate: LMNT, LCSN, ORIN, CPRS, BNGL, LGRU, 2071, 2168, 2192, 1133, KBNT, 150 lb/A

Planting Method/Date: Water-seeded, Apr 7

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A; 0.54 lb/A zinc (foliar), May 12

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ORIN, 2168, Apr 15; CPRS, BNGL, KBNT, LGRU, 1133, LCSN, Apr 16; LMNT, 2071, 2192, Apr 17

Water Management: Flooded, Apr 3; drained, Apr 10; reflooded, Apr 13; harvest drainage, July 26; second crop flooded, Aug 12; harvest drainage, Oct 18

Herbicides: 1.0 oz ai/A Londax (bensulfuron), May 4; 3.5 lb ai/A Ordram (molinate), May 5

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 18

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 29

Harvest: Main crop, Aug 11; ratoon crop, Nov 10

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

Comments: All entries emerged over a 3-day period. Differences in days to 50% heading across all entries were significant (Table 3). Lagrue was much earlier than 2192, while other entries were similar in 50% heading. Main crop grain yields were good to excellent (Table 4). Most entries required 120 to 150 lb N/A for optimum yield. Excellent ratoon yields were produced by Cypress, Kaybonnet, and 2071 (Table 4). Ratoon yields of 1133, Bengal, 2168, Orion, and Lagrue were significantly lower. Total grain yields of all entries except 1133 were in excess of 10,000 lb/A.

Table 3. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1993.

	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	85	86	88	89	87	74	76	83	87	80	0/0	0/0	0/0	0/0	7350	7941	7846	7578	7679	
Lacassine	82	83	83	86	84	76	78	87	87	82	0/0	0/0	0/0	0/0	7581	7715	8505	8140	7985	
Orion	87	87	87	88	87	86	94	96	99	94	0/0	0/0	0/0	0/0	7116	7750	8027	8253	7786	
Cypress	85	85	87	88	86	75	77	83	87	81	0/0	0/0	0/0	0/0	7000	8221	8629	9111	8240	
Bengal	88	88	89	89	89	78	82	85	87	83	0/0	0/0	0/0	0/0	7712	8768	9629	9900	9002	
LaGrue	77	77	79	81	79	87	91	97	100	94	0/0	0/0	0/0	0/0	7417	8495	9209	9936	8764	
2071	83	83	86	87	85	83	83	87	95	87	0/0	0/0	0/0	0/0	6887	7708	8373	8573	7885	
2168	82	82	83	84	83	82	84	88	91	86	0/0	0/0	0/0	0/0	7422	8072	8830	9159	8371	
2192	93	94	96	96	95	84	88	90	94	89	0/0	0/0	0/0	0/0	8031	9510	9250	9339	9032	
AR1133	79	81	82	85	82	86	90	95	100	93	0/0	0/0	0/0	0/0	6346	7077	7883	8113	7355	
Kaybonnet	82	83	84	86	84	86	88	98	100	93	0/0	0/0	0/0	0/0	6300	7609	7996	8212	7529	
N																				
Mean	84	85	86	87		82	85	90	93						7197	8079	8561	8756		
C.V., %			1.07					2.98									4.76			
LSD (0.01):																				
Nitrogen			1					2									808			
Variety			1					2									359			
V within N			-					-									718			
V across N			-					-									1053			

* 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. 1993.

Variety	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	7350	7941	7846	7578	7679	2521	2413	2506	2443	2471	9872	10354	10352	10021	10150
Lacassine	7581	7715	8505	8140	7985	2916	2823	2723	2665	2782	10497	10539	11228	10805	10767
Orion	7116	7750	8027	8253	7786	2586	2593	2547	2658	2596	9702	10343	10574	10910	10383
Cypress	7000	8221	8629	9111	8240	3285	3270	3144	3283	3245	10285	11491	11773	12394	11486
Bengal	7712	8768	9629	9900	9002	1632	1397	1597	1918	1636	9344	10164	11226	11818	10638
LaGrue	7417	8495	9209	9936	8764	2482	2531	2552	2916	2621	9899	11026	11761	12852	11385
2071	6887	7708	8373	8573	7885	4530	4480	4705	4695	4602	11416	12188	13078	13268	12488
2168	7422	8072	8830	9159	8371	2302	2277	2329	2462	2342	9724	10349	11160	11620	10713
2192	8031	9510	9250	9339	9032	2415	2748	2672	3074	2727	10446	12258	11922	12413	11760
AR1133	6346	7077	7883	8113	7355	1663	1633	1529	1434	1565	8009	8710	9412	9547	8920
Kaybonnet	6300	7609	7996	8212	7529	3170	3095	2914	2759	2984	9470	10704	10910	10972	10514
N															
Meen	7197	8079	8561	8756		2682	2660	2656	2755		9879	10739	11218	11511	
C.V., %			4.76					10.34					5.03		
LSD (0.01):															
Nitrogen			808					ns					1174		
Variety			359					257					504		
V within N			718					515					1009		
V across N			1053					637					1509		

Experiment: Special purpose variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.2; O.M.: 1.41%; extractable nutrients (mg/kg): P-49, Na-100, K-58, Ca-1186, Mg-204, Zn-2.57, S-8.65, As-1.80, Fe-67.10

Variety/Seeding Rate: LMNT, DLMT, 2085, 150 lb/A

Planting Method/Date: Water-seeded, Apr 6

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A; 0.54 lb/A zinc (foliar), May 12

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: LMNT, DLMT, 2085, Apr 17

Water Management: Flooded, Apr 3; drained, Apr 10; reflooded, Apr 13; harvest drainage, July 26; second crop flooded, Aug 12; harvest drainage, Oct 18

Herbicides: 1.0 oz ai/A Londax (bensulfuron), May 4; 3.5 lb ai/A Ordram (molinate), May 5

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 18

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 29

Harvest: Main crop, Aug 11; ratoon crop, Nov 10

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

Comments: All entries emerged 11 days after seeding. 2085 matured earlier than either Lemont or Dellmont (Table 5). Main crop grain yield of Lemont was significantly higher than Dellmont or 2085. All entries required 120 lb N/A for optimum yield. 2085 produced the highest ratoon yield (Table 6). Total grain yield of 2085 was also significantly higher than other 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. 1993.

	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	87	89	90	92	89	74	80	88	89	83	0/0	0/0	0/0	0/0	7209	7960	8178	7823	7793
Dellmont	88	90	91	93	91	73	82	88	87	83	0/0	0/0	0/0	0/0	6782	7474	7573	7575	7351
2085	85	86	87	88	86	83	89	95	98	91	0/0	0/0	0/0	0/0	6308	7097	7146	7260	6953
N																			
Mean	87	88	89	91		77	84	91	92						6766	7510	7633	7553	
C.V., %			1.02					2.53									2.56		
LSD (0.01):																			
Nitrogen			2					7									342		
Variety			1					2									186		
V within N			-					-									373		
V across N			-					-									457		

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

Table 6. Effect of N rate in main crop on grain yields of water-seeded aromatic rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1993.

Variety	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	7209	7960	8178	7823	7793	2357	2232	2458	2542	2397	9566	10192	10637	10365	10190
Dellmont	6782	7474	7573	7575	7351	2687	2526	2527	2775	2629	9469	10000	10100	10351	9980
2085	6308	7097	7146	7260	6953	3504	3541	3462	3613	3530	9812	10638	10608	10872	10483
N															
Mean	6766	7510	7632	7553		2849	2767	2816	2977		9616	10277	10448	10529	
C.V., %			2.56					7.22					2.65		
LSD (0.01):															
Nitrogen			342					ns					260		
Variety			186					204					268		
V within N			373					408					536		
V across N			457					556					508		

Experiment: Very early variety x nitrogen trial

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.6; O.M.: 2.76%; extractable nutrients (mg/kg): P-197, Na-49, K-401, Ca-6299, Mg-1328, Zn-2.81, S-4.65, As-6.12, Fe-103.3

Variety/Seeding Rate: MBLE, ALAN, JKSN, ADAR, RT 7015, JODN, 100 lb/A

Planting Method/Date: Drill-seeded, May 19

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ALAN, May 30; JKSN, ADAR, JODN, RT 7015, MBLE, May 31

Water Management: Flushed, May 22, May 31, June 7, June 17; flooded July 2; harvest drainage, Sep 13

Herbicides: 0.375 lb ai/A Facet (quinclorac) + 1.0 lb ai/A Basagran (bentazon) + 32 oz crop oil, June 10; 3.0 lb ai/A Ordram (molinate), July 5; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 23

Fungicides: 0.28 lb ai/A Tilt (propiconazole), Aug 6; 0.5 lb ai/A Benlate (benomyl), Aug 21

Harvest: Sep 29

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

Comments: All entries emerged 8 to 9 days after the initial flush. Days to 50% heading was similar for all entries except Maybelle, which was 6 days earlier (Table 7). Lodging was severe for Alan and Adair when N rate exceeded 120 lb/A. Main crop grain yields were fair to good with Maybelle and RT 7015 yielding significantly less than the other entries. Most entries responded to 120 or 150 lb N/A for optimum yield. Jodon required the maximum rate of 180 lb N/A. Across entries there was no significant response to fertilizer N.

Table 7. 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. 1993.

	N rate (lb/A)																			
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture					
Variety	90	120	150	180	Mean	90	120	150	180	Mean	90	120	150	180	90	120	150	180	Mean	
						----------(cm)----------									----------(lb/A)----------					
Maybelle	84	84	85	85	85	89	93	98	95	94	0/0	0/0	0/0	0/0	5860	6349	6921	7100	6557	
Alan	92	93	94	94	93	100	105	105	103	103	0/0	5/1	55/4	65/5	8120	8569	7838	7304	7958	
Jackson	92	93	94	95	94	98	104	108	109	104	0/0	0/0	0/0	0/0	7818	8026	8457	8889	8298	
Adair	91	92	92	93	92	115	116	117	118	116	20/1	27/2	57/4	77/5	8707	8410	8768	8083	8492	
RT 7015	90	91	92	93	91	84	87	90	89	88	0/0	0/0	0/0	0/0	6666	6923	7492	7548	7157	
Jodon	93	94	94	95	94	92	94	96	98	95	0/0	0/0	0/0	0/0	7993	8288	8390	8593	8316	
N																				
Mean	90	91	92	93		96	100	102	102						7527	7761	7978	7919		
C.V., %			0.76					3.69									4.41			
LSD (0.01):																				
Nitrogen			1					ns									ns			
Variety			1					3									323			
V within N			-					-									647			
V across N			-					-									815			

* 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: 6.4; O.M.: 2.88%; extractable nutrients (mg/kg): P-189, Na-59, K-434, Ca-6317, Mg-1331, Zn-2.94, S-5.72, As-6.29, Fe-108.3

Variety/Seeding Rate: LMNT, LCSN, ORIN, CPRS, BNGL, LGRU, 2071, 2168, 2192, 1133, KBNT, 100 lb/A

Planting Method/Date: Drill-seeded, May 19

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ORIN, BNGL, LGRU, 1133, May 30; LMNT, KBNT, LCSN, CPRS, 2071, 2168, 2192, May 31

Water Management: Flushed, May 22, May 31, June 7, June 17; flooded, July 2; harvest drainage, Sep 13

Herbicides: 0.375 lb ai/A Facet (quinclorac) + 1.0 lb ai/A Basagran, (bentazon) + 32 oz crop oil, June 10; 3.0 lb ai/A Ordram (molinate), May 5; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 23

Fungicides: 0.28 lb ai/A Tilt, (propiconazole), Aug 6; 0.5 lb ai/A Benlate (benomyl), Aug 21

Harvest: Sep 29

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

Comments: All entries emerged 8 to 9 days after the initial flush. Difference in 50% heading across all entries was 8 days (Table 8). Medium-grain entries were earlier in maturity than the long-grain entries. Lodging was severe for Orion, 1133, and Kaybonnet, especially at high rates of N. Bengal also lodged at 180 lb N/A. Main crop grain yields were good to excellent, with 2192 yielding over 11,000 lb/A. The N requirement was variable with respect to entry. Only 90 lb N/A were required for Lemont, Lacassine, Orion, Cypress, Lagrue, 2192, 1133, and Kaybonnet. Bengal, 2071, and 2168 required 150 lb N/A. N response averaged across all entries was not significant.

Table 8. Effect of N rate on egronomic performance of drill-seeded early rice varieties and advanced experimental lines. Buford Perry Farm, East Carroll Parish, LA. 1993.

	N rate (lb/A)																			
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture					
Variety	90	120	150	180	Mean	90	120	150	180	Mean	90	120	150	180	90	120	150	180	Mean	
						----------(cm)----------									----------(lb/A)----------					
Lemont	96	96	97	97	97	89	87	91	91	90	0/0	0/0	0/0	0/0	7388	7276	7138	7007	7202	
Lacassine	95	95	96	97	96	92	93	93	94	93	0/0	0/0	0/0	0/0	7300	7345	7207	7258	7278	
Orion	88	88	88	90	89	102	101	103	103	102	12/1	25/1	47/3	72/5	7340	7361	6726	6221	6912	
Cypress	95	95	96	97	96	102	99	99	98	100	0/0	0/0	0/0	0/0	8139	8173	8042	8171	8131	
Bengal	89	89	90	91	90	93	88	94	92	92	0/0	0/0	7/1	35/3	8457	8615	8808	8770	8662	
LaGrue	92	93	95	96	94	114	108	114	115	113	0/0	0/0	0/0	27/2	9312	9261	9271	8510	9088	
2071	94	94	95	95	95	108	108	107	107	108	0/0	0/0	0/0	0/0	8097	8102	8190	8273	8165	
2168	87	88	89	90	89	100	98	102	101	100	0/0	0/0	0/0	2/1	7110	7170	7291	7715	7322	
2192	90	90	91	93	91	98	97	98	98	98	0/0	0/0	20/1	32/2	11246	11097	11036	10697	11019	
AR1133	92	93	94	95	94	122	118	120	120	120	0/0	0/0	42/2	35/2	7966	7984	7924	7871	7936	
Kaybonnet	93	94	94	95	94	117	112	114	116	115	2/1	0/0	50/4	52/4	8139	8150	7745	7548	7895	
N																				
Mean	92	92	93	94		103	101	103	103						8227	8230	8125	8004		
C.V., %			0.73					2.98									3.72			
LSD (0.01):																				
Nitrogen			1					ns									ns			
Variety			1					3									280			
V within N			-					-									561			
V across N			-					-									877			

* 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: 5.9; O.M.: 1.34%; extractable nutrients (mg/kg): P-77, Na-24, K-83, Ca-972, Mg-143, Zn-1.37, S-10.92, As-2.03, Fe-113.3

Variety/Seeding Rate: MBLE, ALAN, JKSN, ADAR, RT 7015, JODN, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Fertilization: 45 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^2)

Emergence Date: ADAR, Apr 13; MBLE, ALAN, JODN, Apr 14; JKSN, Apr 15; RT 7015, Apr 16

Water Management: Flooded, Apr 1; drained, Apr 4; reflooded, Apr 7; drained, Apr 8; reflooded, Apr 13; harvest drainage, July 19; second crop flooded, Aug 9; harvest drainage, Oct 8

Herbicides: 1.0 oz ai/A Londax (bensulfuron) + 3.5 lb ai/A Ordram (molinate), May 4

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 10

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 20

Harvest: Main crop, Aug 4; ratoon crop, Oct 25

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

Comments: Emergence was delayed due to cool temperatures. After the initial drain the test was reflooded immediately to minimize stand establishment problems due to impending weather conditions. The test was drained again for 5 days and then reflooded. Maybelle headed 3 to 4 days earlier than the other entries (Table 9). All other entries were similar in days to 50% heading. Lodging was minimal and had no influence on main crop grain yields. Main crop grain yields were fair to good for most entries. Maybelle and Jackson yielded significantly less than the other entries. Most entries required 90 to 120 lb N/A for optimum yield. Ratoon crop yield of Maybelle was also less than the other entries (Table 10). Ratoon yield of Adair was excellent, yielding over 3500 lb/A. Total grain yields of Adair and Jodon were over 10,000 lb/A.

Table 9. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

	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)				
Maybelle	78	78	80	80	79	82	87	96	93	90	0/0	2/1	0/0	2/1	5650	6058	7134	6385	6307
Alan	82	83	84	85	83	83	88	96	96	91	2/1	0/0	0/0	2/1	6202	6777	6783	6671	6608
Jackson	81	82	84	85	83	82	87	94	98	90	0/0	2/1	0/0	0/0	6223	6823	7381	7419	6961
Adair	82	83	85	85	84	91	98	103	104	99	0/0	0/0	0/0	20/1	6501	7319	7623	7621	7266
RT 7015	80	82	83	84	82	76	81	85	86	82	0/0	0/0	0/0	0/0	6581	6926	7108	6945	6890
Jodon	82	82	85	84	83	81	82	90	90	86	0/0	0/0	0/0	0/0	7117	7433	7747	7530	7457
N																			
Mean	81	82	83	84		83	87	94	95						6379	6889	7296	7095	
C.V., %			1.06					3.18									4.92		
LSD (0.01):																			
Nitrogen			1					3									500		
Variety			1					3									320		
V within N			-					-									640		
V across N			-					-									749		

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

Table 10. Effect of N rate in main crop on grain yields of water-seeded very early rice varieties and advanced experimental lines. Errol Loumsberry Farm, Vermilion Parish, LA. 1993.

Variety	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Maybelle	5650	6058	7134	6385	6307	2535	2430	2765	2506	2559	8185	8488	9899	8891	8866
Alan	6202	6777	6783	6671	6608	3293	2770	2893	2793	2937	9495	9547	9677	9464	9546
Jackson	6223	6823	7381	7419	6961	2846	2861	2942	3161	2953	9069	9684	10323	10580	9914
Adair	6501	7319	7623	7621	7266	3592	3363	3658	3661	3569	10093	10682	11282	11282	10835
RT 7015	6581	6926	7108	6945	6890	2976	2996	2992	2878	2960	9557	9922	10100	9822	9850
Jodon	7117	7433	7747	7530	7457	2866	3029	3038	2815	2937	9983	10462	10786	10345	10394
N															
Mean	6379	6889	7296	7095		3018	2908	3048	2969		9397	9798	10344	10064	
C.V., %			4.92					6.66					3.73		
LSD (0.01):															
Nitrogen			500					ns					377		
Variety			320					187					350		
V within N			640					374					699		
V across N			749					597					738		

Experiment: Early variety x nitrogen trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 6.6; O.M.: 1.29%; extractable nutrients (mg/kg): P-23, Na-51, K-70, Ca-1443, Mg-259, Zn-0.66, S-4.47, As-2.43, Fe-37.54

Variety/Seeding Rate: LMNT, LCSN, ORIN, CPRS, BNGL, LGRU, 2071, 2168, 2192, 1133, KBNT, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Fertilization: 45 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^2)

Emergence Date: KBNT, Apr 13; ORIN, BNGL, CPRS, LGRU, 2168, 1133, Apr 14; LMNT, 2071, LCSN, Apr 15; 2192, Apr 16

Water Management: Flooded, Apr 1; drained, Apr 4; reflooded, Apr 7; drained, Apr 8; reflooded, Apr 13; harvest drainage, July 19; second crop flooded, Aug 9; harvest drainage, Oct 8

Herbicides: 1.0 oz ai/A Londax (bensulfuron) + 3.5 lb ai/A Ordram (molinate), May 4

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 10

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 20

Harvest: Main crop, Aug 6; ratoon crop, Oct 26

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

Comments: Emergence was delayed due to cool temperatures. After the initial drain the test was reflooded immediately to minimize stand establishment problems due to impending weather conditions. The test was again drained for 5 days and then reflooded. Lagrue reached 50% heading much earlier than the other entries (Table 11), and heading of 2192 was much later. All other entries were similar in days to 50% heading. Grain yields were good to excellent for most entries. 2192 yields were significantly higher than other entries. Yields for Bengal and Lagrue were also high. Most entries required 90 to 120 lb N/A for optimum yield. Ratoon crop yields were excellent for Orion, Cypress, Bengal, 2071, 2168, and 2192 (Table 12). Total grain yields of all entries except Lemont, 1133, and Kaybonnet were over 10,000 lb/A. Bengal, Lagrue, and 2071 averaged over 11,000 lb/A, and 2192 over 12,000 lb/A.

Table 11. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

	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	90	90	93	93	92	75	79	80	83	79	0/0	0/0	0/0	0/0	6212	6860	6664	6289	6506	
Lacassine	88	87	89	89	89	81	85	87	97	88	0/0	0/0	0/0	0/0	6566	7114	7221	7048	6987	
Orion	90	89	90	90	90	89	92	95	97	94	0/0	0/0	0/0	0/0	6324	6879	7057	6724	6746	
Cypress	91	90	92	93	92	79	83	85	85	83	0/0	0/0	0/0	0/0	6322	7113	7092	7048	6894	
Bengal	91	91	93	93	92	77	84	87	89	84	0/0	0/0	0/0	0/0	7013	7705	7932	7622	7568	
LaGrue	80	82	84	85	83	92	101	100	103	99	0/0	0/0	0/0	0/0	6688	7599	8378	8457	7780	
2071	89	90	93	93	91	89	93	94	95	93	0/0	0/0	0/0	0/0	6310	6772	7121	6869	6768	
2168	85	86	86	87	86	86	86	89	94	89	0/0	0/0	0/0	0/0	6157	6984	7590	7316	7012	
2192	96	96	97	97	97	89	92	90	97	92	0/0	0/0	0/0	0/0	7633	8410	8829	8879	8438	
AR 1133	82	82	86	87	84	96	102	101	106	101	0/0	0/0	0/0	0/0	5835	6467	7141	7032	6619	
Kaybonnet	85	87	88	90	88	95	98	98	101	98	0/0	0/0	0/0	0/0	6039	6615	7237	6763	6664	
N																				
Mean	88	88	90	91		86	91	92	95						6464	7138	7478	7277		
C.V., %			0.88					3.71									3.83			
LSD (0.01):																				
Nitrogen			1					7									260			
Variety			1					3									251			
V within N			-					-									502			
V across N			-					-									543			

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

Table 12. 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. 1993.

Variety	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	6212	6860	6664	6289	6506	2592	2568	2561	2726	2612	8804	9428	9225	9015	9118
Lacassine	6566	7114	7221	7048	6987	3204	3225	3299	3078	3201	9771	10339	10520	10125	10189
Orion	6324	6879	7057	6724	6746	3639	3504	3372	3289	3451	9963	10383	10429	10013	10197
Cypress	6322	7113	7092	7048	6894	3660	3635	3504	3358	3539	9983	10748	10596	10406	10433
Bengal	7013	7705	7932	7622	7568	3682	3410	4130	4136	3840	10695	11115	12062	11758	11407
LaGrue	6688	7599	8378	8457	7780	3369	3093	3525	3377	3341	10057	10692	11903	11833	11121
2071	6310	6772	7121	6869	6768	4562	4397	4682	4280	4480	10872	11169	11803	11149	11248
2168	6157	6984	7590	7316	7012	3401	3292	3636	3555	3471	9557	10276	11226	10871	10483
2192	7633	8410	8829	8879	8438	3641	3769	4299	4344	4013	11274	12179	13129	13223	12451
AR1133	5835	6467	7141	7032	6619	3070	2802	3175	2717	2941	8905	9269	10316	9749	9560
Kaybonnet	6039	6615	7237	6763	6664	3065	3195	3105	2739	3026	9104	9810	10343	9502	9690
N															
Mean	6464	7138	7478	7277		3444	3354	3572	3418		9908	10492	11050	10695	
C.V., %			3.83					9.74					4.38		
LSD (0.01):															
Nitrogen			260					ns					484		
Variety			251					311					427		
V within N			502					621					855		
V across N			543					707					944		

Experiment: Very early variety x nitrogen trial

Location: Rapides Parish, Will Bollich Farm

Soil Type/Analysis: Moreland clay; pH: 6.7; O.M.: 2.88%; extractable nutrients (mg/kg): P-180, Na-40, K-347, Ca-4185, Mg-1219, Zn-4.37, S-15.81, As-5.83, Fe-62.65

Variety/Seeding Rate: MBLE, ALAN, JKSN, ADAR, RT 7015, JODN, 100 lb/A

Planting Method/Date: Drill-seeded, May 31

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not recorded

Water Management: Flushed, June 1, June 10; flooded, July 6; harvest drainage, Sep 23

Herbicides: 4.0 lb ai/A Stam (propanil), June 15; Arrosolo (3.0 lb ai/A molinate + 3.0 lb ai/A propanil), June 18; 1.0 oz ai/A Londax (bensulfuron), July 14; 3.0 lb ai/A Ordram, July 15

Insecticides: 0.5 lb ai/A Furadan (carbofuran), Aug 1

Fungicides: 0.5 lb ai/A Rovral (iprodione), Aug 15

Harvest: Oct 7

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

Comments: Days to 50% heading were similar for all entries except Maybelle, which was 4 days earlier (Table 13). Days to 50% heading for all entries in this test were reduced when compared with other locations, probably due to late planting. Lodging was severe for Alan and Adair when N rate exceeded 150 lb/A. Main crop grain yields at this location were somewhat low, especially for Maybelle and RT 7015. Most entries required 150 lb N/A for optimum yield.

Table 13. Effect of N rate on agronomic performance of drill-seeded very early rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1993.

	N rate (lb/A)																			
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture					
Variety	90	120	150	180	Mean	90	120	150	180	Mean	90	120	150	180	90	120	150	180	Mean	
						(cm)									(lb/A)					
Maybelle	77	76	77	76	77	90	94	99	97	95	0/0	0/0	0/0	5/1	5149	5090	5251	5456	5237	
Alan	81	81	83	82	82	95	100	106	103	101	0/0	0/0	12/3	52/5	6268	6325	6361	5934	6222	
Jackson	83	84	85	84	84	91	99	103	102	99	0/0	0/0	0/0	0/0	5563	6040	6201	6079	5971	
Adair	80	81	82	81	81	101	105	110	106	106	0/0	12/1	2/1	40/4	6280	6106	6368	6174	6232	
RT 7015	79	79	80	80	80	86	93	96	91	92	0/0	0/0	0/0	0/0	4743	5288	5384	5361	5194	
Jodon	83	83	84	83	83	94	99	99	100	98	0/0	0/0	2/1	7/2	6372	6545	6741	6752	6603	
N																				
Mean	81	81	82	81		93	98	102	100						5729	5899	6051	5959		
C.V., %			0.80					2.78									5.36			
LSD (0.01):																				
Nitrogen			ns					7									240			
Variety			1					3									298			
V within N			-					-									595			
V across N			-					-									596			

* 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: Rapides Parish, Will Bollich Farm

Soil Type/Analysis: Moreland clay; pH: 6.6; O.M.: 2.73; extractable nutrients (mg/kg): P-176, Na-49, K-353, Ca-4201, Mg-1262, Zn-3.82, S-20.84, As-7.49, Fe-76.59

Variety/Seeding Rate: LMNT, LCSN, ORIN, CPRS, BNGL, LGRU, 2071, 2168, 2192, 1133, KBNT, 100 lb/A

Planting Method/Date: Drill-seeded, May 31

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, June 1, June 10; flooded, July 6; harvest drainage, Sep 23

Herbicides: 4.0 lb ai/A Stam (propanil), June 15; Arrosolo (3.0 lb ai/A molinate + 3.0 lb ai/A propanil), June 18; 1.0 oz ai/A Londax (bensulfuron), July 14; 3.0 lb ai/A Ordram, July 15

Insecticides: 0.5 lb ai/A Furadan (carbofuran), Aug 1

Fungicides: 0.5 lb ai/A Rovral (iprodione), Aug 15

Harvest: Oct 7

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

Comments: Days to 50% heading were similar for all long-grain entries, while the medium-grain entries were earlier in maturity. Days to 50% heading for all entries in this test were reduced when compared with other locations, probably due to late planting. Lodging was minimal and had no effect on grain yields (Table 14). Main crop yields were somewhat low, especially for Lemont, Orion, and 2168. 2192 yielded over 8,000 lb/A. Most entries required 150 to 180 lb N/A for optimum yield.

Table 14. Effect of N rate on agronomic performance of drill-seeded early rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1993.

	N rate (lb/A)																			
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture					
Variety	90	120	150	180	Mean	90	120	150	180	Mean	90	120	150	180	90	120	150	180	Mean	
						(cm)									(lb/A)					
Lemont	93	92	93	94	93	86	86	87	88	87	0/0	0/0	0/0	0/0	4512	5327	5480	5442	5190	
Lacassine	91	91	91	92	92	87	88	86	91	88	0/0	0/0	0/0	0/0	5668	5960	5911	6081	5905	
Orion	81	79	81	81	81	87	88	94	100	92	10/1	0/0	0/0	2/1	4486	5000	5550	5546	5145	
Cypress	90	89	90	90	90	100	99	101	105	101	2/0	0/0	0/0	2/1	6216	6364	6657	6853	6522	
Bengal	81	80	81	82	81	81	85	88	90	86	0/0	0/0	2/1	10/2	5017	5733	6013	6118	5720	
LaGrue	86	88	89	90	88	107	106	109	114	109	0/0	0/0	2/1	17/2	7168	7202	8388	7648	7601	
2071	88	87	87	88	88	99	101	104	108	103	0/0	0/0	0/0	0/0	5791	6074	6439	6427	6183	
2168	78	78	78	79	78	85	90	91	94	90	0/0	0/0	2/1	2/1	4508	5153	5267	5588	5129	
2192	88	87	87	88	87	93	95	92	97	94	0/0	0/0	0/0	0/0	7313	8143	8377	8577	8102	
AR1133	86	85	87	87	87	105	110	111	111	109	0/0	0/0	0/0	17/2	5919	5959	6497	6483	6214	
Kaybonnet	86	86	87	88	87	105	108	106	109	107	2/1	20/2	20/2	17/1	6737	6151	6380	6330	6400	
N																				
Mean	86	86	87	87		94	96	97	101						5758	6097	6451	6463		
C.V., %			1.24					3.59									8.71			
LSD (0.01):																				
Nitrogen			ns					3									352			
Variety			1					3									499			
V within N			-					-									999			
V across N			-					-									1013			

* 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: Morehouse Parish, Zaunbrecher Farm

Soil Type/Analysis: Hebert silty clay; pH: 6.2; O.M.: 2.12%; extractable nutrients (mg/kg): P-139, Na-161, K-241, Ca-3015, Mg-851, Zn-5.31, S-11.79, As-5.97, Fe-184.5

Variety/Seeding Rate: MBLE, ALAN, JKSN, ADAR, RT 7015, JODN, 150 lb/A

Planting Method/Date: Water-seeded delayed flood, May 19

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ALAN, ADAR, May 26; JKSN, RT 7015, MBLE, May 27; JODN, May 28

Water Management: Flooded, May 18; drained, May 21; flushed, May 28, June 3, June 11, June 17; flooded July 1; harvest drainage, Sep 10

Herbicides: 3.5 lb ai/A Stam (propanil), June 1; 4.0 lb ai/A Stam + 0.75 lb ai/A Basagran (bentazon), June 19; 3.5 lb ai/A Ordram (molinate), July 3; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 19; 0.25 lb ai/A methyl parathion, Aug 23

Fungicides: 0.28 lb ai/A Tilt (propiconazole), Aug 5; 0.5 lb ai/A Benlate (benomyl), Aug 19

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: All entries emerged 7 to 9 days after planting. Days to 50% heading were similar for all entries except Maybelle, which was 4 days earlier (Table 15). Lodging was severe for Adair when the N rate exceeded 90 lb/A and grain yield was reduced slightly at the 150 lb/A rate. Main crop grain yields were good to excellent with Maybelle and RT 7015 yielding significantly less than the other entries. Most entries responded to 120 or 150 lb N/A for optimum yield. Adair and Jodon yielded over 10,000 lb/A.

Table 15. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines. Zaumbrecher Farm, Morehouse Parish, LA. 1993.

	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)				
Maybelle	83	83	84	84	84	76	78	78	88	80	0/0	0/0	0/0	17/1	7406	8245	8340	9097	8272
Alan	87	89	90	92	89	84	86	89	95	88	0/0	0/0	0/0	20/2	8668	9735	10189	9901	9623
Jackson	89	91	93	94	92	78	81	84	93	84	0/0	0/0	0/0	0/0	8239	9544	9700	10397	9470
Adair	87	88	89	90	88	91	95	97	105	97	0/0	22/1	32/3	65/5	9395	10345	10401	9979	10030
RT 7015	86	88	89	89	88	74	73	75	80	76	0/0	0/0	0/0	0/0	7864	8721	9269	9514	8842
Jodon	90	91	92	93	91	79	81	77	85	81	0/0	0/0	0/0	0/0	9647	10373	10369	10672	10265
N																			
Mean	87	88	89	90		81	82	83	91						8536	9494	9711	9927	
C.V., %			0.62					3.18									3.66		
LSD (0.01):																			
Nitrogen			2					5									598		
Variety			1					2									324		
V within N			-					-									648		
V across N			-					-									832		

* 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: 6.0; O.M.: 2.12%; extractable nutrients (mg/kg): P-140, Na-152, K-240, Ca-2951, Mg-844, Zn-2.95, S-11.59, As-5.90, Fe-205.1

Variety/Seeding Rate: LMNT, LCSN, ORIN, CPRS, BNGL, LGRU, 2071, 2168, 2192, 1133, KBNT, 150 lb/A

Planting Method/Date: Water-seeded delayed flood, May 18

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ORIN, KBNT, LGRU, 1133, May 27; BNGL, 2168, LCSN, CPRS, LMNT, 2192, May 28; 2071, May 29

Water Management: Flooded, May 18; drained, May 21; flushed, May 28, June 3, June 11, June 17; flooded, July 1; harvest drainage, Sep 10

Herbicides: 3.5 lb ai/A Stam (propanil), June 1; 4.0 lb ai/A Stam + 0.75 lb ai/A Basagran (bentazon), June 19; 3.5 lb ai/A Ordram (molinate), July 3; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 19; 0.25 ai/A methyl parathion, Aug 23

Fungicides: 0.28 lb ai/A Tilt, (propiconazole), Aug 5; 0.5 lb ai/A Benlate (benomyl), Aug 19

Harvest: Sep 28

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

Comments: All entries emerged 9 to 10 days after planting. Medium-grain entries were earlier in maturity than the long-grain entries (Table 16). Lodging was severe for Orion, 2168, 2192, Lagrue, 1133, and Kaybonnet, especially at high rates of N. Most entries required 90 to 120 lb N/A for optimum yield. Main crop grain yields were good to excellent, with 2192 yielding over 11,000 lb/A.

Table 16. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines. Zaunbrecher Farm, Morehouse Parish, LA. 1993.

	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	97	97	98	100	98	76	81	84	85	82	0/0	0/0	0/0	0/0	8096	8656	7967	8550	8317	
Lacassine	95	96	96	98	96	79	83	88	89	85	0/0	0/0	0/0	10/1	8680	8672	8699	8619	8668	
Orion	87	87	87	88	88	81	85	91	99	89	57/3	62/3	62/3	80/4	6583	7359	7796	7454	7298	
Cypress	93	93	96	96	95	89	92	96	94	93	0/0	0/0	0/0	7/1	8829	9202	9906	9629	9392	
Bengal	88	89	89	90	89	80	85	87	89	86	5/1	5/0	10/1	25/2	8864	9107	9874	10033	9470	
LaGrue	90	91	93	95	92	96	104	107	108	104	10/1	15/2	37/3	42/4	9892	10017	9802	8546	9564	
2071	92	93	93	96	94	92	95	100	102	98	0/0	0/0	0/0	0/0	8172	8716	9378	9266	8883	
2168	87	87	88	89	88	88	92	96	97	93	30/1	45/2	60/3	62/4	7096	7741	8334	8165	7834	
2192	90	91	91	92	91	89	89	93	94	91	17/1	30/1	57/2	62/2	10405	11313	11419	11470	11152	
AR1133	90	92	93	94	92	101	108	114	112	109	42/3	17/1	47/4	75/5	8349	8738	8880	7671	8409	
Kaybonnet	91	92	93	95	93	99	106	107	107	105	12/1	37/3	62/4	65/4	8603	9166	9064	8904	8934	
N																				
Mean	91	92	93	94		88	93	97	98						8506	8972	9193	8937		
C.V., %			0.90					2.90									7.40			
LSD (0.01):																				
Nitrogen			2					8									633			
Variety			1					3									610			
V within N			-					-									1219			
V across N			-					-									1319			

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

Experiment: Early medium grain variety x nitrogen trial

Location: Vermilion Parish, Bobby Trahan Farm

Soil Type/Analysis: Reclaimed marsh; pH: 5.1; O.M.: 7.51%; extractable nutrients (mg/kg): P-50, Na-73, K-192, Ca-1854, Mg-527, Zn-1.85, S-18.31, As-21.99, Fe-549.6

Variety/Seeding Rate: ORIN, MARS, BNGL, RICO, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 24

Fertilization: N source, urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 29, May 19; flooded, May 28; harvest drainage, Aug 20

Herbicides: Arrosolo (3.0 lb ai/A molinate + 3.0 lb ai/A propanil), May 25

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 14

Fungicides: None

Harvest: Sep 1

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

Comments: Severe P deficiency occurred immediately after permanent flood establishment. An application of 0-60-60 was made 10 days later. A response was observed within 5 days. Grain yields were somewhat low, especially for Orion and Mars (Table 17). Rico I grain yields were much higher than the other entries. Yield reductions probably occurred due to the early-season P deficiency.

Table 17. Effect of N rate on agronomic performance of drill-seeded medium grain rice varieties. Bobby Trahan Farm, Vermilion Parish, LA. 1993.

	N rate (lb/A)																					
	Days to 50% heading						Plant height						% Lodging/type*					Grain yield at 12% moisture					
Variety	0	30	60	40 20	90	Mean	0	30	60	40 20	90	Mean	0	30	60	40 20	90	0	30	60	40 20	90	Mean
							----------(cm)----------											----------(lb/A)----------					
Orion	93	93	93	93	94	94	87	88	90	91	91	90	0/0	0/0	0/0	0/0	0/0	4134	4386	4018	4220	4145	4181
Mars	92	93	94	93	93	93	95	97	96	97	100	97	0/0	0/0	0/0	0/0	0/0	3583	4027	4372	4174	3979	4027
Bengal	94	94	94	94	94	94	83	84	86	84	84	84	0/0	0/0	0/0	0/0	0/0	4681	4671	4702	4377	4839	4654
Rico 1	97	98	97	98	98	97	91	90	87	90	86	89	0/0	0/0	0/0	0/0	0/0	5788	5835	5257	5766	5781	5686
N																							
Mean	94	95	95	94	95		89	90	90	91	90							4546	4730	4587	4634	4686	
C.V., %				0.73						3.90											12.49		
LSD (0.01):																							
Nitrogen				ns						ns											ns		
Variety				1						3											493		
V within N				-						-											1102		
V across N				-						-											1145		

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

Table 18. Straighthead evaluation for commercial rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1993.

Entry	Grain type*	Rating**
Jasmine 85	L	7.0
8902192	M	6.7
Toro 2	L	6.3
V-4716	M	6.3
9302137	L	5.3
Tebonnet	L	5.0
9302152	L	4.3
9302177	L	4.3
Rico 1	M	4.0
L-203	L	3.3
9302008	M	3.0
AB 647	M	3.0
9302002	M	3.0
Jodon	L	3.0
Skybonnet	L	2.7
9202071	L	2.7
Texmont	L	2.3
9302005	M	2.3
AR 1133	L	2.3
9202062	L	2.3
Mars	M	2.3
Mercury	M	2.3
Della	L	2.3
Millie	L	2.3
Adair	L	2.3
Lacassine	L	2.0
Akitakomachi	M	2.0
9302068	L	2.0
Kaybonnet	L	2.0
L-202	L	1.7
9302074	L	1.7
Orion	M	1.7
9302028	M	1.7
9202128	M	1.3
Katy	L	1.3
Alan	L	1.3
9302048	L	1.3
Bengal	M	1.3
Rosemont	L	1.3
9302045	L	1.3
9302051	L	1.3
9202143	L	1.3
9102085	L	1.3
Dellmont	L	1.3

Continued.

Table 18. Continued.

Entry	Grain type*	Rating**
9302065	L	1.0
Cypress	L	1.0
Lemont	L	1.0
RT 7015	L	1.0
Jackson	L	1.0
AB869	M	1.0
9202042	L	1.0
Maybelle	L	1.0
9302022	M	1.0
Newbonnet	L	1.0
LaGrue	L	1.0
Gulfmont	L	1.0
Saturn	M	1.0
9202149	L	0.7
9102168	M	0.7
Labelle	L	0.7
9103069	M	0.7

* L = long grain, M = medium grain.
** Rating based on a scale from 0 to 9, where 0 = resistant and 9 = highly susceptible.

Table 19. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1993.

Variety	Emergence date	First* tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Maybelle	4-15	--	5-30	6-04	6-23
Alan	4-17	--	5-30	6-06	6-25
Jackson	4-16	--	5-30	6-05	6-27
Adair	4-16	--	5-30	6-06	6-30
RT 7015	4-15	--	5-31	6-05	6-25
2031	4-16	--	5-27	6-02	6-25
Early					
Lemont	4-17	--	5-30	6-07	7-01
Lacassine	4-16	--	5-30	6-06	6-29
Orion	4-15	--	6-03	6-08	7-03
Cypress	4-16	--	5-28	6-06	7-02
Bengal	4-16	--	6-03	6-08	7-04
LaGrue	4-16	--	6-04	6-12	6-24
2071	4-17	--	5-31	6-08	6-29
2168	4-15	--	6-04	6-07	6-29
2192	4-17	--	6-06	6-12	7-11
AR 1133	4-16	--	6-03	6-07	6-28
Kaybonnet	4-16	--	6-01	6-08	6-29
Aromatic					
Lemont	4-17	--	5-31	6-08	7-04
Dellmont	4-17	--	6-02	6-09	7-06
2085	4-17	--	6-02	6-09	7-01

* Data not taken

Table 20. 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. 1993.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Maybelle	5-31	6-16	7-15	7-24	8-21
Alan	5-30	6-15	7-15	7-31	8-20
Jackson	5-31	6-16	7-17	8-01	8-21
Adair	5-31	6-14	7-20	7-30	8-19
RT 7015	5-31	6-15	7-17	7-30	8-19
2031	5-31	6-15	7-18	7-31	8-21
Early					
Lemont	5-31	6-14	7-17	8-05	8-27
Lacassine	5-31	6-16	7-18	8-05	8-25
Orion	5-30	6-16	7-22	7-30	8-18
Cypress	5-31	6-13	7-15	8-05	8-25
Bengal	5-30	6-15	7-17	7-30	8-19
LaGrue	5-30	6-15	7-17	8-04	8-23
2071	5-31	6-15	7-16	7-31	8-24
2168	5-31	6-16	7-20	7-30	8-19
2192	5-31	6-14	7-19	7-31	8-21
AR 1133	5-30	6-16	7-21	8-04	8-23
Kaybonnet	5-31	6-16	7-19	8-02	8-24

Table 21. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Variety	Emergence date	First* tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Maybelle	4-14	--	5-25	6-02	6-20
Alan	4-14	--	5-25	6-03	6-24
Jackson	4-15	--	5-27	6-02	6-23
Adair	4-13	--	5-27	6-02	6-24
RT 7015	4-16	--	5-27	6-02	6-23
2031	4-14	--	5-25	6-03	6-23
Early					
Lemont	4-15	--	5-29	6-05	7-02
Lacassine	4-15	--	5-28	6-07	6-29
Orion	4-14	--	5-31	6-08	6-30
Cypress	4-14	--	5-28	6-07	7-02
Bengal	4-14	--	5-31	6-08	7-03
LaGrue	4-14	--	5-25	6-02	6-23
2071	4-15	--	5-29	6-05	7-01
2168	4-14	--	5-30	6-08	6-27
2192	4-16	--	6-01	6-08	7-07
AR 1133	4-14	--	5-29	6-03	6-24
Kaybonnet	4-13	--	5-31	6-05	6-28

* Data not taken

Table 22. Growth stage information for the DD-50 Rice Management Program. Drill-seeded rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1993.

Variety	Emergence* date	First* tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Maybelle	--	--	7-21	7-26	8-17
Alan	--	--	7-23	7-28	8-22
Jackson	--	--	7-23	8-02	8-24
Adair	--	--	7-23	8-03	8-21
RT 7015	--	--	7-23	7-30	8-20
2031	--	--	7-23	8-03	8-23
Early					
Lemont	--	--	7-28	8-06	9-01
Lacassine	--	--	7-26	8-04	8-31
Orion	--	--	7-24	8-02	8-20
Cypress	--	--	7-23	8-04	8-29
Bengal	--	--	7-24	8-05	8-20
LaGrue	--	--	7-26	8-04	8-29
2071	--	--	7-27	8-11	8-28
2168	--	--	7-26	8-01	8-18
2192	--	--	7-31	8-08	8-27
AR 1133	--	--	7-29	8-04	8-26
Kaybonnet	--	--	7-26	8-06	8-26

* Data not taken

Table 23. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Zaunbrecher Farm, Morehouse Parish, LA. 1993.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Maybelle	5-27	6-14	7-15	7-24	8-10
Alan	5-26	6-12	7-17	7-29	8-16
Jackson	5-27	6-16	7-17	7-31	8-18
Adair	5-26	6-13	7-16	7-28	8-15
RT 7015	5-27	6-14	7-16	7-29	8-15
2031	5-28	6-14	7-15	7-28	8-18
Early					
Lemont	5-28	6-14	7-14	8-03	8-23
Lacassine	5-28	6-12	7-16	8-02	8-22
Orion	5-27	6-13	7-19	7-24	8-13
Cypress	5-28	6-09	7-13	8-03	8-20
Bengal	5-28	6-13	7-15	7-26	8-14
LaGrue	5-27	6-11	7-16	8-01	8-17
2071	5-29	6-15	7-15	7-31	8-21
2168	5-28	6-12	7-16	7-26	8-14
2192	5-28	6-09	7-16	7-26	8-18
AR 1133	5-27	6-11	7-16	7-31	8-18
Kaybonnet	5-27	6-17	7-16	7-29	8-18

Table 24. Growth stage information for the DD-50 Rice Management Program. Drill-seeded medium-grain rice varieties. Trahan Farm, Vermilion Parish, LA. 1993.

Variety	Emergence* date	First* tiller	Green* ring	Panicle* 2 mm	Date of 50% heading
Early					
Orion	--	--	--	--	8-01
Mars	--	--	--	--	8-01
Bengal	--	--	--	--	8-01
Rico I	--	--	--	--	8-05

* Data not taken

RICE NUTRITION STUDIES

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A series of studies was conducted to evaluate various aspects of rice plant nutrition in both drill- and water-seeded rice. Most of the studies concerned fertilizer N management, with emphasis on N source, time of N application in relation to water management, midseason N applications, and N management in a ratoon crop. The response of rice to variable rates of P and K was determined on five soils to assess the accuracy of current recommendations concerning application of these two nutrients. Various Zn formulations were evaluated as soil- and foliar-applied materials. In Vermilion Parish, a lime rate study was conducted on a Crowley silt loam characterized by low soil pH and inadequate Ca.

A study was continued to evaluate the effectiveness of a controlled- release urea fertilizer when applied preplant (PP) in drill-seeded rice. Meister urea was developed by the Chisso Corporation and is currently used in a number of crops grown in Japan. Various timed-release formulations of Meister were applied as a single PP application in drill-seeded Cypress rice. These formulations were compared with urea applied in split applications according to currently recommended practices. All sources of N were applied at rates of 40, 80, 120, 160, and 200 lb/A. Meister formulations were applied as single PP applications with minimal incorporation. The urea fertilizer was applied in split applications with the exception of the 40 and 80 lb/A rate, which were applied as single PF applications. The 120, 160, and 200 lb/A rates were split 80-40, 120-40, and 160-40, respectively, with the initial amount being applied PF and the remainder at PI. Plant samples were taken at 50% heading and at maturity to determine N uptake. A Meister formulation was also evaluated for its effectiveness when applied as a midseason topdress application. Cypress was fertilized with PF N rates of 0, 45, and 90 lb/A. At PI, Meister and conventional urea were applied at rates of 30 and 60 lb N/A.

In studies where fertilizer N uptake and recovery were determined, 2 atom% ^{15}N pelletized fertilizer (either urea or ammonium sulfate) was applied to microplots ranging in size from 3 to 6.25 ft^2. Plant samples were collected at 50% heading in the ^{15}N studies for N recovery. Additional samples were taken at maturity to determine total N uptake, partitioning them into two components (grain and straw), to determine N uptake.

A ratoon study was conducted to compare single and split fertilizer N applications. The varieties Maybelle and Jodon were cultured in a water-seeded, pinpoint flood system. The main crop was fertilized with 120 lb N/A preplant incorporated. After harvest, N was applied at rates of 30, 60, 90, and 120 lb/A in either single applications prior to reflooding or applied in a 50-50 split with the second application being applied 3 weeks after the initial application. In addition to plant growth measurements and yield determinations, ratoon crop tiller production and yield components were evaluated.

Calibration studies for P and K included application rates of 0, 20, 40, 60, and 80 lb/A. These studies were conducted at the Rice Research Station and in Rapides, Morehouse, and East Carroll parishes. Plant tissue samples were collected at PI for analysis of P and K concentration (to be reported on at a later date). Various combinations of N-P-K fertilizer were applied on a reclaimed marsh soil in Vermilion Parish. This was a preliminary investigation to determine rice response to fertilizer nutrients on a high organic matter, humus soil.

Various sources of Zn fertilizer were evaluated as soil- and foliar-applied materials conducted on a Crowley silt loam previously limed to a pH of 7.9. Inorganic formulations were applied at rates of 0, 5, and 10 lb Zn/A. Chelated formulations were applied at 0, 0.5, and 1.0 lb Zn/A. Foliar materials were also tank-mixed with a number of rice herbicides to determine compatibility.

A lime rate study was conducted on a Crowley silt loam in Vermilion Parish. Soil analyses from previous studies at this site indicated low Ca levels and a pH below 5.5. Lime was applied at rates of 0, 500, 1000, 2000, and 3000 lb/A prior to flooding and planting.

Experiment: Controlled-release urea study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.3; O.M.: 1.25%; extractable nutrients (mg/kg): P-54, Na-92, K-55, Ca-1246, Mg-200, Zn-1.17, S-8.73, As-1.88, Fe-70.25

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 3

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 3; Meister treatments, Apr 3; PF urea treatments, May 10; MS split, June 7

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 17

Water Management: Flushed, Apr 12, Apr 19, Apr 26, May 7; permanent flood, May 11; harvest drainage, Aug 2; ratoon flooded, Aug 16; harvest drainage, Oct 14

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 4; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

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

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 13, Oct 28

Experimental Design: Randomized complete block with four replications, N rate assigned to main plot and source to subplot

Comments: A visual response to the preplant Meister treatments was observed 2 weeks after emergence. Visual response to PF urea occurred within 5 days. During later tillering stages, N deficiency was first observed where only 40 lb urea-N/A were applied PF. The Meister formulations also displayed mild N deficiency at the lower rates of application. Overall growth and color were obviously better at higher rates of N for all sources. The Meister formulations did not influence heading, regardless of rate (Table 1). Plant height was influenced by source and rate of N. Height was significantly reduced with the S15 formulation. Plant height was greatest with the M15 formulation. Biomass increased as rate of N increased for all sources. Urea and M15 produced significantly more biomass than did the other formulations.

A significant source by N rate interaction occurred for main crop and total grain yield (Table 2). The response to rate of N was variable with respect to source. Optimum grain yield occurred at a N rate of 160 lb/A for all sources. Yields were significantly lower with M+S and S15 urea. The M15 formulation outyielded all other sources at all rates of application. An application of 120 lb M15 was comparable with 200 lb urea-N/A.

Ratoon yields were not influenced by rate of main crop N. Source of main crop N also affected grain yield. Yields were significantly lower when the S15 formulation was used in the main crop.

Total yield was affected by source of N with most of the contribution in yield resulting from the main crop. The low total yield of the S15 treatment was a combination of yield reductions in both crops. This formulation was very inefficient in supplying adequate N to the rice crop.

N concentration and total N uptake in the whole plant at 50% heading increased as rate of fertilizer N increased (Table 3). Total N in the mature straw also increased up to a fertilizer rate of 160 lb N/A. No differences in N concentration in the mature straw were measured. N concentration in the grain was higher when the fertilizer rate was above 40 lb N/A. Total N in the grain increased as fertilizer rate increased to 160 lb N/A. Source of N significantly influenced N concentration and uptake. The M15 formulation was superior to all other sources. N concentration and uptake were significantly lower with the S15 formulation. The M+S formulation performed similarly to urea in most instances.

Table 1. Effect of N source and rate on agronomic performance of drill-seeded Cypress rice. Rica Research Station, Crowley, LA. 1993.

	N source																								
										Whole plant weight															
	Days to 50% heading					Plant height					50% heading					Maturity					Grain yield at 12% moisture				
N rate	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	Mean
(lb/A)						--------(cm)---------					----------(g/3 ft2)----------										----------(lb/A)----------				
40	97	100	96	97	98	69	69	72	66	69	174	149	231	222	194	294	277	379	374	331	4738	3812	5894	5077	4880
80	96	99	95	95	96	71	65	74	70	70	231	142	349	303	256	352	238	513	346	363	5219	3424	7356	5683	5421
120	96	100	95	97	97	73	70	76	71	73	284	137	353	307	270	380	273	531	422	402	6243	3691	8067	6608	6152
160	95	99	95	97	97	73	68	79	76	74	285	154	434	346	305	455	260	650	503	467	6380	3901	9071	7313	6666
200	95	100	95	98	97	75	67	83	77	76	298	152	463	366	320	469	242	597	504	453	7013	3460	9296	7792	6890
Source																									
Mean	96	100	95	97		72	68	77	72		255	146	366	309		390	258	534	430		5919	3657	7937	6495	
C.V., %			1.05					6.15					9.95					10.24					6.43		
LSD (0.05):																									
Nitrogen			ns					4					23					42					592		
Source			1					3					17					26					246		
S within N			-					-					-					-					550		
S across N			-					-					-					-					759		
Nitrogen x Source			ns					ns					*					*					*		

* Denotes significance at P = 0.05.

Table 2. Effect of main crop N source and rate on the ratoon production of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

	N source														
	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
N rate	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean
(lb/A)	(lb/A)														
40	4738	3812	5894	5077	4880	1883	1751	1787	1977	1849	6621	5564	7680	7053	6730
80	5219	3424	7356	5683	5421	1861	1740	2008	1885	1873	7080	5164	9364	7569	7294
120	6243	3691	8067	6608	6152	1885	1773	1948	1955	1891	8129	5464	10015	8563	8043
160	6380	3901	9071	7313	6666	1973	1810	1878	1971	1908	8353	5711	10949	9284	8574
200	7013	3460	9296	7792	6890	1926	1789	2005	1853	1893	8939	5249	11301	9645	8783
Source															
Mean	5919	3657	7937	6495		1906	1773	1925	1928		7825	5430	9862	8423	
C.V., %			6.43					6.03					5.07		
LSD (0.05):															
Nitrogen			592					ns					640		
Source			246					72					254		
S within N			550					169					569		
S across N			759					180					807		
Nitrogen x Source			*					ns					*		

* Denotes significance at P = 0.05.

Table 3. Effect of N source and rate on N efficiency of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

	N source																									
	Whole plant at 50% heading										Straw at maturity										Grain at maturity					
	N concentration					Total N uptake					N concentration					Total N uptake					N concentration					Total N uptake				
N rate	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean	M+S	S15	M15	Urea	N Mean
	(%)					(lb/A)					(%)					(lb/A)					(%)					(lb/A)				
40	.75	.77	.79	.82	.78	42	37	59	58	49	.47	.47	.46	.45	.46	44	42	56	54	49	1.07	1.11	1.04	1.03	1.06	48	43	62	58	53
80	.75	.74	.94	.78	.80	56	34	105	76	67	.45	.50	.44	.44	.46	51	38	72	49	52	1.07	1.09	1.16	1.04	1.09	54	37	95	54	60
120	.82	.74	.93	.83	.83	75	32	105	82	73	.46	.50	.48	.42	.46	55	43	82	57	59	1.06	1.08	1.12	1.05	1.08	64	41	96	65	67
160	.92	.76	1.00	.80	.87	84	37	139	89	87	.44	.48	.49	.46	.47	64	40	102	74	70	1.08	1.08	1.15	1.10	1.10	78	41	114	86	80
200	.91	.74	1.15	.89	.93	87	36	171	105	100	.42	.46	.52	.42	.45	64	35	100	68	67	1.09	1.06	1.22	1.04	1.11	81	37	110	78	76
Source																														
Mean	.83	.75	.96	.82		69	35	116	82		.45	.48	.48	.44		56	40	82	60		1.07	1.09	1.14	1.05		65	40	95	68	
C.V., %			12.44					17.95					10.74					18.29					3.27					13.08		
LSD (0.05):																														
Nitrogen			.07					9					ns					7					.02					9		
Source			.07					9					.03					7					.02					6		
S within N			-					-					-					-					-					-		
S across N			-					-					-					-					-					-		
Nitrogen x Source			ns					*					ns					*					*					*		

* Denotes significance at P = 0.05.

Experiment: Midseason controlled-release urea study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.39%; extractable nutrients (mg/kg): P-29, Na-56, K-67, Ca-1100, Mg-247, Zn-0.77, S-6.15, As-1.79, Fe-51.09

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 28

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 28; PF urea, May 25; MS splits, June 11

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Not recorded

Water Management: Flushed, May 13, May 18; permanent flood, May 27; harvest drainage, Aug 10; ratoon flooded, Aug 27; harvest drainage, Nov 4

Herbicides: 3.0 lb ai/A Stam (propanil), May 12; 4.0 lb ai/A Stam, May 26; 0.6 oz ai/A Londax (bensulfuron), June 9

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 11

Fungicides: None

Harvest: Aug 26, Nov 23

Experimental Design: Randomized complete block with four replications, PF N rate assigned to main plot and MS splits to subplot

Comments: Visual response to PF urea occurred within 5 days. During later tillering stages, N deficiency was observed where only 45 lb urea-N/A were applied PF. Rate of PF N had a slight effect on heading (Table 1). Plant height was not influenced by either PF N or MS N. Grain yield was significantly influenced by PF N, increasing as rate of N increased. Source and rate of MS N also affected yield. Meister A at 60 lb/A produced the highest grain yield in the main crop. There were no differences among the other sources. Ratoon yields were not affected by rate of N or source. Differences in total grain yields were due to main crop effects.

Total N uptake and N concentration generally increased as PF N and MS N rates increased (Table 2). Total N in the grain at maturity was significantly higher with Meister A at 60 lb/A when compared with urea N at an equivalent rate.

Table 1. Influence of midseason N source and rate on agronomic performance of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

Preflood N	Midseason Source-Rate	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Ratoon crop	Total
(lb/A)			(cm)	(lb/A)		
0	0	81	74	4799	1285	6084
0	Meister A-30	81	75	5191	1295	6486
0	Meister A-60	81	75	5762	1305	7067
0	Urea-30	81	74	4665	1243	5908
0	Urea-60	81	74	4946	1327	6273
45	0	78	80	6812	1310	8123
45	Meister A-30	78	80	7217	1295	8513
45	Meister A-60	79	80	7670	1318	8988
45	Urea-30	79	79	7141	1276	8418
45	Urea-60	79	82	7431	1332	8763
90	0	80	81	8570	1353	9924
90	Meister A-30	80	87	8776	1234	10009
90	Meister A-60	80	88	9115	1280	10395
90	Urea-30	80	87	8974	1389	10363
90	Urea-60	80	90	8755	1315	10070
C.V., %		0.60	5.54	3.73	8.72	3.90
				Main effects		
Preflood N:						
0		81	74	5073	1291	6364
45		79	80	7254	1306	8561
90		80	87	8838	1314	10152
LSD (0.05)		1	ns	369	ns	315
Midseason N:						
0		80	79	6727	1316	8043
Meister A-30		80	81	7061	1275	8336
Meister A-60		80	81	7516	1301	8817
Urea-30		80	80	6927	1303	8230
Urea-60		80	82	7044	1325	8369
LSD (0.05)		ns	ns	218	ns	270
PF N x MS N		ns	ns	*	ns	ns

* Denotes significance at P = 0.05.

Table 2. Effect of midseason N source and rate on N efficiency of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

N Source-Rate	Preflood N																			
	Whole plant at 50% heading								Straw at maturity								Grain at maturity							
	N concentration				Total N uptake				N concentration				Total N uptake				N concentration				Total N uptake			
	0	45	90	N Mean	0	45	90	N Mean	0	45	90	N Mean	0	45	90	N Mean	0	45	90	N Mean	0	45	90	N Mean
	--------(%)---------				--------(lb/A)------				----------(%)---------				-------(lb/A)-------				----------(%)---------				--------(lb/A)-----			
0	.68	.72	.87	.76	44	74	106	75	.39	.36	.42	.39	32	49	74	52	1.07	1.07	1.15	1.10	45	70	96	70
MA-30	.70	.85	.95	.83	46	92	115	85	.38	.41	.42	.40	36	62	80	59	1.07	1.12	1.13	1.11	62	86	103	83
MA-60	.75	.84	.90	.83	52	94	124	90	.42	.38	.45	.42	46	53	88	63	1.06	1.12	1.16	1.12	63	84	111	86
Urea-30	.69	.78	.84	.77	44	88	108	80	.40	.36	.44	.40	37	50	82	56	1.10	1.10	1.12	1.11	51	77	104	78
Urea-60	.76	.81	1.04	.87	52	87	138	92	.43	.36	.42	.40	43	54	77	58	1.11	1.08	1.15	1.11	54	81	103	79
Source Mean	.72	.80	.92		48	87	118		.41	.37	.43		39	53	80		1.08	1.10	1.14		55	80	103	
C.V., %		10.88				14.91				11.72				15.31				3.74				9.46		
LSD (0.05):																								
Preflood N		.05				10				.02				9				.03				8		
Midseason N		.07				10				ns				ns				ns				6		
PF N x MS N		ns				ns				ns				ns				ns				ns		

Experiment: Single vs 2- and 3-way split N applications

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.24%; extractable nutrients (mg/kg): P-53, Na-67, K-53, Ca-1257, Mg-192, Zn-0.80, S-6.20, As-2.20, Fe-65.44

Variety/Seeding Rate: CPRS, BNGL, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 19

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 19; PF urea treatments, May 21; MS splits according to growth stage

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 21, Apr 29, May 7, May 14; permanent flood, May 21; harvest drainage, Aug 2; ratoon flooded, Aug 20; harvest drainage, Oct 18

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 3

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 19, Nov 10

Experimental Design: Randomized complete block with four replications, factorial arrangement of varieties and N

Comments: Plant height of Bengal decreased as PF N decreased while height of Cypress remained constant (Table 1). Grain yield was similar when N was applied in either a single application or in a 2-way split. A significant yield reduction occurred with the 3-way split. Main crop N management had no effect on ratoon crop yield. Total yields were also influenced by main crop N in a manner similar to that in the main crop. Whole plant weight was not influenced by main crop N management.

Total N uptake, ^{15}N recovery, total dry matter production, and grain N were not different with respect to variety (Table 2). Method of N application also had no influence on any of these variables. More straw N was accumulated by Bengal. A significant reduction in straw N occurred with the 3-way split.

Table 1. Influence of N timing on agronomic performance of drill-seeded Cypress and Bengal rice. Rice Research Station, Crowley, LA. 1993.

Variety	Time[1]	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Grain yield at 12% moisture: Ratoon crop	Grain yield at 12% moisture: Total	Whole plant weight
	(lb/A)		(cm)	----------(lb/A)----------			(g/3ft²)
Cypress	120 PF	88	83	8293	1308	9602	307
Bengal	120 PF	87	84	9165	1015	10180	383
Cypress	90PF|30PI	87	82	8394	1413	9807	320
Bengal	90PF|30PI	87	83	9357	928	10286	376
Cypress	60PF|30PI|30PD	87	82	7914	1270	9184	303
Bengal	60PF|30PI|30PD	86	79	8082	1055	9137	338
C.V., %		1.10	3.58	5.33	13.98	4.79	8.84
				Main effects			
Variety:							
Cypress		87	82	8201	1330	9531	310
Bengal		87	82	8868	999	9868	366
LSD (0.05)		1	3	316	204	354	26
Time:							
Single PF		88	84	8729	1161	9891	345
2-way		87	83	8876	1171	10046	348
3-way		86	81	7998	1162	9161	321
LSD (0.05)		1	3	387	ns	434	ns
Variety x Time		ns	ns	ns	ns	ns	*

[1] PF = preflood, PI = panicle initiation, PD = panicle differentiation.
* Denotes significance at P = 0.05.

Table 2. Influence of N timing on N recovery of drill-seeded Cypress and Bengal rice. Rice Research Station, Crowley, LA. 1993.

Variety	Time[1]	50% heading		Maturity		
		Total N uptake	^{15}N recovery	Total dry matter	Grain N	Straw N
	(lb/A)	-(lb/A)-	-(%)-	----------(lb/A)----------		
Cypress	120 PF	59	49	17147	81	36
Bengal	120 PF	43	36	19452	86	52
Cypress	90PF|30PI	43	36	18609	89	41
Bengal	90PF|30PI	45	37	16838	74	40
Cypress	60PF|30PI|30PD	53	45	16592	82	29
Bengal	60PF|30PI|30PD	45	38	15717	72	31
C.V., %		17.51	17.49	9.20	11.40	10.74
			Main effects			
Variety:						
Cypress		52	43	17449	84	35
Bengal		45	37	17335	77	41
LSD (0.05)		ns	ns	ns	ns	4
Time:						
Single PF		51	43	18299	84	44
2-way		44	37	17723	81	41
3-way		49	41	16155	77	30
LSD (0.05)		ns	ns	ns	ns	5
Variety x Time		ns	ns	ns	ns	*

[1] PF = preflood, PI = panicle initiation, PD = panicle differentiation.
* Denotes significance at P = 0.05.

Experiment: Midseason N time of application

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.24%; extractable nutrients (mg/kg): P-47, Na-77, K-58, Ca-1221, Mg-202, Zn-0.89, S-7.09, As-1.95, Fe-61.55

Variety/Seeding Rate: LCSN, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 19

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 19; PF urea treatments, May 21; MS splits according to growth stage

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 21, Apr 29, May 7, May 14; permanent flood, May 21; harvest drainage, Aug 2; ratoon flooded, Aug 20; harvest drainage, Oct 18

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 3

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 19, Nov 10

Experimental Design: Randomized complete block with four replications, factorial arrangement of PF N and MS N

Comments: Days to 50% heading, plant height, and main crop and total grain yields were increased as PF N increased (Table 1). Midseason N management had no influence on main crop yield. All midseason applications increased total grain production, and the PD split increased ratoon yields slightly.

Total N uptake, ^{15}N recovery, total dry matter production, grain N, and straw N increased with PF N (Table 2). Total N uptake and ^{15}N recovery were higher with PD applications, but total dry matter production, grain N, and straw N were not affected.

Table 1. Influence of preflood N and midseason N timing on agronomic performance of drill-seeded Lacassine rice. Rice Research Station, Crowley, LA. 1993.

Preflood N	Midseason N timing[1]	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Ratoon crop	Total
(lb/A)			(cm)	(lb/A)		
0	PI	104	66	5107	2155	7262
0	PD	104	66	4645	2000	6645
0	PI|PI + 10	103	65	4814	2062	6876
0	PD|PD + 10	103	65	5100	2198	7298
0	0	104	64	4482	2070	6552
60	PI	104	73	7359	1765	9125
60	PD	103	74	7864	1753	9617
60	PI|PI + 10	103	76	7430	1857	9287
60	PD|PD + 10	104	75	7484	1901	9384
60	0	105	72	6573	1768	8340
120	PI	106	80	8488	1761	10249
120	PD	106	78	8553	1688	10241
120	PI|PI + 10	106	81	8553	1705	10258
120	PD|PD + 10	106	80	8435	1988	10424
120	0	106	78	8601	1757	10358
C.V., %		.79	4.00	6.67	7.23	5.37
				Main effects		
Preflood N:						
0		104	65	4830	2097	6927
60		104	74	7342	1809	9151
120		106	79	8526	1780	10306
LSD (0.05)		1	2	293	87	302
Midseason N:						
PI		105	73	6985	1894	8878
PD		105	73	7021	1814	8835
PI|PI + 10		104	74	6933	1875	8807
PD|PD + 10		105	74	7006	2029	9035
0		105	71	6552	1865	8417
LSD (0.05)		ns	ns	ns	113	389
Preflood N x Midseason N		ns	ns	ns	ns	ns

[1] PI = panicle initiation, PD = panicle differentiation with a total of 60 lb N/A applied. Where midseason N was split, two applications of 30 lb/A each were applied 10 days apart.

Table 2. Influence of preflood N rate and midseason N timing on N recovery and total N uptake in drill-seeded Lacassine rice. Rice Research Station, Crowley, LA. 1993.

Preflood N	Midseason N timing[1]	50% heading		Maturity		
		Total N uptake	^{15}N recovery	Total dry matter	Grain N	Straw N
(lb/A)		-(lb/A)-	-(%)-	----------(lb/A)----------		
0	PI	19	32	10812	64	25
0	PD	33	56	9275	54	24
0	PI|PI + 10	27	45	10571	61	24
0	PD|PD + 10	34	57	10035	60	26
60	PI	36	60	15357	83	36
60	PD	42	69	15389	85	39
60	PI|PI + 10	39	65	15269	92	35
60	PD|PD + 10	46	76	16261	95	42
120	PI	33	55	17790	104	53
120	PD	42	71	18166	104	55
120	PI|PI + 10	35	58	18798	115	57
120	PD|PD + 10	45	75	17590	104	57
C.V., %		12.44	12.43	8.66	12.02	17.37
				Main effects		
Preflood N:						
0		28	47	10173	60	25
60		41	68	15569	89	38
120		39	65	18086	107	56
LSD (0.05)		3	5	910	7	5
Midseason N:						
PI		29	49	14653	84	38
PD		39	65	14277	81	39
PI|PI + 10		34	56	14880	90	39
PD|PD + 10		42	70	14629	87	42
LSD (0.05)		4	6	ns	ns	ns
Preflood N X Midseason N		ns	ns	ns	ns	ns

[1] PI = panicle initiation, PD = panicle differentiation with a total of 60 lb N/A applied. Where midseason N was split, two applications of 30 lb/A each were applied 10 days apart.

Experiment: Late season N timing study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.36%; extractable nutrients (mg/kg): P-53, Na-73, K-61, Ca-1140, Mg-197, Zn-1.25, S-8.22, As-1.95, Fe-71.46

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 3

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 3; PF urea treatments, May 10; MS splits according to timing schedule

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 16

Water Management: Flushed, Apr 12, Apr 19, Apr 26, May 7; permanent flood, May 11; harvest drainage, Aug 2; ratoon flooded, Aug 16; harvest drainage, Oct 14

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 4; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 3

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 13, Oct 28

Experimental Design: Randomized complete block with four replications, factorial arrangement of PF N and MS N

Comments: Main crop and total grain yields were significantly higher with 120 lb PF N/A (Table 1). Milling yield was not affected. Main crop yield increased when midseason N was applied 7 and 21 days after PI. Significant yield reductions occurred when midseason N was applied later than 21 days after PI. Total grain yields were affected in a similar manner. Percent head rice increased slightly when midseason N was applied 28 and 35 days after PI. A significant interaction occurred between PF and MS N for total grain yield. N applied 14 days after PI suppressed grain yield in the main and total crops. Average response due to midseason N was slightly different between the two levels of PF N, causing the interaction to occur.

Table 1. Influence of late season N timing on agronomic performance of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

Preflood N	Midseason N timing[1]	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Ratoon crop	Total	% Milling yield[2]
(lb/A)			(cm)	----------(lb/A)----------			(head-total)
60	PI	85	74	6846	2210	9055	65-71
60	PI + 7	85	77	7075	2060	9135	65-71
60	PI + 14	86	71	6893	2109	9001	66-72
60	PI + 21	84	76	6952	2073	9025	66-71
60	PI + 28	84	72	6153	2101	8254	66-72
60	PI + 35	85	70	5781	2133	7924	66-72
120	PI	86	77	7696	2033	9729	65-72
120	PI + 7	86	79	8274	2075	10350	65-71
120	PI + 14	85	76	7453	2109	9561	65-71
120	PI + 21	85	80	7964	2052	10016	65-71
120	PI + 28	86	74	7467	2241	9708	66-72
120	PI + 35	85	80	7608	2227	9835	66-72
C.V., %		1.19	5.30	5.71	7.45	4.66	1.3-.6
				Main effects			
Preflood N:							
60		85	73	6618	2114	8732	66-72
120		86	78	7744	2123	9866	65-72
LSD (0.05)		1	2	241	ns	254	ns-ns
Midseason N:							
PI		85	76	7271	2121	9392	65-72
PI + 7		85	78	7675	2067	9742	65-71
PI + 14		86	74	7173	2109	9281	65-72
PI + 21		85	78	7458	2063	9521	65-71
PI + 28		85	73	6810	2171	8981	66-72
PI + 35		85	75	6699	2180	8879	66-72
LSD (0.05)		ns	4	417	ns	441	.8-ns
PF N x MS N		ns	ns	ns	ns	*	ns-ns

[1] PI = panicle initiation with 45 lb N/A applied beginning at PI and continuing at 7-day intervals for 35 days.

[2] Milling yield is expressed as % head - % total.

* Denotes significance at P = 0.05.

Experiment: Urea vs ammonium sulfate

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.5; O.M.: 1.41%; extractable nutrients (mg/kg): P-65, Na-76, K-68, Ca-1496, Mg-200, Zn-0.94, S-7.25, As-2.21, Fe-57.61

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 19

Fertilization: 45 lb/A P_2O_6 and K_2O, Apr 19; PF urea treatments, May 21; MS splits at PI

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 21, Apr 29, May 7, May 14; permanent flood, May 21; harvest drainage, Aug 2

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 3

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 19

Experimental Design: Randomized complete block with four replications, factorial arrangement of N source and time

Comments: Source of N had no influence on days to 50% heading, plant height, or grain yield (Table 1). Whole plant weight at 50% heading, total dry matter production, grain N, and straw N were not affected by source of N either PF or at midseason. Total N uptake and ^{15}N recovery were significantly higher when urea N was applied PF and significantly lower when urea N was applied at midseason. Where S was applied with the urea, there was no difference in total N uptake or ^{15}N recovery when compared with ammonium sulfate N. The addition of S possibly mitigated the potential loss of urea N by affecting the pH at the soil-water interface.

Table 1. Influence of N source on egronomic performance, N uptake, and N recovery of drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

Source[1]	Time and rate[2]	Days to 50% heading	Plant height	Main crop grain yield at 12% moisture	50% heading			Maturity		
					Whole plant weight	Total N uptake	^{15}N recovery	Total dry matter	Grain N	Straw N
	(lb/A)		(cm)	-(lb/A)-	(g/3ft^2)	-(lb/A)-	-(%)-	----------(lb/A)---------		
A.S.	90 ^{15}N PF|45 N PI	87	79	8037	336	23	26	17542	85	38
A.S.	90 N PF|45 ^{15}N PI	86	79	8288	314	24	53	16165	80	33
Urea	90 ^{15}N PF|45 N PI	87	80	8295	327	33	37	18086	88	44
Urea	90 N PF|45 ^{15}N PI	86	79	8072	305	16	36	17072	80	40
U + S	90 ^{15}N PF|45 N PI	87	78	8223	330	37	41	18171	91	39
U + S	90 N PF|45 ^{15}N PI	86	81	8177	315	22	48	17318	84	40
C.V., %		0.64	3.06	4.34	6.01	10.27	12.84	7.97	9.31	18.11
LSD (0.05)		ns	ns	ns	ns	5	9	ns	ns	ns

[1] A.S. = ammonium sulfate; U + S = urea + a rate of sulfur equivalent to that applied when ammonium sulfate is the N source.
[2] ^{15}N was applied as either a preflood (PF) or panicle initiation (PI) application in each N source.

Experiment: N timing trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 6.6; O.M.: 1.47%; extractable nutrients (mg/kg): P-77, Na-40, K-80, Ca-1379, Mg-170, Zn-1.05, S-8.50, As-2.75, Fe-71.30

Variety/Seeding Rate: CPRS, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; ratoon crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 15

Water Management: Flooded, Apr 1; drained, Apr 4; reflooded, Apr 7; drained, Apr 8; reflooded, Apr 13; harvest drainage, July 19; ratoon crop flooded, Aug 9; harvest drainage, Oct 8

Herbicides: 1.0 oz ai/A Londax (bensulfuron) + 3.5 lb ai/A Ordram (molinate), May 4

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 10

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 20

Harvest: Aug 4, Oct 25

Experimental Design: Randomized complete block with four replications

Comments: PP N was incorporated to a depth of 2 in. PF N was applied after the initial drain and prior to flooding. After the initial drain the test was reflooded immediately to minimize stand establishment problems due to impending weather conditions. The test was again drained and permanently flooded 5 days later. Postflood applications of N were applied 2 weeks after emergence (3- to 4-leaf). Time of N application significantly affected plant height and grain yield (Table 1). Preplant N was more efficiently utilized than either PF or postflood N. A single PP application of N was superior to any of the other methods of application. Yields were lowest when all of the N was applied postflood.

Table 1. Influence of N timing on agronomic performance of water-seeded Cypress rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

N[1] Timing	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Ratoon crop	Total
-(lb/A)-		(cm)	----------(lb/A)----------		
90 PP	91	79	7600	3564	11164
90 PF	90	72	5289	3528	8818
90 Post	91	68	4630	3374	8004
45 PP + 45 Post	90	74	6523	3632	10155
45 PF + 45 Post	90	70	5107	3561	8667
C.V., %	0.58	2.25	5.95	6.78	5.75
LSD (0.05)	ns	3	534	ns	829

[1] PP = preplant; PF = preflood; Post = postflood.

Experiment: Ratoon crop variety x N management

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 5.8; O.M.: 1.34%; extractable nutrients (mg/kg): P-80, Na-23, K-75, Ca-939, Mg-118, Zn-1.58, S-10.46, As-2.66, Fe-116.9

Variety/Seeding Rate: MBLE, JODN, 150 lb/A

Planting Method/Date: Water-seeded, Apr 6

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; ratoon crop, variable rates and timings; 0.54 lb/A zinc (foliar), May 12

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MBLE, JODN, Apr 16

Water Management: Flooded, Apr 3; drained, Apr 10; reflooded, Apr 13; harvest drainage, July 19; ratoon crop flooded, Aug 4; harvest drainage, Oct 14

Herbicides: 1.0 oz ai/A Londax (bensulfuron), May 4; 3.5 lb ai/A Ordram (molinate), May 5

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 18

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 29

Harvest: Aug 3, Oct 28

Experimental Design: Split plot in a randomized complete block with four replications, factorial arrangement of varieties and N

Comments: Ratoon crop yield was higher for Jodon (Table 1). N application significantly influenced ratoon and total grain yield. Approximately 90 lb N/A were required for optimum grain yield. Ratoon crop grain yields were not affected by method of N application. Whole plant weight, grain weight, and grain number increased as rate of N increased (Table 2). Method of N application had no influence on any yield component except grains per panicle although the effect was negligible.

Table 1. Effect of ratoon crop N management on agronomic performance of Maybelle and Jodon. Rice Research Station, Crowley, LA. 1993.

Ratoon N[1]	Main crop days to 50% heading			Main crop plant height			Main crop grain yield at 12% moisture			Ratoon crop grain yield at 12% moisture			Total grain yield at 12% moisture			Ratoon crop tillers		
	MBLE	JODN	N Mean	MBLE	JODN	N Maan	MBLE	JODN	N Mean	MBLE	JODN	N Mean	MBLE	JODN	N Mean	MBLE	JODN	N Mean
				------(cm)------			----------(lb/A)----------									----(no/ft²)----		
0	79	84	81	96	87	91	9252	9315	9283	2144	2179	2162	11396	11494	11445	45	55	50
15 PF + 15 MS	78	83	81	97	86	91	9330	9096	9213	2551	2275	2413	11882	11371	11627	48	58	53
30 PF	79	84	82	99	91	95	9276	9276	9276	2528	2511	2520	11805	11787	11796	60	50	55
30 PF + 30 MS	79	82	81	100	87	94	9192	9353	9273	2611	2998	2804	11802	12351	12077	49	58	54
60 PF	79	84	81	97	85	91	9335	9234	9285	2579	2850	2715	11914	12085	11999	55	54	55
45 PF + 45 MS	79	84	82	99	89	94	9517	9504	9511	3021	3297	3159	12538	12801	12670	53	56	55
90 PF	78	83	81	98	87	93	9437	9417	9427	3000	3257	3128	12437	12674	12556	55	49	52
60 PF + 60 MS	78	83	81	98	88	93	9355	9174	9265	2973	3241	3107	12329	12415	12372	59	58	58
120 PF	79	83	81	95	87	91	9265	9557	9411	2962	3575	3268	12227	13132	12679	56	56	56
Variety mean	79	83		98	87		9329	9325		2708	2909		12037	12235		53	55	
C.V., %											9.11			3.10			14.11	
LSD (0.01):																		
Variety											161			ns			ns	
Nitrogen											342			504			ns	
Variety x Nitrogen											ns			ns			ns	
Contrast:																		
Single vs split N											ns			ns			ns	

[1] PF application is N applied after main crop harvest and prior to ratoon crop floodup. MS split applied 3 weeks after PF application.

Table 2. Effect of ratoon crop N management on yield components of Maybelle and Jodon. Rice Research Station, Crowley, LA. 1993.

	Whole plant weight			Panicle number			Grain weight			Grain number			Grains per panicle		
Ratoon N[1]	MBLE	JODN	N Mean	MBLE	JODN	N Mean	MBLE	JODN	N Mean	MBLE	JODN	N Mean	MBLE	JODN	N Mean
	-------(g/3 ft²)------			--------(3 ft²)-------			------(g/3 ft²)-------			---------(3 ft²)-------					
0	206	218	212	155	156	156	62	68	65	3024	3110	3067	21	22	21
15 PF + 15 MS	245	243	244	158	158	158	82	69	76	3837	3236	3537	21	21	21
30 PF	276	247	262	160	176	168	86	75	81	4232	3482	3857	20	22	21
30 PF + 30 MS	290	278	284	166	177	172	80	86	83	3868	3998	3933	21	21	21
60 PF	285	283	284	165	180	173	83	92	88	4095	4357	4226	20	21	21
45 PF + 45 MS	298	276	287	162	179	170	90	88	89	4446	4175	4311	20	21	21
90 PF	300	303	302	157	184	170	85	101	93	4194	4883	4539	20	21	20
60 PF + 60 MS	329	341	335	187	166	177	103	104	104	5004	5146	5075	21	20	20
120 PF	322	347	335	167	191	179	103	111	107	5191	5446	5319	20	20	20
Variety mean	283	282		164	174		86	88		4210	4204		20	21	
C.V., %		12.09			13.06			14.34			14.98			2.50	
LSD (0.01):															
Variety		ns			ns			ns			ns			1	
Nitrogen		46			ns			17			843			1	
Variety x Nitrogen		ns			ns			ns			*			ns	
Contrast:															
Single vs split N		ns			ns			ns			ns			*	

[1] PF application is N applied after main crop harvest and prior to ratoon crop floodup. MS split applied 3 weeks after PF application.
* Denotes significance at P = 0.05.

Experiment: P and K rate study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.4; O.M.: 0.89%; extractable nutrients (mg/kg): P-31, Na-56, K-71, Ca-1242, Mg-253, Zn-0.75, S-5.82, As-2.06, Fe-44.10

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 28

Fertilization: Variable rates of P and K, Apr 28; 135 lb N/A PF as urea, May 25

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, May 13, May 18; permanent flood, May 27; harvest drainage, Aug 10

Herbicides: 4.0 lb ai/A Stam (propanil), May 26; 0.6 oz ai/A Londax (bensulfuron), June 9

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 11

Fungicides: None

Harvest: Aug 26

Experimental Design: Randomized complete block with four replications

Comments: Plant growth and grain yield were unaffected by P and K applications (Table 1).

Table 1. Influence of variable rates of phosphorus and potassium on drill-seeded Cypress rice. Rice Research Station, Crowley, LA. 1993.

Phosphorus rate	Potassium rate	Days to 50% heading	Plant height	Grain yield at 12% moisture
--------(lb/A)--------			-(cm)-	----(lb/A)----
60	0	82	93	9259
60	20	82	96	9322
60	40	82	89	9410
60	60	82	91	9477
60	80	83	93	9396
0	60	83	93	9378
20	60	82	94	9476
40	60	82	92	9369
60	60	83	92	9385
80	60	82	94	9336
C.V., %		0.60	2.84	2.49
LSD (0.05)		1	ns	ns

Experiment: P and K rate study

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.7; O.M.: 3.04%; extractable nutrients (mg/kg): P-232, Na-59, K-463, Ca-6759, Mg-1412, Zn-2.96, S-5.51, As-6.50, Fe-100.0

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, May 20

Fertilization: Variable rates of P and K, May 20; 135 lb N/A PF as ammonium sulfate, June 30

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: May 31

Water Management: Flushed, May 22, May 31, June 7, June 17; flooded, July 2; harvest drainage, Sep 13

Herbicides: 0.375 lb ai/A Facet (quinclorac) + 1.0 lb ai/A Basagran (bentazon) + 1 qt/A crop oil, June 10; 3.0 lb ai/A Ordram (molinate), July 5; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 23

Fungicides: 0.5 lb ai/A Benlate (benomyl), Aug 4, Aug 21

Harvest: Sep 29

Experimental Design: Randomized complete block with four replications

Comments: No response to P or K was measured (Table 2).

Table 2. Influence of variable rates of phosphorus and potassium on drill-seeded Cypress rice. Buford Perry Farm, East Carroll Parish, LA. 1993.

Phosphorus rate	Potassium rate	Days to 50% heading	Plant height	Grain yield at 12% moisture
--------(lb/A)--------			-(cm)-	----(lb/A)----
60	0	93	103	8830
60	20	93	101	8665
60	40	93	100	8761
60	60	94	100	8840
60	80	93	101	8769
0	60	93	100	8783
20	60	93	105	8784
40	60	93	103	8678
60	60	93	100	8573
80	60	93	100	8738
C.V., %		0.58	4.92	3.81
LSD (0.05)		ns	ns	ns

Experiment: P and K rate study

Location: Rapides Parish, Will Bollich Farm

Soil Type/Analysis: Moreland clay; pH: 6.9; O.M.: 2.99%; extractable nutrients (mg/kg): P-181, Na-43, K-378, Ca-4598, Mg-1287, Zn-3.69, S-12.36, As-7.49, Fe-61.78

Variety/Seeding Rate: CPRS, 100 lb/A

Planting Method/Date: Drill-seeded, May 31

Fertilization: Variable rates of P and K, May 31; 150 lb N/A PF as urea, July 2

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, June 1, June 10; flooded, July 6; harvest drainage, Sep 23

Herbicides: 4.0 lb ai/A Stam (propanil), June 15; Arrosolo (3.0 lb ai/A molinate + 3.0 lb ai/A propanil), June 18; 1.0 oz ai/A Londax (bensulfuron), July 14; 3.0 lb ai/A Ordram, July 15

Insecticides: 0.5 lb ai/A Furadan (carbofuran), Aug 1

Fungicides: 0.5 lb ai/A Rovral (iprodione), Aug 15

Harvest: Oct 7

Experimental Design: Randomized complete block with four replications

Comments: There was no response to P or K (Table 3).

Table 3. Influence of variable rates of phosphorus and potassium on drill-seeded Cypress rice. Will Bollich Farm, Rapides Parish, LA. 1993.

Phosphorus rate	Potassium rate	Days to 50% heading	Plant height	Grain yield at 12% moisture
--------(lb/A)--------			-(cm)-	----(lb/A)----
60	0	90	94	4927
60	20	90	98	5990
60	40	90	94	4806
60	60	90	95	5371
60	80	90	99	5994
0	60	91	96	5940
20	60	90	95	6037
40	60	91	97	5483
60	60	90	93	5387
80	60	90	98	6168
C.V., %		1.04	4.45	18.89
LSD (0.05)		ns	ns	ns

Experiment: P and K rate study

Location: Morehouse Parish, Zaunbrecher Farm

Soil Type/Analysis: Hebert silty clay; pH: 6.0; O.M.: 1.67%; extractable nutrients (mg/kg): P-97, Na-205, K-238, Ca-3285, Mg-989, Zn-2.58, S-17.27, As-4.93, Fe-136.9

Variety/Seeding Rate: CPRS, 150 lb/A

Planting Method/Date: Water seeded, May 19

Fertilization: Variable rates of P and K, May 17; 120 lb N/A PF as urea, June 29

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: May 28

Water Management: Flooded, May 18; drained, May 21; flushed, May 28, June 3, June 11, June 17; flooded, July 1; harvest drainage, Sep 10

Herbicides: 3.5 lb ai/A Stam (propanil), June 1; 4.0 lb ai/A Stam + 0.75 lb ai/A Basagran (bentazon), June 19; 3.5 lb ai/A Ordram (molinate), July 3; 1.0 oz ai/A Londax (bensulfuron), July 6

Insecticides: 0.5 lb ai/A Furadan (carbofuran), July 19; 0.25 lb ai/A methyl parathion; Aug 23

Fungicides: 0.28 lb ai/A Tilt (propiconazole), Aug 5; 0.5 lb ai/A Benlate (benomyl), Aug 19

Harvest: Sep 27

Experimental Design: Randomized complete block with four replications

Comments: There was no response to P or K (Table 4).

Table 4. Influence of variable rates of phosphorus and potassium on water-seeded Cypress rice. Zaunbrecher Farm, Morehouse Parish, LA. 1993.

Phosphorus rate	Potassium rate	Days to 50% heading	Plant height	Grain yield at 12% moisture
--------(lb/A)--------			-(cm)-	----(lb/A)----
60	0	95	85	9410
60	20	95	83	9303
60	40	95	84	9223
60	60	96	84	9132
60	80	95	85	9137
0	60	95	86	9294
20	60	95	83	9296
40	60	96	81	9033
60	60	95	82	9062
80	60	95	82	9109
C.V., %		0.61	3.98	2.63
LSD (0.05)		ns	ns	ns

Experiment: N-P-K fertilizer trial

Location: Vermilion Parish, Bobby Trahan Farm

Soil Type/Analysis: Reclaimed marsh; pH: 5.1; O.M.: 7.51%; extractable nutrients (mg/kg): P-50, Na-73, K-192, Ca-1854, Mg-527, Zn-1.85, S-18.31, As-21.99, Fe-549.6

Variety/Seeding Rate: ORIN, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 24

Fertilization: Variable fertilizer combinations

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 29, May 19; flooded, May 28; harvest drainage, Aug 20

Herbicides: Arrosolo (3.0 lb ai/A molinate + 3.0 lb ai/A propanil), May 25

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 14

Fungicides: None

Harvest: Sep 1

Experimental Design: Completely randomized design with four replications of eight fertilizer combinations

Comments: Severe P deficiency occurred immediately after permanent flood establishment in fertilizer treatments where P was not applied, and grain yields were significantly reduced (Table 1).

Table 1. Influence of variable N-P-K fertilizer combinations on drill-seeded Orion rice. Bobby Trahan Farm, Vermilion Parish, LA. 1993.

Fertilizer combination	Nitrogen[1] source	Days to 50% heading	Plant height	Grain yield at 12% moisture
---(lb/A)--	-(%)-		-(cm)-	----(lb/A)----
0-0-0	-	93	87	4484
60-0-0	46	93	88	4266
60-0-0	21	93	88	4489
60-60-0	21	94	90	5565
60-0-60	21	94	89	4123
60-60-60	21	94	90	5380
0-60-0	21	94	87	5447
0-0-60	21	93	86	4346
C.V., %		0.50	2.69	6.70
LSD (0.05)		ns	ns	469

[1] Nitrogen source, 46% = urea; 21% = ammonium sulfate.

Experiment: Soil applied Zn study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 7.5; O.M.: 0.83%; extractable nutrients (mg/kg): P-57, Na-55, K-139, Ca-2162, Mg-272, Zn-3.17, S-6.62, As-6.01, Fe-21.24

Variety/Seeding Rate: LCSN, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 22

Fertilization: 42 lb/A P_2O_5 and K_2O, soil applied Zn, Apr 21; PF urea (135 lb N/A), May 26

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Not recorded

Water Management: Flushed, Apr 26, May 7, May 13, May 18; permanent flood, May 27; harvest drainage, Aug 20

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 0.6 oz ai/A Londax (bensulfuron), June 9

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 11

Fungicides: None

Harvest: Aug 31

Experimental Design: Completely randomized design with three replications, treatment combinations consisting of Zn source and rate

Comments: Zn source and rate had no significant effect on heading, plant height, or grain yield (Table 1). Very little bronzing was observed throughout the study. Leaf Zn content at mid-tillering was not affected by rate of Zn. EDTA, Super Tel, Zinc Gro, and 31% Frit increased Zn content at mid-tillering. Source and rate did significantly influence Zn content at midseason. At PI Zn content was significantly lower in the check. EDTA, Ruffin, Super Tel, Frit 31%, Frit 36%, and Zinc Gro increased accumulation of Zn in the plant at PI. Content increased as rate of Zn increased up to 10 lb/A (or 1.0 lb/A with chelated sources). According to a summary of plant tissue analyses for rice, a Zn content of >20 mg/kg at the PI growth stage is considered sufficient. Therefore, a response to applied Zn would not be expected. Zn deficiency generally occurs on silt loam soils when soil Zn is low and soil pH is alkaline. Most of the Zn deficiency in southwest Louisiana is related to cool weather conditions and poor root growth, which limits uptake of Zn. The later planting date in this study provided more favorable growing conditions for the seedling rice and decreased the potential for Zn deficiency to reduce grain yields.

Table 1. Effect of soil applied Zn sources and rates on agronomic performance of drill-seeded Lacassine rice. Rice Research Station, Crowley, LA. 1993.

		Zn rate (lb/A)[1]												Zn content							
		Days to 50% heading				Plant height				Grain yield at 12% moisture				Mid-tillering				Panicle Initiation			
Source	Formulation	5	10	15	Mean	5	10	15	Mean	5	10	15	Mean	5	10	15	Mean	5	10	15	Mean
	-(%)-					-------(cm)-------				----------(lb/A)----------				----------(mg/kg)----------							
Zinc Gro	35.5	98	94	93	95	88	85	88	87	5878	6033	6906	6272	31	35	37	35	22	27	35	28
Frit	36.0	97	97	96	97	83	82	87	84	6392	5729	6788	6303	32	34	34	33	26	26	28	27
Frit	31.0	97	98	98	98	89	86	84	86	6661	5631	6362	6218	37	34	34	35	31	27	29	29
Frit	20.0	98	95	95	96	86	89	88	88	5798	6872	6485	6385	31	34	35	33	20	31	25	25
Frit[2]	12.0	97	98	96	97	87	88	87	87	6674	6436	6720	6610	33	35	33	34	22	23	25	23
Ruffin[2]	10.0	98	99	96	98	82	86	86	85	5044	5956	6465	5822	31	31	32	31	20	23	25	23
Traylor	36.0	99	100	97	99	84	92	81	85	5984	5573	5385	5647	32	34	32	33	22	22	26	23
Super Tel[2]	35.5	98	95	93	95	89	87	82	86	6215	6322	6229	6256	37	35	38	37	26	29	27	28
ADT[2]	7.3	96	98	100	98	86	85	87	86	6072	6022	5549	5881	31	33	33	32	22	23	21	22
Ruffin[2]	7.0	98	98	99	98	86	83	88	85	5800	5767	5621	5729	33	31	35	33	24	29	25	26
Traylor[2]	7.0	94	98	97	96	83	86	86	85	6007	5513	6184	5902	29	34	35	33	26	25	23	25
EDTA[2]	15.0	98	98	101	99	90	89	90	90	6146	5627	6281	6018	38	35	38	37	33	35	37	35
Check	-	99	98	97	98	84	85	85	85	5587	5379	6394	5787	31	32	35	33	20	23	26	23
Check	-	99	98	97	98	85	85	84	85	5008	6024	6028	5687	32	34	31	32	21	24	23	22
Zn Mean		97	97	97		86	86	86		5948	5920	6243		33	34	34		24	26	27	
C.V., %				3.58				5.60				12.40				9.36				15.99	
LSD (0.05):																					
Zn source				ns				ns				ns				3				4	
Zn rate				ns				ns				ns				ns				2	

[1] Non-chelated sources applied at 5, 10, and 15 lb/A. Chelated sources applied at 0.5, 1.0, and 1.5 lb/A.
[2] Chelated sources.

Experiment: Foliar applied Zn study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 7.6; O.M.: 1.31%; extractable nutrients (mg/kg): P-45, Na-50, K-122, Ca-2093, Mg-277, Zn-0.96, S-4.92, As-4.26, Fe-20.85

Variety/Seeding Rate: LCSN, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 22

Fertilization: 42 lb/A P_2O_5 and K_2O, Apr 21; PF urea (135 lb/A N), May 26; foliar Zn, June 10

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Not recorded

Water Management: Flushed, Apr 26, May 7, May 13, May 18; permanent flood, May 27; harvest drainage, Aug 20

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 0.6 oz ai/A Londax (bensulfuron), June 9

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 11

Fungicides: None

Harvest: Aug 31

Experimental Design: Completely randomized design with three replications, treatment combinations consisting of Zn source and rate

Comments: Zn source and rate had no significant effect on heading, plant height, or grain yield (Table 2). Very little bronzing was observed throughout the study. Leaf Zn content at mid-tillering was not affected by either source or rate of Zn. Source and rate did significantly influence Zn content at midseason. At PI, Zn content was significantly lower in the check. All sources of Zn increased accumulation in the plant at PI. Content increased as rate of Zn increased. According to a summary of plant tissue analyses for rice, a Zn content of >20 mg/kg at the PI growth stage is considered sufficient. Therefore, a response to applied Zn would not be expected.

Compatibility of foliar Zn materials with rice herbicides is shown in Table 3. Solutions were mixed at a 5 gal/A rate of application. After mixing, each solution set at room temperature for 15 to 20 minutes and was evaluated for precipitation, flocculation or suspension, and agitation required to keep mixed. None of the chelated Zn materials mixed with 2,4-D. Most Zn materials remained mixed with agitation. The results of this study show that with proper agitation most of the Zn materials and commonly used rice herbicides are compatible. It is unknown whether these tankmixes would cause problems with either plugged screens or nozzles on application equipment due to suspended particles.

Zn deficiency generally occurs on silt loam soils when soil Zn is low and soil pH is alkaline. Most of the Zn deficiency in southwest Louisiana is related to cool weather conditions and poor root growth, which limits uptake of Zn. The later planting date in this study provided more favorable growing conditions for the seedling rice and decreased the potential for Zn deficiency to reduce grain yields.

Table 2. Effect of foliar applied Zn sources and rates on agronomic performance of drill-seeded Lacassine rice. Rice Research Station, Crowley, LA. 1993.

		Zn rate (lb/A)																			
														Zn content							
		Days to 50% heading				Plant height				Grain yield at 12% moisture				Mid-tillering				Panicle Initiation			
Source	Formulation	0.5	1.0	1.5	Mean	0.5	1.0	1.5	Mean	0.5	1.0	1.5	Mean	0.5	1.0	1.5	Mean	0.5	1.0	1.5	Mean
	-(%)-					--------(cm)-------				----------(lb/A)----------				----------(mg/kg)----------							
Super Tel	35.5	91	94	97	94	79	84	76	80	8230	7811	5446	7162	34	35	33	34	38	53	55	49
ADM	7.3	101	93	92	95	78	78	85	80	5745	7222	8697	7222	33	39	35	36	35	44	52	44
Ruffin	7.0	92	95	96	94	79	83	78	80	7862	7374	6292	7176	31	35	32	33	32	52	53	46
Traylor	7.0	92	93	97	94	83	84	78	82	8261	8124	5508	7297	33	34	31	33	36	56	90	61
EDTA	15.0	93	98	99	97	79	76	77	77	7029	5622	6727	6459	32	32	34	33	49	45	43	46
Check	-	95	95	92	94	78	83	82	81	6855	7275	8024	7385	32	29	32	31	27	29	31	29
Check	-	98	97	93	96	81	82	73	79	6347	7159	6482	6663	33	33	33	33	27	22	32	27
Zn Mean		94	95	95		79	81	78		7190	7227	6739		33	34	33		35	43	51	
C.V., %				4.54				6.49				19.93				9.93				26.24	
LSD (0.05):																					
Zn source				ns				ns				ns				ns				11	
Zn rate				ns				ns				ns				ns				7	

Table 3. Compatibility of various Zn sources with rice herbicides. Rice Research Station, Crowley, LA. 1993.

Source	Formulation	Herbicide						
		Stam	Arrosolo	2,4-D	Basagran	Bolero	Londax	Blazer
	-(%)-							
Super Tel	35.5	forms suspension does not mix easily	slight suspension agitate to mix	precipitates does not mix	slight precipitate agitate to mix	slight precipitate agitate to mix	slight precipitate agitate to mix	precipitates does not suspend with agitation
ADM	7.3	precipitates agitate to mix	forms suspension does not mix easily	crystalline precipitate does not mix	goes into solution without agitation	slight precipitate agitate to mix	precipitates agitate to mix	goes into solution without agitation
Ruffin	7.0	agitate to mix	slight precipitate agitate to mix	precipitates does not mix	slight precipitate agitate to mix	slight precipitate agitate to mix	slight precipitate agitate to mix	very slight precipitate agitate to mix
Traylor	7.0	slight precipitate agitate to mix	very slight precipitate agitate to mix	precipitates does not mix	slight precipitate agitate to mix	precipitates easily suspended agitate to mix	slight precipitate agitate to mix	very slight precipitate agitate to mix

Experiment: Lime rate trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 5.4; O.M.: 1.21%; extractable nutrients (mg/kg): P-65, Na-17, K-71, Ca-786, Mg-108, Zn-1.20, S-7.54, As-1.85, Fe-110.8

Variety/Seeding Rate: CPRS, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; 90 lb N/A as ammonium sulfate; ratoon crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 15

Water Management: Flooded, Apr 1; drained, Apr 4; reflooded, Apr 7; drained, Apr 8; reflooded, Apr 13; harvest drainage, July 19; ratoon crop flooded, Aug 9; harvest drainage, Oct 8

Herbicides: 1.0 oz ai/A Londax (bensulfuron) + 3.5 lb ai/A Ordram (molinate), May 4

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 10

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 20

Harvest: Aug 4, Oct 25

Experimental Design: Randomized complete block with four replications

Comments: Lime was applied preplant with minimal incorporation. There was no response to lime application (Table 1).

Table 1. Influence of lime application on agronomic performance of water-seeded Cypress rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Lime rate	Days to 50% heading	Plant height	Grain yield at 12% moisture		
			Main crop	Ratoon crop	Total
-(lb/A)-		(cm)	----------(lb/A)----------		
0	91	80	7194	3564	10758
500	91	79	7167	3488	10655
1000	91	80	7294	3259	10553
2000	91	80	7262	3461	10723
3000	91	82	7511	3446	10957
C.V., %	0.78	1.76	3.25	8.08	3.71
LSD (0.05)	ns	ns	ns	ns	ns

CULTURAL MANAGEMENT STUDIES

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A seeding rate by N rate by variety study was conducted in Vermilion Parish to determine the influence of stand density and fertilizer N on disease development. The varieties Lacassine and Cypress were cultured in a water-seeded, pinpoint flood system with N being incorporated PP. Rates of both N and seed included 60, 90, 120, and 150 lb/A. Plant growth measurements, main and ratoon crop grain yields, and disease incidence were determined.

A row spacing and orientation study was conducted to evaluate the influence of row arrangement on plant growth, grain yields, and yield components of Cypress and Bengal. The study was drill-seeded at 100 lb seed/A, regardless of row arrangement. Rice was seeded at constant 7- or 14-inch spacings or in a 2- or 3-row arrangement alternating with a 7-inch skip.

A preliminary investigation was conducted in Vermilion Parish to determine the influence of main crop harvest method on ratoon production of Bengal rice. The main crop was harvested by either a conventional cutter bar header or a stripper header. Ratoon crop grain yield and yield components were determined.

Experiment: Seeding rate x variety x N rate trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 5.6; O.M.: 1.34%; extractable nutrients (mg/kg): P-66, Na-30, K-79, Ca-1026, Mg-154, Zn-1.32, S-11.37, As-2.09, Fe-108.4

Variety/Seeding Rate: CPRS, LCSN, 60, 90, 120, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Fertilization: 45 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; ratoon crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: CPRS, Apr 14; LCSN, Apr 15

Water Management: Flooded, Apr 1; drained, Apr 4; reflooded, Apr 7; drained, Apr 8; reflooded, Apr 13; harvest drainage, July 19; ratoon crop flooded, Aug 9; harvest drainage, Oct 8

Herbicides: 1.0 oz ai/A Londax (bensulfuron) + 3.5 lb ai/A Ordram (molinate), May 4

Insecticides: 0.5 lb ai/A Furadan (carbofuran), May 10

Fungicides: 0.75 lb ai/A Benlate (benomyl), June 20

Harvest: Aug 4, Oct 25

Experimental Design: Factorial arrangement of variety, seeding rate, and N rate in a randomized complete block with four replications

Comments: Stand densities of Cypress were much higher than those of Lacassine (Table 1). Density increased as seeding rate increased. Grain yields of Cypress and Lacassine were similar and were not influenced by seeding rate. Both varieties required 90 lb N/A for optimum grain yields. Seeding rate had no influence on ratoon or total grain yields (Table 2). Ratoon yield of Cypress was slightly higher than Lacassine. Disease reactions were significantly different for Cypress and Lacassine (Table 3). Tiller infection and rating were higher in Cypress. Nitrogen rate had no influence on tiller infection but did affect final rating. Tiller infection and rating increased as seeding rate increased.

Table 1. Influence of N rate and seeding rate on performance and grain yields of water-seeded Cypress and Lacassine rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Rate		Stand density		Days to 50% heading		Plant height		Grain yield at 12% moisture	
Nitrogen	Seed	Cypress	Lacassine	Cypress	Lacassine	Cypress	Lacassine	Cypress	Lacassine
----(lb/A)----		----(plants/ft²)---				-------(cm)--------		-------(lb/A)------	
60	60	10	8	93	90	81	80	6039	5932
60	90	14	9	91	89	78	81	6134	6289
60	120	21	11	91	89	75	78	6570	6018
60	150	25	14	90	88	75	78	6157	5929
90	60	11	6	94	92	85	84	6578	6371
90	90	18	11	92	90	82	83	6866	6761
90	120	24	13	91	89	81	63	6461	6960
90	150	24	14	91	89	79	82	6654	6763
120	60	14	7	95	94	86	90	6815	6622
120	90	19	10	93	91	85	86	6611	6888
120	120	18	11	93	89	82	86	6835	6945
120	150	26	12	92	89	83	86	6973	6707
150	60	9	7	94	94	90	91	6794	6676
150	90	15	9	94	91	87	89	6769	6751
150	120	22	11	93	91	83	88	6913	6542
150	150	29	14	93	90	84	86	6720	7012
Variety Mean		19	10	92	90	82	85	6618	6573
C.V., %		31.19		0.97		2.74		5.25	
LSD (0.05):									
Variety		2		1		1		ns	
Nitrogen mean									
60		14		90		78		6134	
90		15		91		83		6677	
120		15		92		85		6799	
150		14		93		87		6772	
LSD (0.05):		ns		1		1		172	
Seed rate mean									
60		9		93		86		6478	
90		13		92		84		6634	
120		16		91		82		6655	
150		20		90		82		6614	
LSD (0.05):		2		1		1		ns	
N rate x seed rate		ns		ns		ns		ns	
N rate x variety		ns		ns		ns		ns	
Variety x seed rate		*		*		ns		ns	
V x N x S		ns		ns		ns		ns	

* Denotes significance at P = 0.05.

Table 2. Influence of N rate and seeding rate in the main crop on grain yields of water-seeded Cypress and Lacassine rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Rate		Main crop grain yield at 12% moisture		Ratoon crop grain yield at 12% moisture		Total grain yield at 12% moisture	
Nitrogen	Seed	Cypress	Lacassine	Cypress	Lacassine	Cypress	Lacassine
----------	----------	----------	----------	----------	----------	----------	----------
				(lb/A)			
60	60	6039	5932	3079	3012	9118	8944
60	90	6134	6289	3028	2888	9162	9177
60	120	6570	6018	3407	2849	9976	8867
60	150	6157	5929	2965	3011	9122	8941
90	60	6578	6371	3077	2906	9655	9277
90	90	6866	6761	3110	2833	9976	9594
90	120	6461	6960	3232	2812	9692	9772
90	150	6654	6763	2940	2728	9594	9491
120	60	6815	6622	2887	2904	9702	9526
120	90	6611	6888	2620	2795	9231	9683
120	120	6835	6945	2870	2640	9705	9585
120	150	6973	6707	3018	2636	9991	9343
150	60	6794	6676	2803	2967	9597	9644
150	90	6769	6751	2893	2689	9662	9440
150	120	6913	6542	2926	2492	9839	9035
150	150	6720	7012	2875	2717	9594	9729
Variety Mean		6618	6573	2983	2805	9601	9378
C.V., %		5.25		9.98		5.68	
LSD (0.05):							
Variety		ns		101		189	
Nitrogen mean							
60		6134		3030		9163	
90		6677		2955		9631	
120		6799		2796		9596	
150		6772		2795		9567	
LSD (0.05):		172		143		268	
Seed rate mean							
60		6478		2954		9433	
90		6634		2857		9491	
120		6655		2904		9559	
150		6614		2861		9476	
LSD (0.05):		ns		ns		ns	
N rate x seed rate		ns		ns		ns	
N rate x variety		ns		ns		ns	
Variety x seed rate		ns		*		ns	
V x N x S		ns		ns		ns	

* Denotes significance at P = 0.05.

Table 3. Influence of N rate and seeding rate on disease reactions of water-seeded Cypress and Lacassine rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Rate		Sheath blight (tiller infection)		Sheath blight rating[1]	
Nitrogen	Seed	Cypress	Lacassine	Cypress	Lacassine
----(lb/A)----		---------(%)----------			
60	60	42.5	28.0	4.7	4.7
60	90	35.0	30.5	5.5	5.0
60	120	55.0	40.0	5.7	6.0
60	150	57.5	53.0	5.2	6.0
90	60	27.5	15.0	5.5	4.2
90	90	43.5	40.5	6.0	6.2
90	120	48.5	49.0	6.0	5.5
90	150	54.5	50.0	6.7	6.5
120	60	30.5	25.5	4.7	4.7
120	90	60.5	54.0	7.0	6.2
120	120	47.0	44.5	6.5	6.2
120	150	73.5	46.5	6.5	7.0
150	60	34.0	28.5	5.7	4.5
150	90	66.0	53.0	6.7	5.7
150	120	54.5	36.0	7.7	6.7
150	150	53.5	53.0	7.2	6.7
Variety Mean		49.0	40.4	6.1	5.8
C.V., %		43.44		14.22	
LSD (0.05):					
Variety		6.8		0.3	
Nitrogen mean					
60		42.7		5.4	
90		41.1		5.8	
120		47.7		6.1	
150		47.3		6.4	
LSD (0.05):		ns		0.4	
Seed rate mean					
60		28.9		4.9	
90		47.9		6.1	
120		46.8		6.3	
150		55.2		6.5	
LSD (0.05):		2.3		0.4	
N rate x seed rate		ns		ns	
N rate x variety		ns		ns	
Variety x seed rate		ns		ns	
N x V x S		ns		ns	

[1] 0-9 disease scale where 0 = none (immune) and 9 = maximum (very susceptible).

Experiment: Row spacing and arrangement

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.2; O.M.: 1.40%; extractable nutrients (mg/kg): P-51, Na-85, K-65, Ca-1238, Mg-211, Zn-1.05, S-7.33, As-1.64, Fe-73.06

Variety/Seeding Rate: CPRS, BNGL, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 19

Fertilization: 45 lb/A P_2O_5 and K_2O, Apr 19; 135 lb N/A PF, May 21; 75 lb/A ratoon crop N

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: May 1

Water Management: Flushed, Apr 21, Apr 29, May 7, May 14; permanent flood, May 21; harvest drainage, Aug 2; ratoon flooded, Aug 20; harvest drainage, Oct 18

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 3.0 lb ai/A Ordram (molinate), 0.6 oz ai/A Londax (bensulfuron), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 3

Fungicides: 0.28 lb ai/A Tilt (propiconazol), June 29; 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 19, Nov 10

Experimental Design: Randomized complete block with four replications, factorial arrangement of variety and row

Comments: Main crop and total grain yields of Bengal were significantly higher than Cypress (Table 1). Row arrangement influenced main, ratoon, and total grain yields. Main crop yield was reduced with a 14-inch drill row and a 7-inch x 2 rows + 7-inch skip. Ratoon and total grain yields were highest with the standard 7-inch drill spacing and significantly lower with all other arrangements. Whole plant weight, straw weight, grain weight, and grain number were also significantly higher with the standard 7-inch drill spacing (Table 2).

Table 1. Influence of row spacing and arrangement on agronomic performance of drill-seeded Cypress and Bengal rice. Rice Research Station, Crowley, LA. 1993.

Variety	Row arrangement	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Ratoon crop	Total
			(cm)	----------(lb/A)----------		
Cypress	7" ||||	88	84	8330	2340	10670
Bengal	7" ||||	88	87	8939	2114	11053
Cypress	14" | | | |	89	84	7673	2167	9840
Bengal	14" | | | |	88	85	8246	1862	10108
Cypress	7" x 2 rows + 7" skip || || ||	88	84	7909	2157	10065
Bengal	7" x 2 rows + 7" skip || || ||	88	85	8629	1829	10458
Cypress	7" x 3 rows + 7" skip ||| |||	88	85	8184	2089	10274
Bengal	7" x 3 rows + 7" skip ||| |||	88	86	8535	1927	10463
C.V., %		0.62	3.64	6.08	8.75	5.38
				Main effects		
Variety:						
Cypress		88	84	8024	2188	10212
Bengal		88	86	8587	1933	10520
LSD (0.05)		1	2	253	90	280
Row:						
7"		88	86	8634	2227	10861
14"		88	85	7959	2015	9974
7" x 2 rows + 7" skip		88	85	8269	1993	10262
7" x 3 rows + 7" skip		88	86	8360	2008	10368
LSD (0.05)		ns	ns	358	128	396
Variety x Row		ns	ns	ns	ns	ns

Table 2. Influence of row spacing and arrangement on yield components of drill-seeded Cypress and Bengal rice. Rice Research Station, Crowley, LA. 1993.

Variety	Row arrangement	Whole plant weight	Straw weight	Grain weight	Grain number	Panicle number	Grains per panicle	Grain weight per panicle	1000 grain weight
		----------(g/7 ft²)----------			------(7 ft²)-----			----------(g)----------	
Cypress	7"	1302	707	595	26830	316	86	1.90	22
Bengal	7"	1329	701	628	25196	260	97	2.41	25
Cypress	14"	1090	575	515	23641	292	81	1.78	22
Bengal	14"	1170	656	514	20896	239	87	2.15	25
Cypress	7" x 2 rows + 7" skip	1085	585	500	22718	287	79	1.74	22
Bengal	7" x 2 rows + 7" skip	1216	663	552	22261	238	94	2.33	25
Cypress	7" x 3 rows + 7" skip	1198	649	549	25358	334	76	1.64	22
Bengal	7" x 3 rows + 7" skip	1158	619	539	21733	234	93	2.32	25
C.V., %		7.31	7.86	8.51	8.52	11.11	7.90	7.98	1.61
					Main effects				
Variety:									
Cypress		1169	629	540	24637	307	80	1.76	22
Bengal		1219	660	558	22522	243	93	2.31	25
LSD (0.05)		ns	ns	ns	1070	22	5	.12	1
Row:									
7"		1316	704	611	26013	288	91	2.16	23
14"		1130	616	515	22269	265	84	1.97	23
7" x 2 rows + 7" skip		1150	624	526	22490	263	86	2.03	23
7" x 3 rows + 7" skip		1178	634	544	23546	284	85	1.98	23
LSD (0.05)		90	52	48	2079	ns	ns	ns	ns
Variety x Row		ns	ns	ns	ns	ns	ns	ns	ns

Experiment: Stripper header effects on ratoon performance

Location: Vermilion Parish, Errol Lounsberry Farm

Variety: BNGL, 150 lb/A

Planting Method: Water-seeded

Fertilization: Ratoon crop, 75 lb N/A

Plot Size: 10 x 25 ft (250 ft^2)

Experimental Design: Paired plots (stripper vs conventional main crop harvest) with 13 replications

Comments: Grain yield was significantly higher when the main crop was harvested with a conventional header (Table 1). Number of panicles per unit area was not affected by method of harvest. Grain weight per unit area and grains per panicle were significantly higher with a conventionally harvested main crop. By visual observation, more lodging occurred with the stripped main crop and was due to the collapse of the main crop straw. The increased ratoon yield with conventional harvest appears to be due to larger panicles and a higher percentage of filled grains.

Table 1. Influence of main crop harvest method on ratoon crop performance of water-seeded Bengal rice. Errol Lounsberry Farm, Vermilion Parish, LA. 1993.

Harvest	Grain yield at 12% moisture	Panicle number	Grain weight (g)	Grain number	Grains per panicle
	-(lb/A)-	---------($3ft^2$)---------			
Conventional	2752	106	86	3657	35
Stripped	2341	122	72	3179	27
C.V., %	14.32	18.55	20.35	20.37	18.87
LSD (0.05)	295	ns	13	ns	5

CONSERVATION TILLAGE STUDIES

P.K. Bollich, D.E. Sanders, W.J. Leonards, Jr., G.A. Meche,
G.R. Romero, and D.M. Walker

Studies relating to conservation tillage conducted in 1993 included three preplant herbicide burndown evaluations and a variety by N by tillage study. The preplant burndown studies were conducted in both drill- and water-seeded, delayed flood, cultural systems. The variety by N by tillage study was drill seeded.

In the no-till, preplant burndown studies, Roundup D-Pak (glyphosate), Gramoxone, and Ignite (glufosinate) were evaluated alone and in combination with either Facet (quinclorac) or Bolero (thiobencarb). Tankmix combinations of Roundup + Harmony Extra (Thifensulfuron + tribenuron) with and without Facet and Bolero were also evaluated. All treatments were applied with 1/2% Triton AG98 surfactant. Treatment combinations and rates of application are shown in Tables 1 and 2. Treatments were rated for % weed control 30 days after planting. Stand density was determined at the time of permanent flood establishment.

Facet was evaluated in various tankmix and sequential combinations with Roundup and Gramoxone. Facet rates and times of application are shown in Table 3. Weed control ratings were not taken.

The varieties Cypress, Bengal, Lacassine, and Maybelle were evaluated in a variety by N by tillage study. Roundup plus 1/2% surfactant was applied 5 days prior to drill seeding. Nitrogen was applied as single applications at rates including 90, 120, 150, and 180 lb/A PF. The 150 lb N/A rate was also applied as a 2-way split (100 PF + 50 PI). Days to 50% heading, plant height, lodging, grain moisture, and grain yield were determined.

Experiment: Preplant burndown study

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 5.9; O.M.: 2.66%; extractable nutrients (mg/kg): P-70, Na-120, K-114, Ca-2042, Mg-657, Zn-2.02, S-5.66, As-3.44, Fe-139.3

Variety/Seeding Rate: MBLE, 150 lb/A

Planting Method/Date: Water-seeded, Apr 23

Fertilization: 40 lb/A P_2O_5 and K_2O; 90 lb N/A (urea) PF, May 26; 55 lb N/A, June 16

Plot Size: 9.0 x 25 ft (225 ft^2)

Emergence Date: Data not taken

Water Management: Flooded, Apr 23; drained, Apr 26; flushed, May 6, May 13; permanent flood, May 26; harvest drainage, Aug 3

Herbicides: 3.5 lb ai/A Ordram (molinate), May 31

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 9

Fungicides: 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 16

Experimental Design: Randomized complete block with four replications

Comments: All burndown herbicides gave good control of most existing vegetation. Dessication of preplant vegetation was most rapid with Gramoxone, followed by Ignite and Roundup. Herbicide ratings reflect their effectiveness in controlling or suppressing weeds when applied as preplant tankmixes. Ratings were taken 30 days after planting. There were no differences in control of curly dock, alligatorweed, or little barley between burndown alone and residual herbicide tankmixes (Table 1). Barnyardgrass control increased with the use of residual herbicides in the preplant tankmixes. Grass control was less than satisfactory in all treatments, requiring an application of Ordram after permanent flood establishment. Grain yield was not influenced by herbicide treatment.

Table 1. Preplant burndown evaluation in no-till, water-seeded Maybelle rice. Rice Research Station, South Unit, Crowley, LA. 1993.

Herbicide	Rate	Stand density	% Weed control[1]				Days to 50% heading	Plant height	Grain yield at 12% moisture
			CD	AW	BY	LB			
	(lb ai/A)	(plants/ft²)						(cm)	(lb/A)
Roundup	1.0	7	92	87	30	100	76	95	7284
Roundup + Facet	1.0 + .375	10	92	75	60	100	77	96	7242
Roundup + Bolero	1.0 + 4.0	5	92	87	62	100	78	97	7545
Gramoxone	.63	9	80	67	37	97	77	99	7279
Gramoxone + Facet	.63 + .375	8	80	62	67	100	77	96	6975
Gramoxone + Bolero	.63 + 4.0	6	70	52	60	97	77	94	7037
Ignite	.75	6	77	65	27	100	77	94	7065
Ignite + Facet	.75 + .375	9	87	65	60	100	78	96	7509
Ignite + Bolero	.75 + 4.0	11	90	60	70	100	76	96	7211
Roundup + Harmony	1.0 + .023	8	90	87	47	97	77	95	7416
Roundup + Harmony + Facet	1.0 + .023 + .375	7	97	95	62	100	77	95	7256
Roundup + Harmony + Bolero	1.0 + .023 + 4.0	9	97	97	57	100	77	97	7067
Untreated	-	4	0	0	0	0	81	95	7354
C.V.%		45.92	15.17	18.42	21.36	2.59	1.72	2.83	6.46
LSD (0.05)		ns	17	18	15	3	2	ns	ns
Contrasts:									
Burndown vs tankmix		ns	ns	ns	*	ns	ns	ns	ns
Facet vs Bolero		ns	ns	ns	ns	ns	ns	ns	ns

[1] CD= curly dock; AW= alligatorweed; BY= barnyardgrass; LB= little barley.
* Denotes significance at P = 0.05.

Experiment: Facet burndown study

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 5.8; O.M.: 1.80%; extractable nutrients (mg/kg): P-49, Na-106, K-103, Ca-2118, Mg-673, Zn-1.59, S-7.56, As-3.19, Fe-97.62

Variety/Seeding Rate: MBLE, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 23

Fertilization: 40 lb/A P_2O_5 and K_2O; 90 lb N/A (urea) PF, May 26; 45 lb N/A, June 16

Plot Size: 8.75 x 25 ft (225 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 27, May 6, May 14; permanent flood, May 26; harvest drainage, Aug 8

Herbicides: Facet x burndown combinations

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 9

Fungicides: None

Harvest: Aug 23

Experimental Design: Randomized complete block with four replications

Comments: All burndown herbicides gave good control of most existing vegetation. Dessication of preplant vegetation was most rapid with Gramoxone. Grass control was poor (ratings not taken) with all Facet applications except the early post treatment. Weather conditions after planting delayed permanent flood establishment and effectiveness of the early-season Facet applications diminished. Grass control was significantly improved when Facet was applied early post. Significant yield reductions occurred in all treatments except the early post Facet application and the preflood Stam + Bolero tankmix (Table 3).

Table 3. Facet evaluation in no-till, drill-seeded Maybelle rice. Rice Research Station, South Unit, Crowley, LA. 1993.

Treatment[1]	Time of Facet application	Rate	Days to 50% heading	Plant height	Grain yield at 12% moisture
		(lb ai/A)		(cm)	(lb/A)
Untreated			78	100	3288
Roundup / Facet	preplant	.5 / .375	79	96	3297
Roundup / Facet	early post	.5 / .375	78	102	6880
Roundup / Facet	delayed pre	.5 / .375	79	100	4112
Roundup / Stam + Bolero	post	.5 / 3.0 + 3.0	79	99	7339
Roundup + Facet	tankmix	.5 + .375	78	99	3535
Gramoxone + Facet	tankmix	.63 + .375	78	102	5020
Gramoxone / Facet	preplant	.63 / .375	78	101	4164
C.V.%			0.98	3.80	23.44
LSD (0.05)			ns	ns	1622

[1] Roundup was applied 7 days preplant in all treatments.

Experiment: Tillage x variety x N trial

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 5.4; O.M.: 2.49%; extractable nutrients (mg/kg): P-97, Na-69, K-117, Ca-1840, Mg-470, Zn-4.51, S-7.46, As-3.30, Fe-180.0

Variety/Seeding Rate: LCSN, CPRS, BNGL, MBLE, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 23

Fertilization: 40 lb/A P_2O_5 and K_2O; N source urea

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Data not taken

Water Management: Flushed, Apr 26, May 6, May 14; permanent flood, May 25; harvest drainage, Aug 12

Herbicides: 1.0 lb ai/A Roundup (glyphosate), Apr 18; 3.0 lb ai/A Stam (propanil) + 2.0 lb ai/A Bolero (thiobencarb), May 21; 3.5 lb ai/A Ordram (molinate), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 9

Fungicides: 0.5 lb ai/A Benlate (benomyl), July 20

Harvest: Aug 24

Experimental Design: Randomized complete block with four replications, tillage assigned to main plots and variety x N treatments assigned to subplots

Comments: Days to 50% heading and plant height were decreased slightly in the no-till seedbed (Table 1). A significant variety x tillage interaction occurred for grain yield. Maybelle yields were reduced in the no-till planting to a greater extent than the other varieties. There was no response to N rate in either tillage system. Grain yields of all varieties were significantly different on the order of Bengal > Cypress > Maybelle > Lacassine.

Table 1. Influence of tillage and N rate on performance and grain yield of drill-seeded rice varieties. Rice Research Station, Crowley, LA. 1993.

Variety	N[1] rate	Days to 50% heading		Plant height		% Lodging/type[2]		Grain yield at 12% moisture	
		Conv	No-till	Conv	No-till	Conv	No-till	Conv	No-till
				--------(cm)--------				-------(lb/A)------	
Lacassine	90	93	88	89	86	0/0	0/0	6314	6759
Lacassine	120	93	88	87	89	0/0	0/0	6562	6799
Lacassine	150	93	90	89	92	10/2	10/2	6886	6694
Lacassine	100|50	92	89	88	84	5/1	13/1	6728	6503
Lacassine	180	92	91	94	90	15/2	8/1	6980	6686
Cypress	90	91	89	91	90	0/0	0/0	7614	7107
Cypress	120	92	88	94	89	0/0	0/0	8161	7367
Cypress	150	94	90	97	93	2/1	0/0	7586	7365
Cypress	100|50	94	90	93	91	0/0	0/0	7392	7064
Cypress	180	94	90	94	94	0/0	0/0	7437	7191
Bengal	90	87	87	89	85	0/0	0/0	8129	7731
Bengal	120	87	86	90	85	0/0	0/0	8258	8143
Bengal	150	87	87	88	87	10/1	0/0	8392	8205
Bengal	100|50	88	87	89	86	0/0	5/1	8392	7992
Bengal	180	88	87	93	88	0/0	0/0	8333	7910
Maybelle	90	79	80	100	95	3/1	0/0	7284	6124
Maybelle	120	79	79	97	99	0/0	0/0	7124	6547
Maybelle	150	81	79	102	99	5/1	10/1	7465	6650
Maybelle	100|50	80	78	97	99	3/1	0/0	7462	6609
Maybelle	180	80	80	100	96	20/3	5/1	7713	6648
Tillage (T) mean		88	86	93	91			7511	7105
C.V., %		1.84		4.26				7.27	
LSD (0.05):									
Tillage		ns		1				ns	
Nitrogen (N) mean									
90		87		91				7133	
120		87		91				7370	
150		88		93				7405	
100|50		88		94				7362	
180		88		91				7268	
LSD (0.05):		1		2				ns	
Variety (V) mean									
Lacassine		91		89				6691	
Cypress		91		93				7428	
Bengal		87		88				8148	
Maybelle		80		99				6963	
LSD (0.05):		1		2				235	
Main effect interactions									
V x N		ns		ns				ns	
V x T		*		ns				*	
N x T		ns		ns				ns	
V x N x T		ns		ns				ns	

[1] Two-way application of 150 lb N/A applied as 100 lb preflood and 50 lb at panicle initiation.
[2] Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.
* Denotes significance at P = 0.05.

RICE WATER QUALITY STUDY

P.K. Bollich, S.E. Feagley, W.J. Leonards, Jr.,
G.A. Meche, G.R. Romero, and D.M. Walker

A water-seeded tillage study was conducted to determine the impact of various tillage methods on the quality of rice field floodwater released during the growing season. These tillage practices were also evaluated for suppression of red rice. The tillage methods closely parallel those previously established in the ASCS cost-sharing program implemented in the Mermentau River Basin. Clear water planting (dry seedbed preparation), no-till (planting into residue with no soil disturbance), and water retention for a specified period of time after mudding in (seedbed prepared under flooded conditions with no release of water for 2 weeks), were compared with the traditional mudding in (seedbed prepared under flooded conditions with water release soon after planting).

Water quality measurements and agronomic data were collected on large, replicated plots. Water samples were collected during the initial drain, at midseason, and at harvest drain. TSS, TDS, TS, EC, pH, and nutrient levels were determined at each sampling. BOD5 was determined on the initial and harvest drains. Stand density, days to 50% heading, plant height, grain yield, and milling quality were determined. Red rice establishment in the test area was variable, and any reference to differences in red rice due to tillage was based on visual observation.

Experiment: Tillage x water quality

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 5.9; O.M.: 2.19%; extractable nutrients (mg/kg): P-92, Na-43, K-130, Ca-1252, Mg-388, Zn-7.10, S-6.63, As-2.72, Fe-184.4

Variety/Seeding Rate: MBLE, 150 lb/A

Planting Method/Date: Water-seeded, Apr 23

Fertilization: 75-45-45 (N-P-K) early season; 75 lb N/A midseason

Plot Size: 43 x 286 ft (12,298 ft^2)

Emergence Date: Clear water, Apr 28; mudding in, Apr 29; no-till, May 4

Water Management: Flooded mudding in with retention, Apr 12; flooded mudding in, Apr 20; flooded clear water and no-till, Apr 21; drained, Apr 26; flooded no-till, Apr 29; flooded clear water and mudding in, May 1; drained, May 15; flooded, May 17; drained, July 20

Herbicides: 4.0 lb ai/A Stam (propanil) + 1.0 lb ai/A Basagran (bentazon), May 17; 3.5 lb ai/A Ordram (molinate), May 31

Insecticides: 0.5 lb ai/A Furadan (carbofuran), June 9

Fungicides: None

Harvest: Aug 9

Experimental Design: Randomized complete block with three replications

Comments: Emergence was slow and stand establishment poor in the no-till treatment. Stand density was decreased significantly in the no-till treatment (Table 1). Maturity was delayed and grain yield significantly reduced in the no-till planting. By visual assessment, red rice establishment was more severe in the no-till planting. Red rice seed was contained in the harvest sample from the no-till treatment. The amount was not enough to cause a reduction in quality.

Water quality parameters are shown in Tables 2-4. In the initial drain (Table 2), BOD5 and TSS were lowest in the no-till planting. There was no difference in TDS or TS between the clear water and no-till plantings. Both of these parameters were significantly higher in the mudding in treatments. Retention of the floodwater after mudding in did reduce TDS, TSS, and TS when compared with mudding in alone. Where differences were measured with respect to dissolved elements, values were higher in the mudding in treatments while the no-till and clear water treatments were similar.

At midseason, values of most parameters were much lower than at the initial drain (Table 3). EC was lowest in the mudding in treatments and significantly higher in the no-till treatment. TDS was similar for the clear water and no-till planting but higher than either mudding in treatment. TS was significantly higher in the no-till treatment when compared with all others. Values for dissolved elements were similar across all planting methods. NO_2^- was detected in the conventional and mudding in treatments, and NO_3^- was significantly higher in the no-till treatment.

Values of most parameters continued to decrease as indicated in water samples collected at harvest drain (Table 4). Si, Ca, and Na did increase slightly in all treatments.

Table 1. Influence of tillage on agronomic performance of water-seeded Maybelle rice. Rice Research Station, South Unit, Crowley, LA. 1993.

Tillage	Stand density	Days to 50% heading	Plant height	Grain yield at 12% moisture	% Milling yield
	-(ft^2)-		(cm)	-(lb/A)-	(head-total)
Conventional	41	69	95	5594	54-69
Mudding in	41	70	89	5243	51-69
Mudding in|retention	35	71	99	5449	57-69
No-till	9	76	94	4376	56-67
C.V., %	22.35	1.06	5.52	5.43	3.3-1.4
LSD (0.05)	14	1	ns	560	4-ns

Table 2. Influence of tillage on water quality of rice field floodwater (initial drain) from water-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1993.[1]

Parameter	Conventional	Mudding in	Mudding in with retention	No-till	LSD (0.05)
BOD5 (mg/L)	18.1	14.0	18.6	7.3	4.4
pH	8.2	7.4	7.7	7.8	0.4
EC (dS/m)	0.48	0.35	0.38	0.55	0.05
TSS (mg/L)	74	300	100	7	14
TDS (mg/L)	325	3887	2000	436	2036
TS (mg/L)	520	8800	4207	453	2776
Fe (mg/L)	0.02	11.31	1.35	0.05	7.08
Mn (mg/L)	0.001	0.021	0.009	0.001	ns
Ni (mg/L)	0.03	0.04	0.03	0.03	ns
Al (mg/L)	0.06	28.68	3.51	0.03	18.0
Cd (mg/L)	0.002	0.003	0.002	0.002	ns
Cu (mg/L)	0.003	0.010	0.005	0.004	0.005
As (mg/L)	0.023	0.070	0.033	0.020	ns
B (mg/L)	0.100	0.070	0.050	0.087	ns
Cr (mg/L)	0.004	0.023	0.004	0.004	ns
Si (mg/L)	7.7	55.2	13.5	15.5	30.5
P (mg/L)	0.15	0.41	0.17	0.28	ns
Pb (mg/L)	0.050	0.053	0.050	0.050	ns
Zn (mg/L)	0.010	0.052	0.015	0.018	.027
Mg (mg/L)	22.5	10.4	14.2	24.8	6.4
K (mg/L)	5.7	5.5	4.6	8.2	1.3
S (mg/L)	1.09	2.75	2.28	0.94	0.64
Na (mg/L)	95.6	67.6	61.5	80.2	ns
Ca (mg/L)	31.7	13.9	23.4	40.9	11.4
F^- (mg/L)	0.74	0.70	0.72	0.56	ns
Cl^- (mg/L)	50.1	48.3	40.8	42.0	ns
Br^- (mg/L)	0.13	0.20	0.15	0.07	ns
NO_2^- (mg/L)	0.00	0.00	0.00	0.00	ns
NO_3^- (mg/L)	0.25	0.90	0.53	0.28	ns
PO_4^{3-} (mg/L)	0.000	0.000	0.000	0.167	ns
SO_4^{2-} (mg/L)	1.81	5.98	4.43	1.10	1.64

[1] Zero values may indicate no measured amount at the detection limits for that particular variable.

Table 3. Influence of tillage on water quality of rice field floodwater (midseason drain) from water-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1993.[1]

Parameter	Conventional	Mudding in	Mudding in with retention	No-till	LSD (0.05)
BOD5 (mg/L)[2]	-	-	-	-	-
pH	7.8	7.7	7.8	7.8	ns
EC (dS/m)	0.185	0.160	0.167	0.221	0.13
TSS (mg/L)	5.67	7.67	4.33	8.67	ns
TDS (mg/L)	144	117	127	156	19
TS (mg/L)	125	113	114	158	15
Fe (mg/L)	1.21	1.40	0.94	0.57	ns
Mn (mg/L)	0.001	0.002	0.000	0.000	.001
Ni (mg/L)	0.004	0.000	0.004	0.001	ns
Al (mg/L)	0.033	0.043	0.047	0.017	ns
Cd (mg/L)	0.000	0.000	0.000	0.000	ns
Cu (mg/L)	0.004	0.002	0.003	0.003	ns
As (mg/L)	0.037	0.039	0.044	0.028	ns
B (mg/L)	0.033	0.033	0.033	0.037	ns
Cr (mg/L)	0.000	0.000	0.004	0.000	ns
Si (mg/L)	2.97	2.93	3.03	3.53	.29
P (mg/L)	0.19	0.24	0.28	0.30	ns
Pb (mg/L)	0.090	0.083	0.117	0.087	ns
Zn (mg/L)	0.005	0.005	0.012	0.002	ns
Mg (mg/L)	6.89	6.10	6.25	7.99	0.55
K (mg/L)	1.41	1.56	1.23	1.01	ns
S (mg/L)	0.35	0.37	0.38	0.44	0.05
Na (mg/L)	18.7	16.5	16.9	21.6	1.9
Ca (mg/L)	15.8	12.8	14.1	21.7	1.4
F^- (mg/L)	0.18	0.19	0.20	0.21	0.02
Cl^- (mg/L)	9.3	8.4	8.6	11.3	ns
Br^- (mg/L)	0.051	0.054	0.058	0.056	ns
NO_2^- (mg/L)	0.102	0.432	0.000	0.000	0.230
NO_3^- (mg/L)	0.34	0.05	0.48	1.29	0.35
PO_4^{3-} (mg/L)	0.000	0.000	0.000	0.140	0.022
SO_4^{2-} (mg/L)	0.36	0.39	0.38	0.40	ns

[1] Zero values may indicate no measured amount at the detection limits for that particular variable.

[2] BOD5 was not determined on the midseason drain samples.

Table 4. Influence of tillage on water quality of rice field floodwater (harvest drain) from water-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1993.[1]

Parameter	Conventional	Mudding in	Mudding in with retention	No-till	LSD (0.05)
BOD5 (mg/L)	5.3	2.4	3.6	2.6	ns
pH	7.9	7.9	8.0	8.0	0.1
EC (dS/m)	0.283	0.277	0.292	0.282	ns
TSS (mg/L)	9.0	10.7	7.3	2.0	3.1
TDS (mg/L)	207	204	202	197	ns
TS (mg/L)	208	212	218	200	ns
Fe (mg/L)	1.2	1.2	1.0	0.1	0.7
Mn (mg/L)	0.000	0.000	0.000	0.000	ns
Ni (mg/L)	0.021	0.023	0.017	0.020	ns
Al (mg/L)	0.013	0.003	0.020	0.027	ns
Cd (mg/L)	0.001	0.000	0.002	0.003	ns
Cu (mg/L)	0.002	0.001	0.002	0.003	ns
As (mg/L)	0.016	0.023	0.012	0.034	ns
B (mg/L)	0.067	0.073	0.080	0.080	ns
Cr (mg/L)	0.003	0.002	0.003	0.009	0.005
Si (mg/L)	11.2	8.2	9.1	7.2	1.5
P (mg/L)	0.070	0.087	0.100	0.117	ns
Pb (mg/L)	0.040	0.027	0.033	0.063	ns
Zn (mg/L)	0.002	0.003	0.001	0.001	ns
Mg (mg/L)	12.2	11.8	12.4	12.0	ns
K (mg/L)	7.8	6.3	6.2	3.1	1.5
S (mg/L)	1.23	0.46	0.39	0.34	ns
Na (mg/L)	30.5	30.6	32.9	30.8	ns
Ca (mg/L)	20.0	17.5	19.6	23.1	3.7
F^- (mg/L)	0.22	0.26	0.25	0.24	0.01
Cl^- (mg/L)	28.7	29.8	28.0	22.2	4.5
Br^- (mg/L)	0.24	0.23	0.25	0.15	0.02
NO_2^- (mg/L)	0.77	0.51	0.38	0.00	ns
NO_3^- (mg/L)	0.000	0.000	0.025	0.023	ns
PO_4^{3-} (mg/L)	0.144	0.081	0.122	0.053	ns
SO_4^{2-} (mg/L)	0.43	0.40	0.37	0.18	0.11

[1] Zero values may indicate no measured amount at the detection limits for that particular variable.

WATER QUALITY, SOIL EROSION, AND FIELD ESTIMATION OF SEDIMENT CONCENTRATION

R.J. Edling and P.K. Bollich

Water Quality and Soil Erosion

Sediment is recognized as a serious pollutant, not only because of the physical movement of the sediment particles but also because chemicals, including pesticides, adhere to the sediment particles. Efforts to reduce pollution from non-point sources often include efforts to reduce the amount of sediment in runoff. The volume of sediment that erodes from a field is a function of runoff volume and the sediment concentration in the runoff. Reducing either or both reduces erosion and non-point source pollution.

In southwestern Louisiana, to level the fields and for weed control, fields are flooded and then worked with implements to mix the soil and water before the fields are planted and drained. This drainage water may be high in sediment concentration, causing erosion from the field and reducing stream water quality. Management practices to improve water quality included a 15-day retention of the ponded water after tillage. The 15-day holding period is used for all conditions, regardless of sediment concentration. Previous research by the principal investigator has shown that low-lying soils in the western part of the drainage area and soils that had been more extensively tilled had higher sediment concentrations and required longer settling times.

A technique, based on Stoke's Equation, was developed to determine the fractional settling of soils of different soil series and laboratory deposition from 10 cm (4 in) of water during a 16-day retention. Based on the calculations, 16-day average deposition of sediment from a Crowley series soil is about one-fourth of that from the average Midland Series soil. On the average, 50% of the 16-day deposition occurred in 3 days, 80% occurred in 7 days and 90% occurred in 10 days. Samples that retained larger amounts of sediment in long-term suspension, material staying in the top 2.54 cm (1 in) in 4 days, and samples that had higher amounts of deposition from 1 to 16 days were from soil series that had lower physiographic positions, as stated in the Parish soil surveys.

Field Estimation of Sediment Concentration

A field method to determine sediment concentration was developed to aid rice farmers in deciding when to drain their flooded and tilled rice fields. The method employs a standardized container, a commonly used flocculating agent, and a prescribed period for settling. The depth of floc in the bottom of the container is measured and correlated to the sediment concentration in ppm by an equation of best fit that was obtained from experimental data. A correlation coefficient of 0.96 was obtained. The method may be adapted or perhaps used directly to determine the sediment concentration of water in other locations.

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 112,000 cwt. of pedigreed stock of 26 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 an/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 roguing 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.

1993 ACTIVITIES

Of the 2850 cwt. of foundation seed rice sold in 1993, the varieties and quantities were as follows: Cypress, 1812 cwt.; Bengal, 730 cwt.; Maybelle, 266 cwt.; and Lacassine, 42 cwt.

The Rice Research Station's foundation seed crop in 1993 consisted of 29.33 acres of Cypress, 23.27 acres of Jodon, 21.26 acres of Bengal, and 7.02 acres of Maybelle.

Breeder seed was grown in 1993 as follows: Cypress, .90 acre; Jodon, .90 acre; Bengal, .85 acre; Maybelle, .50 acre; LaGrue, .20 acre; and Mars, .15 acre.

Headrows of Cypress, Jodon, Bengal, Maybelle, Jackson, Toro-2, Della, and Saturn were grown for replenishment of breeder seed stocks.

RICE PHYSIOLOGY

INTRODUCTION

Plant growth regulators (PGRs) 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 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 one inch below the soil surface can result in poor stands. Small plot seed treatment studies were continued in 1993. In addition, seedling height of semidwarf rice increases slowly resulting in poor seedling vigor. Studies to increase seedling height with PGRs were conducted in 1993.

At present, PGRs have been identified which can modify internode elongation and modification of internode elongation can be beneficial. In some semidwarf varieties panicles are below the upper leaves at maturity. This increases the plant matter entering combines at harvest and decreases harvest efficiency. Plant growth regulators can increase upper stem elongation and raise panicles above the canopy for easier harvest. In contrast, research has shown PGRs can shorten plant stature by reducing 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 limit internode elongation in rice have shown that PGRs can prevent exsertion 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 measure for established red rice in commercial rice production. Studies on enhancing panicle exsertion in white rice and preventing panicle exsertion in red rice were conducted.

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, harvest efficiency, red rice seed elimination, and yield enhancement, PGRs were tested for their effects on rice growth and development.

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Seedling Vigor in Rice - January Planting Date

Location: Rice Research Station, Crowley, LA (Blast Nursery)

Variety: See treatments

Seeding Rate: 40 seed/2 row ft

Planting Date: 22 Jan 93

Row Spacing: 2 inches

Planting Depth: 1 inch

Fertilizer: None

Plot Size: 0.33 ft^2 - 2 inches x 2 ft

Treated Area: 0.33 ft^2 - 2 inches x 2 ft

Treatment(s): **Varieties**

Alan	Jackson	Maybelle
Bengal	Katy	Orion
Cypress	Lacassine	RT7015
Dellmont	Lemont	Tebonnet
Gulfmont	Mars	

Plant Growth Regulator

Gibberellic acid (22 ppm) - RELEASE (0.35 oz/cwt)

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: 0.1 inch, 24 Jan; 0.1 inch, 29 Jan; 0.2 inch, 5 Feb; 0.6 inch, 10 Feb; 0.1 inch, 11 Feb

Herbicide(s): Not applicable

Insecticide(s): Not applicable

Fungicide(s): Dithane (4 fl oz/cwt)

Emergence: 12 Feb

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Each variety was planted in paired rows (one with untreated seed and one with treated seed). All varieties in paired rows were blocked and replicated four times.

Comments: Evaluations of stand were made at 35 days after planting. Mars and Maybelle had significant increases in stand due to gibberellic acid (GA_3) seed treatment. In the remaining 12 varieties, there was no effect from GA_3 seed treatment. For the untreated plots (no GA_3), stands of the 14 varieties averaged 5 plants/row. With GA_3 seed treatment, stands averaged 8 plants/row. The low stands (less than 10% emergence without GA_3) were the result of cold temperatures. During the period from planting to evaluation, daily average temperature averaged 52°F.

Table 1. The effect of plant growth regulator seed treatment on final emergence of current varieties planted in January. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Alan Stand (Plants/ 40 seed) 35 DAP	Bengal Stand (Plants/ 40 seed) 35 DAP	Cypress Stand (Plants/ 40 seed) 35 DAP	Delmont Stand (Plants/ 40 seed) 35 DAP	Gulfmont Stand (Plants/ 40 seed) 35 DAP	Jackson Stand (Plants/ 40 seed) 35 DAP	Katy Stand (Plants/ 40 seed) 35 DAP	Lcssne Stand (Plants/ 40 seed) 35 DAP	Lemont Stand (Plants/ 40 seed) 35 DAP
GA_3 0 ppm			8a	7a	6a	1a	3a	9a	2a	2a	4a
GA_3 22 ppm			5a	6a	8a	7a	11a	7a	4a	6a	6a
LSD (.05)	=		8	4	6	7	8	6	3	6	2
Standard Dev.	=		3.6055	1.9472	2.614	3.285	3.5296	2.614	1.4577	2.4494	.88975
CV	=		55.47	30.54	38.73	84.78	51.34	33.73	46.65	57.64	19.24

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Mars Stand (Plants/ 40 seed) 35 DAP	Maybelle Stand (Plants/ 40 seed) 35 DAP	Orion Stand (Plants/ 40 seed) 35 DAP	RT7015 Stand (Plants/ 40 seed) 35 DAP	Tebonnet Stand (Plants/ 40 seed) 35 DAP
RELEASE 0 ppm			9b	10b	5a	2a	6a
RELEASE 22 ppm			12a	13a	8a	2a	10a
LSD (.05)	=		2	4	5	2	5
Standard Dev.	=		.88975	1.5679	2.031	.88975	2
CV	=		8.79	13.78	31.86	41.87	25.81

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Seedling Vigor in Rice - February Planting Date

Location: Rice Research Station, Crowley, LA (Blast Nursery)

Variety: See treatments

Seeding Rate: 40 seed/2 row ft

Planting Date: 18 Feb 93

Row Spacing: 2 inches

Planting Depth: 1 inch

Fertilizer: None

Plot Size: 0.33 ft^2 - 2 inches x 2 ft

Treated Area: 0.33 ft^2 - 2 inches x 2 ft

Treatment(s): Varieties

Alan	Jackson	Maybelle
Bengal	Katy	Orion
Cypress	Lacassine	RT7015
Dellmont	Lemont	Tebonnet
Gulfmont	Mars	

Plant Growth Regulator(s)

Gibberellic acid (22 ppm) - RELEASE (0.35 oz/cwt)

Gibberellic acid (2 g/A) - RyzUp (2 fl oz/A), Tween 20 (0.25%) was added as an adjuvant

Timing

Seed treatment
2- to 3-leaf, 2 Apr

Sprayer: Not applicable

Pertinent Rainfall: 0.2 inch, 21 Feb; 1.9 inches, 25 Feb; 1.3 inches, 1 Mar; 1.1 inches, 2 Mar

Herbicide(s): Not applicable

Insecticide(s): Not applicable

Fungicide(s): Dithane (4 fl oz/cwt)

Emergence: 12 Mar

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Each variety was planted in paired rows (one with untreated seed and one with treated seed). All varieties in paired rows were blocked and replicated four times.

Comments: Evaluations of stand were made at 24 and 36 days after planting (DAP). In the early emergence evaluation at 24 DAP, Dellmont, Cypress, Gulfmont, and Lemont had significant increases in stand due to GA_3 seed treatment (Table 1). In the remaining 10 varieties, there was no effect from GA_3 seed treatment. By 36 DAP, there was no significant effect of GA_3 seed treatment on stand (Table 2). Regardless of seed treatment, stands of the 14 varieties averaged 24 plants per row. The higher stands (averaging 60% emergence without GA_3) compared with the January planting date results were due to the warmer weather. During the period from planting to first evaluation (24 DAP), daily average temperature averaged 54°F. By 36 DAP, daily average temperature for the period from planting averaged 57°F.

After evaluating emergence, half the length of each row was oversprayed with gibberellic acid (GA_3). Evaluations of the effect on seedling height were made at 7 and 12 days after treatment (DAT). At 7 DAT, four varieties had significant increases in height due to GA_3 (Table 3). The varieties were Lemont, Mars, Orion, and RT7015. Height increases ranged between 10 and 20 mm. At 12 DAT, only Mars and RT7015 continued to exhibit significant increases in height (Table 4). The weak response to GA_3 was due to cool weather following application. During the period from 2 days prior to application through 7 and 12 days following application, daily average temperatures averaged 59°F and 61°F, respectively.

Table 1. The effect of plant growth regulator seed treatment on initial emergence of current varieties planted in February. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Alan Stand (Plants/ 40 seed) 24 DAP	Bengal Stand (Plants/ 40 seed) 24 DAP	Cypress Stand (Plants/ 40 seed) 24 DAP	Delmont Stand (Plants/ 40 seed) 24 DAP	Gulfmont Stand (Plants/ 40 seed) 24 DAP	Jackson Stand (Plants/ 40 seed) 24 DAP	Katyn Stand (Plants/ 40 seed) 24 DAP	Lcssne Stand (Plants/ 40 seed) 24 DAP	Lemont Stand (Plants/ 40 seed) 24 DAP
GA_3 0 ppm			15a	15a	6b	3b	8b	18a	14a	8a	6b
GA_3 22 ppm			16a	18a	16a	19a	17a	20a	16a	14a	15a
LSD (.05)	=		12	5	6	8	4	14	2	11	7
Standard Dev.	=		5.549	2.1984	2.5413	3.5765	1.6832	6.0415	1	4.739	3.1819
CV	=		36.09	13.53	22.84	32.15	13.47	32.22	6.56	43.58	31.43

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Mars Stand (Plants/ 40 seed) 24 DAP	Maybelle Stand (Plants/ 40 seed) 24 DAP	Orion Stand (Plants/ 40 seed) 24 DAP	RT7015 Stand (Plants/ 40 seed) 24 DAP	Tebonnet Stand (Plants/ 40 seed) 24 DAP
GA_3 0 ppm			16a	18a	11a	9a	19a
GA_3 22 ppm			22a	19a	11a	9a	22a
LSD (.05)	=		5	6	6	3	13
Standard Dev.	=		2.4065	2.8504	2.5166	1.1547	5.6862
CV	=		12.75	15.30	23.41	13.58	27.40

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The effect of plant growth regulator seed treatment on final emergence of current varieties planted in February. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Alan Stand (Plants/ 40 seed) 36 DAP	Bengal Stand (Plants/ 40 seed) 36 DAP	Cypress Stand (Plants/ 40 seed) 36 DAP	Delmont Stand (Plants/ 40 seed) 36 DAP	Gulfmont Stand (Plants/ 40 seed) 36 DAP	Jackson Stand (Plants/ 40 seed) 36 DAP	Katy Stand (Plants/ 40 seed) 36 DAP	Lcssne Stand (Plants/ 40 seed) 36 DAP	Lemont Stand (Plants/ 40 seed) 36 DAP
GA_3 0 ppm			25a	26a	18a	27a	27a	26a	29a	22a	23a
GA_3 22 ppm			19a	25a	25a	26a	24a	26a	27a	23a	21b
LSD (.05)	=		9	6	11	4	8	10	3	2	1
Standard Dev.	=		4.1783	2.5166	4.8131	1.7677	3.7638	4.2622	1.5275	.88975	.57735
CV	=		19.10	9.87	22.39	6.77	14.76	16.39	5.50	3.93	2.59

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Mars Stand (Plants/ 40 seed) 36 DAP	Maybelle Stand (Plants/ 40 seed) 36 DAP	Orion Stand (Plants/ 40 seed) 36 DAP	RT7015 Stand (Plants/ 40 seed) 36 DAP	Tebonnet Stand (Plants/ 40 seed) 36 DAP
GA_3 0 ppm			25a	28a	21a	16a	27a
GA_3 22 ppm			28a	27a	24a	13a	29a
LSD (.05)	=		7	10	11	6	12
Standard Dev.	=		3.1819	4.3732	5.0124	2.6692	5.1437
CV	=		12.18	15.98	22.66	18.90	18.45

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 3. The initial effect of plant growth regulator seed and foliar treatments on seedling growth of current rice varieties planted in February. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Alen Seedling Height (mm) 7 DAT	Bengal Seedling Height (mm) 7 DAT	Cypress Seedling Height (mm) 7 DAT	Delmont Seedling Height (mm) 7 DAT	Gulfmont Seedling Height (mm) 7 DAT	Jackson Seedling Height (mm) 7 DAT	Katy Seedling Height (mm) 7 DAT	Lacassine Seedling Height (mm) 7 DAT	Lemont Seedling Height (mm) 7 DAT
				TABLE OF R MEANS								
Replicate 1				132	133	133	103	103	146	110	107	106
Replicate 2				120	131	104	113	106	125	111	101	112
Replicate 3				110	140	125	109	113	153	123	111	110
Replicate 4				120	151	114	128	119	132	128	121	110
				TABLE OF A MEANS								
GA_3 0 ppm				121	139	114	110	109	136	119	104	105
GA_3 22ppm				120	139	124	117	111	142	117	116	114
				TABLE OF B MEANS								
GA_3	l	0		116	133	116	110	103	136	113	104	101a
GA_3	l	2		125	144	122	116	117	142	123	116	118b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 3. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Mars Seedling Height (mm) 7 DAT	Maybelle Seedling Height (mm) 7 DAT	Orion Seedling Height (mm) 7 DAT	RT7015 Seedling Height (mm) 7 DAT	Tebonnet Seedling Height (mm) 7 DAT
TABLE OF R MEANS								
Replicate 1				111	130	116	118	124
Replicate 2				129	130	135	97	111
Replicate 3				134	137	136	119	127
Replicate 4				143	121	96	113	138
TABLE OF A MEANS								
GA_3 0 ppm				129	130	122	109	125
GA_3 22 ppm				130	129	119	114	125
TABLE OF B MEANS								
GA_3	l	0		119a	123	111a	102a	118
GA_3	l	2		140b	136	130b	122b	132

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 4. The final effect of plant growth regulator seed and foliar treatments on seedling growth of current varieties planted in February. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Alan Seedling Height (mm) 12 DAT	Bengal Seedling Height (mm) 12 DAT	Cypress Seedling Height (mm) 12 DAT	Delmont Seedling Height (mm) 12 DAT	Gulfmont Seedling Height (mm) 12 DAT	Jackson Seedling Height (mm) 12 DAT	Katy Seedling Height (mm) 12 DAT	Lacassine Seedling Height (mm) 12 DAT	Lemont Seedling Height (mm) 12 DAT
				TABLE OF R MEANS								
Replicate 1				127	130	112	119	109	126	114	94	104
Replicate 2				119	136	128	110	102	142	118	113	111
Replicate 3				127	151	128	137	127	163	142	123	142
Replicate 4				119	148	146	143	140	163	134	119	143
				TABLE OF A MEANS								
GA_3	0 ppm			125	131	127	122	112	142	118	111	120
GA_3	22 ppm			120	152	130	132	127	155	136	113	130
				TABLE OF B MEANS								
GA_3		l	0	124	133	122	126	113	149	120	109	124
GA_3		l	2	121	150	135	128	126	147	134	115	127

Continued.

Table 4. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Mars Seedling Height (mm) 12 DAT	Maybelle Seedling Height (mm) 12 DAT	Orion Seedling Height (mm) 12 DAT	RT7015 Seedling Height (mm) 12 DAT	Tebonnet Seedling Height (mm) 12 DAT
				TABLE OF R MEANS				
Replicate 1				142	131	119	102	138
Replicate 2				133	134	110	103	130
Replicate 3				147	155	108	129	169
Replicate 4				158	146	146	147	144
				TABLE OF A MEANS				
GA_3 0 ppm				143	143	126	118	145
GA_3 22 ppm				146	141	116	122	145
				TABLE OF B MEANS				
GA_3	l	0		141a	142	132	113	144
GA_3	l	2		149b	141	110	127	146

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Seedling Vigor in Rice - March Planting Date

Location: Rice Research Station, Crowley, LA (Blast Nursery)

Variety: See treatments

Seeding Rate: 40 seed/2 row ft

Planting Date: 25 Mar 93

Row Spacing: 2 inches

Planting Depth: 1 inch

Fertilizer: None

Plot Size: 0.33 ft^2 - 2 inches x 2 ft

Treated Area: 0.33 ft^2 - 2 inches x 2 ft

Treatment(s): **Varieties**

Alan	Jackson	Maybelle
Bengal	Katy	Orion
Cypress	Lacassine	RT7015
Dellmont	Lemont	Tebonnet
Gulfmont	Mars	

Plant Growth Regulator(s)

Gibberellic acid (22 ppm) - RELEASE (0.35 oz/cwt)

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A), tank mixed with 1 gal Stam M4/A

Timing

Seed treatment
3- to 4-leaf, 6 May

Sprayer: Not applicable

Pertinent Rainfall: 0.2 inch, 25 Mar; 2.3 inches, 3 Apr; 1.1 inches, 4 Apr; 4 inches, 7 Apr; 1.6 inches, 8 Apr

Herbicide(s): Stam M4 (1 gal/A), 6 May

Insecticide(s): Not applicable

Fungicide(s): Dithane (4 fl oz/cwt)

Emergence: 31 Mar

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Each variety was planted in paired rows (one with untreated seed and one with treated seed). All varieties in paired rows were blocked and replicated four times.

Comments: Evaluations of stand were made at 8 and 15 days after planting (DAP). In the early emergence evaluation at 8 DAP, Cypress, Dellmont, Lacassine, Lemont, Maybelle, RT7015, and Tebonnet had significant increases in stand due to GA_3 seed treatment (Table 1). In the remaining seven varieties, there was no effect from GA_3 seed treatment. By 15 DAP, Dellmont, Lacassine, and Lemont were the only varieties exhibiting a significant response to GA_3 (Table 2). Regardless of seed treatment, stands of the 14 varieties averaged 30 plants per row. The higher stands (averaging 75% emergence without GA_3 compared with the February planting date results were due to the warmer weather. During the period from planting to first evaluation (7 DAP), daily average temperature averaged 65°F. By 15 DAP, daily average temperature for the period from planting averaged 61°F.

After evaluating emergence, half the length of each row was oversprayed with GA_3 Evaluations of the effect on seedling height were made at 5 and 11 days after treatment (DAT). At 5 DAT, all 14 varieties had significant increases in height due to GA_3 (Table 3). Height increases ranged between 20 and 70 mm. At 11 DAT, all 14 varieties continued to exhibit significant increases in height (Table 4). The strong response to GA_3 was due to warm weather following application. During the period from 2 days prior to application through 5 and 11 days following application, daily average temperatures averaged 73°F and 72°F, respectively.

Table 1. The effect of plant growth regulator seed treatment on initial emergence of current varieties planted in March. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Alan Stand (Plants/ 40 seed) 8 DAP	Bengal Stand (Plants/ 40 seed) 8 DAP	Cypress Stand (Plants/ 40 seed) 8 DAP	Delmont Stand (Plants/ 40 seed) 8 DAP	Gulfmont Stand (Plants/ 40 seed) 8 DAP	Jackson Stand (Plants/ 40 seed) 8 DAP	Katy Stand (Plants/ 40 seed) 8 DAP	Lcssne Stand (Plants/ 40 seed) 8 DAP	Lemont Stand (Plants/ 40 seed) 8 DAP
GA_3 0 ppm			19a	6a	10b	2b	0a	16a	8a	3b	0b
GA_3 22 ppm			20a	12a	22a	18a	14a	20a	21a	17a	14a
LSD (.05)	=		2	15	12	12	16	5	15	8	11
Standard Dev.	=		.88975	6.516	5.1437	5.3851	7.1268	2.0412	6.4678	3.385	4.9497
CV	=		4.53	73.42	32.40	55.23	103.66	11.34	45.39	35.17	70.71

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Mars Stand (Plants/ 40 seed) 8 DAP	Maybelle Stand (Plants/ 40 seed) 8 DAP	Orion Stand (Plants/ 40 seed) 8 DAP	RT7015 Stand (Plants/ 40 seed) 8 DAP	Tebonnet Stand (Plants/ 40 seed) 8 DAP
GA_3 0 ppm			10a	6b	6a	3b	10b
GA_3 22 ppm			23a	24a	15a	12a	18a
LSD (.05)	=		13	6	10	6	3
Standard Dev.	=		5.8594	2.6692	4.3732	2.7913	1.3385
CV	=		34.98	17.94	42.15	37.85	9.65

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The effect of plant growth regulator seed treatment on final emergence of current varieties planted in March. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Alan Stand (Plants/ 40 seed) 15 DAP	Bengal Stand (Plants/ 40 seed) 15 DAP	Cypress Stand (Plants/ 40 seed) 15 DAP	Delmont Stand (Plants/ 40 seed) 15 DAP	Gulfmont Stand (Plants/ 40 seed) 15 DAP	Jackson Stand (Plants/ 40 seed) 15 DAP	Katy Stand (Plants/ 40 seed) 15 DAP	Lcssne Stand (Plants/ 40 seed) 15 DAP	Lemont Stand (Plants/ 40 seed) 15 DAP
GA_3 0 ppm			30a	31a	31a	25b	27a	34a	31a	24b	28b
GA_3 22 ppm			29a	29a	34a	33a	30a	32a	32a	30a	33a
LSD (.05)	=		3	11	4	7	4	5	4	3	2
Standard Dev.	=		1.2247	4.9833	1.8596	2.965	1.9148	2.2638	1.6832	1.2909	.88975
CV	=		4.15	16.75	5.74	10.27	6.78	6.89	5.39	4.78	2.95

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05)

Table 2. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Mars Stand (Plants/ 40 seed) 15 DAP	Maybelle Stand (Plants/ 40 seed) 15 DAP	Orion Stand (Plants/ 40 seed) 15 DAP	RT7015 Stand (Plants/ 40 seed) 15 DAP	Tebonnet Stand (Plants/ 40 seed) 15 DAP
GA_3 0 ppm			33a	33a	31a	18a	32a
GA_3 22 ppm			34a	34a	32a	22a	30a
LSD (.05)	=		6	3	7	5	4
Standard Dev.	=		2.7309	1.5275	3.285	2.4065	1.732
CV	=		8.12	4.63	10.47	12.11	5.59

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 3. The initial effect of plant growth regulator seed and foliar treatments on seedling growth of current varieties planted in March. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Alan Pl. Ht. Seedling Height (mm) 5 DAT	Bengal Pl. Ht. Seedling Height (mm) 5 DAT	Cypress Pl. Ht. Seedling Height (mm) 5 DAT	Delmont Pl. Ht. Seedling Height (mm) 5 DAT	Gulfmont Pl. Ht. Seedling Height (mm) 5 DAT	Jackson Pl. Ht. Seedling Height (mm) 5 DAT	Katy Pl. Ht. Seedling Height (mm) 5 DAT	Lacassin Pl. Ht. Seedling Height (mm) 5 DAT	Lemont Pl. Ht. Seedling Height (mm) 5 DAT
TABLE OF R MEANS												
Replicate 1				151	171	141	132	118	166	153	139	118
Replicate 2				147	151	159	108	117	152	150	114	122
Replicate 3				163	157	158	143	140	153	146	125	139
Replicate 4				158	188	166	134	122	171	155	145	130
TABLE OF A MEANS												
GA_3 0 ppm				161	159	164	136	126	161	150	127	128
GA_3 22 ppm				149	175	148	123	123	160	152	134	126
TABLE OF B MEANS												
GA_3	1	0		141a	151a	137a	116a	100a	146a	128a	108a	106a
GA_3	1	1		169b	183b	176b	143b	149b	174b	174b	153b	149b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 3. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Mars Seedling Height (mm) 5 DAT	Maybelle Seedling Height (mm) 5 DAT	Orion Seedling Height (mm) 5 DAT	RT7015 Seedling Height (mm) 5 DAT	Tebonnet Seedling Height (mm) 5 DAT
				TABLE OF R MEANS				
Replicate 1				178	148	157	142	151
Replicate 2				168	176	158	132	151
Replicate 3				187	167	162	148	176
Replicate 4				158	146	150	167	159
				TABLE OF A MEANS				
GA_3	0 ppm			179	157	159	148	162
GA_3	22 ppm			166	161	154	146	157
				TABLE OF B MEANS				
GA_3	1	0		156a	124a	136a	126a	131a
GA_3	1	1		189b	194b	177b	168b	188b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 4. The final effect of plant growth regulator seed and foliar treatments on seedling growth of current varieties planted in March. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Alan Seedling Height (mm) 11 DAT	Bengal Seedling Height (mm) 11 DAT	Cypress Seedling Height (mm) 11 DAT	Delmont Seedling Height (mm) 11 DAT	Gulfmont Seedling Height (mm) 11 DAT	Jackson Seedling Height (mm) 11 DAT	Katy Seedling Height (mm) 11 DAT	Lacassine Seedling Height (mm) 11 DAT	Lemont Seedling Height (mm) 11 DAT
TABLE OF R MEANS												
Replicate 1				213	191	170	188	154	193	213	181	141
Replicate 2				206	220	237	196	160	213	187	152	188
Replicate 3				246	211	203	162	181	231	211	189	205
Replicate 4				252	251	224	192	178	236	213	245	217
TABLE OF A MEANS												
GA_3 0 ppm				227	231	211	181	174	216	205	194	198
GA_3 22 ppm				231	205	206	188	163	220	207	189	177
TABLE OF B MEANS												
GA_3	1	0		208a	188a	180a	162a	133a	194a	177a	164a	151
GA_3	1	1		250b	248b	237b	206b	204b	242b	236b	219b	224

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 4. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Mars Seedling Height (mm) 11 DAT	Maybelle Seedling Height (mm) 11 DAT	Orion Seedling Height (mm) 11 DAT	RT7015 Seedling Height (mm) 11 DAT	Tebonnet Seedling Height (mm) 11 DAT
				TABLE OF R MEANS				
Replicate 1				206	214	208	205	189
Replicate 2				193	225	214	187	183
Replicate 3				243	212	190	200	241
Replicate 4				255	211	247	251	245
				TABLE OF A MEANS				
GA_3 0 ppm				221	215	217	209	219
GA_3 22 ppm				227	216	212	212	210
				TABLE OF B MEANS				
GA_3	1	0		187a	194a	193a	176a	176a
GA_3	1	1		261b	238b	236b	245b	253b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Seedling Vigor in Rice - April Planting Date

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: See treatments

Seeding Rate: 100 lb/A

Planting Date: 28 Apr 93

Row Spacing: 7 inches

Planting Depth: 3 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 31 May

Plot Size: 11.7 ft^2 - .58 (1 row) x 20 ft

Treated Area: 11.7 ft^2 - .58 (1 row) x 20 ft

Treatment(s): **Varieties/Experimental Lines**

AB647	Herbicide	Mars	Skybonnet
Adair	resistant	Maybelle	Texmont
Alan	line	Millie	Jodon
Bengal	Jackson	Newbonnet	LA2085
Cypress	Jasmine	Orion	LA2192
Dellmont	Katy	Rexmont	TX3069
Gulfmont	LaGrue	Rico	9101133
	Lemont	Rosemont	Kaybonnet
	L-202	RT7015	

Plant Growth Regulator(s)

Seed Treatment

Gibberellic acid (22 and 44 ppm) - GibGro (0.17 and 0.35 oz/cwt)

Gibberellic acid (22 and 44 ppm) - RELEASE (0.35 and 0.7 oz/cwt)

Foliar Treatment (tank mixed with 3 qt Stam M4/A)

Gibberellic acid (1.5 g/A) - GibGro 4LS (1.5 fl oz/A)

Gibberellic acid (1.5 g/A) - RyzUp (1.5 fl oz/A)

Timing

Seed treatment, 10 Mar; 3- to 4-leaf, 27 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May; no measurable rainfall within 24 hours after foliar application

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May
Londax (1.5 oz/A) by airplane, 8 June
Ordram 15G (25 lb/A) by airplane, 8 June
Bolero 10G (30 lb/A) by airplane, 16 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 and 16 June

Fungicide(s): Dithane (4 fl oz/cwt) seed treatment
Tilt (10 oz/A) by airplane, 29 June
Benlate 50 WP (2 lb/A) by airplane, 20 July

Emergence: 9 May

Permanent Flood: 1 June

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications. A given plot contained a different variety or experimental line in each row. There were five such plots. Four contained seven rows and one contained three rows in accommodating 31 varieties and experimental lines. The position of a variety or experimental line within a given plot was constant. Each given plot was planted in quintuplicate in each replicate. Of each quintuplicate, one plot had untreated seed, two plots had seed treated with different rates of GibGro, and two plots had seed treated with different rates of RELEASE according to the randomization of plots.

Comments: Gibberellic acid seed treatment had a significant effect on stand for 14 of 31 varieties and experimental lines evaluated at 26 days after planting (DAP) (Table 1). Semidwarf varieties that were responsive were Dellmont, Gulfmont, Lemont, Rexmont, and Texmont. Other responsive varieties were AB647, Alan, Kaybonnet, LaGrue, and Orion. Experimental lines are selections that are being evaluated for release as varieties in the future. Responsive experimental lines were Experimental Herbicide Resistant Line, LA2031, LA2085, and LA2192. Heavy rainfall shortly after planting and soil crusting resulted in poor stands in general. Without GA_3 seed treatment, stand averaged 6 plants/ft^2 over all varieties and experimental lines. The range was 1 to 13 plants/ft^2. With GA_3 seed treatment, stand averaged 8 plants/ft^2 and ranged between 2 and 15 plants/ft^2. There was no significant difference in response between rate and formulation of GA_3

Overspraying each plot with GA_3 at the 3- to 4-leaf stage resulted in a significant increase in seedling height of all varieties and experimental lines (Table 2). Most varieties and experimental lines had a 9- to 11-cm increase at 7 days after treatment. Jasmine and LA2085 were slightly more responsive with a 12-cm increase, and Newbonnet, Orion, Rico, Rosemont, and 9101133 were slightly less responsive with a 7- to 8-cm increase. There was no significant difference in response to GA_3 due to formulation.

Table 1. The effect of plant growth regulator seed treatment on final emergence of current varieties planted in April. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	AB647 Stand (Plants/ sq ft)	Adair Stand (Plants/ sq ft)	Alan Stand (Plants/ sq ft)	Bengal Stand (Plants/ sq ft)	Cypress Stand (Plants/ sq ft)	Delmont Stand (Plants/ sq ft)	Gulfmont Stand (Plants/ sq ft)	Herb Res Stand (Plants/ sq ft)
Control			4c	6a	4b	6a	12a	4b	2b	2b
RELEASE 22 ppm			5bc	8a	9a	8a	14a	8a	7a	4ab
RELEASE 44 ppm			6abc	6a	6ab	8a	13a	9a	6a	3ab
GibGro 22 ppm			6ab	8a	5ab	7a	15a	10a	6a	5a
GibGro 44 ppm			8a	9a	5b	6a	15a	8a	7a	4ab
LSD (.05) =			2	4	3	3	5	3	3	2
Standard Dev.=			1.2909	2.4983	2.0756	1.9958	2.924	2.135	1.6733	1.0684
CV =			23.26	34.70	36.41	29.14	21.34	27.55	29.10	32.38

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Jackson Stand (Plants/ 26 DAP	Jasmine Stand (Plants/ 26 DAP	Katy Stand (Plants/ 26 DAP	Lagrue Stand (Plants/ 26 DAP	Lemont Stand (Plants/ 26 DAP	L202 Stand (Plants/ 26 DAP	Mars Stand (Plants/ 26 DAP	Maybelle Stand (Plants/ 26 DAP
Control			9a	9ab	7a	8b	3c	6a	6a	11a
RELEASE 22 ppm			9a	7b	8a	13a	13a	8a	7a	10a
RELEASE 44 ppm			9a	11a	7a	10ab	11ab	7a	8a	11a
GibGro 22 ppm			8a	9ab	8a	11ab	10b	5a	7a	8a
GibGro 44 ppm			10a	8b	7a	11ab	10b	9a	6a	10a
LSD (.05) =			5	2	3	4	2	4	3	4
Standard Dev.=			3.0454	1.4317	2.2173	2.734	1.3964	2.7853	2.0432	2.8533
CV =			33.84	16.75	29.96	26.04	15.02	40.08	30.27	28.82

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Millie Stand (Plants/ shoot sq ft)	Nwbonnet Stand (Plants/ shoot sq ft)	Orion Stand (Plants/ shoot sq ft)	Rexmont Stand (Plants/ shoot sq ft)	Rico Stand (Plants/ shoot sq ft)	Rosemont Stand (Plants/ shoot sq ft)	RT7015 Stand (Plants/ shoot sq ft)	Skybonnet Stand (Plants/ shoot sq ft)
Control			8a	13a	3b	1b	7a	4a	7a	10a
RELEASE 22 ppm			10a	13a	7a	2ab	8a	5a	11a	13a
RELEASE 44 ppm			9a	11a	7a	3a	6a	5a	10a	10a
GibGro 22 ppm			10a	13a	7a	3a	7a	3a	9a	11a
GibGro 44 ppm			8a	12a	7a	3a	6a	6a	13a	10a
LSD (.05) =			4	5	3	1	3	3	6	5
Standard Dev.=			2.5364	3.0889	1.9706	.85634	2.1193	1.9235	4.029	3.0207
CV =			28.34	24.81	33.12	38.92	30.94	43.23	41.75	28.50

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Texmont Stand (Plants/ sq ft)	LA2031 Stand (Plants/ sq ft)	LA2085 Stand (Plants/ sq ft)	LA2192 Stand (Plants/ sq ft)	TX3069 Stand (Plants/ sq ft)	9101133 Stand (Plants/ sq ft)	9101142 Stand (Plants/ sq ft)
Control			4c	3b	2b	2b	4a	7a	8b
RELEASE 22 ppm			6bc	7a	6a	4ab	4a	9a	12a
RELEASE 44 ppm			9a	7a	6a	6a	4a	11a	7b
GibGro 22 ppm			6bc	7a	6a	6a	4a	8a	4b
GibGro 44 ppm			9ab	6ab	6a	6a	7a	8a	6b
LSD (.05) =			3	3	3	3	3	4	4
Standard Dev.=			1.7368	1.6758	1.7151	1.7368	2.0676	2.3822	2.8621
CV =			25.54	28.40	33.30	36.95	43.53	27.70	38.42

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The effect of plant growth regulator seed and foliar treatments on seedling growth of current rice varieties and experimental lines planted in April. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	AB647 Seedling Height (cm) 7 DAT	Adair Seedling Height (cm) 7 DAT	Alan Seedling Height (cm) 7 DAT	Bengal Seedling Height (cm) 7 DAT	Cypress Seedling Height (cm) 7 DAT	Delmont Seedling Height (cm) 7 DAT	Gulfmont Seedling Height (cm) 7 DAT	Herb Res Seedling Height (cm) 7 DAT	Jackson Seedling Height (cm) 7 DAT
TABLE OF R MEANS												
Replicate 1				30	34	35	33	32	32	29	26	34
Replicate 2				31	33	35	32	33	32	28	27	32
Replicate 3				30	35	35	32	34	30	29	29	36
Replicate 4				31	35	35	35	35	33	31	29	35
TABLE OF A MEANS												
Seed-Check				30	32	35	33	33	29	27	27	34
GibGro 22ppm				30	35	34	33	35	34	30	28	33
GibGro 44ppm				31	34	34	33	34	32	30	28	35
RELEASE 22ppm				29	36	36	34	32	31	31	28	33
RELEASE 44ppm				31	33	35	32	34	33	29	28	36
TABLE OF B MEANS												
Foliar-Check				23a	28a	28a	26a	27a	25a	23a	22a	28a
GibGro 4LS	1	1.5		34b	37b	39b	35b	36b	35b	32b	30b	38b
RyzUp	1	1.5		34b	38b	38b	37b	37b	34b	33b	31b	37b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Jasmine Seedling Height (cm) 7 DAT	Katy Seedling Height (cm) 7 DAT	Lagrue Seedling Height (cm) 7 DAT	Lemont Seedling Height (cm) 7 DAT	L202 Seedling Height (cm) 7 DAT	Mars Seedling Height (cm) 7 DAT	Maybelle Seedling Height (cm) 7 DAT	Millie Seedling Height (cm) 7 DAT	Newbonnet Seedling Height (cm) 7 DAT
TABLE OF R MEANS												
Replicate 1				32	31	34	30	33	31	34	34	34
Replicate 2				32	31	32	32	33	33	35	33	34
Replicate 3				32	30	33	32	33	32	32	35	32
Replicate 4				32	32	34	32	35	35	35	35	34
TABLE OF A MEANS												
Seed-Check				33	30	35	26	33	33	34	33	33
GibGro 22ppm				31	30	33	33	33	32	34	34	33
GibGro 44ppm				31	33	34	32	34	32	36	35	35
RELEASE 22ppm				33	32	33	33	33	35	35	34	35
RELEASE 44ppm				31	31	33	33	34	32	32	36	32
TABLE OF B MEANS												
Foliar-Check				24a	26a	27a	24a	26a	27a	29a	28a	28a
GibGro 4LS	1	1.5		36b	34b	38b	35b	37b	35b	36b	38b	36b
RyzUp	1	1.5		36b	35b	36b	36b	37b	36b	38b	37b	36b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Orion Seedling Height (cm) 7 DAT	Rexmont Seedling Height (cm) 7 DAT	Rico Seedling Height (cm) 7 DAT	Rosemont Seedling Height (cm) 7 DAT	RT7015 Seedling Height (cm) 7 DAT
TABLE OF R MEANS								
Replicate 1				30	27	30	28	34
Replicate 2				31	28	31	28	33
Replicate 3				31	29	30	25	30
Replicate 4				32	27	31	30	34
TABLE OF A MEANS								
Seed-Check				31	31	32	27	33
GibGro 22ppm				30	28	30	26	33
GibGro 44ppm				33	29	31	29	34
RELEASE 22ppm				30	28	30	29	34
RELEASE 44ppm				30	24	30	30	31
TABLE OF B MEANS								
Foliar-Check				26a	21a	25a	23a	26a
GibGro 4LS	l	1.5		33b	32b	33b	31b	35b
RyzUp	l	1.5		33b	30b	33b	31b	37b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Skybonnet Seedling Height (cm) 7 DAT	Texmont Seedling Height (cm) 7 DAT	LA2031 Seedling Height (cm) 7 DAT	LA2085 Seedling Height (cm) 7 DAT	LA2192 Seedling Height (cm) 7 DAT	TX3069 Seedling Height (cm) 7 DAT	9101133 Seedling Height (cm) 7 DAT	Kaybonnet Seedling Height (cm) 7 DAT
TABLE OF R MEANS											
Replicate 1				35	31	33	29	28	30	32	32
Replicate 2				36	31	34	30	26	30	34	31
Replicate 3				36	31	34	28	25	30	31	30
Replicate 4				37	32	35	32	28	33	33	32
TABLE OF A MEANS											
Seed-Check				36	29	34	28	26	31	31	32
GibGro 22ppm				37	31	35	31	30	29	34	29
GibGro 44ppm				38	31	35	31	25	34	34	31
RELEASE 22ppm				35	33	34	29	27	31	33	33
RELEASE 44ppm				35	33	33	31	26	30	31	32
TABLE OF B MEANS											
Foliar-Check				29a	25a	28a	22a	21a	25a	27a	26a
GibGro 4LS	1	1.5		40b	35b	38b	34b	29b	33b	35b	35b
RyzUp	1	1.5		39b	35b	37b	34b	30b	34b	35b	34b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Seed Treatment, Seeding Rate, and Seedling Vigor of Three Semidwarf Rice Varieties

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: See treatments

Seeding Rate: See treatments

Planting Date: 28 Apr 93

Row Spacing: 7 inches

Planting Depth: 3 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 31 May

Plot Size: 210 ft^2 - 7 (12 row) x 30 ft

Treated Area: 210 ft^2 - 7 (12 row) x 30 ft

Treatment(s): **Varieties**

Bengal, Cypress, and Lacassine

Seeding Rate

50 and 100 lb/A

Plant Growth Regulator

Gibberellic acid (22 ppm) - RELEASE (0.35 oz/cwt)

Timing

Seed treatment, 10 Mar

Sprayer: Not applicable

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May
Londax (1.5 oz/A) by airplane, 8 June
Ordram 15G (25 lb/A) by airplane, 8 June
Bolero 10G (30 lb/A) by airplane, 16 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 and 16 June

Fungicide(s): Dithane (4 fl oz/cwt) seed treatment
Tilt (10 fl oz/A) by airplane, 29 June
Benlate 50 WP (2 lb/A) by airplane, 20 July

Emergence: 9 May

Permanent Flood: 1 June

Harvest Date: 25 Aug

Harvested Area: 46.6 ft^2 - 2.33 (4 rows) x 20 ft

Exp. Design: Randomized complete block design and four replications. Factorial arrangement of treatments (3 varieties x 2 seeding rates x 2 gibberellic acid rates).

Comments: Varieties. Varietal differences in seedling vigor and crop production were significant (Tables 1 and 2). Cypress had significantly better seedling vigor than either Bengal or Lacassine and was taller than both other varieties at maturity. Bengal had better seedling vigor than Lacassine. Bengal and Cypress, although not significantly different in yield and panicle density, had significantly higher yield and panicle density than Lacassine.

Seeding rate. An increase in seeding rate from 50 to 100 lb/A improved seedling vigor and crop production. The seeding rate increase doubled stand and improved grain yield by 525 lb/A. The increase in grain yield was due to a 25% increase in panicle production.

Gibberellic acid seed treatment. The GA_3 seed treatment had similar effects as those noted with increased seeding rate. GA_3 seed treatment increased stand by 40%, which resulted in a 15% increase in panicle density at maturity. The increase in panicle density directly related to a 600 lb/A yield increase on average across all three varieties.

Table 1. The main effects of plant growth regulator seed treatment and seeding rate on emergence and productivity of three rice varieties. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Stand (plants/ sq ft) 26 DAP	Plant Height (cm) 121 DAP	Grain moisture (%) 121 DAP	Yield (lb/A) 121 DAP	Panicle Density (pan./ sq ft) 134 DAP
TABLE OF R MEANS							
Replicate 1			7	86	18.0	4936	16
Replicate 2			6	88	18.0	4636	18
Replicate 3			4	88	18.3	4160	14
Replicate 4			7	87	18.3	4614	20
TABLE OF A MEANS							
Bengal			6b	85b	18.2a	4811a	18a
Cypress			8a	90a	18.7a	5157a	20a
Lacassine			4c	87b	17.5b	3792b	13b
TABLE OF B MEANS							
Seeding Rate	50		4	87	18.3	4275b	15b
Seeding Rate	100		8	87	18.0	4898a	19a
TABLE OF C MEANS							
GA_3	0ppm		5	87	18.3	4287b	16b
GA_3	22ppm	seed	7	87	18.0	4887a	18a

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator seed treatment and seeding rate on emergence and productivity of three rice varieties. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Stand (plants/ sq ft) 26 DAP	Plant Height (cm) 121 DAP	Grain moisture (%) 121 DAP	Yield (lb/A) 121 DAP	Panicle Density (pan./ sq ft) 134 DAP
Bengal Seeding Rate GA_3 0 ppm	50		5de	84c	18.3a-d	4444abc	15b-e
Bengal Seeding Rate GA_3 22 ppm	50	seed	4de	84c	18.4a-d	4496abc	19abc
Bengal Seeding Rate GA_3 0 ppm	100		7bc	85bc	18.1bcd	4933ab	19abc
Bengal Seeding Rate GA_3 22 ppm	100	seed	8b	87abc	18.2a-d	5372a	20ab
Cypress Seeding Rate GA_3 0 ppm	50		4de	92a	19.3a	5010ab	17a-d
Cypress Seeding Rate GA_3 22 ppm	50	seed	5cd	90ab	18.8ab	5051ab	21ab
Cypress Seeding Rate GA_3 0 ppm	100		9b	88abc	18.5abc	5037ab	22a
Cypress Seeding Rate GA_3 22 ppm	100	seed	13a	90ab	18.2a-d	5528a	22a
Lacassine Seeding Rate GA_3	50		2e	88abc	17.7bcd	2858d	9e
Lacassine Seeding Rate GA_3 22 ppm	50	seed	3de	88abc	17.4cd	3793bcd	12de
Lacassine Seeding Rate GA_3	100		5de	86bc	17.6bcd	3439cd	13cde
Lacassine Seeding Rate GA_3 22 ppm	100	seed	7b	86bc	17.2d	5079ab	18abc
LSD (.05)	=		2	5	1.0	1202	5
Standard Dev.	=		1.4601	3.2625	.71183	832.76	3.7403
CV	=		24.77	3.74	3.93	18.16	21.82

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Seed and Foliar Treatment, Seeding Depth, and Seedling Vigor of Two Semidwarf Rice Varieties

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: See treatments

Seeding Rate: 100 lb/A

Planting Date: 27 Apr 93

Row Spacing: 7 inches

Planting Depth: See treatments

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 31 May

Plot Size: 210 ft^2 - 7 (12 row) x 30 ft

Treated Area: 210 ft^2 - 7 (12 row) x 30 ft

Treatment(s):

Varieties

Cypress and Lemont

Seeding Depth

1 and 3 inches

Plant Growth Regulator

Gibberellic acid (22 ppm + 1.5 g/A) -
RELEASE (0.35 oz/cwt) + RyzUp (1.5 fl oz/A)

Timing

Seed treatment, 10 Mar
3- to 4-leaf, 21 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May; no measurable rainfall within 24 hours after foliar

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May
Londax (1.5 oz/A) by airplane, 8 June
Ordram 15G (25 lb/A) by airplane, 8 June
Bolero 10G (30 lb/A) by airplane, 16 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 and 16 June

Fungicide(s): Dithane (4 fl oz/cwt) seed treatment
Tilt (10 fl oz/A) by airplane, 29 June
Benlate 50 WP (2 lb/A) by airplane, 20 July

Emergence: 9 May

Permanent Flood: 1 June

Harvest Date: 25 Aug

Harvested Area: 46.6 ft^2 - 2.33 (4 rows) x 20 ft

Exp. Design: Randomized complete block design and four replications. Factorial arrangement of treatments (2 varieties x 2 seeding depths x 2 gibberellic acid treatments).

Comments: Seedling Vigor. Emergence, stand density, and seedling height varied depending on variety, seeding depth, and gibberellic acid treatment (Tables 1 and 2). In general, Cypress emerged several days earlier than Lemont and had higher stands than Lemont. At the shallow planting depth, RELEASE seed treatment shortened time to emergence by 2 and 3 days for Cypress and Lemont, respectively. At the deep planting depth, RELEASE seed treatment had no effect on emergence of Cypress and shortened the time to emergence for Lemont by 3 days. RELEASE seed treatment improved stands for the deep planted rice only. At the deep planting depth, stand of Cypress was improved 15% compared with an almost 4-fold improvement for Lemont. Following stand establishment, the application of GA_3 at the 3- to 4-leaf stage significantly increased seedling height of both varieties at 7 days after treatment. Increases in height were 8 and 10 cm for Cypress and Lemont, respectively.

Mature Plant Development. At maturity, Lemont was shorter in stature, earlier maturing, and lower yielding than Cypress. The yield differential was slightly over 700 lb/A. Grain yield was also influenced by gibberellic acid. RELEASE seed treatment followed by GA_3 foliar treatment increased grain yield by a little over 500 lb/A, independent of planting depth or variety. Panicle density was decreased 25% by planting deep. Gibberellic acid decreased panicle density of Cypress by 10% and increased panicle density of Lemont by 20%.

Table 1. The main effects of plant growth regulator seed and foliar treatments and planting depth on seedling vigor and productivity of two rice varieties. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Emergence (DAP)	Stand (plants/ sq ft) 24 DAP	Seedling Height (cm) 7 DAT	Mature Height (cm) 120 DAP	Grain Moisture (%) 120 DAP	Yield (lb/A) 120 DAP	Panicle Density (panicle /sq ft) 129 DAP
				TABLE OF R MEANS						
Replicate 1				12	16	24	90	16.1	6950	25
Replicate 2				12	15	25	91	15.8	6808	25
Replicate 3				12	15	24	92	16.3	6857	25
Replicate 4				11	16	23	91	16.5	6866	24
				TABLE OF A MEANS						
Deep Seeded				13	12	22b	91	16.8a	6602b	22b
Shallow Seeded				10	19	26a	91	15.6b	7139a	28a
				TABLE OF B MEANS						
Cypress				11	18	20b	92	16.6	7080	30a
GA_3	sp	0								
GA_3	l	0								
Cypress				11	19	28a	93	17.0	7348	28a
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							
Lemont				14	10	19b	90	15.9	6187	18c
GA_3	sp	0								
GA_3	l	0								
Lemont				11	15	29a	89	15.4	6868	23b
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator seed and foliar treatments and planting depth on seedling vigor and productivity of two rice varieties. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Emergence (DAP)	Stand (plants/ sq ft) 24 DAP	Seedling Height (cm) 7 DAT	Mature Height (cm) 120 DAP	Grain Moisture (%) 120 DAP	Yield (lb/A) 120 DAP	Panicle Density (panicle /sq ft) 129 DAP
Deep Seeded Cypress				12b	13b	19e	94a	17.3a	7269ab	25bc
GA_3	sp	0								
GA_3	l	0								
Deep Seeded Cypress				12b	15b	27c	93a	17.4a	6939bc	25bc
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							
Deep Seeded Lemont				15a	4c	17e	90b	17.3a	5772d	15d
GA_3	sp	0								
GA_3	l	0								
Deep Seeded Lemont				12b	15b	26c	89b	15.5ab	6430cd	21cd
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							
Shallow Seeded Cypress				11c	23a	21d	91ab	15.9ab	6891bc	35a
GA_3	sp	0								
GA_3	l	0								
Shallow Seeded Cypress				9d	22a	29b	94a	16.7a	7756a	31ab
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							
Shallow Seeded Lemont				12b	16b	21d	90b	14.5b	6601bc	21cd
GA_3	sp	0								
GA_3	l	0								
Shallow Seeded Lemont				9d	16b	32a	88b	15.3ab	7307ab	24bc
GA_3	sp	0.35	seed							
GA_3	l	1.5	2-3L							
LSD (.05)	=			0	4	2	3	2.0	686	7
Standard Dev.	=			.24397	2.6538	1.1266	1.9548	1.357	459.78	4.5316
CV	=			2.12	17.16	4.73	2.15	8.37	6.69	18.31

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, ABG-3144, ABG-3145, and Seed Soaking in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 150 lb/A

Planting Date: 5 May 93

Row Spacing: Water-seeded: seed were soaked in solutions for 24 hr beginning on 3 May; seed were kept moist for 24 hr following draining before sowing by hand directly into 3- to 4-inch flood.

Fertilizer: 23-12-12 with 1.2% zinc at 400 lb/A drilled preplant, 28 Apr; urea (46% N) at 200 lb/A by airplane, 31 May

Water Management: Flooded (3 to 4 inches) for seeding, 3 May; flood maintained until drained for harvest, 23 Aug

Plot Size: 150 ft^2 - 5 x 30 ft

Treated Area: 150 ft^2 - 5 x 30 ft

Treatment(s): **Plant Growth Regulator(s)**

ABG-3144 (100 mg/L soaking solution)
ABG-3145 (1 mg/L soaking solution)
Gibberellic acid (100 mg RELEASE/L soaking solution)
Gibberellic acid (200 mg RELEASE/L soaking solution)

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: Not applicable

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May
Londax (1.5 oz/A) by airplane, 8 and 17 June
Ordram 15G (25 lb/A) by airplane, 17 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 and 16 June

Fungicide(s): Tilt (10 oz/A) by airplane, 29 June
Benlate 50 WP (2 lb/A) by airplane, 20 July

Emergence: 9 May

Permanent Flood: 3 May

Harvest Date: 2 Sept

Harvested Area: 150 ft^2 - 5 x 30 ft

Exp. Design: Randomized complete block design and four replications.

Comments: GA_3, ABG-3144, and ABG-3145 were evaluated for effects on seedling vigor and grain production in water-seeded, continuous flood culture rice. Visual ratings of soak solution treatments at 55 and 120 days after planting (DAP) showed no significant effects (Table 1). The highest ratings were associated with the combination treatments of GA_3 and ABG-3144. Ratings at 55 DAP were based on visual appearance of plots. The factors compositely evaluated were evenness of stand, stand density, and canopy color. Ratings at 120 DAP were based on degree of canopy closure within individual plots. This was an indirect measure of evenness of stand, tillering, and leaf size.

Grain production was evaluated by measuring grain moisture and yield at maturity (120 DAP). Neither parameter was significantly affected by treatments. Numerically, the control treatment (water only soaking) had the highest grain yield.

Adverse weather conditions, including heavy rainfall following seedbed preparation and strong southerly winds following planting, contributed significantly to drifting and low stand density in general. Movement of seedlings between adjacent plots cannot be ruled out and complicate the interpretation of results. Even with the poor conditions during the early part of the growing season, grain yields across treatments were good, and the coefficient of variability (CV) was 7%.

Table 1. The effect of plant growth regulator seed treatment on seedling vigor and productivity of water-seeded rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Seedling Vigor (r.u.) 55 DAP	Mature Plant Vigor (r.u.) 120 DAP	Grain Moisture (%) 120 DAP	Yield (lb/A) 120 DAP
Control			3a	4a	15.3a	7183a
GA_3-10		seed	3a	3a	15.7a	7036a
GA_3-20		seed	3a	3a	15.7a	6876a
ABG-3144-100		seed	3a	4a	15.4a	7182a
ABG-3145-1		seed	3a	3a	15.5a	6954a
GA_3-10 ABG-3144-100		seed seed	4a	6a	14.9a	7007a
GA_3-20 ABG-3144-100		seed seed	4a	5a	14.9a	7177a
LSD (.05)	=		2	3	1.1	728
Standard Dev.	=		1.1615	2.2173	.7538	489.81
CV	=		38.26	55.43	4.91	6.94

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Fungicide Seed Treatment in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 28 Apr 93

Row Spacing: 7 inches

Planting Depth: 3 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting

Plot Size: 140 ft^2 - 4.67 x 30 ft

Treated Area: 140 ft^2 - 4.67 x 30 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid - GibGro (0.17 oz/cwt)

Fungicide(s)

Copper hydroxide - Champ (8 fl oz/cwt)
Thiram - Gufstafson Thiram (3.3 fl oz/cwt)

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May

Insecticide(s): Not applicable

Fungicide(s): Not applicable

Emergence: 9 May

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications

Comments: Gibberellic acid, copper hydroxide and thiram were evaluated for effects on stand in deep-seeded rice. Seed treatment with the fungicides, copper hydroxide and thiram, had no significant effect on stand compared with the control (no seed treatment) (Table 1). The addition of GA_3 to the fungicide seed treatments improved stand significantly. The increase in stand with GA_3 was almost 3-fold greater with thiram and 2-fold greater with copper hydroxide.

Table 1. The effect of plant growth regulator and fungicide seed treatment on seedling vigor of rice (*Oryza sativa* 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Stand (plants/ sq ft) 25 DAP
Untreated				4c
Thiram	l	3.3	seed	6c
Dithane	l	6.4	seed	11b
Champ	l	8	seed	6c
GA_3	sp	0.17	seed	16a
Thiram	l	3.3	seed	
GA_3	sp	0.17	seed	11b
Dithane	l	6.4	seed	
GA_3	sp	0.17	seed	12b
Champ	l	8	seed	
LSD (.05)	=			3
Standard Dev.	=			1.7525
CV	=			19.09

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Planting Depth in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: See treatments

Seeding Rate: 100 lb/A

Planting Date: 29 Apr 93

Row Spacing: 7 inches

Planting Depth: See treatments

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting

Plot Size: 140 ft^2 - 4.67 x 30 ft

Treated Area: 140 ft^2 - 4.67 x 30 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid - GibGro (0.17 oz/cwt)

Varieties

Maybelle
Lemont

Planting Depth

1 inch
3 inches

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May

Insecticide(s): Not applicable

Fungicide(s): Dithane (4 oz/cwt) seed treatment

Emergence: 9 May

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications. Factorial (2 varieties x 2 planting depths x 2 plant growth regulator rates) arrangement of treatments.

Comments: In general, stands were better at the shallow planting depth and Maybelle had better stands than Lemont (Table 1). Gibberellic acid seed treatment significantly improved stands of Lemont and had no effect on stands of Maybelle. Stands of Lemont with GA_3 seed treatment were lower than stands of Maybelle with or without GA_3 seed treatment (Table 2).

Table 1. The main effects of plant growth regulator seed treatment on seedling vigor of a short stature and a semidwarf variety. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Stand (plants/ sq ft) 25 DAP
TABLE OF R MEANS				
Replicate 1				11
Replicate 2				11
Replicate 3				12
Replicate 4				11
TABLE OF A MEANS				
Shallow				18
Deep				5
TABLE OF B MEANS				
Lemont				8c
Lemont GA_3	sp	0.17	seed	11b
Maybelle				13a
Maybelle GA_3	sp	0.17	seed	13a

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator seed treatment on seedling vigor of a short stature and a semidwarf variety. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Stand (plants/ sq ft) 25 DAP
Shallow Lemont				13c
Shallow Lemont GA_3	sp	0.17	seed	17b
Shallow Maybelle				19ab
Shallow Maybelle GA_3	sp	0.17	seed	21a
Deep Lemont				3f
Deep Lemont GA_3	sp	0.17	seed	4ef
Deep Maybelle				7d
Deep Maybelle GA_3	sp	0.17	seed	6de
LSD (.05) =				2
Standard Dev.=				1.5569
CV =				13.88

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Seed Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: PGR IV, PHCA, and Krebsol Seed Treatments and Seedling Vigor in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 29 Apr 93

Row Spacing: 7 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting

Plot Size: 140 ft^2 - 4.67 (8 rows) x 30 ft

Treated Area: 140 ft^2 - 4.67 (8 rows) x 30 ft

Treatment(s): **Plant Growth Regulator**

PGR IV (3 and 6 fl oz/cwt)
PHCA (8 and 16 fl oz/cwt)
Krebsol (1 and 2 fl oz/cwt)

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: 0.1 inch, 30 Apr; 2.3 inches, 1 May; 1 inch, 2 May

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May

Insecticide(s): Not applicable

Fungicide(s): Not applicable

Emergence: 9 May

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block and four replications

Comments: Evaluations of root development were made 40 days after planting by twice sampling a 6-inch soil profile with a 3-inch core sampler in a drill row. Root length was increased above control levels by all treatments (Table 1). Using the Least Significant Difference means test, root lengths were significantly longer for seed treatments with 16 fl oz PHCA/cwt and 1 fl oz Krebsol/cwt compared with the control. At lower rates of PHCA and higher rates of Krebsol, root lengths, although still longer than the control, were not significantly different from the control. In comparison to root length, root density was not significantly affected by any of the seed treatments. The number of roots per plant varied from 13 to 15, and root dry weight/85 cm^3 of soil varied from 0.86 to 1.37 g. Root dry weight tended to decrease as rate of PGR IV and Krebsol decreased and tended to increase as rate of PHCA decreased.

Table 1. The effect of plant growth regulator seed treatment on root development in rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Root Length (mm)	Root No. (roots\ plant)	Root Dry Wt. (g/0.1 sq ft)
Control			99a	13a	1.00a
PGR IV 3 oz/cwt			105a	14a	1.09a
PGR IV 6 oz/cwt			104a	13a	0.93a
PHCA 8 oz/cwt			107a	15a	1.37a
PHCA 16 oz/cwt			110a	13a	0.86a
KREBSOL 1 oz/cw			110a	14a	0.90a
KREBSOL 2 oz/cw			105a	15a	1.03a
LSD (.05)	=		10	3	0.59
Standard Dev.	=		6.902	1.9082	.40011
CV	=		6.53	13.70	39.01

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid Rate and Timing and Seedling Vigor in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inches

Planting Depth: 2 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 26 May

Plot Size: 210 ft^2 - 7 (12 row) x 30 ft

Treated Area: 210 ft^2 - 7 (12 row) x 30 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A)

Timing

1- to 2-leaf, 7 May
2- to 3-leaf, 12 May
3- to 4-leaf, 18 May
4- to 5-leaf, 25 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 6 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Stam M4 (1 gal/A) + Londax (1 oz/A) by hand, 26 May
Londax (1 oz/A) by airplane, 8 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Gufstafson Thiram (3.3 fl oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: 18 Aug

Harvested Area: 210 ft^2 - 7 (12 rows) x 30 ft

Exp. Design: Randomized complete block design and four replications. Factorial arrangement of treatments (4 RyzUp rates x 4 timings).

Comments: Seedling height evaluations made at 5, 10, and 15 days after treatment showed rate and time of application had a significant impact on seedling development (Table 1). GA_3 increased seedling height during the period from 5 to 15 days after treatment. Response to GA_3 was independent of plant age. Seedling height increased 2 to 4 cm for each 1 oz/A increase in rate during the entire 10-day evaluation period following application.

At maturity, grain moisture and grain yield were not significantly affected by rate or time of GA_3 application. There was a general tendency for yield to be higher in the GA_3 treatments. Using the Least Significant Difference means comparison test for comparing the control to each of the rates of GA_3, there was a significant difference between the control and the 2 oz/A rate (Table 2).

Table 1. The main effects of time and rate of plant growth regulator foliar treatments on seedling growth and productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Seedling Height (mm) 5 DAT	Seedling Height (mm) 10 DAT	Seedling Height (mm) 15 DAT	Grain Moisture (%) 120 DAP	Yield (lb/A) 120 DAP
TABLE OF R MEANS								
Replicate 1				281	333	368	19.2	4354
Replicate 2				270	321	378	19.3	4475
Replicate 3				287	348	390	19.4	4984
Replicate 4				299	352	414	18.4	5263
TABLE OF A MEANS								
Time 1			1-2L	221c	258	267c	19.0	4802
Time 2			2-3L	232bc	247	271c	19.4	4762
Time 3			3-4L	252b	296	412b	18.9	4719
Time 4			4-5L	430a	553	600a	19.1	4793
TABLE OF B MEANS								
GA_3	l	0		244c	289	346c	19.0	4534
GA_3	l	1		278b	327	383b	19.0	4705
GA_3	l	2		292b	353	402ab	19.2	5015
GA_3	l	3		323a	385	419a	19.2	4822

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of time and rate of plant growth regulator foliar treatments on seedling growth and productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Seedling Height (mm) 5 DAT	Seedling Height (mm) 10 DAT	Seedling Height (mm) 15 DAT	Grain Moisture (%) 120 DAP	Yield (lb/A) 120 DAP
Time 1 RyzUp	l	0	1-2L	172h	205i	215g	19.0abc	4556a
Time 1 RyzUp	l	1	1-2L	223efg	248fgh	267def	18.7c	4572a
Time 1 RyzUp	l	2	1-2L	222fg	271d-g	276def	19.0abc	5269a
Time 1 RyzUp	l	3	1-2L	268de	307d	311d	19.5abc	4811a
Time 2 RyzUp	l	0	2-3L	203gh	211hi	231fg	19.2abc	4592a
Time 2 RyzUp	l	1	2-3L	220g	232ghi	258efg	19.6ab	4815a
Time 2 RyzUp	l	2	2-3L	241d-g	263efg	283de	19.0abc	4751a
Time 2 RyzUp	l	3	2-3L	266def	285def	310d	19.7a	4890a
Time 3 RyzUp	l	0	3-4L	234d-g	285def	384c	18.9abc	4408a
Time 3 RyzUp	l	1	3-4L	239d-g	285def	415c	19.0abc	4561a
Time 3 RyzUp	l	2	3-4L	270d	303de	422c	19.3abc	5015a
Time 3 RyzUp	l	3	3-4L	267def	312d	428c	18.6c	4892a
Time 4 RyzUp	l	0	4-5L	366c	456c	555b	18.8abc	4582a
Time 4 RyzUp	l	1	4-5L	432b	544b	593ab	18.8bc	4871a
Time 4 RyzUp	l	2	4-5L	435b	575b	628a	19.6ab	5024a
Time 4 RyzUp	l	3	4-5L	489a	638a	626a	19.1abc	4695a
LSD (.05)	=			40	37	43	0.7	906
Standard Dev.	=			28.268	25.903	30.354	.4908	634.21
CV	=			9.95	7.65	7.83	2.57	13.30

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, Propanil Formulations, and Seedling Vigor in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inches

Planting Depth: 2 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 26 May

Plot Size: 210 ft^2 - 7 (12 row) x 30 ft

Treated Area: 210 ft^2 - 7 (12 row) x 30 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A)

Herbicides (1 qt crop oil/A added to DF formulations)

Propanil - Stam M4 (1 gal/A)
Propanil - Propanil 4 (1 gal/A)
Propanil - Terra Propanil 60 DF (6.67 lb/A)
Propanil - Stam 80 EDF (5 lb/A)
Propanil - Wham 80 DF (5 lb/A)

Timing

2- to 4-leaf, 21 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 24 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Londax (1 oz/A) by airplane, 8 June
Ordram 15 G (25 lb/A) by airplane, 8 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Gufstafson Thiram (3.3 fl oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications. Factorial arrangement of treatments (2 RyzUp rates x 6 herbicide treatments).

Comments: Seedling height evaluations made at 7 and 14 days after treatment (DAT) showed propanil formulation had a significant effect on GA_3 activity at 7 DAT (Table 1). GA_3 mixed with the emulsifiable concentrate (ec) formulations of propanil increased seedling height more than GA_3 mixed with the dry flowable (df) formulations of propanil. GA_3 in mixture with Stam M4 and Propanil 4, the ec formulations, and Terra Propanil 60 DF, Stam 80 EDF and Wham 80 DF, the df formulations, increased height 7, 4, 0, 3, and 2 cm, respectively (Table 2). GA_3 alone increased height 1 cm. At 14 DAT, propanil formulation had no effect on the activity of GA_3, and GA_3 increased seedling height an average of 2 cm across all propanil formulations.

Herbicide efficacy was relatively constant. Weed control ranged between 96 and 100% for the herbicide formulations, and GA_3 had no effect on herbicide efficacy. Rice was not injured by any of the propanil treatments. Consequently, injury ratings were not made.

Table 1. The main effects of plant growth regulator foliar treatment and propanil formulation on chemical efficacy in rice (Oryza sativa 'Lemont.' Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Seedling Height (cm) 7 DAT	Seedling Height (cm) 14 DAT	Weed Control (%) 14 DAT
TABLE OF R MEANS							
Replicate 1					30	50	73
Replicate 2					31	48	83
Replicate 3					29	48	81
Replicate 4					29	47	83
TABLE OF A MEANS							
GA_3	l	0	oz p/A		28	47b	81
GA_3	l	1	oz p/A	3-4L	31	49a	79
TABLE OF B MEANS							
Stam M4	ec	4	lb/A	3-4L	32	50	100a
Propanil 4	ec	4	lb/A	3-4L	31	49	100a
Terra Propanil	df	4	lb/A	3-4L	29	49	85a
COC	l	1	qt/A	3-4L			
Stam 80 EDF	df	4	lb/A	3-4L	28	46	100a
COC	l	1	qt/A	3-4L			
Wham 80 DF	df	4	lb/A	3-4L	29	47	96a
COC	l	1	qt/A	3-4L			
No Herbicide					28	49	0b

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator foliar treatment and propanil formulation on chemical efficacy in rice (*Oryza sativa* 'Lemont.' Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Seedling Height (cm) 7 DAT	Seedling Height (cm) 14 DAT	Weed Control (%) 14 DAT
GA_3	l	0	oz p/A		28cd	47abc	100a
Stam M4	ec	4	lb/A	3-4L			
GA_3	l	0	oz p/A		29cd	47abc	100a
Propanil 4	ec	4	lb/A	3-4L			
GA_3	l	0	oz p/A		28cd	46bc	95a
Terra Propanil	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	0	oz p/A		27d	44c	100a
Stam 80 EDF	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	0	oz p/A		28cd	47abc	93a
Wham 80 DF	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	0	oz p/A		28cd	49abc	0b
No Herbicide							
GA_3	l	1	oz p/A	3-4L	36a	53a	100a
Stam M4	ec	4	lb/A	3-4L			
GA_3	l	1	oz p/A	3-4L	33b	51ab	100a
Propanil 4	ec	4	lb/A	3-4L			
GA_3	l	1	oz p/A	3-4L	29cd	51ab	100a
Terra Propanil	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	1	oz p/A	3-4L	30c	48abc	100a
Stam 80 EDF	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	1	oz p/A	3-4L	30c	46bc	100a
Wham 80 DF	df	4	lb/A	3-4L			
COC	l	1	qt/A	3-4L			
GA_3	l	1	oz p/A	3-4L	29cd	48abc	0b
No Herbicide							
LSD (.05)	=				2	5	8
Standard Dev.	=				1.6189	3.6065	5.3565
CV	=				5.49	7.52	6.51

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, Carrier Volume and pH, and Seedling Vigor in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 29 Apr 93

Row Spacing: 7 inches

Planting Depth: 1 inch

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting

Plot Size: 210 ft2 - 7 (12 row) x 30 ft

Treated Area: 210 ft2 - 7 (12 row) x 30 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A)

Timing

3- to 4-leaf, 28 May

Sprayer: CO2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.1 inch immediately following application

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May

Insecticide(s): Not applicable

Fungicide(s): Gufstafson Thiram (3.3 fl oz/cwt) seed treatment

Emergence: 9 May

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications.

Comments: Rainfall shortly after application reduced the effects of GA_3 compared with previous year's results. Solution pHs of 3, 7, and 10 had no effect on seedling height at 7 and 14 days after treatment (DAT) (Table 1). Delivery rates of 10, 20, and 40 gal/A significantly increased seedling height at 7 DAT compared with the 5 gal/A delivery rate. The increase averaged 4 cm. There was no significant effect of delivery volume at 14 DAT.

Table 1. The effect of plant growth regulator foliar treatment, Ph, and delivery rate on seedling growth of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Seedling Height (cm) 7 DAT	Seedling Height (cm) 14 DAT
Control				26cd	37ab
GA_3/pH3	1	1	2-3L	25d	38ab
GA_3/pH7	1	1	2-3L	24d	36b
GA_3/pH10	1	1	2-3L	27bcd	37ab
GA_3/5gal	1	1	2-3L	25d	38ab
GA_3/10 gal	1	1	2-3L	30a	41a
GA_3/20 gal	1	1	2-3L	29ab	41a
GA_3/40 gal	1	1	2-3L	28abc	41a
LSD (.05)	=			3	4
Standard Dev.	=			1.8787	2.5715
CV	=			7.07	6.69

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, Injurious Herbicides, and Seedling Vigor in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inches

Planting Depth: 2 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 26 May

Plot Size: 210 ft^2 - 7 (12 rows) x 30 ft

Treated Area: 210 ft^2 - 7 (12 rows) x 30 ft

Treatment(s):

Plant Growth Regulator

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A)

Herbicide and Herbicide Combinations

Propanil (4 and 6 lb/A) - Stam M4 (1 and 1.5 gal/A)
Propanil (4 lb/A) + Thiobencarb (3 lb/A) - Stam M4 (1 gal/A) + Bolero 8EC (3 pt/A)
Propanil (4 lb/A) + Surfactant (0.4%) + Zinc (0.44 lb/A) - Stam M4 (1 gal/A) + Latron AG-98 (4.8 oz/A) + CheLa (5pt/A)
Propanil (3 lb/A) + Molinate (3 lb/A) + Zinc (0.44 lb/A) - Stam M4 (3 qt/A) + Ordram 8E (3 pt/A) + CheLa (5 pt/A)
Propanil (3 lb/A) + Molinate (3 lb/A) + Thiobencarb (1 lb/A) - Arrosolo (1 gal/A) + Bolero 8EC (1 pt/A)
Propanil (3 lb/A) + Molinate (3 lb/A) + Zinc (0.44 lb/A) - Arrosolo (1 gal/A) + CheLa (5 pt/A)

Timing
2- to 4-leaf, 18 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.5 inch within 3 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Londax (1 oz/A) by airplane, 8 June
Ordram 15G (25 lb/A) by airplane, 8 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Gufstafson Thiram (3.3 oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications.

Comments: Seedling height evaluations made at 7 and 14 days after treatment (DAT) showed herbicide treatments had a significant effect on GA_3 activity (Table 1). At 7 DAT, seedling height was significantly increased 4 to 7 cm by GA_3 tank mixed with all herbicide treatments except 6 lb propanil/A. GA_3 + propanil (1.5 gal/A) increased seedling height 2 cm. At 14 DAT, the trend continued with significant height increases, ranging from 6 to 9 cm. In addition to the 6 lb propanil/A treatment, the propanil + surfactant + zinc treatment minimized GA_3 activity. Seedling height increases were 4 and 5 cm for the high rate of propanil and propanil + surfactant + zinc, respectively. These increases were not significant.

Rice was not injured by any of the herbicide treatments. Consequently, injury ratings were not made.

Table 1. The effect of plant growth regulator and other foliar treatments on seedling vigor of rice (*Oryza sativa* 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Plant Height (cm) 7 DAT	Plant Height (cm) 14 DAT
GA_3	l	1	oz p/A	3-4L	20e	36cd
Propanil	ec	4	lb/A	3-4L	21de	37bcd
GA_3	l	1	oz p/A	3-4L	28a	44a
Propanil	ec	4	lb/A	3-4L		
Propanil	ec	4	lb/A	3-4L	21de	36cd
Bolero 8EC	ec	3	lb/A	3-4L		
GA_3	l	1	oz p/A	3-4L	27a	45a
Propanil	ec	4	lb/A	3-4L		
Bolero 8EC	ec	3	lb/A	3-4L		
Propanil	ec	4	lb/A	3-4L	21de	38bcd
Latron AG-98	l	4.8	oz p/A	3-4L		
Zn Chelate	l	5	pt/A	3-4L		
GA_3	l	1	oz p/A	3-4L	26ab	43ab
Propanil	ec	4	lb/A	3-4L		
Latron AG-98	l	4.8	oz p/A	3-4L		
Zn Chelate	l	5	pt/A	3-4L		
Propanil	ec	3	lb/A	3-4L	20e	35d
Ordram-8E	ec	3	lb/A	3-4L		
Zn Chelate	l	5	pt/A	3-4L		
GA_3	l	1	oz p/A	3-4L	25abc	41abc
Propanil	ec	3	lb/A	3-4L		
Ordram-8E	ec	3	lb/A	3-4L		
Zn Chelate	l	5	pt/A	3-4L		
Arrosolo 3-3E	ec	6	lb/A	3-4L	22cde	36cd
Bolero 8EC	ec	1	lb/A	3-4L		
GA_3	l	1	oz p/A	3-4L	28a	45a
Arrosolo 3-3E	ec	6	lb/A	3-4L		
Bolero 8EC	ec	1	lb/A	3-4L		
Arrosolo 3-3E	ec	6	lb/A	3-4L	22cde	35d
Zn Chelate	l	5	pt/A	3-4L		
GA_3	l	1	oz p/A	3-4L	26ab	41abc
Arrosolo 3-3E	ec	6	lb/A	3-4L		
Zn Chelate	l	5	pt/A	3-4L		
Propanil	ec	6	lb/A	3-4L	23b-e	37bcd
GA_3	l	1	oz p/A	3-4L	25a-d	41abc
Propanil	ec	6	lb/A	3-4L		
LSD (.05) =					4	5
Standard Dev.=					2.5014	3.2759
CV =					10.65	8.36

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, Adjuvants, and Seedling Vigor in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 29 Apr 93

Row Spacing: 7 inches

Planting Depth: 1 inch

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting

Plot Size: 210 ft^2 - 7 (12 rows) x 30 ft

Treated Area: 210 ft^2 - 7 (12 rows) x 30 ft

Treatment(s):

Plant Growth Regulator

Gibberellic acid (1 g/A) - RyzUp (1 fl oz/A)

Adjuvant(s)

Surfactant (4.8 fl oz/A)

Latron AG-98	Latron CS-7	Tween 20	Unifilm 8020
Dyne-maic	Kinetic	Valent X-77	

Crop Oil Concentrate (1 pt/A)

Penetrator Plus, Prime Ag Oil, Prime Oil

Herbicide

Propanil (4 lb/A) - Stam M4 (1 gal/A)

Timing

3- to 4-leaf, 28 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.1 inch within 1 hour after application

Herbicide(s): Arrosolo (1 gal/A) by airplane, 17 May

Insecticide(s): Not applicable

Fungicide(s): Gufstafson Thiram (3.3 fl oz/cwt) seed treatment

Emergence: 9 May

Permanent Flood: Not applicable

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications.

Comments: All GA_3 treatments significantly increased seedling height compared with the control at 7 and 14 days after treatment (DAT) (Table 1). Increases in seedling height from GA_3 ranged from 3 to 11 cm at 7 DAT and from 7 to 14 cm at 14 DAT. The effect of adjuvants on GA_3 activity was minimal. Of all the adjuvants tested, only Kinetic elevated GA_3 activity above the level of GA_3 alone.

Table 1. The effect of plant growth regulator foliar treatments and adjuvants on seedling growth of rice (*Oryza sativa* 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Seedling Height (cm) 7 DAT	Seedling Height (cm) 14 DAT
GA_3	1	0	oz p/A		21e	28d
GA_3	1	1	oz p/A	2-3L	28bcd	38abc
AG-98	1	4.8	oz p/A	2-3L	26bcd	36c
GA_3	1	1	oz p/A	2-3L		
Dyne-maic	1	4.8	oz p/A	2-3L	26bcd	38abc
GA_3	1	1	oz p/A	2-3L		
CS-7	1	4.8	oz p/A	2-3L	27bcd	39abc
GA_3	1	1	oz p/A	2-3L		
Kinetic	1	4.8	oz p/A	2-3L	32a	42a
GA_3	1	1	oz p/A	2-3L		
Penetrator +	1	16	oz p/A	2-3L	29abc	40ab
GA_3	1	1	oz p/A	2-3L		
Prime Ag Oil	1	16	oz p/A	2-3L	25cd	35c
GA_3	1	1	oz p/A	2-3L		
Prime Oil	1	16	oz p/A	2-3L	24d	37bc
GA_3	1	1	oz p/A	2-3L		
Tween 20	1	4.8	oz p/A	2-3L	30ab	40ab
GA_3	1	1	oz p/A	2-3L		
X-77	1	4.8	oz p/A	2-3L	28bc	35c
GA_3	1	1	oz p/A	2-3L		
Unifilm 8020	1	4.8	oz p/A	2-3L	29ab	41ab
GA_3	1	1	oz p/A	2-3L		
Stam M4	ec	4	lb/A	2-3L	30ab	40ab
GA_3	1	1	oz p/A	2-3L		
LSD (.05)	=				3	4
Standard Dev.	=				2.2826	2.4539
CV	=				8.40	6.53

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, M.P. Braverman, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid, Propanil, Thiobencarb, Triclopyr, and Quinclorac Interaction in Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: See treatments

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46%) at 200 lb/A by airplane, 26 May

Plot Size: 192.6 ft^2 - 6.42 (11 rows) x 30 ft

Treated Area: 192.6 ft^2 - 6.42 (11 rows) x 30 ft

Treatment(s):

Varieties

Lemont, Mars, and Maybelle

Plant Growth Regulator

Gibberellic acid - GibGro 4LS (1 oz/A)

Herbicide(s)

Propanil - Stam M4 (1 gal/A)
Thiobencarb - Bolero 8 EC (3 pt/A)
Triclopyr - Grandstand (1 pt/A)
Quinclorac - Facet 50 WP (0.75 lb/A)

Timing

2- to 4-leaf for propanil, thiobencarb, and quinclorac, 13 May
4- to 6-leaf for triclopyr, 25 May

Sprayer: CO_2-driven, hand-held, 21 psi, 15 GPA, 80015 nozzles

Pertinent
Rainfall: No rainfall within 24 hours after application

Growth
Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Londax (1 oz/A) by airplane, 8 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Dithane (4 oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: Not applicable

Harvested Area: Not applicable

Exp. Design: Randomized complete block design and four replications. Split plot (main plots = varieties and subplots = herbicides and gibberellic acid combinations) arrangement of treatments.

Comments: Weed Control. Weed control ratings were made at 30 and 45 days after planting (DAP). For all herbicide treatments except triclopyr, the ratings were made at 7 and 22 days after treatment (DAT). For the triclopyr treatments, the ratings were made at 5 days before treatment and 10 DAT.

At 30 DAP, all treatments containing propanil had the highest weed control (81 to 91%) (Table 1). Intermediate weed control was observed with quinclorac (71 and 72%) due to the inability of quinclorac to control a low infestation of sedges. GA_3 had no effect on the efficacy of any of the herbicides.

At 45 DAP, all treatments except those with triclopyr had good weed control (Table 1). Triclopyr did not control the grassy weeds present. GA_3 had no effect on the efficacy of any of the herbicides.

Rice Injury. Rice injury was rated at 30 and 45 DAP. Injury symptoms were noted at 30 DAP only. Injury (16 to 18%) was greatest with propanil + thiobencarb, intermediate with propanil alone (7%), and lowest with quinclorac (4%) (Table 1). GA_3 reduced injury for propanil alone, making it equivalent to injury with quinclorac (Table 2). GA_3 did not alter the injury levels caused by propanil + thiobencarb or quinclorac. No injury was noted at 45 DAP.

Seedling Vigor. GA_3 increased seedling height at 30 and 33 DAP. Increases in seedling height were dependent on the herbicide or herbicide combinations with which GA_3 was in mixture. GA_3 increased seedling height 6 to 7 cm when mixed with propanil, propanil + thiobencarb, and quinclorac + thiobencarb. Compared with the control, propanil, propanil + thiobencarb, and quinclorac + thiobencarb had no effect on seedling height. Differences in seedling height between these herbicide treatments and the control were less than 3 cm during the 30 and 33 DAP evaluation period. In comparison, triclopyr decreased seedling height 3 and 6 cm at 30 and 33 DAP, respectively. Adding GA_3 to triclopyr prevented this significant reduction in seedling height.

Table 1. The main effects of plant growth regulator foliar treatment and herbicides on chemical efficacy and productivity of rice Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Weed Control (%) 30 DAP	Weed Control (%) 45 DAP	Rice Injury (%) 30 DAP	Rice Injury (%) 45 DAP	Rice Increase (cm) 30 DAP	Rice Increase (cm) 33 DAP
				TABLE OF R MEANS						
Replicate 1					59	69	7	0	1	2
Replicate 2					53	69	6	0	2	4
Replicate 3					58	68	6	0	3	4
Replicate 4					51	67	4	0	2	4
				TABLE OF A MEANS						
Lemont					53	68	6	0	1	3
Mars					59	69	5	0	1	4
Maybelle					55	68	6	0	4	3
				TABLE OF B MEANS						
Control					6c	0d	0d	0	0b	0de
Propanil	ec	3	lb/A	2-3L	91a	100a	16a	0	6a	11ab
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Propanil	ec	3	lb/A	2-3L	91a	100a	18a	0	0b	2cd
Thiobencarb	ec	3	lb/A	2-3L						
Quinclorac	wp	.375	lb/A	2-3L	72b	100a	4c	0	6a	9b
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Quinclorac	wp	.375	lb/A	2-3L	71b	98ab	4c	0	1b	1cd
Thiobencarb	ec	3	lb/A	2-3L						
Propanil	ec	4	lb/A	2-3L	81ab	96b	4c	0	7a	13a
GA_3	l	1	oz p/A	2-3L						
Propanil	ec	4	lb/A	2-3L	86a	100a	7b	0	1b	3c
Triclopyr	e	.375	lb/A	4-5L	0c	10c	0d	0	0b	-2e
GA_3	l	1	oz p/A	4-5L						
Triclopyr	e	.375	lb/A	4-5L	0c	10c	0d	0	-3c	-6f

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05)

Table 2. The simple effects of plant growth regulator foliar treatment and herbicides on chemical efficacy and productivity of rice Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Os	Rate	Rate Unit	Grow Stg	Weed Control (%) 30 OAP	Weed Control (%) 45 OAP	Rice Injury (%) 30 OAP	Rice Injury (%) 45 OAP	Rice Increase (cm) 30 OAP	Rice Increase (cm) 33 DAP
Lemont Control					0d	0d	0e	0a	0fgh	0cde
Lemont					91ab	100a	16a	0a	6a-e	11ab
Propanil	ec	3	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Lemont					90ab	100a	19a	0a	-2ghi	1cd
Propanil	ec	3	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
Lemont					68bc	100a	4cde	0a	7abc	10ab
Quinclorac	wp	.375	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Lemont					58c	98a	4cde	0a	0fgh	1cd
Quinclorac	wp	.375	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
Lemont					79abc	93b	4cde	0a	7abc	14a
Propanil	ec	4	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Lemont					91a	100a	9b	0a	1e-h	3c
Propanil	ec	4	lb/A	2-3L						
Lemont					0d	10c	0e	0a	0fgh	-5efg
Triclopyr	e	.375	lb/A	4-5L						
GA_3	l	1	oz p/A	4-5L						
Lemont					0d	10c	0e	0a	-6i	-9g
Triclopyr	e	.375	lb/A	4-5L						
Mars Control					19d	0d	1de	0a	0fgh	0cde
Mars					94a	100a	15a	0a	5a-f	12ab
Propanil	ec	3	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Mars					93a	100a	15a	0a	1d-h	3c
Propanil	ec	3	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
Mars					76abc	100a	4cde	0a	5a-f	8b
Quinclorac	wp	.375	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Mars					79abc	100a	4cde	0a	1d-h	1cd
Quinclorac	wp	.375	lb/A	2-3L						
Thiobencarb	ec	3	lb/A	2-3L						
Mars					85ab	98a	4cde	0a	6a-d	14a
Propanil	ec	4	lb/A	2-3L						
GA_3	l	1	oz p/A	2-3L						
Mars					82ab	100a	6bcd	0a	0fgh	3c
Propanil	ec	4	lb/A	2-3L						

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Weed Control (%) 30 DAP	Weed Control (%) 45 DAP	Rice Injury (%) 30 DAP	Rice Injury (%) 45 DAP	Rice Increase (cm) 30 DAP	Rice Increase (cm) 33 DAP
Mars Triclopyr GA_3	e l	.375 1	lb/A oz p/A	4-5L 4-5L	0d	10c	0e	0a	-3hi	1cd
Mars Triclopyr	e	.375	lb/A	4-5L	0d	10c	0e	0a	-3hi	-3def
Maybelle Control					0d	0d	0e	0a	0fgh	0cde
Maybelle Propanil Thiobencarb GA_3	ec ec l	3 3 1	lb/A lb/A oz p/A	2-3L 2-3L 2-3L	90ab	100a	18a	0a	7abc	10ab
Maybelle Propanil Thiobencarb	ec ec	3 3	lb/A lb/A	2-3L 2-3L	92a	100a	19a	0a	2c-h	4c
Maybelle Quinclorac Thiobencarb GA_3	wp ec l	.375 3 1	lb/A lb/A oz p/A	2-3L 2-3L 2-3L	73abc	100a	4cde	0a	7ab	9b
Maybelle Quinclorac Thiobencarb	wp ec	.375 3	lb/A lb/A	2-3L 2-3L	76abc	95ab	4cde	0a	2b-h	3c
Maybelle Propanil GA_3	ec l	4 1	lb/A oz p/A	2-3L 2-3L	79abc	98a	4cde	0a	9a	13ab
Maybelle Propanil	ec	4	lb/A	2-3L	85ab	100a	6bc	0a	2b-h	3c
Maybelle Triclopyr GA_3	e l	.375 1	lb/A oz p/A	4-5L 4-5L	0d	10c	0e	0a	4b-g	-4def
Maybelle Triclopyr	e	.375	lb/A	4-5L	0d	10c	0e	0a	-1fgh	-6fg
LSD (.05) =					19	4	4	0	5	4
Standard Dev.=					13.64	3.0739	2.9431	0	3.2308	2.942
CV =					24.61	4.51	50.53	0	155.78	83.71

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05)

SEEDLING VIGOR STUDIES (Foliar Treatment)

R.T. Dunand, M.P. Braverman, R.R. Dilly, Jr., and G.A. Meche

Experiment: Bentazon, Gibberellic Acid, Propanil, Thiobencarb, and Quinclorac Interaction in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inch

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane (26 May)

Plot Size: 210 ft^2 - 7 (12 rows) x 30 ft

Treated Area: 210 ft^2 - 7 x 30 ft

Treatment(s):

Plant Growth Regulator

Gibberellic Acid - RyzUp (1 oz/A)

Herbicide(s)

Bentazon - Basagran (1 qt/A)
Propanil - Stam M4 (3 qt/A)
Thiobencarb - Bolero 8 EC (3 pt/A)
Quinclorac - Facet 50 WP (0.75 lb/A)

Crop Oil Concentrate

Prime Oil (1 qt/A)

Timing

2- to 3-leaf (12 May)

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 24 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt)

Herbicide(s): Londax (1 oz/A) by airplane (8 June)

Insecticide(s): Furadan 3G (17 lb/A) by airplane (8 June)

Fungicide(s): Dithane (4 oz/cwt)
Benlate 50 WP (1 lb/A) by airplane (20 July)

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: 18 Aug

Harvested Area: 210 ft^2 - 7 (12 rows) x 30 ft

Exp. Design: Randomized complete block and four replications

Comments: Weed Control. The primary grass weeds were barnyardgrass and broadleaf signalgrass. There was a low infestation of sprangletop. The broadleaf weed infestation was too low to rate.

Weed control ratings taken at 8, 23, and 48 days after treatment (DAT) showed weed control, in general, was lowest in treatments with quinclorac (Table 1). This was due to the low infestation of sprangletop. The high weed control rating with quinclorac at 23 DAT reflects flood coverage of young sprangletop. As the sprangletop grew above the flood and began to compete more noticeably with the rice, ratings decreased at 48 DAT.

Rice Injury. Rice injury was rated at 8, 23, and 48 DAT. Injury symptoms were noted at 8 DAT only (Table 1). Quinclorac and GA_3 alone or in combination had the lowest injury ratings (less than 2%). Propanil + thiobencarb had the highest injury rating (13%). Combinations of quinclorac with bentazon, thiobencarb, and propanil, as well as propanil + bentazon, had intermediate levels of injury (3-5%). Injury was limited to those leaves present at the time of application, and this explains the disappearance of injury at 23 and 48 DAT, by which time 3 to 4 new leaves had emerged.

Seedling Vigor. GA_3 increased seedling height at 8 and 14 DAT (Table 1). At 8 DAT, whether GA_3 was applied alone or in combination with any of the herbicide mixtures, seedling height was increased 3 to 10 cm compared with the control. Increases in height were greatest for GA_3 mixed with emulsifiable concentrate herbicide formulations. The increase in height with the EC formulations exceeded the increase in height from GA_3 alone or GA_3 mixed with quinclorac and a crop oil. At 14 DAT, height was increased by GA_3 mixed with the EC herbicides only, and height with GA_3 alone or in combination with quinclorac was not different from the control.

Grain Yield. Grain yield was increased by controlling weeds with herbicides (Table 1). All herbicides were equally effective at increasing yield. The highest yield was obtained with quinclorac + GA_3.

Table 1. The effect of plant growth regulator foliar treatment and herbicides on chemical efficacy and productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Weed Control (%) 8 DAT	Weed Control (%) 23 DAT	Weed Control (%) 48 DAT	Rice Injury (%) 8 DAT	Rice Injury (%) 23 DAT	Rice Injury (%) 48 DAT	Seedling Height (cm) 8 DAT	Seedling Height (cm) 14 DAT
Control					0c	0c	0c	0d	0a	0a	21e	25e
Quinclorac	wp	.38	lb/A	2-3L	55b	93b	85b	0d	0a	0a	21e	28de
Prime Oil	l	1	qt/A	2-3L								
Quinclorac	wp	.38	lb/A	2-3L	54b	95ab	88b	1cd	0a	0a	24d	28de
Prime Oil	l	1	qt/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
Quinclorac	wp	.38	lb/A	2-3L	93a	100a	100a	5b	0a	0a	26c	31cd
Propanil	ec	3	lb/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
Quinclorac	wp	.38	lb/A	2-3L	81a	98a	100a	4bc	0a	0a	29b	33bc
Thiobencarb	ec	3	lb/A	2-3L								
Prime Oil	l	1	qt/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
Quinclorac	wp	.38	lb/A	2-3L	89a	100a	85b	3bcd	0a	0a	27bc	30cd
Bentazon	sl	1	lb/A	2-3L								
Prime Oil	l	1	qt/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
Propanil	ec	3	lb/A	2-3L	94a	100a	100a	13a	0a	0a	28bc	34ab
Thiobencarb	ec	3	lb/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
Propanil	ec	3	lb/A	2-3L	94a	100a	98a	5b	0a	0a	31a	37a
Bentazon	sl	1	lb/A	2-3L								
GA_3	l	1	oz p/A	2-3L								
GA_3	l	1	oz p/A	2-3L	13c	0c	0c	0d	0a	0a	24d	27de
LSD (.05)	=				16	5	9	3	0	0	2	4
Standard Dev.	=				11.288	3.1549	6.3282	2.027	0	0	1.1726	2.4113
CV	=				17.78	4.15	8.70	60.81	0	0	4.58	8.00

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 1. Continued.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Grain Moisture (%)	Yield (lb/A)
Control					19.2c	5026b
Quinclorac	wp	.38	lb/A	2-3L	20.6b	5836ab
Prime Oil	l	1	qt/A	2-3L		
Quinclorac	wp	.38	lb/A	2-3L	20.8b	6001a
Prime Oil	l	1	qt/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
Quinclorac	wp	.38	lb/A	2-3L	21.4ab	5846ab
Propanil	ec	3	lb/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
Quinclorac	wp	.38	lb/A	2-3L	21.7a	5747ab
Thiobencarb	ec	3	lb/A	2-3L		
Prime Oil	l	1	qt/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
Quinclorac	wp	.38	lb/A	2-3L	20.6b	5133ab
Bentazon	sl	1	lb/A	2-3L		
Prime Oil	l	1	qt/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
Propanil	ec	3	lb/A	2-3L	21.2ab	5847ab
Thiobencarb	ec	3	lb/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
Propanil	ec	3	lb/A	2-3L	20.9ab	5740ab
Bentazon	sl	1	lb/A	2-3L		
GA_3	l	1	oz p/A	2-3L		
GA_3	l	1	oz p/A	2-3L	19.0c	5207ab
LSD (.05)	=				0.7	792
Standard Dev.	=				.51242	542.54
CV	=				2.49	9.69

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: PGR IV and PHCA for Yield Enhancement in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 20 Apr 93

Row Spacing: 7 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 200 lb/A by airplane, 26 May

Plot Size: 192.6 ft^2 - 6.42 (11 rows) x 30 ft

Treated Area: 192.6 ft^2 - 6.42 (11 rows) x 30 ft

Treatment(s): **Plant Growth Regulator**
(Propanil at 4 lb/A as Stam M4/A added with selected treatments)

PGR IV (3 and 6 fl oz/A)
PHCA (8 and 16 fl oz/A)

Timing

3- to 4-leaf, 18 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.5 inch 7 hr after application

Growth Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Stam M4 (1 gal/A) + Londax (1 oz/A) by hand sprayer, 26 May
Londax (1 oz/A) by airplane, 8 June
Whip (1 pt/A) by hand sprayer, 10 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Dithane (4 oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: 18 Aug

Harvested Area: 192.6 ft^2 - 6.42 (11 rows) x 30 ft

Exp. Design: Randomized complete block and four replications

Comments: PGR IV and PHCA were evaluated for effects on crop maturity and production. Weed infestations became high in treatments without propanil. Delaying overspraying for general weed control so as not to complicate the effects of the plant growth regulators applied alone at the 3- to 4-leaf stage contributed to the weed problem. Subsequent overspraying with herbicides did not eliminate the weeds. With weeds present at panicle initiation and obviously complicating the experiment, applications at panicle initiation were cancelled. Consequently, there were two different sets of results. Treatments which included propanil were higher yielding and later maturing (Table 1). There were no significant differences between rates of PGR IV tank mixed with propanil. In the weedy treatments, there were also no significant effects with PGR IV and PHCA, but there were trends. Both PGR IV seed treatments were higher yielding than the control as were all the PHCA foliar treatments. Comparing rates of PGR IV foliar treatments, yields were consistently lower at the 6-oz rate compared with the 3-oz rate.

Table 1. The effect of plant growth regulator seed and foliar treatment on productivity of rice (*Oryza sativa* 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Grain Moisture (%)	Yield (lb/A)
Control					17.2c	2261b
PGR-IV 3 oz/cw				seed	17.8c	2517b
PGR-IV 6 oz/cw				seed	18.0c	2509b
PGR-IV	l	3	oz p/A	3-4L	17.5c	2300b
PGR-IV	l	6	oz p/A	3-4L	17.2c	2108b
PGR-IV	l	3	oz p/A	3-4L	21.1ab	5934a
Propanil	ec	4	lb/A	3-4L		
PGR-IV	l	6	oz p/A	3-4L	20.1b	5719a
Propanil	ec	4	lb/A	3-4L		
PGR-IV	l	3	oz p/A	3-4L	18.3c	2537b
PGR-IV	l	3	oz p/A	PI		
PGR-IV	l	6	oz p/A	3-4L	17.1c	2301b
PGR-IV	l	6	oz p/A	PI		
PGR-IV	l	3	oz p/A	3-4L	22.4a	5519a
Propanil	ec	4	lb/A	3-4L		
PGR-IV	l	3	oz p/A	PI		
PGR-IV	l	6	oz p/A	3-4L	22.4a	5719a
Propanil	ec	4	lb/A	3-4L		
PGR-IV	l	6	oz p/A	PI		
PHCA	l	8	oz p/A	3-4L	18.2c	2500b
PHCA	l	16	oz p/A	3-4L	17.6c	2583b
PHCA	l	8	oz p/A	3-4L	16.6c	2335b
PHCA	l	8	oz p/A	PI		
LSD (.05)	=				1.7	826
Standard Dev.	=				1.1906	578.09
CV	=				6.38	17.28

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Chitosan Seed Treatment and Yield Enhancement in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 150 lb/A

Planting Date: 5 May 93

Row Spacing: Water-seeded: dry seeded by hand directly into 3- to 4-inch flood

Fertilizer: 23-12-12 with 1.2% zinc at 400 lb/A drilled preplant (28 Apr); urea (46% N) at 200 lb/A by airplane (31 May)

Water Management: Flooded for seeding (3- to 4 inches), 3 May; flood maintained until drained for harvest on 23 Aug

Plot Size: 150 ft^2 - 5 x 30 ft

Treated Area: 150 ft^2 - 5 x 30 ft

Treatment(s): **Plant Growth Regulator**

Chitosan - Various formulations (15 g/cwt)

Fungicide(s)

Metalaxyl - Apron (0.1 fluid oz/cwt)

Timing

Seed treatment

Sprayer: Not applicable

Pertinent Rainfall: Not applicable

Herbicide(s): Arrosolo (1 gal/A) by airplane (17 May)
Londax (1.5 oz/A) by airplane (8 June and 17 June)
Ordram 15G (25 lb/A) by airplane (17 June)

Insecticide(s): Furadan 3G (17 lb/A) by airplane (8 June and 16 June)

Fungicide(s): Tilt (10 oz/A) by airplane (29 June)
Benlate 50 WP (2 lb/A) by airplane (20 July)

Emergence: 9 May

Permanent Flood: 3 May

Harvest Date: 2 Sept

Harvested Area: 150 ft^2 - 5 x 30 ft

Exp. Design: Randomized complete block and four replications

Comments: Chitosan seed treatment was tested for effects on grain production. Overall analysis of variance showed no significant effect. Using the Least Significant Difference (LSD) statistical comparison, Chitosan 400 was the only treatment that was significantly different from the control (Table 1). In general, treatments lower than Chitosan 420 had a positive effect on grain yield, and treatments higher than Chitosan 420 had little effect on grain yield. No effects were noted on maturity as reflected in grain moisture at harvest.

Due to adverse environmental conditions at and following seeding, stands were relatively low. The seedbed had been made smooth by heavy rainfall prior to flooding for seeding, and windy conditions followed for several weeks following seeding. Both conditions contributed to causing seedlings to drift out of the plots. Even with these conditions, yields were good.

Table 1. The effect of plant growth regulator seed treatment on productivity of rice (*Oryza sativa* 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Yield (lb/A)	Grain Moisture (%)
Control			5776b	17.5a
100 F-1.0-LSU-93		seed	6032ab	16.5a
200 F-2.0-LSU-93		seed	6446ab	17.1a
330 blend F-3.0-LSU-93		seed	6029ab	18.2a
420 F-4.0-LSU-93		seed	6269ab	17.1a
530 F-5.0-LSU-93		seed	5858ab	17.0a
250 F-6.0-LSU-93		seed	6256ab	17.6a
395 F-7.0-LSU-93		seed	5874ab	17.3a
395+Apron F-8.0-LSU-93		seed	6267ab	16.8a
Glutamic Acid F-9.0-LSU-93		seed	6051ab	17.4a
400 F-10.0-LSU-93		seed	6687a	17.0a
500 F-11.0-LSU-93		seed	5721b	17.8a
600 F-12.0-LSU-93		seed	6182ab	17.3a
400ws F-400-ws		seed	6038ab	17.0a
LSD (.05) =			758	1.6
Standard Dev.=			530.7	1.1489
CV =			8.69	6.66

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

YIELD ENHANCEMENT STUDIES

R.T. Dunand, P.K. Bollich, R.R. Dilly, Jr., W.J. Leonards, Jr.,
G.A. Meche, and G.R. Romero

Experiment: Effect of Asset Impregnated Fertilizer and Placement Technique on Rice Production

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: See treatments

Seeding Rate: 140 lb/A

Planting Date: 30 Apr 93

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 28 Apr; seed were kept moist for 24 hr following draining before sowing by hand

Fertilizer: **First Crop**

7-21-21 with 1.2% zinc at 200 lb/A and ammonium sulfate (21% N, impregnated with Asset) at 450 lb/A preplant incorporated, 28 Apr; urea (45% N) at 100 lb/A by airplane, June 15

Second Crop

Ammonium sulfate (21% N, impregnated with Asset) at 300 lb/A by hand, 20 Aug

Water Management: Flooded for seeding (1 to 2 inches), 29 Apr; drained, 3 May; and permanent flood (3 to 4 inches), 7 May; drained for harvest, 6 Aug; flooded (3 to 4 inches), 20 Aug; drained for harvest, 8 Nov

Plot Size: 175 ft^2 - 7 x 25 ft

Treated Area: 175 ft^2 - 7 x 25 ft

Treatment(s): **Varieties**

Cypress
Lacassine

Nitrogen Placement and Plant Growth Regulator

First Crop
Banded (7-inch spacing) and 6 oz Asset/A
Broadcast and 11 oz Asset/A

Second Crop
Broadcast (6 oz Asset/A on first crop banded and 11 oz Asset/A on first crop broadcast)

Sprayer: Not applicable

Pertinent Rainfall: None

Herbicide(s): Londax (1 oz/A) by airplane, 26 May

Insecticide(s): Furadan 3G (20 lb/A) by airplane, 11 June

Fungicide(s): Dithane (4 fl. oz./cwt)

Emergence: 3 May

Permanent Flood: 7 May

Harvest Date: 19 Aug

Harvested Area: 173 ft^2 - 7 x 25 ft (Two 1 ft^2 areas removed with sampling)

Exp. Design: Randomized complete block design and four replications. Split plot arrangement of treatments (Main plot = Asset treatments and subplots = 2 x 2 factorial (2 varieties x 2 nitrogen placement methods).

Comments: **First Crop**. Evaluations of seedling establishment and growth were made at 40 days after planting (DAP). Stands of Cypress were significantly higher than Lacassine (Table 1). On average, stand of Cypress was 44 plants/ft^2 compared with 34 plants/ft^2 for Lacassine. Stand was unaffected by Asset or nitrogen placement method.

In general, seedling shoot and root development of Cypress exceeded Lacassine. Canopy density of Cypress averaged 95 stems/ft^2 compared with 70 stems/ft^2 for Lacassine. Nitrogen placement method had no effect on canopy density of Asset treatments. In the absence of Asset, canopy density of Cypress was decreased by banding fertilizer while banding increased canopy density of Lacassine. Trends in shoot weight were similar.

Root weight was monitored and showed Asset, in general, decreased root growth (Table 1). The decrease was greatest for Cypress grown under the broadcast method of fertilizer application. Without Asset, root dry weight of Cypress was 10.41 g/ft^2 compared with 8.25 g/ft^2 with Asset. Other treatment comparisons had decreases half that amount, approximately 1 g/ft^2.

Asset tended to cause a slight delay in maturity (Table 1). On average, there were 77 days to 50% heading for the Asset treatments and 76 days for treatments without Asset. In like fashion, at harvest, Asset caused an increase in grain moisture. The increase was greatest for Cypress grown under the broadcast method. Without Asset, grain moisture of Cypress was 17.8% compared with 18.6% with Asset. Other increases averaged 0.5%.

In two cases, Asset increased grain yield noticeably; in one case, Asset increased grain yield slightly; and in one case, Asset decreased grain yield slightly (Table 2). Using the banding method to fertilize Cypress, Asset increased grain yield by 466 lb/A. Similarly, using the broadcast method to fertilize Lacassine, Asset increased grain yield by 739 lb/A. In the two cases in which Asset had little effect on grain yield, Asset increased grain yield 137 lb/A when Lacassine was fertilized by the banding method, and Asset decreased grain yield 138 lb/A when Cypress was fertilized by the broadcast method.

Second Crop and Total Yield. Second crop yields were affected primarily by nitrogen placement in the first crop (Table 1). The response was variety dependent. Broadcasting nitrogen fertilizer in the first crop resulted in a 50 lb/A grain yield in Cypress compared with band placement. For Lacassine, the increase was 276 lb/A. Second crop yields are influenced by first crop yields, and in general, yields from broadcast were lower than yields for banding in the first crop.

Total yield (first + second crop) is strongly influenced by first crop yield because first crop yield is approximately 75% of the total yield. In this study, similar trends between first crop and total crop yields were noted (Table 2). In the two cases in which Asset increased first crop yield, total crop yield was also higher. Using the banding method to fertilize Cypress, Asset increased grain yield by 402 lb/A. Similarly, using the broadcast method to fertilize Lacassine, Asset increased grain yield by 536 lb/A. In the two cases in which Asset had less effect on first crop yield, Asset increased total grain yield 39 lb/A when Lacassine was fertilized by the banding method, and Asset decreased total grain yield 220 lb/A when Cypress was fertilized by the broadcast method.

Table 1. The main effect of Asset on rice variety and nitrogen fertilizer placement combinations on seedling growth and mature plant development in the main and ratoon crops. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds Rate	Grow Stg	Stand (plants/ sq ft) 40 DAP	Stemming (stems /sq ft) 40 DAP	Shoot weight (dry g/ sq ft) 40 DAP	Root weight (dry g /sq ft) 40 DAP	Mature Plant Height (cm)	Heading (DAP)	Main Crop Grain Moisture (%)	Main Crop Yield (lb/A)
TABLE OF R MEANS										
Replicate 1			38	78	33.18	6.24	76	75	17.9	7678
Replicate 2			38	84	35.35	5.28	79	76	17.7	8139
Replicate 3			39	83	33.76	6.29	74	76	17.4	7751
Replicate 4			40	86	33.92	6.78	78	77	17.8	7770
TABLE OF A MEANS										
No Asset			39	83	33.46	6.72	75	76b	17.4	7684
Asset			39	83	34.64	5.57	78	77a	18.0	7985
TABLE OF B MEANS										
Cypress Band			40ab	94a	37.94a	5.98b	81a	78a	19.1a	8783
Lacassine Band			34b	73b	29.18b	3.35c	77b	77c	17.2c	7718
Cypress Broadcast			47a	98a	40.61a	9.33a	78b	77c	18.2b	8006
Lacassine Broadcast			35b	67b	28.48b	5.93b	71c	74b	16.3d	6830

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 1. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Ratoon Crop Grain Moisture (%)	Ratoon Crop Yield (lb/A)	Total Yield (lb/A)
TABLE OF R MEANS					
Replicate 1			19.2	2143	9820
Replicate 2			18.8	2559	10698
Replicate 3			19.7	2199	9950
Replicate 4			19.9	2672	10441
TABLE OF A MEANS					
No Asset			19.4	2449	10133
Asset			19.4	2337	10321
TABLE OF B MEANS					
Cypress Band			19.5ab	2220c	11003
Lacassine Band			20.3a	2403b	10122
Cypress Broadcast			19.1b	2270c	10276
Lacassine Broadcast			18.7b	2679a	9509

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of Aaset on rice variety and nitrogen fertilizer placement combinations on seedling growth and mature plant development in the main and ratoon crops. Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Da Rate	Grow Stg	Stand (plants/ sq ft) 40 DAP	Stemmg (stems /sq ft) 40 DAP	Shoot weight (dry g/ sq ft) 40 DAP	Root weight (dry g /sq ft) 40 DAP	Mature Plant Height (cm)	Heading (DAP)	Main Crop Grain Moisture (%)	Main Crop Yield (lb/A)
No Aaset Cypress Band			38bc	89a	36.74a	6.26bc	80ab	78ab	18.9ab	8550b
No Aaset Lacassine Band			38bc	77b	29.80b	3.74cd	76bc	77ab	17.0cde	7650c
No Aaset Cypress Broadcast			44ab	99a	40.73a	10.41a	77bc	76b	17.8bc	8075c
No Aaset Lacassine Broadcast			35bc	66c	26.57b	6.48bc	68d	72d	16.0e	6460e
Aaset Cypress Band			42ab	98a	39.15a	5.70bc	83a	78a	19.3a	9016a
Aaset Lacassine Band			30c	68bc	28.56b	2.95d	78bc	77ab	17.4cd	7787c
Aaset Cypress Broadcast			50a	96a	40.48a	8.25ab	79abc	77ab	18.6ab	7937c
Aaset Lacassine Broadcast			36bc	68bc	30.38b	5.38cd	74c	75c	16.6de	7199d
LSD (.05) =			10	10	5.67	2.54	4	1	1.1	425
Standard Dev.=			6.5128	6.9135	3.8555	1.727	3.0308	.90386	.71892	288.8
CV =			16.70	8.35	11.32	28.10	3.95	1.19	4.06	3.69

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Continued.

Table 2. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Ratoon Crop Grain Moisture (%)	Ratoon Crop Yield (lb/A)	Total Yield (lb/A)
No Asset Cypress Band			19.9ab	2254de	10804ab
No Asset Lacassine Band			20.5a	2453bc	10102cd
No Asset Cypress Broadcast			18.8ab	2310cde	10386bc
No Asset Lacassine Broadcast			18.5b	2781a	9241e
Asset Cypress Band			19.1ab	2186e	11202a
Asset Lacassine Band			20.0ab	2354cd	10141cd
Asset Cypress Broadcast			19.3ab	2229de	10166cd
Asset Lacassine Broadcast			19.0ab	2578b	9777d
LSD (.05)	=		1.5	152	509
Standard Dev.	=		.99764	103.49	346.37
CV	=		5.14	4.32	3.39

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

RED RICE STUDIES

R.T. Dunand, M.P. Braverman, R.R. Dilly, Jr., and G.A. Meche

Experiment: Maleic Hydrazide and Late Season Pesticides on Seedhead Suppression in Red Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Maybelle

Seeding Rate: 150 lb/A

Planting Date: 26 Apr 93

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 24 Apr; seed were kept moist for 24 hr following draining before sowing by airplane

Fertilizer: 23-12-12 with 1.2% zinc at 200 lb/A by airplane and preplant incorporated (22 Apr); urea (46% N) at 100 lb/A by airplane (8 June)

Water Management: Flooded for seeding (1 to 2 inches), 24 Apr; drained, 26 Apr; permanent flood (3 to 4 inches), 30 Apr; and drained for harvest, 23 July

Plot Size: 630 ft^2 - 7 x 90 ft

Treated Area: 630 ft^2 - 7 x 90 ft

Treatment(s):

Plant Growth Regulator
Maleic Hydrazide - Royal MH 30 SG (2.5 lb/A)

Pesticide(s)
Acephate - Orthene (1.5 lb/A)
Benomyl - Benlate 50 WP (2 lb/A)
Carbaryl - Sevin XLR Plus (1 qt/A)
Methyl parathion - Sure Crop 4 lb Methyl (0.5 pt/A)

Timing
Milk stage (16 July)

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: Rainfall within 2 hours after application

Herbicide(s): Basagran (1 qt/A) by airplane (31 May)

Insecticide(s): Furadan 3G (17 lb/A) by airplane (26 May)

Fungicide(s): None

Emergence: 26 Apr

Permanent Flood: 30 Apr

Harvest Date: 12 Aug

Harvested Area: 630 ft^2 - 7 x 90 ft

Exp. Design: Randomized complete block and four replications

Comments: Rainfall within 2 hours of application and severe lodging (ranging between 50 and 100%) affected the results. Maleic hydrazide (MH) activity was reduced and plants from adjacent plots fell together, causing mixed results at harvest. A thick and uneven population of red rice contributed to a large degree in variability in the field data (CVs ranged between 50 and 90%).

The effect of MH on panicle production was significant (Table 1). Mature panicles of red rice were significantly reduced. Mature panicles were those having seed production to any degree. In the control treatment, mature panicle density averaged 138 panicles/sq m. With the various MH treatments, mature panicle density ranged between 6 and 25%. There was no significant effect of late season pesticide on MH activity. Benlate tended to improve MH activity and the insecticides tended to decrease MH activity relative to MH alone.

Red rice content of the grain, although relatively high for all treatments, was significantly reduced by MH application (Table 1). Without MH, grain red rice content was 44%. With MH, red rice content ranged between 14.2 to 27.9%. The results were reflective of the mature panicle density data. The only treatment that was significantly different from the control was Orthene + MH. Grain red rice content is the basis for grade determination, and the results of the various pesticide and MH combinations on grade paralleled the results on grain red rice content.

Red rice in rice grain can affect milling yield because of the poor milling yield of red rice compared with white rice. Although trends to this affect were noted in the results, MH and pesticide tank mixtures had no significant effect on milling yields (Table 1). Grain yield and moisture content were also not significantly affected by MH and pesticide tank mixtures.

Table 1. The effect of plant growth regulator, insecticide, and fungicide tank mixes on red rice (Oryza sativa L.) suppression in rice (Oryza sativa 'Maybelle'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Lodging (%)	Red Rice Panicle Density (panicles /sq m) 27 DAT	Grain Red Rice Content (%)	Grade (r.u.)	Total Milling (%)	Whole Milling (%)	Yield (lb/A)	Grain Moisture (%)
Control				100a	138a	44.0a	7a	53a	38a	4058b	20.4a
MH 30	df	1.5	ds	100a	17b	18.4ab	6a	56a	44a	3365b	18.4a
Benlate	wp	1	ds	50b	6b	17.2b	5a	59a	48a	3921b	17.7a
MH	df	1.5	ds								
Malathion	ec	.5	ds	100a	141a	38.5ab	7a	59a	47a	6230a	16.4a
MH	df	1.5	ds								
Orthene	s	1	ds	83ab	23b	14.2b	6a	58a	47a	4353b	18.6a
MH	df	1.5	ds								
Sevin XLR Plus	ec	1	ds	100a	26b	19.8ab	5a	56a	44a	4005b	18.8a
MH	df	1.5	ds								
Methyl parathi	ec	.25	ds	100a	25b	27.9ab	7a	53a	41a	3416b	20.7a
MH	df	1.5	ds								
LSD (.05)	=			41	59	24.1	2	7	10	1690	4.9
Standard Dev.	=			23.145	32.952	13.542	1.0764	4.2041	5.8411	949.81	2.7511
CV	=			25.58	61.35	52.66	17.13	7.50	13.26	22.66	14.70

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

RED RICE STUDIES

R.T. Dunand, M.P. Braverman, R.R. Dilly, Jr., and G.A. Meche

Experiment: High Rates of Maleic Hydrazide and Seedhead Suppression in Dense Red Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Maybelle

Seeding Rate: 150 lb/A

Planting Date: 26 Apr 93

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 24 Apr; seed were kept moist for 24 hr following draining before sowing by airplane

Fertilizer: 23-12-12 with 1.2% zinc at 200 lb/A by airplane and preplant incorporated (22 Apr); urea (46% N) at 100 lb/A by airplane (8 June)

Water Management: Flooded for seeding (1 to 2 inches), 24 Apr; drained, 26 Apr; permanent flood (3 to 4 inches), 30 Apr; and drained for harvest, 23 July

Plot Size: 630 ft^2 - 7 x 90 ft

Treated Area: 630 ft^2 - 7 x 90 ft

Treatment(s): **Plant Growth Regulator**

Maleic Hydrazide - Royal MH 30 SG

Adjuvant(s)

Penetrator Plus (1 pt/A)
Tween 20 (4.8 oz/A)

Timing

Milk stage (16 July)

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: Rainfall within 2 hours after application

Herbicide(s): Basagran (1 qt/A) by airplane (31 May)

Insecticide(s): Furadan 3G (17 lb/A) by airplane (26 May)

Fungicide(s): None

Emergence: 26 Apr

Permanent Flood: 30 Apr

Harvest Date: 12 Aug

Harvested Area: 630 ft^2 - 7 x 90 ft

Exp. Design: Randomized complete block and four replications

Comments: Rainfall within 2 hours of application and severe lodging (ranging between 50 and 100%) affected the results. Maleic hydrazide (MH) activity was reduced and plants from adjacent plots fell together, causing mixed results at harvest. A thick and uneven population of red rice contributed to a large degree in variability in the field data (CVs ranged between 15 and 77%).

The effect of MH on panicle production was significant (Table 1). Mature panicles of red rice were significantly reduced. Mature panicles were those having seed production to any degree. In the control treatment, mature panicle density averaged 174 panicles/sq m. With the various MH treatments, mature panicle density ranged between 2 and 25 panicles/sq m. Rate of MH had a small but insignificant affect and adjuvants appeared to reduce the efficacy of MH.

Red rice content of the grain, although relatively high for all treatments, was significantly reduced by MH application (Table 1). Without MH, grain red rice content was 52.6%. With MH, red rice content ranged from 9.4 to 21.4%. The results were reflective of the mature panicle density data. Rate of MH had little effect and adjuvants appeared to reduce the efficacy of MH. Grain red rice content is the basis for grade determination, and the results of MH on grade paralleled the results on grain red rice content.

Red rice in rice grain can affect milling yield because of the poor milling yield of red rice compared with white rice. Although trends to this affect were noted in the results, MH had no significant affect on milling yields (Table 1). Grain yield and moisture content were also not significantly affected by MH.

Table 1. The effect of rate of plant growth regulator and adjuvants on red rice (Oryza sativa L.) suppression in rice (Oryza sativa 'Maybelle'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	Lodging (%)	Red Rice Panicle Density (panicles /sq m) 24 DAT	Grain Red Rice Content (%)	Grade (r.u.)	Total Milling (%)	Whole Milling (%)	Grain Moisture (%)	Yield (lb/A)
Control					100a	174a	52.6a	7a	55a	42a	18.9a	4558a
MH	df	1.5	lb/A	DS	50a	8b	10.4b	5a	61a	48a	16.4a	4269a
MH	df	3.0	lb/A	DS	50a	2b	9.4b	5a	59a	45a	17.2a	3512a
MH	df	4.5	lb/A	DS	50a	3b	10.2b	4a	57a	44a	16.6a	3514a
MH	df	1.5	lb/A	DS	50a	10b	12.6b	5a	59a	47a	17.0a	4310a
Penetrator Plu	l	1	pt/A	DS								
MH	df	1.5	lb/A	DS	100a	25b	21.4b	6a	55a	44a	17.8a	3745a
Tween 20	l	4.8	oz p/A	DS								
LSD (.05)	=				75	40	22.5	3	8	7	4.1	2530
Standard Dev.	=				49.441	26.617	14.945	2.1317	5.1604	4.8542	2.6918	1679.2
CV	=				74.16	72.02	77.02	41.26	8.97	10.78	15.55	42.14

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

UPPER CANOPY ELONGATION STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Harvest Efficiency in Semidwarf Rice

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 21 Apr 93

Row Spacing: 7 inches

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46%) at 200 lb/A by airplane, 26 May

Plot Size: 6581 ft^2 - 16.33 (28 rows) x 403 ft

Treated Area: 6581 ft^2 - 16.33 (28 rows) x 403 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid - GibGro 4LS (5 oz/A)

Timing

50% heading, 22 July

Combine Speed

1.8, 2.1, and 2.7 MPH

Sprayer: CO_2-driven, hand-held, 21 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 24 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt) seed treatment

Herbicide(s): Stam M4 (3 qt/A) by airplane, 12 May
Stam M4 (4 qt/A) + Basagran (1 qt/A) by airplane, 17 May
Stam M4 (3 qt/A) + Londax (1 oz/A) by airplane, 26 May
Ordram 15-G (25 lb/A) by airplane, 8 June
Londax (1 oz/A) by airplane, 8 June
Bolero 10G (30 lb/A) by airplane, 16 June

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 8 June

Fungicide(s): Dithane (4 oz/cwt) seed treatment
Benlate 50 WP (1 lb/A) by airplane, 20 July

Emergence: 29 Apr

Permanent Flood: 27 May

Harvest Date: 19 Aug

Harvested Area: 5172 ft^2 - 12.83 (22 rows) x 403 ft

Exp. Design: Randomized complete block design and three replications. Factorial (3 combine speeds x 2 gibberellic acid rates) arrangement of treatments.

Comments: The application of gibberellic acid altered upper canopy development (Table 1). Overall plant height (distance from base of plant to tip of panicle extended upward) was increased significantly by 12 cm. Panicle exsertion above the collar of the flag leaf was significantly increased an additional 2 cm and stem length (distance from base of plant to base of panicle) was significantly increased by 10 cm.

These extensions of the upper canopy allowed cutting height to be raised 5 inches. Plots not treated with gibberellic acid were cut at 18 inches from the base of the plants and plots treated with gibberellic acid were cut at 23 inches from the base.

Even with less plant matter entering the combine during harvest, harvest efficiency decreased as combine speed increased (Table 1). Whether treated with gibberellic acid or not, grain yield decreased an average of 481 lb/A when combine speed was increased from 1.8 to 2.1 MPH, and yield decreased an additional 534 lb/A when combine speed was increased to 2.7 MPH. Less straw was noted behind the combine following harvest of the gibberellic acid treatments compared with the control treatments. With this reduction in straw intake, there was a decrease in threshing efficiency. This decrease was less for the GA_3 treatments (Table 2). In the GA_3 treatments, grain yield decreased 450 lb/A on average with each increase in combine speed. Without GA_3, the decrease was 580 lb/A.

This resulted in a 900-lb/A decrease at the highest speed using GA_3 compared with a 1130-lb/A decrease without GA_3. Reductions in the clearance of the threshing mechanism would have increased threshing efficiency even more for the GA_3 treatments and prevented the 900-lb/A yield reduction in the gibberellic acid treatments that were harvested at the higher combine speeds.

Table 1. The main effect of plant growth regulator foliar treatment and harvesting speed on productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Plant Height (cm)	Panicle Extension (cm)	Stem Height (cm)	Yield (lb/A)	Grain Moisture (%)
TABLE OF R MEANS								
Replicate 1				104	3	79	4032	17.6
Replicate 2				105	3	81	4131	18.8
Replicate 3				105	3	81	3820	19.1
TABLE OF A MEANS								
GA_3	1	0		99b	2b	75b	3966	18.4
GA_3	1	5	50%H	111a	4a	85a	4023	18.6
TABLE OF B MEANS								
Speed 1.8 MPH				106	3	82	4493a	18.7
Speed 2.1 MPH				104	3	80	4012b	18.6
Speed 2.7 MPH				105	3	80	3478c	18.2

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator foliar treatment and harvesting speed on productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Grow Stg	Plant Height (cm)	Panicle Extension (cm)	Stem Height (cm)	Yield (lb/A)	Grain Moisture (%)
GA_3 Speed 1.8 MPH	1	0		100b	2c	77b	4524a	18.6a
GA_3 Speed 2.1 MPH	1	0		98b	2bc	74b	3980b	18.5a
GA_3 Speed 2.7 MPH	1	0		98b	2c	75b	3393c	18.1a
GA_3 Speed 1.8 MPH	1	5	50%H	111a	4ab	87a	4461a	18.8a
GA_3 Speed 2.1 MPH	1	5	50%H	110a	4a	85a	4043b	18.8a
GA_3 Speed 2.7 MPH	1	5	50%H	111a	4ab	84a	3563c	18.4a
LSD (.05) =				4	1	6	181	0.8
Standard Dev.=				2.2335	.80966	3.0258	99.441	.43881
CV =				2.13	28.03	3.76	2.49	2.37

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

UPPER CANOPY ELONGATION STUDIES

R.T. Dunand, D.E. Groth, R.R. Dilly, Jr., and G.A. Meche

Experiment: Gibberellic Acid and Fungicide Foliar Treatment for Disease Control in Rice

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 120 lb/A

Planting Date: 28 Apr 93

Row Spacing: 7 inches

Fertilizer: 7-21-21 with 1.2% zinc at 200 lb/A preplant incorporated, 27 Apr; urea (46% N) at 100 lb/A by airplane, 18 May and 11 June

Plot Size: 64 ft^2 - 4 (7 rows) x 16 ft

Treated Area: 64 ft^2 - 4 (7 rows) x 16 ft

Treatment(s): **Plant Growth Regulator**

Gibberellic acid - GibGro 4LS (3 and 6 oz/A)

Fungicide(s)

Benomyl - Benlate 50 WP (1.5 lb/A)
Iprodione - Rovral 4F (1 pt/A)

Timing

50% heading, 20 July

Sprayer: CO_2-driven, hand-held, 26 psi, 15 GPA, 8002 nozzles

Pertinent **Rainfall:** No rainfall within 24 hours after application

Herbicide(s): Stam M4 (1 gal/A) + Basagran (2 qt/A) by airplane, 17 May
Londax (1.5 oz/A) by airplane, 26 May

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 26 May

Fungicide(s): Gufstafson Thiram (3.3 fl oz/cwt) seed treatment

Emergence: 9 May

Permanent Flood: 19 May

Harvest Date: 27 Aug

Harvested Area: 37.3 ft^2 = 2.33 (4 rows) x 16 ft

Exp. Design: Randomized complete block design and four replications. Factorial (2 gibberellic acid rates x 2 fungicides x 2 fungicide rates) arrangement of treatments.

Comments: All evaluations of sheath blight control were lower for the benomyl and iprodione treatments regardless of presence or absence of gibberellic acid (Table 1). On average, the fungicides reduced sheath blight rating by one unit and percentage of tillers infected with sheath blight by 15 to 17%. A similar effect on percentage of tillers infected with sheath blight was noted for gibberellic acid. Regardless of presence or absence of fungicide percentage of tillers infected with sheath blight was reduced 12 to 16% by gibberellic acid. Of all treatments only benomyl gave blast control. There was a 13% reduction in percentage of panicles infected.

At maturity, plant stature, maturity, and grain production were evaluated. Both benomyl and GA_3 significantly increased plant height (Table 1). Plant height was increased an average of 3 cm by benomyl and 6 and 10 cm by the 3 and 6 oz/A rates of GA_3, respectively. Maturity was delayed slightly by fungicide application as noted in the 0.6 and 0.9% higher moisture for treatments with iprodione and benomyl, respectively. There were interactions between fungicide and gibberellic acid on grain yield (Table 2). Without fungicide, GA_3 increased grain yield at the 3 oz/A rate but not at the 6 oz/A rate. Otherwise, GA_3 had little effect on disease control when mixed with a fungicide. The exception was GA_3 at the 3 oz/A rate mixed with iprodione. This treatment had a lower yield than the treatment with benomyl alone.

Table 1. The main effect of plant growth regulator and fungicide foliar treatment on chemical efficacy and productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	SB Rated (r.u.)	SB Rated % tiller	Blast % rotten necks	Pl. Ht. (cm)	Grain Moisture (%)	Yield (lb/A)
TABLE OF R MEANS										
Replicate 1					7	67	31	95	18.1	6341
Replicate 2					7	71	35	95	18.3	6369
Replicate 3					7	66	27	95	18.4	6314
Replicate 4					7	70	37	96	18.6	6214
Replicate 5					7	64	27	93	18.6	6097
Replicate 6					7	64	25	96	19.0	6297
TABLE OF A MEANS										
No Fungicide					8a	78a	36a	94a	18.0b	6062
Benomyl 50WP	wp	0.75	lb/A	50%H	7b	61b	23b	97b	18.9a	6444
Iprodione 4F	ec	0.5	lb/A	50%H	7b	63b	33a	95ab	18.6a	6310
TABLE OF B MEANS										
No GA					7	76a	30	90c	18.2	6202
GA_3	l	3	oz p/A	50%H	7	64b	32	96b	18.6	6328
GA_3	l	6	oz p/A	50%H	7	60b	29	100a	18.7	6286

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

Table 2. The simple effects of plant growth regulator and fungicide foliar treatment on chemical efficacy and productivity of rice (Oryza sativa 'Lemont'). Rice Research Station, Crowley, LA. 1993.

Treatment Name	Fm Ds	Rate	Rate Unit	Grow Stg	SB Rated (r.u.)	SB Rated % tiller	Blast % rotten necks	Pl. Ht. (cm)	Grain Moisture (%)	Yield (lb/A)
No Fungicide No GA					8a	89a	37a	89e	17.9c	5680d
No Fungicide GA_3	l	3	oz p/A	50%H	8a	73ab	32ab	94d	18.1bc	6478ab
No Fungicide GA_3	l	6	oz p/A	50%H	7ab	72abc	39a	98bc	18.1bc	6027cd
Benomyl 50WP No GA	wp	0.75	lb/A	50%H	7ab	72abc	22cd	90e	18.7abc	6665a
Benomyl 50WP GA_3	wp l	0.75 3	lb/A oz p/A	50%H 50%H	7b	54cd	27bc	98bc	18.9ab	6353abc
Benomyl 50WP GA_3	wp l	0.75 6	lb/A oz p/A	50%H 50%H	7b	55bcd	19d	101a	19.1a	6314abc
Iprodione 4F No GA	ec	0.5	lb/A	50%H	7b	69bcd	32ab	91e	18.1bc	6262abc
Iprodione 4F GA_3	ec l	0.5 3	lb/A oz p/A	50%H 50%H	7ab	66bcd	36ab	95cd	18.8abc	6154bc
Iprodione 4F GA_3	ec l	0.5 6	lb/A oz p/A	50%H 50%H	7ab	53d	31ab	100ab	18.7abc	6516ab
LSD (.05)	=				1	16	8	3	0.9	389
Standard Dev.	=				.63464	13.891	6.8599	2.3333	.75585	332.96
CV	=				9.00	20.75	22.57	2.45	4.09	5.31

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

DEVELOPMENT OF CHEMICALS FOR BREAKING SEED DORMANCY

Marc Alan Cohn

SUMMARY

Using dehulled, dormant red rice as a model system, the efficacy of dormancy-breaking chemicals can be dramatically altered by location and nature of functional groups. Seeds were exposed to chemicals as a 24-hour pulse and then incubated in water at 30°C for up to 14 days. 1-pentanol or hexanol stimulated germination; 2-pentanol, 2-hexanol, or 3-pentanol were inactive. In contrast, aliphatic ketones of 3 to 5 carbons broke dormancy.

While cyclohexane carboxylic acid broke dormancy, cyclohexanol and cyclohexanone were inactive. Moreover, cyclohexylmethanol or 2-cyclohexylethanol broke dormancy readily while 1-cyclohexylethanol was inactive. Concentrations of active chemicals that yielded 50% germination were consistent with previously derived regression equations correlating the relative activity of more than 2 dozen chemicals with lipophilicity (Cohn et al., 1989). However, more than lipophilicity alone governed activity. Inactive substances penetrated the seeds as indicated by toxicity effects during axis-growth, viability assays after chemical treatments. Taken together, these data strongly indicate that an -OH functional group must be at a location susceptible to oxidative modification to a -COOH for dormancy-breaking activity. In contrast, the position of a carbonyl group (C=O) does not seem to alter the dormancy-breaking activity of aldehydes and ketones.

INTRODUCTION

Seed dormancy is a state of suspended animation that permits the survival of numerous higher plant species under suboptimal conditions. To properly evaluate seed performance in the laboratory, plant a crop in the field, or control weeds efficiently, seed dormancy must be broken.

While manipulations of light and temperature regimes, as well as application of various chemicals, are generally known to break dormancy, such treatments have been derived empirically and are only effective for certain plant species under specific conditions. Progress in logical development of broad-spectrum, cost-effective, dormancy-breaking chemicals has been hampered by a lack of research on the relationship between chemical structure and physiological activity.

Addressing this deficiency, recent results from this laboratory have clearly shown that the relative dormancy-breaking activities of weak acids, alcohols, aldehydes, and esters are strongly dependent upon the lipid solubility of each chemical (Cohn, 1990).

Materials with the highest lipid solubility (octanol/water partition coefficients) showed the greatest activity (i.e. elicit germination at the lowest concentrations). However, this is not the whole story; further data analysis suggested that the nature and position of the functional groups present would also alter dormancy-breaking activity (Cohn et al., 1989). The objective of the research summarized in this report was to (1) experimentally measure the change in the efficacy of dormancy-breaking chemicals after altering the position of either carbonyl or hydroxy groups and (2) further extend previous work on the impact of chemical lipophilicity upon activity.

MATERIALS AND METHODS

Seeds of red rice (Oryza sp.) - an annual grass - were utilized as the model system. Red rice was selected for study because the species is a serious weed problem in Louisiana agriculture due to persistence of its seeds, and the seeds are completely dormant at maturity, readily produced in mass quantities, and are easy to experimentally manipulate. Mature, strawhulled, awnless red rice was obtained from the South Farm, Rice Research Station, Crowley, LA. Seeds were harvested via hand-shattering, air dried at room temperature for 3 days to under 12% moisture content (fwb), and stored in sealed glass containers at -15C until use. Seeds were dehulled by hand just prior to treatments.

Groups of 20 dehulled seeds were placed in 50 ml Erlenmeyer flasks containing two layers of Whatman No. 1 filter paper and 2 ml of test solution for 24 hours. All incubations were conducted at 30C in darkness. After treatment, seeds were rinsed from flasks, washed copiously with running water, briefly blotted with tissue, and transferred to clean flasks containing filter paper and 2 ml of water for 7 to 14 days, 30°C. Each treatment consisted of five replications, and experiments were repeated an average of three times. All chemicals employed were reagent grade or better. Test solutions were prepared fresh daily. Germination over the timecourse of each experiment was scored as visible protrusion of the radicle. Viability of ungerminated seeds was evaluated after treatments by growth of isolated embryos.

Octanol/water partition coefficients were obtained directly from Sangster (1989), by regression equations, or experimental determinations (Table 1). These values helped to predict the dormancy-breaking concentration ranges for each chemical. Partition coefficient values were also utilized in graphing structure-activity plots for physiologically active chemicals.

RESULTS AND DISCUSSION

Chemical concentrations required to elicit 50% germination are listed in Table 1. The concentrations needed to obtain 50% germination for all active chemicals in this study were inversely correlated with partition coefficient values. Regression analysis was consistent with existing data (Cohn et al., 1989).

Role of carbon-chain length

We had hypothesized that alcohols of seven carbons or greater have restricted access to a receptor site involved in the dormancy-breaking process at the cellular level to explain initial difficulties in obtaining 50% germination or greater. However, this was not the reason for the problems observed. The "cut-off" analogy was discarded after evaluation of numerous optimization experiments (flask sealing, double chemical pulse, solution volume, extended germination times). We concluded that slower seed response to applied chemicals (possibly a result of enhanced toxicity) and general solution factors resulted in the less than maximal seed response observed previously. We explored the use of surfactants to simplify these experiments but did not observe any enhancement of the germination response.

While 50% or greater germination was obtained with hexanol or heptanol, a significant part of the seed population did not germinate even though the seeds were viable after chemical treatment. This could be ascribed to sensitivity differences between seed weight classes. Dehulled seeds were weighed individually and divided into low weight (<20.9 mg/seed) and a high weight class (>23 mg/seed). The high weight seeds responded markedly to dormancy-breaking concentrations of hexanol and heptanol. In contrast, the low weight seeds exhibited minimal germination (<20% germination) although shown to be viable after chemical exposure.

Carboxylic acids (seven carbon linear and cyclized, eight carbon linear) are active as dormancy-breaking chemicals. Increasing the carbon-chain length increases lipophilicity of the molecule and reduces the applied concentration required for 50% germination proportionally.

Position and nature of functional groups

(1) Hydroxyl group position: A germination response to 1-pentanol or 1-hexanol was observed. In contrast, no dormancy-breaking activity was seen using 2-pentanol, 3-pentanol, or 2-hexanol.

Experiments with cyclohexanol showed minimal stimulation. This is consistent with the lack of response to linear non-primary alcohols and suggested that non-acid substances must be amenable by biochemical transformation to a carboxylic acid. This was confirmed by demonstrating that cyclohexylmethanol and 2-cyclohexylethanol substances potentially convertible to a monocarboxylic acid, will break dormancy. The putative metabolic product of cyclohexylmethanol, i.e. cyclohexanecarboxylic acid, readily broke dormancy. In contrast, only minimal germination was observed over the same range of concentrations if the hydroxyl group was positioned internally (1-cyclohexylethanol).

Octanol/water partition coefficients of inactive substances were similar to those of dormancy-breaking substances (Table 1). Lack of uptake of inactive substances was not a limiting feature since various concentrations of 2-pentanol (150 mM), 2-hexanol (60 mM), cyclohexanol (125 mM), and cyclohexanone (200 mM) killed the seeds. Taken together, results with linear and cyclic alcohols and derivatives strongly point to the importance of hydroxyl group placement for dormancy-breaking activity (Cohn et al., 1991).

Seed response to secondary alcohols is also influenced by carbon-chain length to a limited extent. Both isopropanol (three carbons) and 2-butanol exhibit dormancy-breaking activity, yet secondary alcohols with longer carbon-chain lengths have no activity.

(2) Nature of the oxygen functionality: We had hypothesized that ketones would be inactive because of the internal position of the oxygen-containing functionality. This was correct for the cyclic ketones: cyclohexanone and cycloheptanone. However, based upon preliminary data indicating dormancy-breaking activity for 2-propanone (acetone), complete concentration vs activity curves were generated for 2-propanone, 2-butanone, 2-pentanone, and 3-pentanone. Each ketone elicited dormancy-breaking activity to 50% germination or higher in the one seedlot tested. These results were exciting, unexpected, and suggested that a metabolic pathway independent of alcohol and aldehyde dehydrogenases could account for the linear ketone response. Confirmation of these results with other seedlots is in progress.

(3) Abscisic acid (ABA): ABA is a monocarboxylic acid; however, it usually is associated with the maintenance or induction of seed dormancy. As such, ABA is rarely tested for dormancy-breaking activity. Interestingly, this germination-inhibiting property contrasts with the dormancy-breaking activity of simple monocarboxylic acids. ABA was tested at its pK (pH 4.7) as a 24-hour pulse treatment from 1 pM to 5 mM (solubility limit). No dormancy-breaking activity was observed. Growth inhibition of isolated embryos (which germinate) from dormant seeds showed sensitivity at 10 uM.

Future Directions

The thrust of this research program will, by necessity, become more biochemical in nature. The metabolism of dormancy-breaking chemicals requires study to suggest further structural design strategies. The mechanism of the dormancy-breaking process is also of significant interest. Work is focused upon the regulation of intracellular pH (Footitt and Cohn, 1992) and levels of glycolytic regulators (Cohn and Footitt, 1992; Footitt and Cohn, 1993). Both of these coarse metabolic controls appear highly sensitive to the development status of the seed.

Structure-activity studies will continue with investigation of linear multifunctional compounds.

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Table 1. Partition coefficients and dormancy-breaking activity of chemicals.

Compound	Log, partition coefficient (Log Ko/w)	mM concentration, 50% germination (G50, mM)
2-butanol	0.65	350-425 mM
2-pentanol	1.18	inactive
3-pentanol	1.11	inactive
2-hexanol	1.79	inactive
cyclohexanol	1.27	inactive
1-cyclohexylethanol	2.48	inactive
1-pentanol	1.57	6.7 mM
cyclohexylmethanol	1.78	5.2 mM
1-hexanol	2.10	7.5 mM
2-cyclohexylethanol	2.36	2.0 mM
1-heptanol	2.62	3.5 mM
1-octanol	3.07	0.7 mM
2-propanone	-0.24	910 mM
2-butanone	0.29	275 mM
2-pentanone	0.84	144 mM
3-pentanone	0.82	200 mM
cyclohexanone	0.89	inactive
cycloheptanone	1.43	inactive
cyclohexanecarboxylic acid	2.01	1.12 mM
heptanoic acid	2.50	1.7 mM
octanoic acid	2.82	0.7 mM

WEED CONTROL STUDIES

Michael Braverman

Mannagrass:

Several preplant burndown treatments were evaluated for the control of mannagrass (Glyceria septentrionalis) on existing stands. This study was conducted on Mr. Errol Lounsberry's farm in Gueydan, Vermilion Parish. Mannagrass was in full bloom when herbicides were applied on March 25, 1993 in a 10 gal/A spray volume. Fusilade, Select, Poast Plus, Whip, and Assure II were mixed with Herbimax Crop oil at 2 pt/A, while all other herbicides were applied with X-77 surfactant at 0.5% by volume. Treatments were replicated four times in a randomized complete block design.

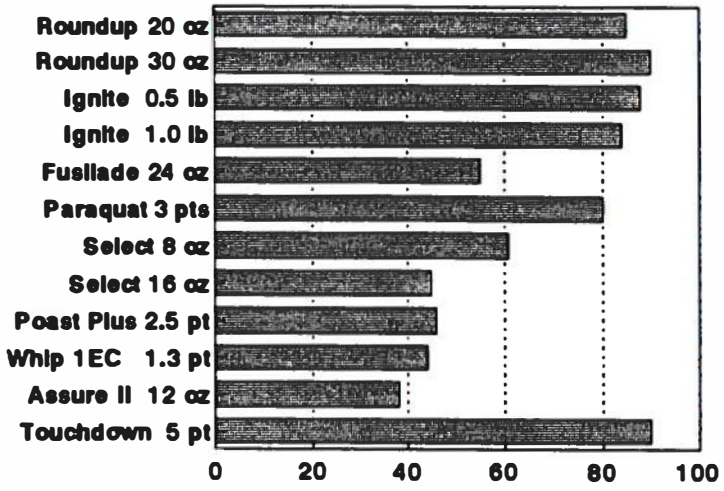
At 1 week after application, Roundup at 20 or 30 oz/A, Ignite at 0.5 or 1.0 lb ai/A, Paraquat(Gramoxone Extra) at 3 pt/A, and Touchdown at 5 pt/A all provided 80 to 90% control. At 2 weeks after application, both Roundup treatments and Touchdown provided around 100% control. Control with Paraquat at 3 pt/A or Ignite at the 1.0 lb ai/A rate maintained 82% control, while regrowth was evident at the low rate of Ignite. Control with the graminicides increased but still was not adequate. At 4 weeks after application, Roundup at either rate and Touchdown continued to provide 95 to 100% control. Mannagrass regrew slightly in the Paraquat treatment and regrew dramatically in the Ignite treatments. Control with most of the graminicides improved, where Poast Plus provided 100% control and Fusilade at 24 oz and Select at 16 oz/A provided about 90% control. Whip only provided 45% control; however, it is the only herbicide tested here that could be used postemergence in rice.

Watergrass:

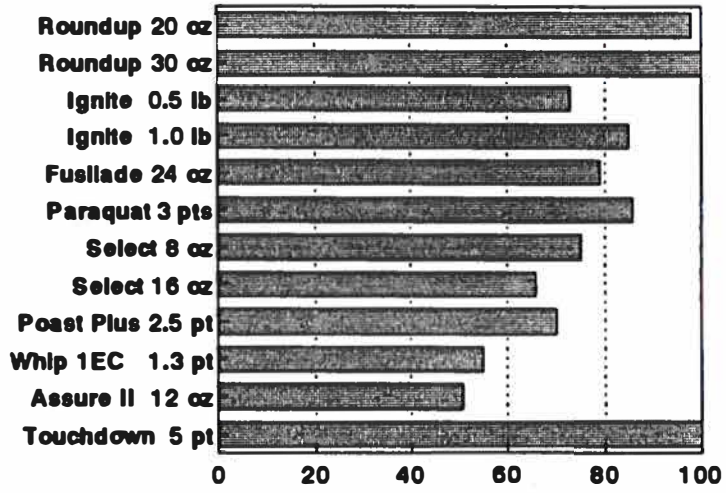
This weed, like mannagrass, is a perennial weed. It is often referred to by several common names such as watergrass, southern watergrass, water bermuda, etc. Scientifically, it is referred to as Hydrochloa caroliniensis. Several preplant burndown treatments were evaluated for the control of watergrass on existing stands. This study was conducted on Mr. Mike Pousson's farm in Iota. Watergrass was approximately 3 inches tall and spread over most of the area tested. Herbicides were applied in a 10 gal/A spray volume. Poast Plus and Assure II were mixed with Herbimax Crop oil at 2.5% while all other herbicides were applied with X-77 surfactant at 0.5% by volume. Treatments were replicated four times in a randomized complete block design.

At 1 week after application, Ignite at 1 lb ai/A provided poor control, but the 65% control was still the best treatment. At 5 weeks after application, 85 oz/A of Touchdown provided 90% control and 60 oz/A of Roundup provided 78% control. Regrowth was evident in the Ignite-treated plots, and all other treatments provided minimal control.

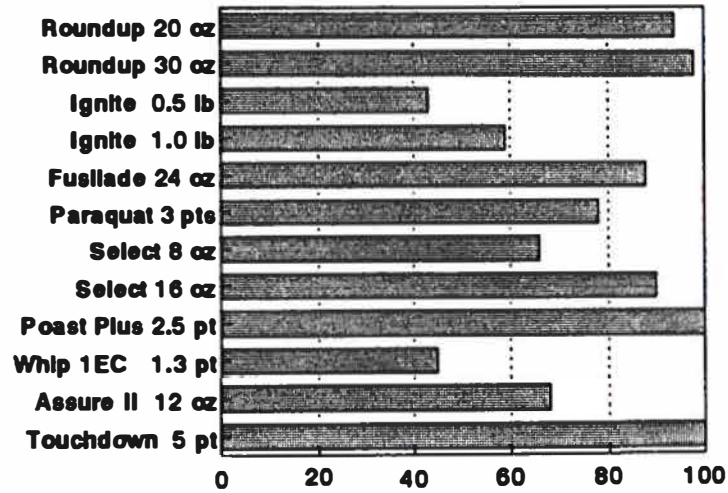
Mannagrass Control at 1 wk



Mannagrass Control at 2 wks

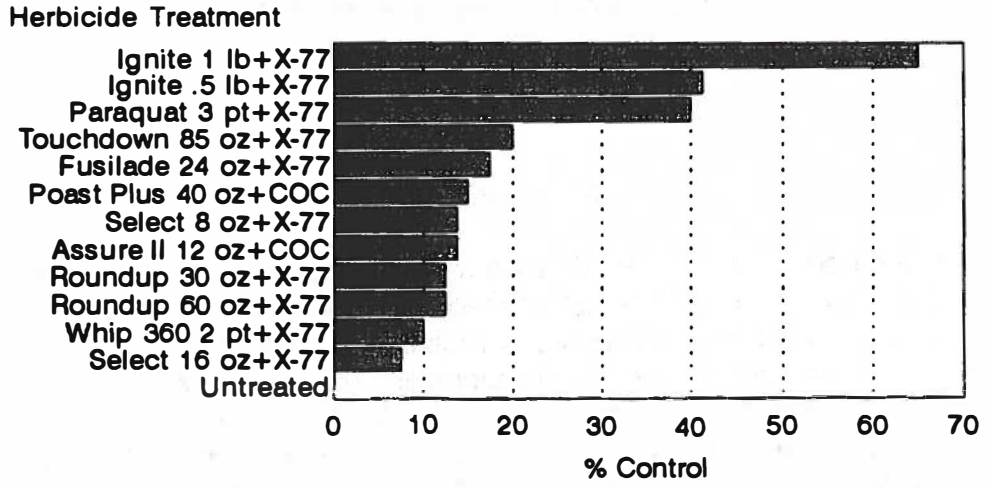


Mannagrass Control at 4 wks



Southern Watergrass (Hydrochloa) Control

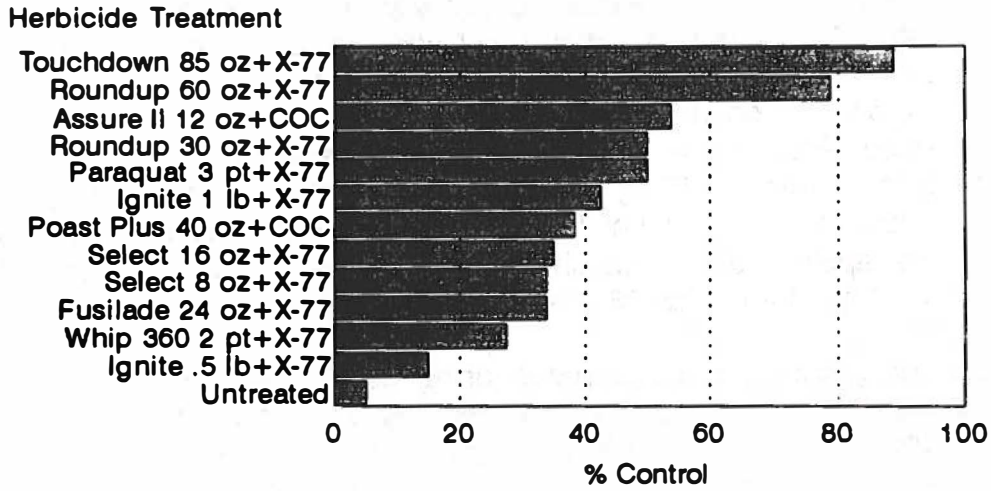
1 Week After Application



X-77 at 0.5% by volume
COC=Herbimax Crop Oil Concentrate at 2.5% by volume

Southern Watergrass (Hydrochloa) Control

5 Weeks After Application



X-77 at 0.5% by volume
COC=Herbimax Crop Oil Concentrate at 2.5% by volume

POSTFLOOD GRANULAR HERBICIDE COMBINATIONS FOR WEED CONTROL IN RICE

M.P. Braverman

INTRODUCTION

The weed complexes that exist in the water-seeded rice culture of south Louisiana often involve both grasses and aquatic weeds. Such complexes can require different herbicides, such as granular thiobencarb or molinate and spray applications of quinclorac or bensulfuron. Tank mix herbicide applications are widely used in all crops as a method to increase the activity or spectrum of weed control. Since granular and spray applications can not be applied together, separate costs for aerial application are also incurred. During the course of rice production, granular fertilizer is also applied by air. Recently, the application of fertilizer coated with bensulfuron has become a popular commercial method to control aquatic weeds in rice due to the savings in application costs and its effectiveness.

MATERIALS AND METHODS

Experiments were conducted at the Rice Research Station South Unit in Crowley, Louisiana, in 1992 and 1993. Soil was a Crowley silt loam (fine montmorillonitic, thermic Typic Albaqualf). Each plot was individually leveed, which created an average flooded surface area of 4.6 X 12.2 m and a 3 X 9.1 m seeded plot area. Herbicide rate calculations were based on the flooded surface area of the plots when the flood was 10.2 to 15.24 cm deep. Pregerminated 'Lemont' rice was water seeded by hand in 1992 and by air in 1993 at the rate of 143 kg ha^{-1} on May 1 and May 14, respectively. Plots were drained for seedling establishment for 7 days and flushed as needed. Successive flushings were applied during which weeds emerged and permanent flood was established on May 19 and May 26, respectively.

Herbicide granules were prepared using commercial granular formulations of thiobencarb, molinate, or granular 7-21-21 fertilizer as a carrier to supply 4.4 kg ai of herbicide or 275 kg of formulated fertilizer granule ha^{-1}, respectively. Bensulfuron and quinclorac (technical grade) were suspended (partially dissolved) in 100 ml of water or Dimethyl sulfoxide, respectively, plus 1 ml of non-ionic surfactant. Granules were placed in a portable cement mixer and sprayed with quinclorac or bensulfuron so that when the carrier granules were coated, supplied 0, 0.275, 0.418, and 0.55 kg ha^{-1} quinclorac, or 0, 0.0275, 0.055, and 0.11 kg ha^{-1} of bensulfuron. The minimal amount of solvent used to spray the herbicide coatings dried rapidly. Fertilizer and herbicide granule combinations were applied by hand to each plot on June 4, 1992 and June 9, 1993. Plots that did not have fertilizer treated with herbicide were also treated with 7-21-21 fertilizer at 275 kg ha^{-1} to maintain treatment uniformity.

RESULTS AND DISCUSSION

Junglerice control at 2 and 4 weeks after treatment was affected by carrier granule and herbicide coating (Table 1). When thiobencarb or fertilizer was used as the carrier granule, junglerice control was 55% or less, regardless of herbicide coating while molinate provided at least 81% control. Fertilizer coated with quinclorac at the 0.55 kg rate or thiobencarb coated at all rates of quinclorac provided greater junglerice control than the untreated check and thiobencarb granules alone, respectively. Control with molinate was not significantly improved by any of the herbicide coatings. Bensulfuron coated on thiobencarb or fertilizer did not increase junglerice control while on molinate it tended to increase control, but was not significantly different regardless of coating. Junglerice control with most thiobencarb or fertilizer-herbicide coating combinations decreased from 2 to 4 weeks after treatment; however control with molinate tended to improve. Smith (1990) reported that for consistent postemergence barnyardgrass control with quinclorac, the addition of surfactant was required.

Ducksalad control was affected by carrier granule, herbicide coating, and year (Table 2). Bensulfuron at 0.055 or 0.11 kg ha^{-1} was the only herbicide that provided adequate control of ducksalad. Overall control of ducksalad was greater in 1993 than in 1992, and there was generally a decrease in control comparing 2 and 4 weeks after treatment.

Rice injury and yield were affected by carrier granule and year (Table 3). Significantly greater rice injury was caused by molinate than thiobencarb or fertilizer in 1992, but not 1993. While there were statistical differences, the greatest injury of 11.3% was not of any practical significance, and the rice receiving the molinate treatment produced the greatest yields. Junglerice competition in 1992 was not as severe as in 1993, and may be the reason for significant differences in yield in 1993. Overall, yields were low because no early season herbicide treatment was applied.

While quinclorac did provide some junglerice control, there was not a significant enough of a reduction in junglerice competition to influence rice yields. Similarly, there were several treatments that provided excellent control of ducksalad; however, ducksalad is not a very competitive weed except when in high populations prior to tillering. In these studies, any such competition would have already occurred prior to treatment. The use of molinate as the carrier granule with bensulfuron as the herbicide coating was the only combination that could provide adequate control of both junglerice and ducksalad.

Table 1. Junglerice control at 2 and 4 weeks after treatment (WAT) as affected by carrier granule and herbicide coating.

Carrier granule	Herbicide coating	Rate	Junglerice control 2	4
		(kg ai/ha)	----------%----------	
Thiobencarb	Quinclorac	0.275	51	46
		0.418	45	42
		0.550	46	55
	Bensulfuron	0.0275	23	15
		0.550	17	29
		0.11	18	7
	None		20	26
Molinate	Quinclorac	0.275	84	99
		0.418	86	100
		0.550	87	100
	Bensulfuron	0.0275	97	99
		0.550	97	100
		0.11	93	100
	None		81	99
Fertilizer	Quinclorac	0.275	24	12
		0.418	30	26
		0.550	39	39
	Bensulfuron	0.0275	4	2
		0.055	12	8
		0.11	15	8
	None (control)		18	0
LSD (0.05)			10	16

Table 2. Ducksalad control at 2 and 4 weeks after treatment (WAT) as affected by carrier granule, herbicide coating, and year.

Carrier granule	Herbicide coating	Rate	Control WAT 1992 2	1992 4	1993 2	1993 4
		(kg ai/ha)		%		
Thiobencarb	Quinclorac	0.275	0	0	34	9
		0.418	0	0	19	4
		0.55	18	0	16	15
	Bensulfuron	0.0275	23	0	36	15
		0.055	93	60	53	35
		0.11	93	57	64	73
	None		17	0	28	16
Molinate	Quinclorac	0.275	0	0	34	13
		0.418	0	0	13	6
		0.55	18	0	16	15
	Bensulfuron	0.0275	73	19	39	30
		0.055	98	86	30	5
		0.11	90	83	51	33
	None		0	0	30	33
Fertilizer	Quinclorac	0.275	0	0	35	13
		0.418	0	3	20	0
		0.55	0	0	23	21
	Bensulfuron	0.0275	66	50	38	20
		0.055	98	74	68	60
		0.11	96	96	89	86
	None (control)		0	0	0	8
LSD (0.05)			26	24	26	24

Table 3. Rice injury at 2 and 4 weeks after treatment (WAT) and rice yield as affected by carrier granule and year.

Carrier granule	Rice injury WAT				Rice yield	
	1992		1993			
	2	4	2	4	1992	1993
	----------%----------				-----(kg/ha)-----	
Thiobencarb	4	2	0	0	4305	3733
Molinate	10	11	0	0	5030	4089
Fertilizer	2	1	0	0	4447	2363
LSD (0.05)	2.9	1.8	2.9	1.8	653	

EFFECTS OF APPLICATION TIME AND TANK MIXES ON THE ACTIVITY OF BENSULFURON

R.O. Wilde and M.P. Braverman

INTRODUCTION

Bensulfuron (Londax) is a sulfonylurea herbicide used both pre- and postemergence in rice to control broadleaf weeds and sedges. The activity of bensulfuron can be affected by environmental factors, such as temperature. Under cool conditions the appearance of chlorosis and eventual necrosis in susceptible plants may be delayed. Bensulfuron can be tank-mixed with other herbicides in order to broaden the spectrum of weed control or to increase activity on a particular weed.

Objectives of this research were to determine the effect of temperature on bensulfuron activity and the effect of various tank-mixes on the activity of bensulfuron.

MATERIALS AND METHODS

Critical Temperature Studies: Experiments were conducted during 1993 at the Rice Research Station in Crowley, Louisiana on a Crowley silt loam. Alligatorweed (Alternanthera philoxeroides) cuttings were spread throughout test plots, which were 25 ft long and 6 ft wide. To insure treatment integrity, metal rings encompassing about 100 sq ft were placed in each plot. The metal rings provided a mechanical barrier that prevented treated floodwater from moving on and off the plots. Londax was applied at 0, 0.5, 1, 1.5, and 2 oz ai/A. The first application took place in mid March and each subsequent application took place at 2-week intervals. Herbicide treatments were applied with a CO_2 back pack sprayer in a 10 gal/A spray volume. Visual ratings of alligatorweed control were recorded at 7, 14, and 28 days after treatment (DAT), on a 0 to 100 scale where 0 is equal to no control and 100 is equal to complete control. Rice yield data were determined by harvesting with a small plot combine.

Tank mix study: The plot size, mechanical barrier, and alligatorweed propagation techniques were conducted as described in the critical temperature study. Londax was applied at 0, 0.5, 1, and 1.5 oz ai/A alone and in combination with either Facet WP at 0.5 lb ai/A, Grandstand at 0.25 lb ai/A, Arrosolo-6EC at 4.5 lb ai/A, or X-77 at 0.25%. Visual ratings were based on a 0 to 100 scale where 0 equals no phytotoxicity and 100 equals complete phytotoxicity or plant death. Visual ratings of alligatorweed (Alternanthera philoxeroides), redroot flatsedge (Cyperus erythrorhizos), ducksalad (Heteranthera limosa), and slender arrowhead (Sagittaria platyphylla) were recorded at 7, 14, and 28 DAT. Rice yield data were determined by harvesting with a small plot combine.

RESULTS AND DISCUSSION

Critical Temperature Studies: Londax rate and application time interacted in their effect on alligatorweed control at 7 and 14 DAT. In order to compare application times, data were converted to the Londax rate required to inhibit alligatorweed by 10% (I_{10}). The Londax rate required to cause 10% inhibition of alligatorweed increased as cumulative hours below 70°F increased (Figure 1). The I_{10} Londax rate increased more dramatically following 40 hours below 70°F at 7 DAT. At 14 DAT, there was also a significant rate by temperature interaction. This interaction became more pronounced as cumulative hours below 70°F increased above 140 hours at 14 DAT. The primary difference between 7 and 14 DAT is that I_{10} Londax rate did not increase until more hours below 70°F were accumulated at 14 DAT.

Londax activity on alligatorweed increased as the Londax rate increased (Figure 2). Alligatorweed control was significantly greater for all Londax rates when compared with the control at each rating. At both 7 and 14 DAT, there was a significant increase in control between 0.5 and 2.0 oz of Londax/A. Overall, alligatorweed control increased at 28 DAT in comparison to the 7- to 14-day ratings. Rice treated with Londax had significantly greater yields than the control; however, there was no significant difference in rice yield due to Londax rates (Figure 3).

The main effect of application timing on rice yield was that rice treated with Londax at the earliest application (time 1) resulted in greater yields than at application time 3, 4, or 5 (Figure 4). Although lower temperatures at the first application time reduced the speed at which alligatorweed control was obtained, there was an improved level of control at the time of early rice development. Therefore, preplant applications during cool weather are more efficacious than later applications within the crop due to the elimination of early season alligatorweed competition.

Tank Mix Study: Increased control of alligatorweed was obtained when Londax was tank mixed with Facet, Grandstand, or Arrosolo, but not with X-77 (Figure 5). Control of sedge and slender arrowhead was poor with all treatments except the Londax + Arrosolo tankmix which gave significantly greater control than any other treatment.

Londax + Grandstand and Londax + Arrosolo provided the best control of both alligatorweed and ducksalad and sedge and slender arrowhead, respectively. All tank mixes provided superior control of all weeds in comparison to Londax + X-77 or Londax alone (Figure 6).

Londax + Facet, Grandstand, or Arrosolo controlled alligatorweed significantly better than did Londax + X-77 or Londax alone. All treatments controlled slender arrowhead significantly better than Londax + Arrosolo (Figure 7).

Fig 1. Effect of Critical Temperature on Alligatorweed Control With Londax

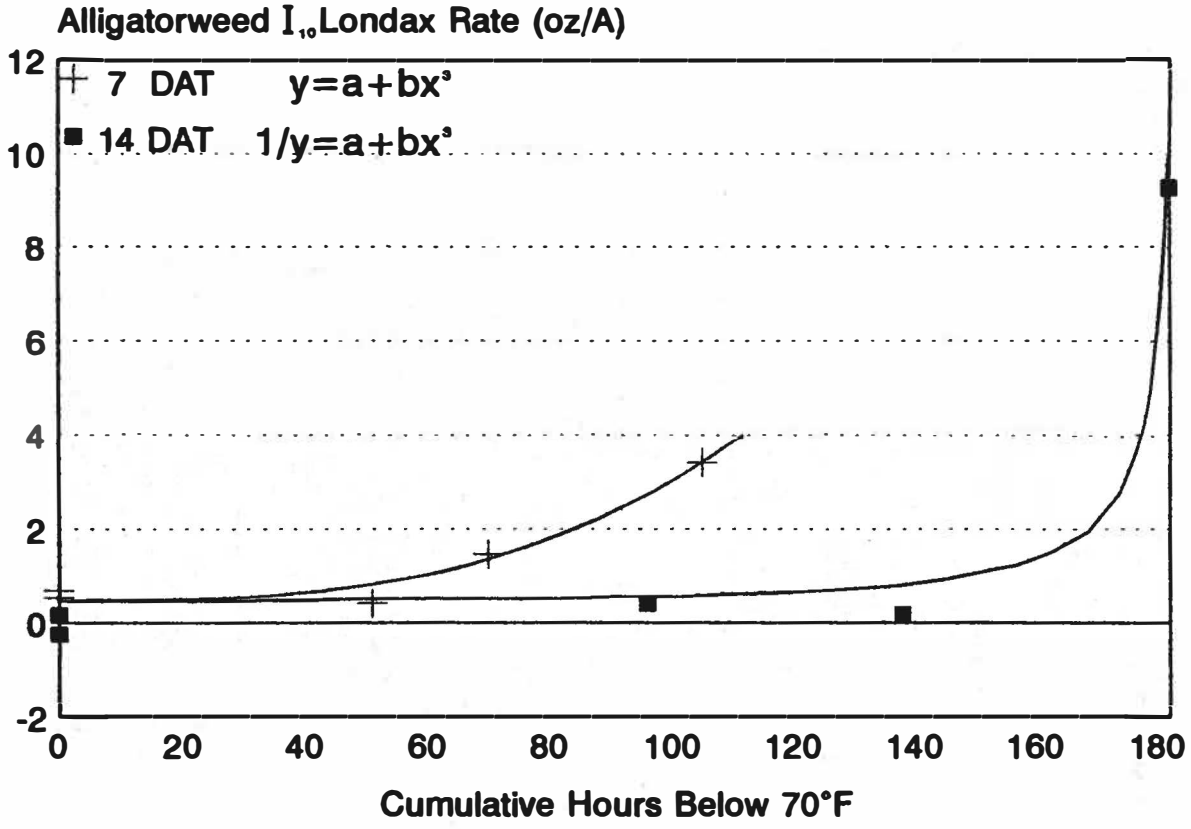


Fig 2. Effect of Londax on Alligatorweed

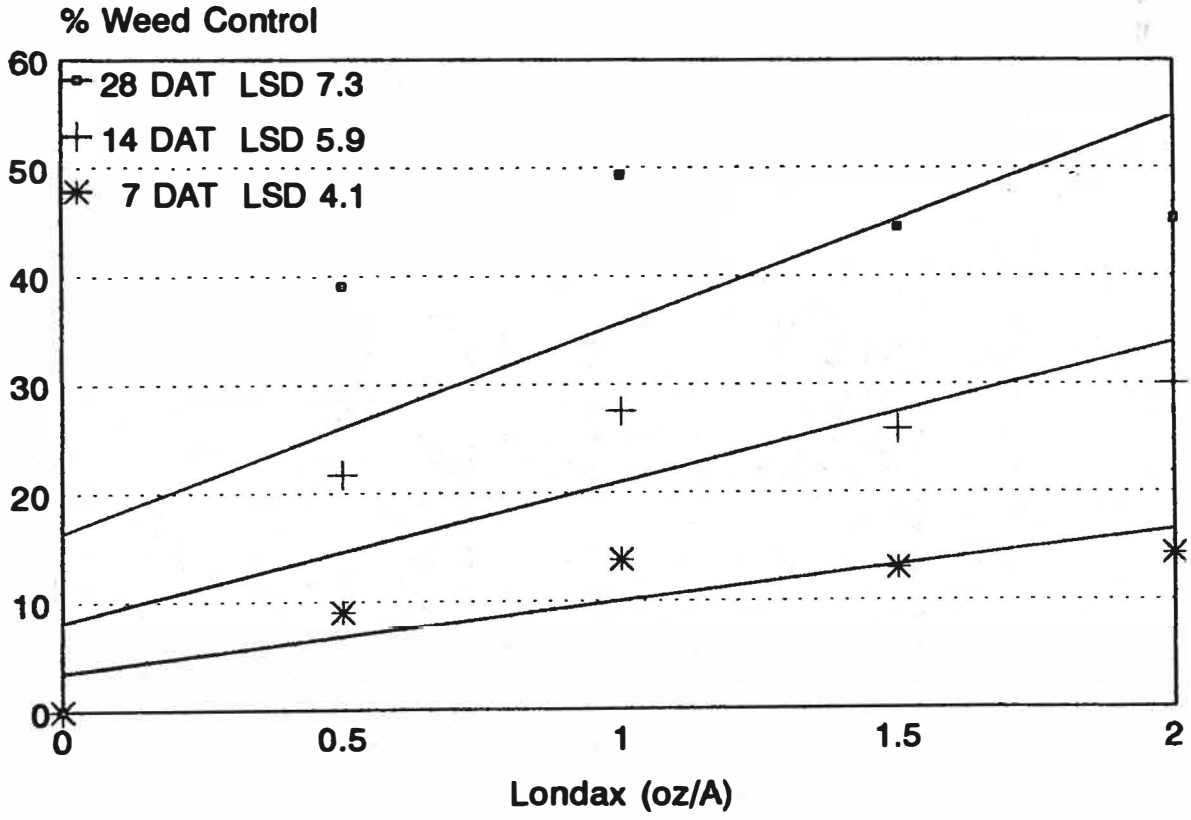


Fig 3. Effect of Londax on Rice Yield

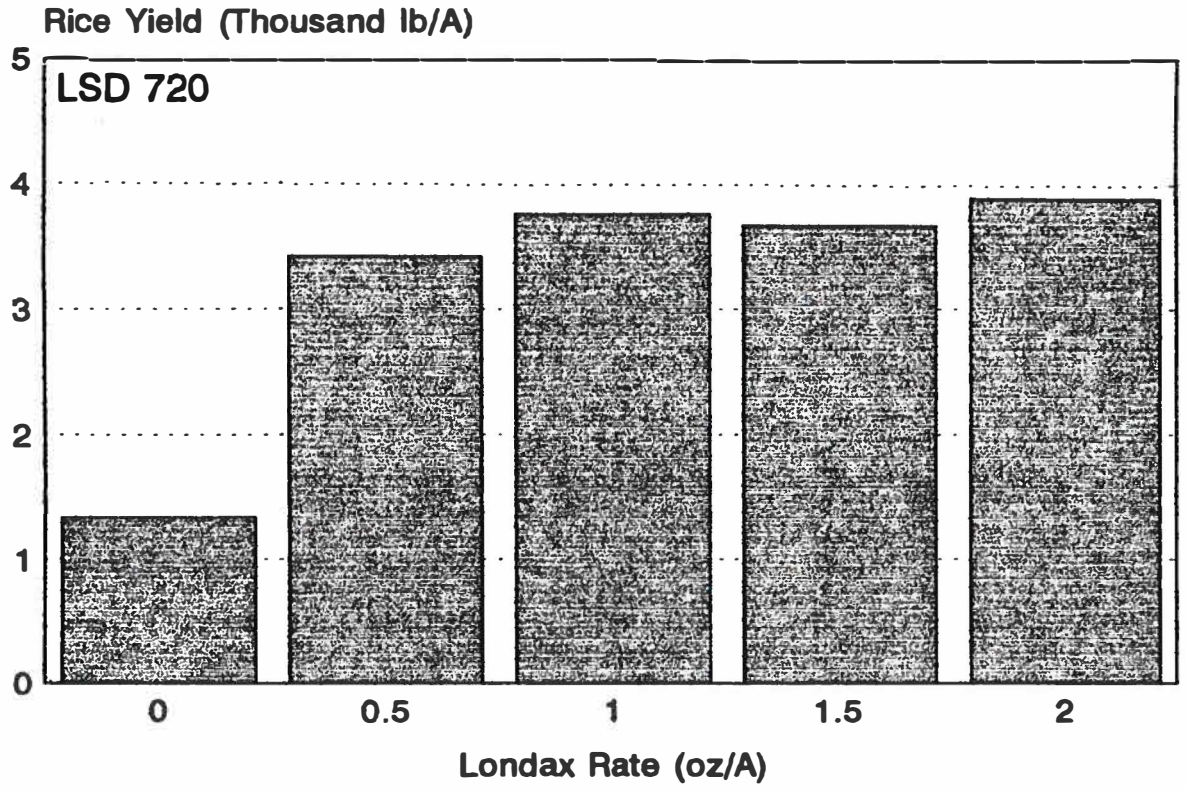


Fig 4. Effect of Timing on Rice Yield

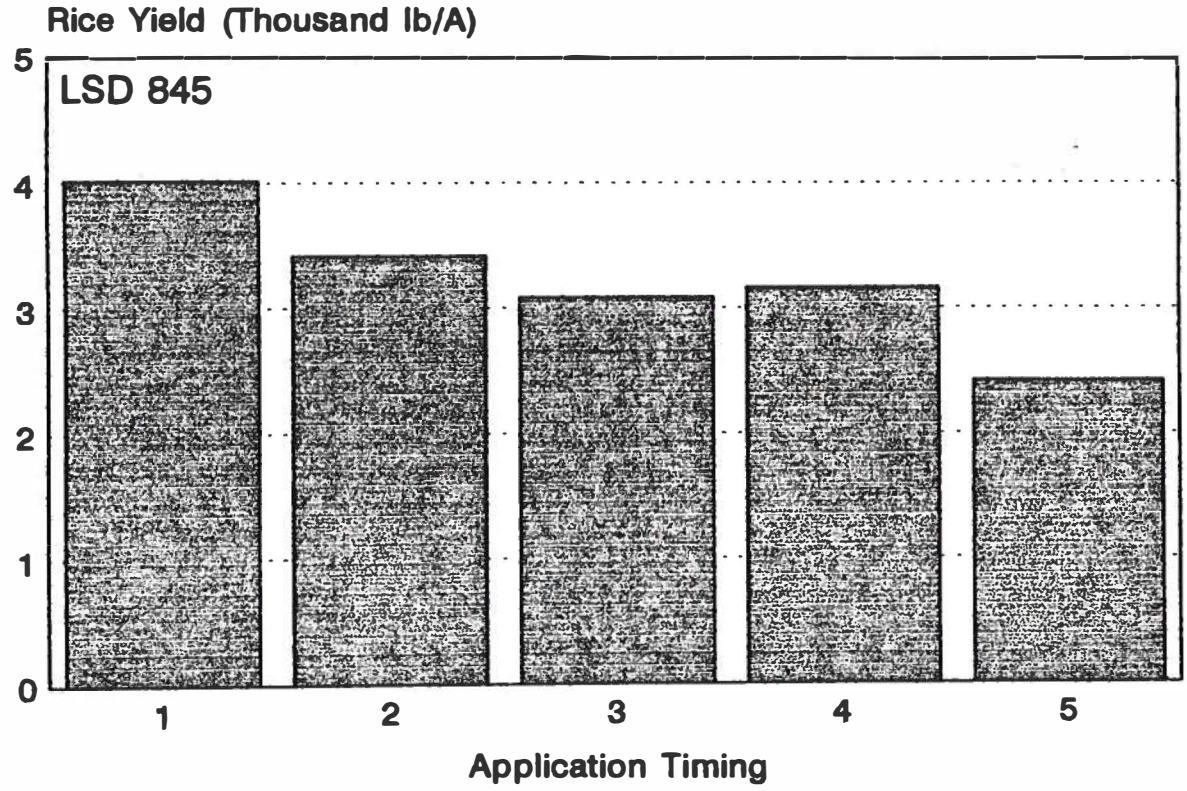


Fig 5. Effect of Londax Tankmixes on Weed Control

7 DAT

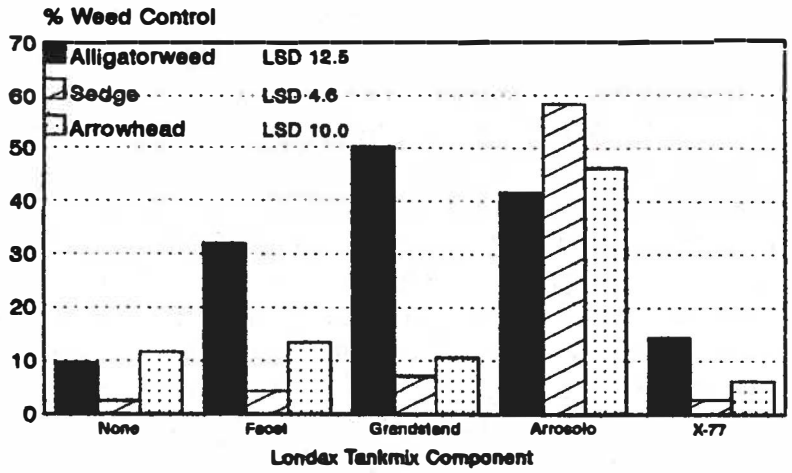


Fig 6. Effect of Londax Tankmixes on Weed Control

14 DAT

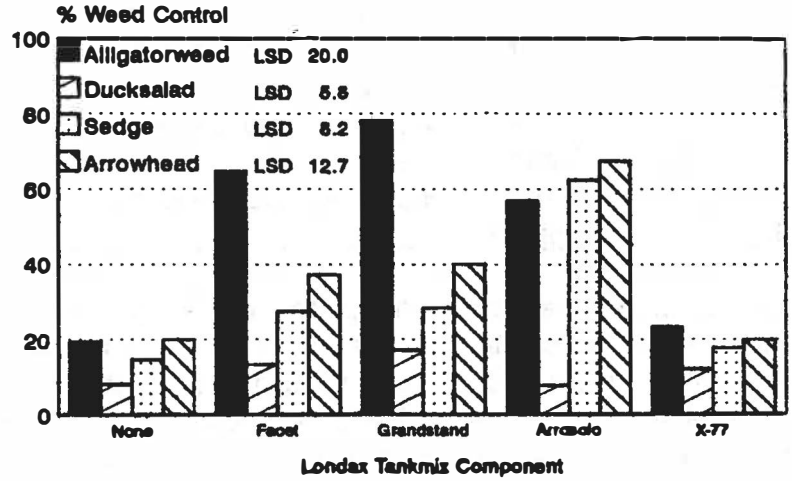
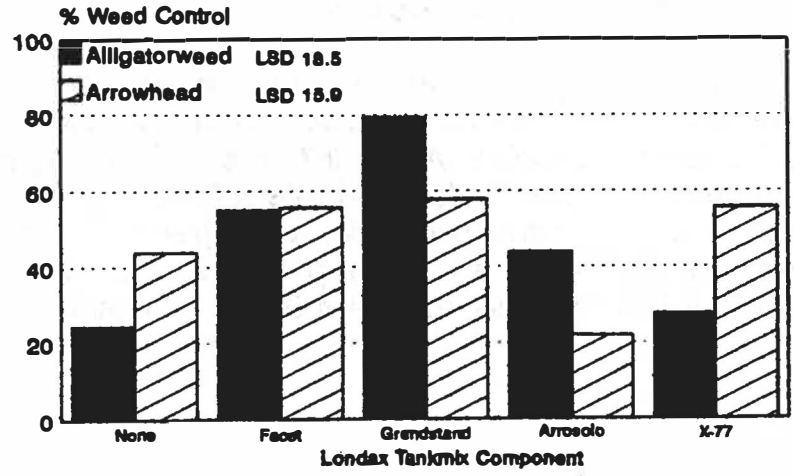


Fig 7. Effect of Londax Tankmixes on Weed Control

28 DAT



RED RICE CONTROL STUDIES

M.P. Braverman

Burndown Herbicide - Bolero Combinations for Weed control in Stale Seedbed, Water-Seeded Rice

Studies were conducted in the red rice area of the South Farm. The land had been worked dry in the Fall and lightly on March 8 and 9. The herbicides Roundup, Touchdown, Ignite, and Paraquat (Gramoxone Extra) were applied with or without Bolero at 3, 7, 14, or 28 days before seeding. Even at the first time of application there were existing dense stands of River rush (Scirpus fluviatilis)and Bullstem rush(Scirpus acutus). Red rice emerged just prior to the 14 days before seeding application. Rainfall occurred; however, no flood was present until the day of seeding.

Tmt #	Herbicide
1	Roundup 0.56 lb ai
2	Roundup 0.56 lb ai + Bolero 4.0 lb ai
3	Touchdown 85 oz
4	Touchdown 85 oz + Bolero 4.0 lb ai
5	Ignite 1.0 lb ai
6	Ignite 1.0 lb ai + Bolero 4.0 lb ai
7	Paraquat 3.0 pt
8	Paraquat 3.0 pt + Bolero 4.0 lb ai
9	Control

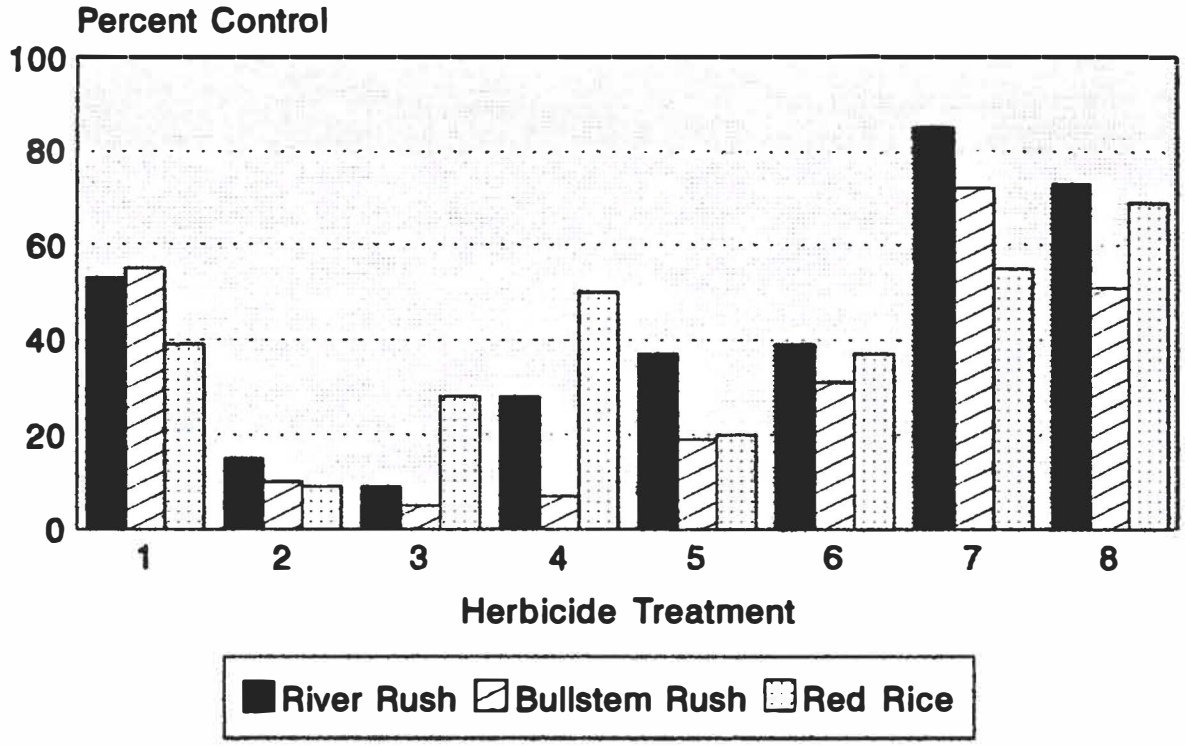
At 3 days prior to seeding, all treatments performed rather poorly because they did not have enough time to kill the existing vegetation. Under these conditions, paraquat (treatments 7 and 8) which is a rapid burndown herbicide, tended to provide the best control. Overall, control improved with application at 7 days prior to seeding. Paraquat provided 90-100% control of rushes but only 70% control of red rice. The only treatment that provided adequate control of red rice at the 7-day timing was Ignite. Control was greatly improved for most treatments at the 14-day timing. All treatments provided greater than 90% control of red rice and greater than 92% control of river rush. At 28 days prior to seeding control of both rush species was 90% or greater with several treatments providing 100% control. Red rice control was poor regardless of treatment.

Visual estimations of the decrease of the percent of the plot covered with red rice panicles was performed. The red rice panicle reduction were affected by days between spraying and seeding and by herbicide. At 3 and 7 days after seeding there was a 51% reduction in comparison with 47% at 14 days and 33% at 28 days. Although early ratings of red rice control indicated poor control of red rice, those plants may have died after that rating. The combination of paraquat and bolero provided the greatest reduction in red rice panicles (Treatment 8) while Touchdown plus Bolero also performed well.

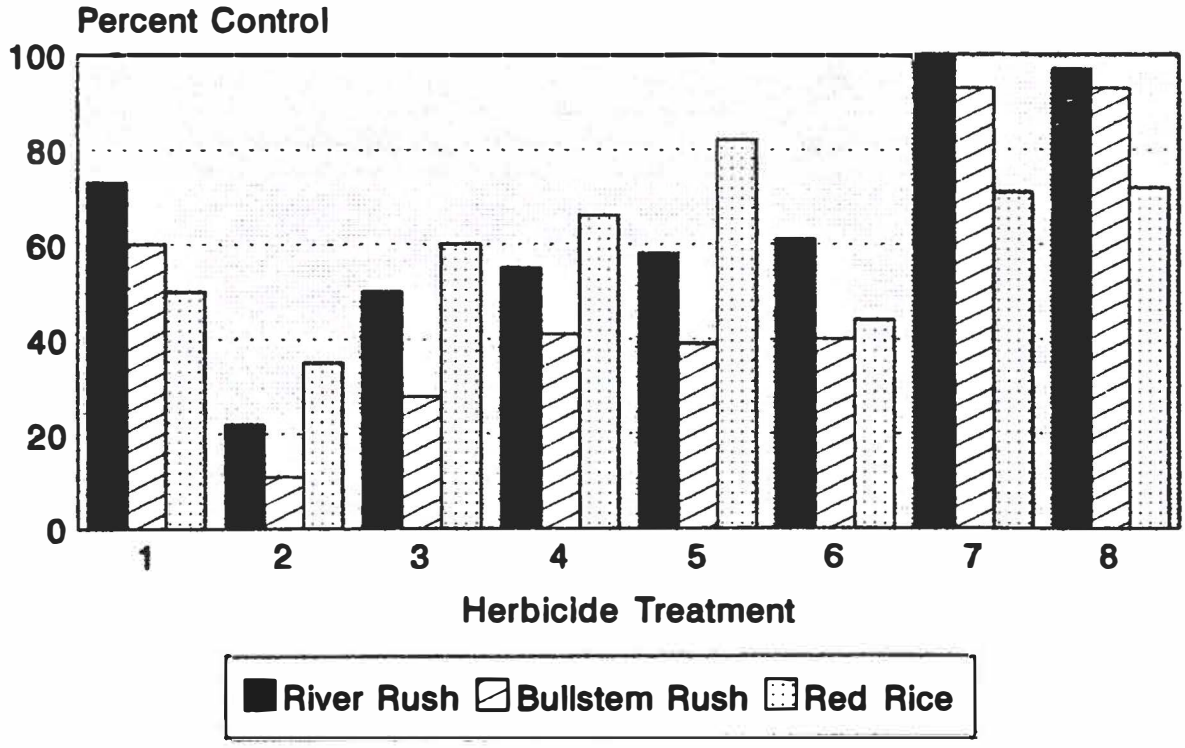
It was observed that during heading of the rice crop, there were some differences in the percentage of green versus mature grains. The application of Roundup alone or the untreated control had a lower percent maturity compared with other treatments. This same pattern was discovered at harvest with the rice from the Roundup treated plots or the control having the greatest moisture.

Rice yield was also lowest in the untreated control. The plots treated with Ignite alone or in combination with Bolero, or Paraquat in combination with Bolero produced the greatest yields. Red rice infestation was very intense and the percentage of red rice in the harvested grain was 32% in the untreated control. The combination of Ignite and Bolero resulted in 25% of the grain being red rice. The combination of Paraquat and Bolero resulted in only 14% of the rice seed being red rice. Based on this preliminary research, the combination of Paraquat at 3 pt/A and Bolero at 4 lb ai/A was the best treatment.

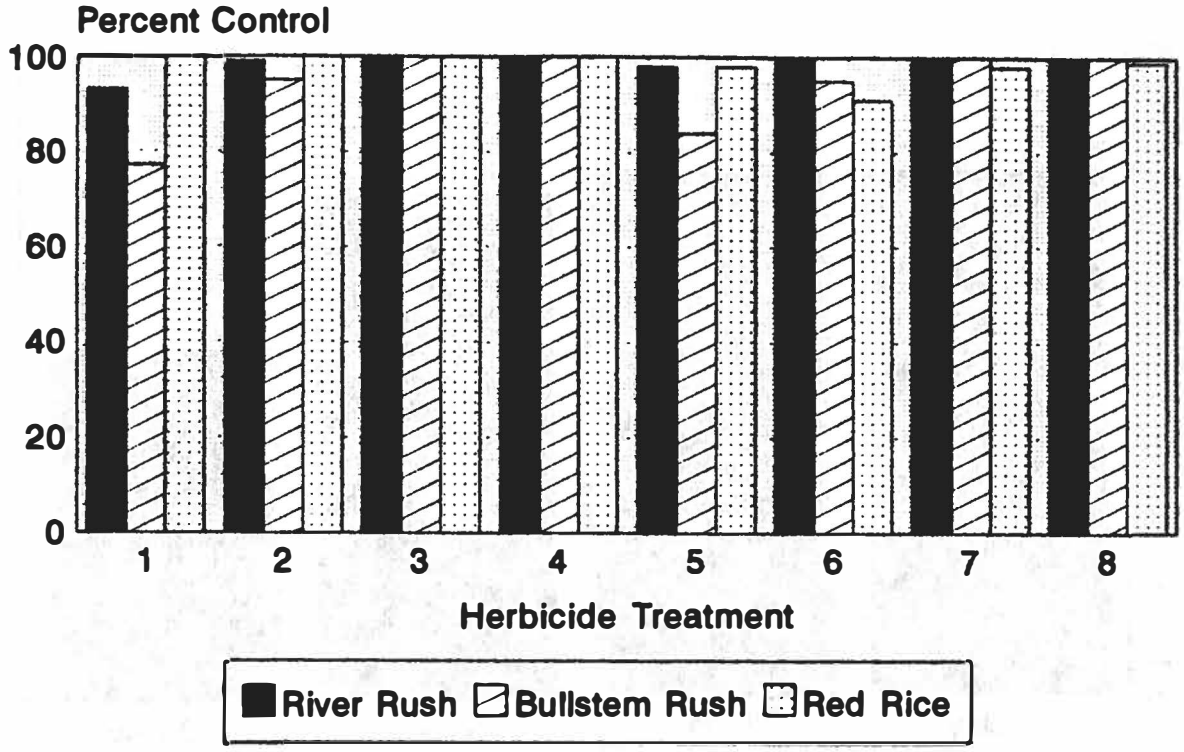
Applied 3 Days Before Seeding



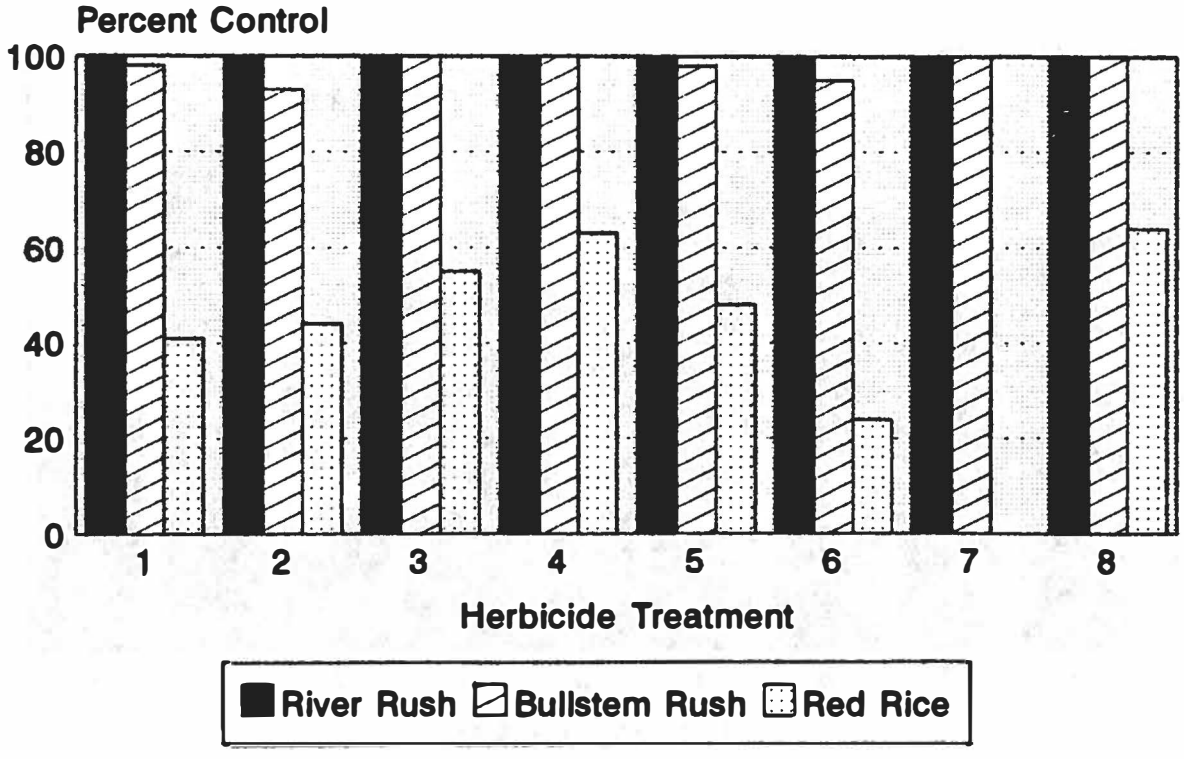
Applied 7 Days Before Seeding



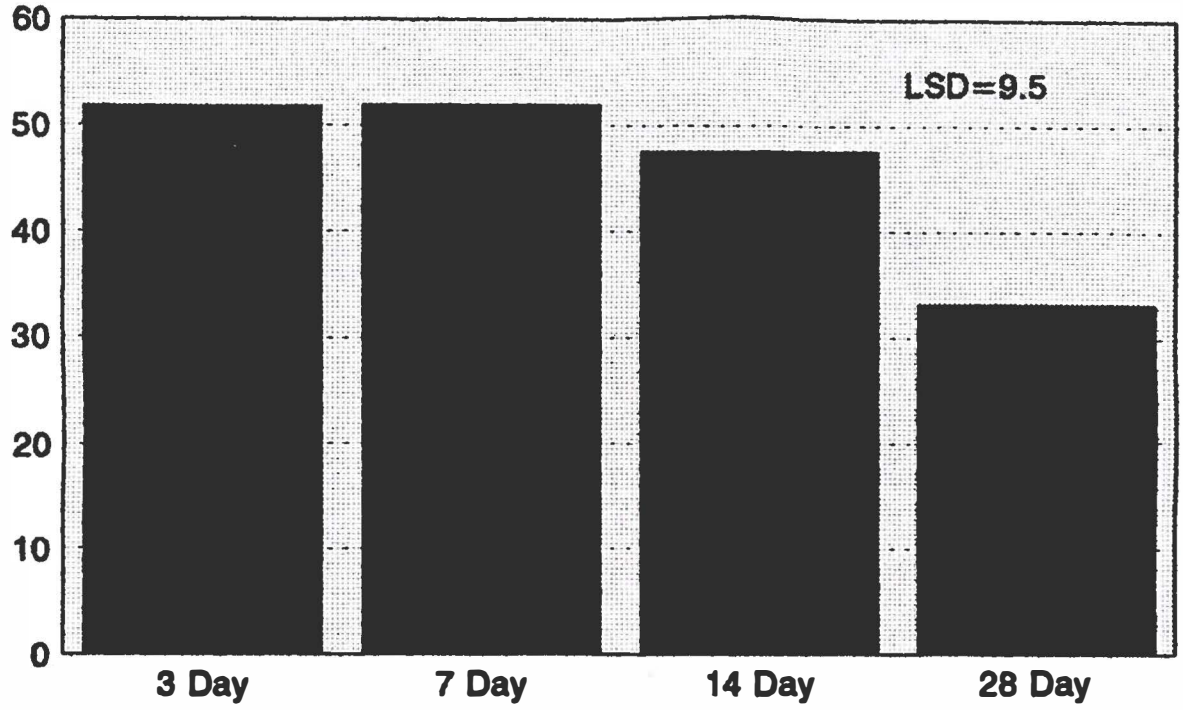
Applied 14 Days Before Seeding



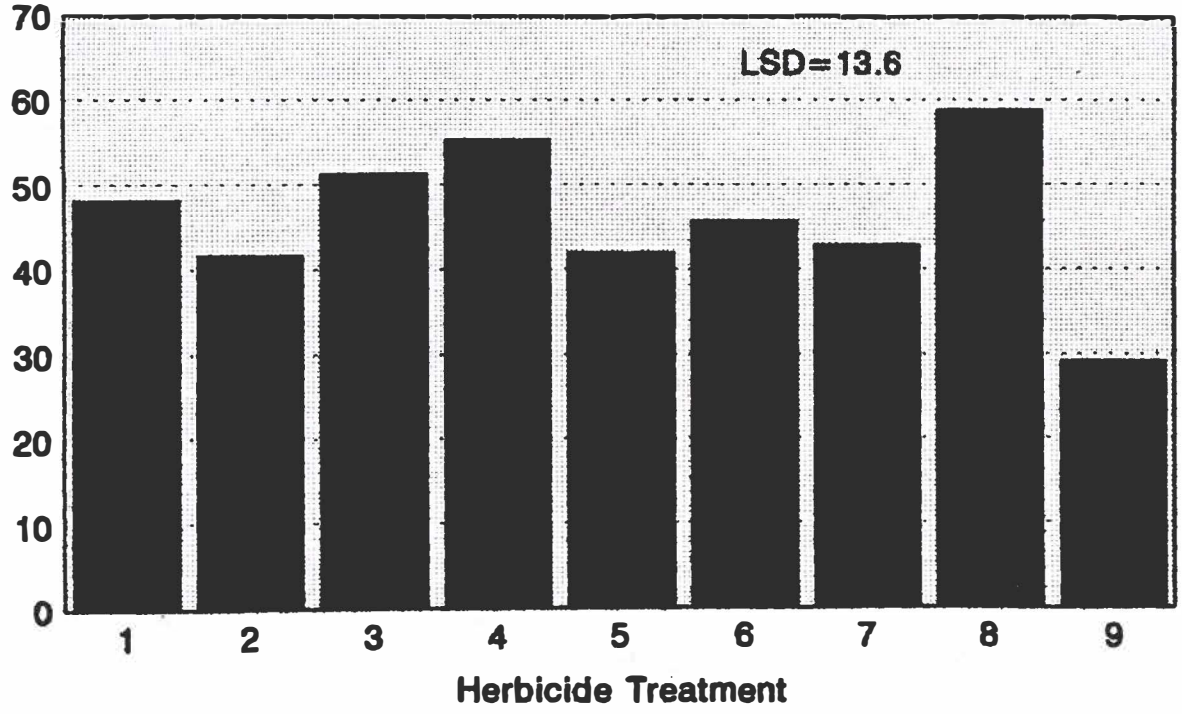
Applied 28 Days Before Seeding



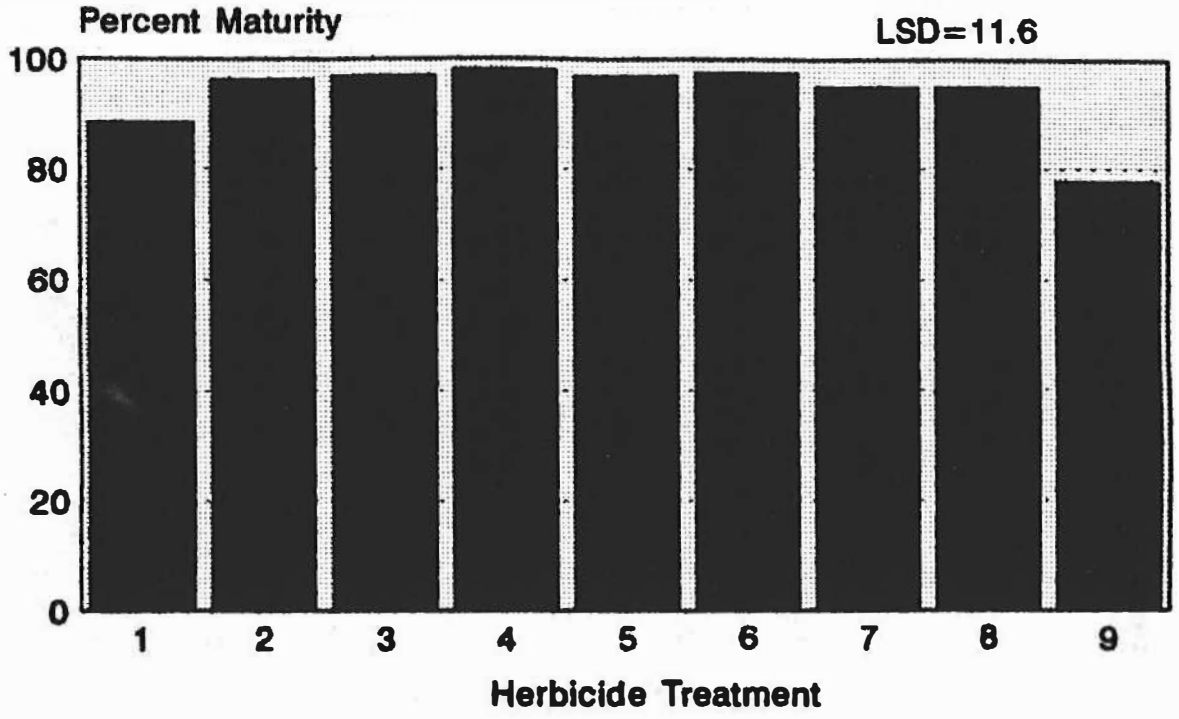
% Red Rice Panicle Reduction



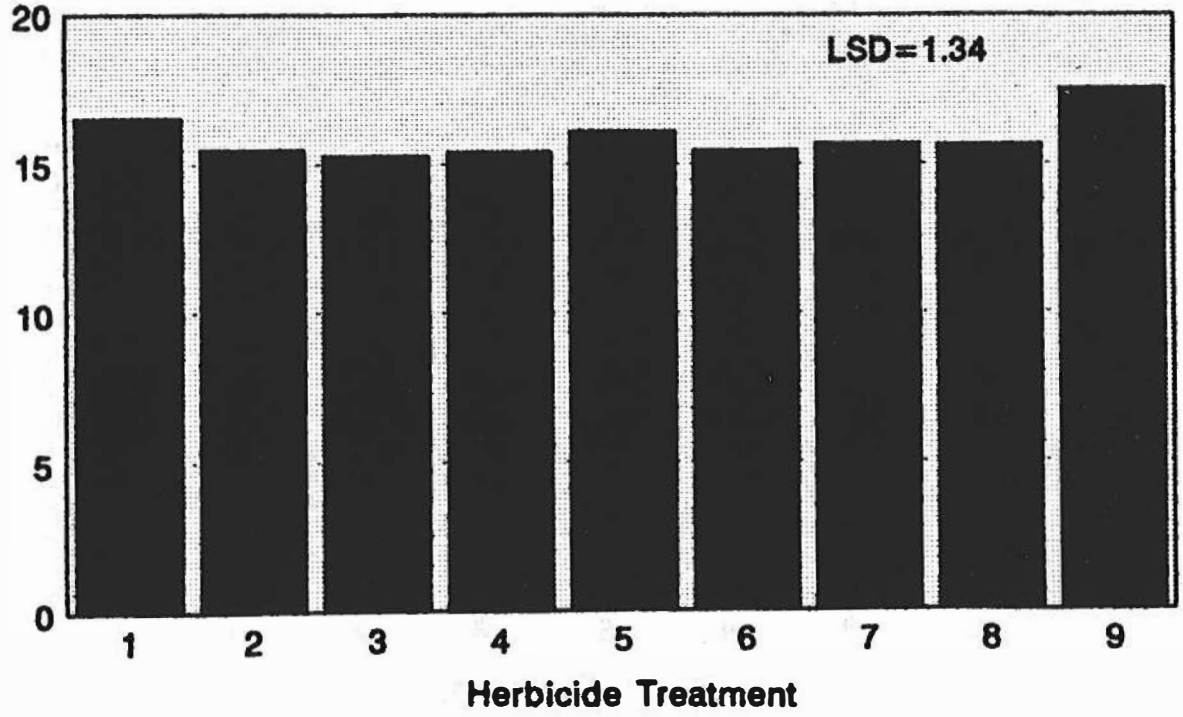
% Red Rice Panicle Reduction



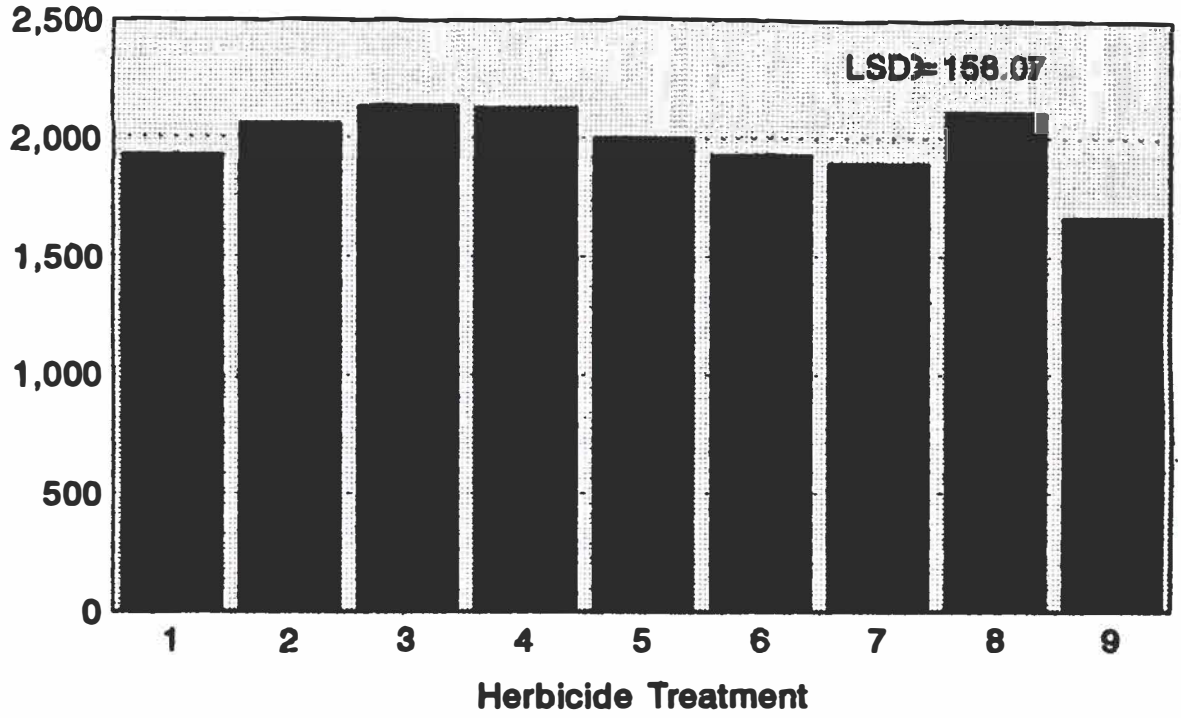
Visual Crop Maturity at Heading



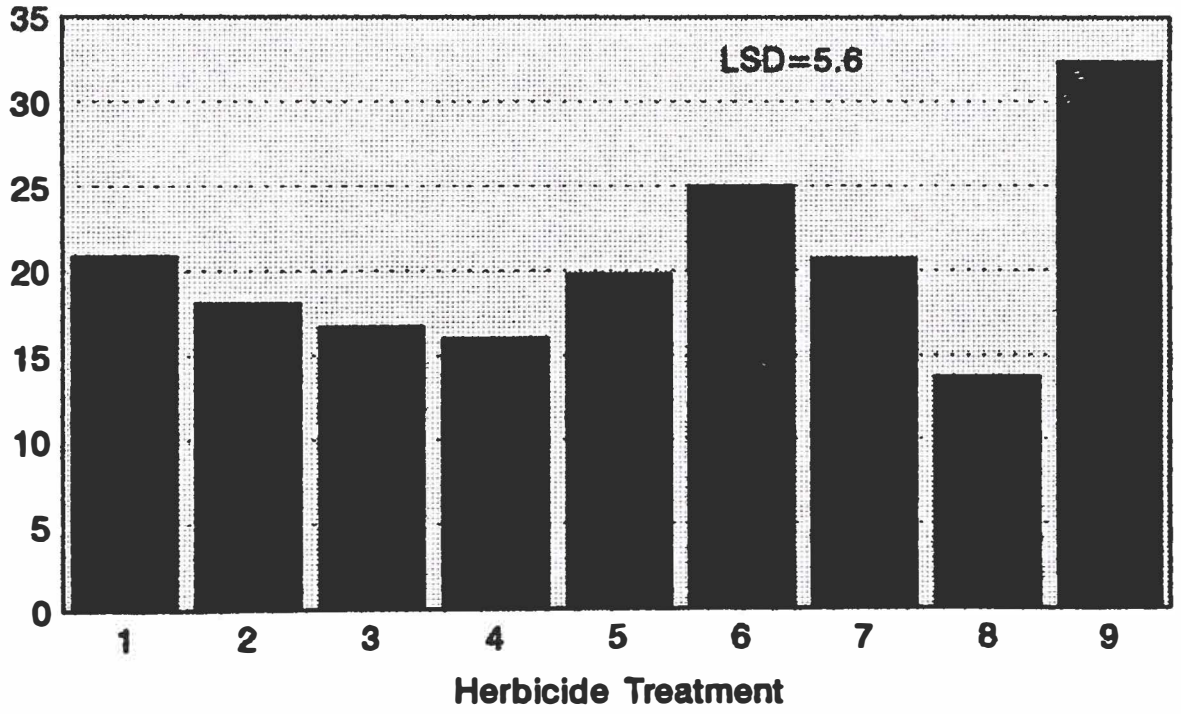
Rice Moisture



Rice Yield at 12% Moisture



% Red Rice in Harvested Grain



USE OF IGNITE ON IGNITE RESISTANT RICE AND RED RICE

M.P. Braverman and S.D. Linscombe

This report is based on the same field study presented under the rice breeding project report for the evaluation of transgenic-Ignite resistant rice and additional research on the effectiveness of Ignite on red rice. Herbicide treatments in the resistant rice study were applied with a backpack sprayer to 3-leaf rice and included Ignite at 1 or 2 lb ai/A and an untreated check. The 15 resistant rice and 9 commercial lines evaluated are as follows:

Entry Number	Line Number	Cultivar
	Ignite Resistant Lines	
1	517-1-R1	Gulfmont
2	517-2-R1	Gulfmont
3	517-3-R1	Gulfmont
4	517-5-R1	Gulfmont
5	517-7-R1	Gulfmont
6	526-1	Gulfmont
7	495-1-R1	Koshihikari
8	495-1-R2	Koshihikari
9	496-1-R1	Koshihikari
10	496-1-R2	Koshihikari
11	496-2-R1	Koshihikari
12	496-3-R1	Koshihikari
13	496-3-R2	Koshihikari
14	496-4-R1	Koshihikari
15	496-4-R2	Koshihikari
	Commercial Lines	
16	PI 502967	Gulfmont
17	KOSH	Koshihikari
18	93P10501	BK
19	PI561735	Bengal
20	PI561753	Cypress
21	PI475833	Lemont
22	RU 8902031	RXCL
23	RU 8902192	L202/Lemont
24	PI 527707	Katy

Injury symptoms observed included death of off-types(segregates) and yellowing spots to necrosis on other plants. In weed control studies, Ignite was applied as a single application at 0, 0.25, 0.38, 0.5, 0.75, or 1.0 lb ai/A or a sequential treatment of 0.25, 0.38, or 0.5 lb ai/A applied 1 week apart. All of the rates were applied on red rice at the 3- to 4-leaf, 0.5- to 1-inch internode elongation, or booting stage of red rice.

RESULTS

Resistant rice lines: At 8 days after treatment, most of the resistant Gulfmont lines sustained 10 to 15% injury while most of the resistant Koshihikari lines had 20 to 30% injury. Koshihikari lines 9 and 10 were more sensitive with 30% injury at 1.0 lb ai/A and 60 and 70% injury with 2.0 lb ai/A of Ignite. All of the commercial lines were severely injured (90-100%). At 20 days after application, all of the resistant Gulfmont lines had less than 10% injury. Koshihikari lines also recovered, but still had a greater average injury than the Gulfmont lines. All of the commercial lines were still showing greater than 90% injury and did not recover.

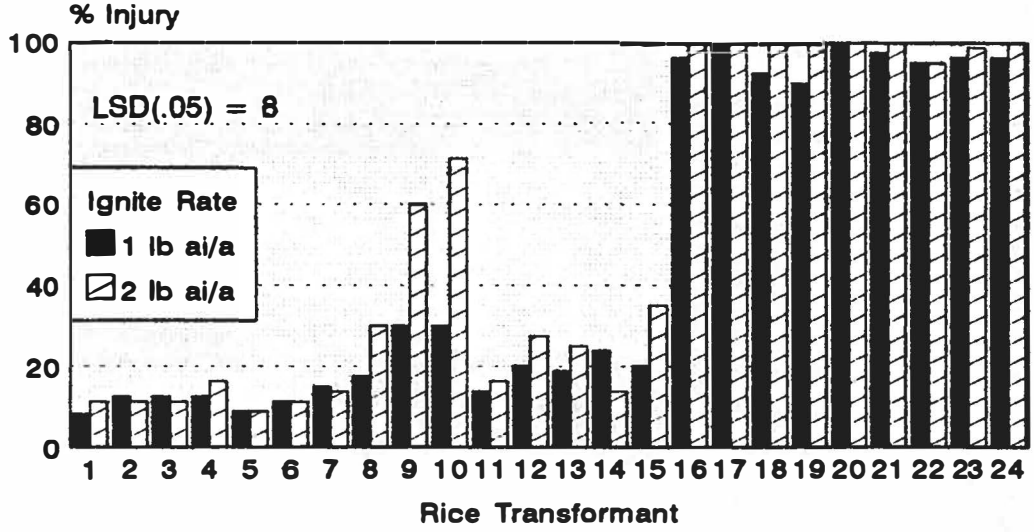
Rice yields of the resistant Gulfmont and Koshihikari lines were at least as great when 1 or 2 lb ai/A of Ignite was applied as compared with their respective untreated controls. The yield of the commercial lines was severely reduced with either rate of Ignite. The resistant Gulfmont lines and commercial lines were similar in untreated control.

Red rice control: Red rice in the 3- to 4-leaf stage was adequately controlled by Ignite at 0.38 lb ai/A at 7 days after treatment and increased with increasing Ignite rate. At this leaf stage there was no advantage to low rate sequential treatments at 7 days, but they were superior to single applications at 14 and 30 days after treatment. At the 0.5- to 1.0-inch internode elongation stage, even 1.0 lb ai/A of Ignite only provided 70% control. Control was greatly improved by using sequential treatments. This was probably due to the first treatment opening up the dense red rice canopy and exposing additional plants to the sequential treatment. A similar trend occurred at the boot stage of red rice; however, even the sequential applications barely provided adequate control. At the boot stage, control of the red rice plant may increase harvest efficiency, but avoiding red rice seed in the harvest through panicle suppression (stopping the panicle from emerging through the boot) is probably more critical. The efficacy of Ignite on panicle suppression was evaluated at 22 days after application. At 0.5 to 1.0 lb ai/A of Ignite, 80 to 90% of the panicles were suppressed.

In summary, several of the Gulfmont and Koshihikari lines were capable of withstanding up to 2 lb ai/A of Ignite without effecting yield while 3- to 4-leaf red rice was adequately controlled with only 0.5 to 1.0 lb ai/A of Ignite.

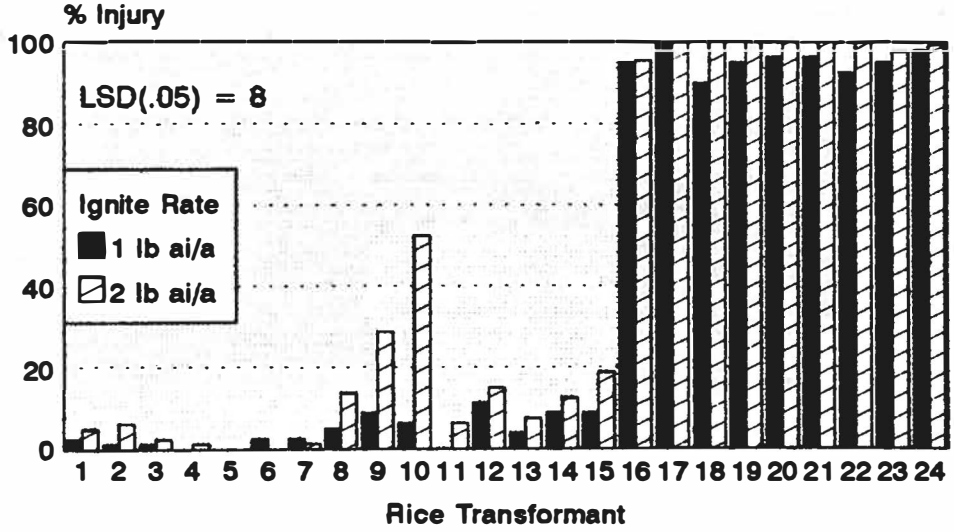
Ignite Resistant Transgenic Rice Study

8 Days After Application

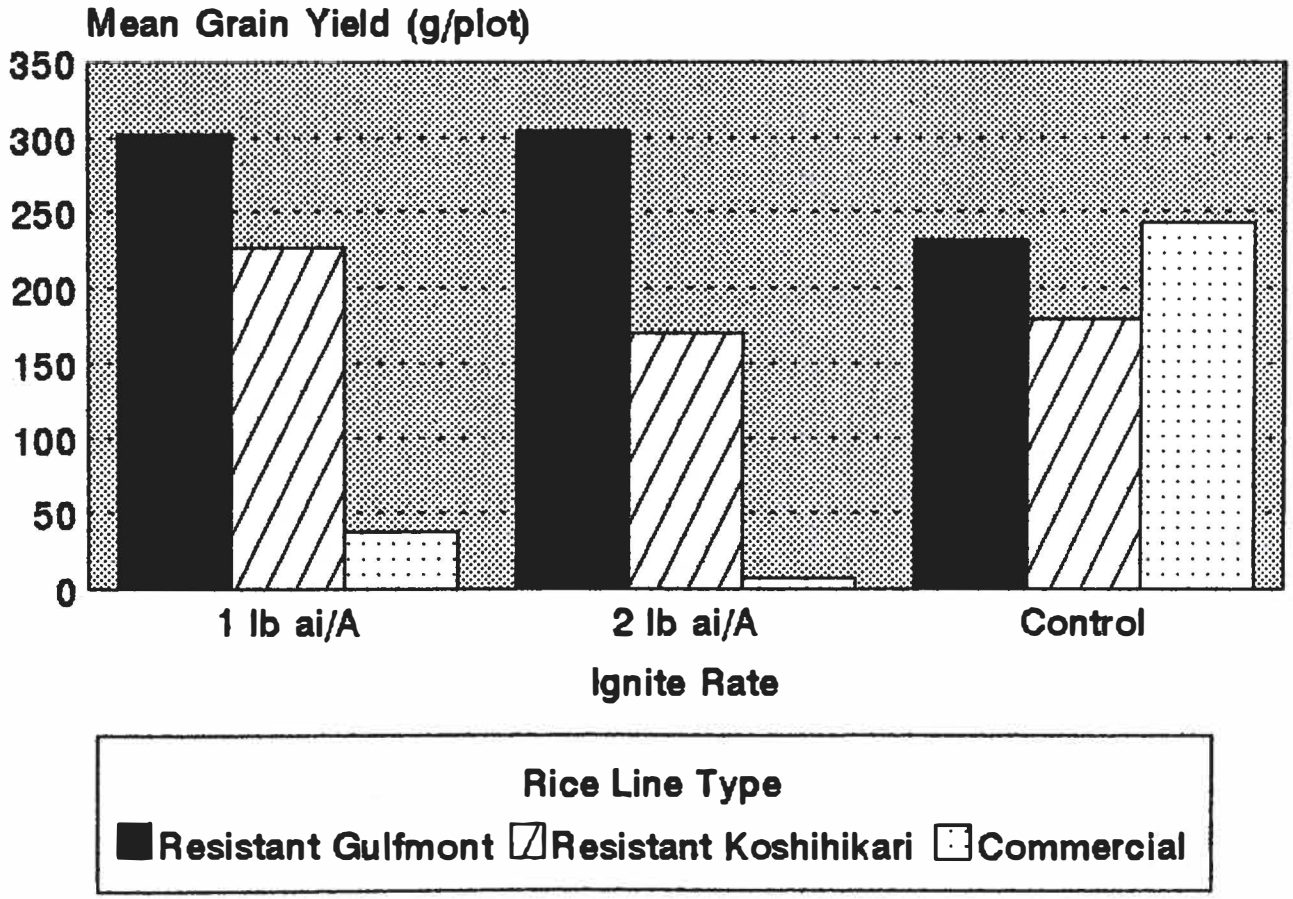


Ignite Resistant Transgenic Rice Study

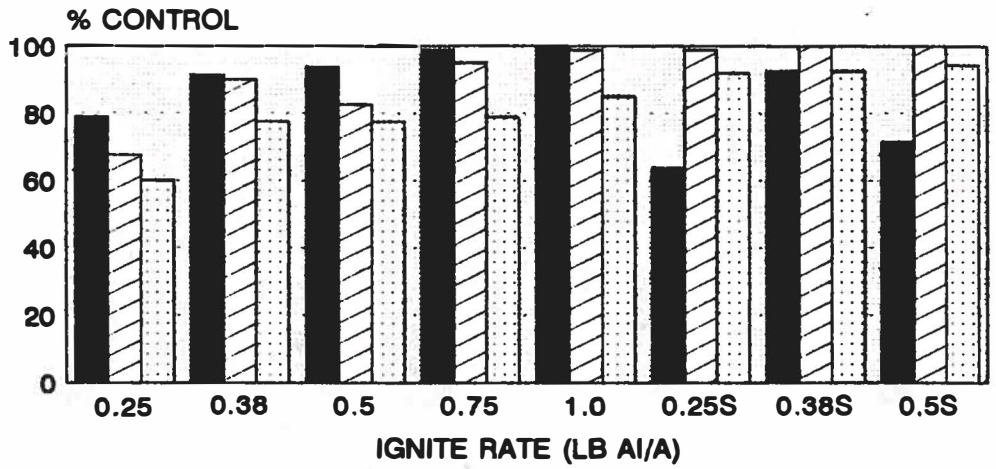
20 Days After Application



Mean Yield For Transgenic and Non-Transgenic Lines



EFFICACY OF IGNITE ON 3-4 LEAF STAGE RED RICE

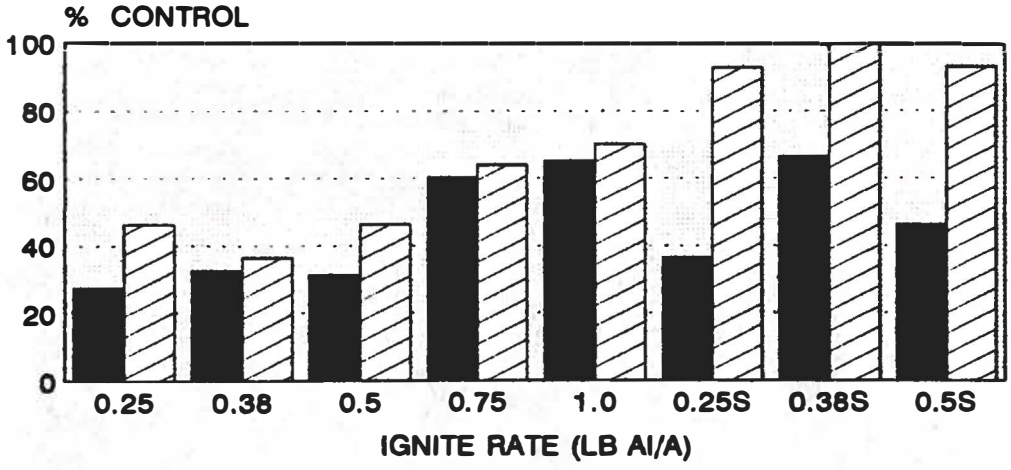


DAYS AFTER APPLICATION
■7 ▨14 □30

S=SEQUENTIAL APPLICATIONS

LSD(.05) 7 day = 24
LSD(.05)14 day = 17
LSD(.05)30 day = 16

EFFICACY OF IGNITE ON 0.5-1 INCH I.E. RED RICE

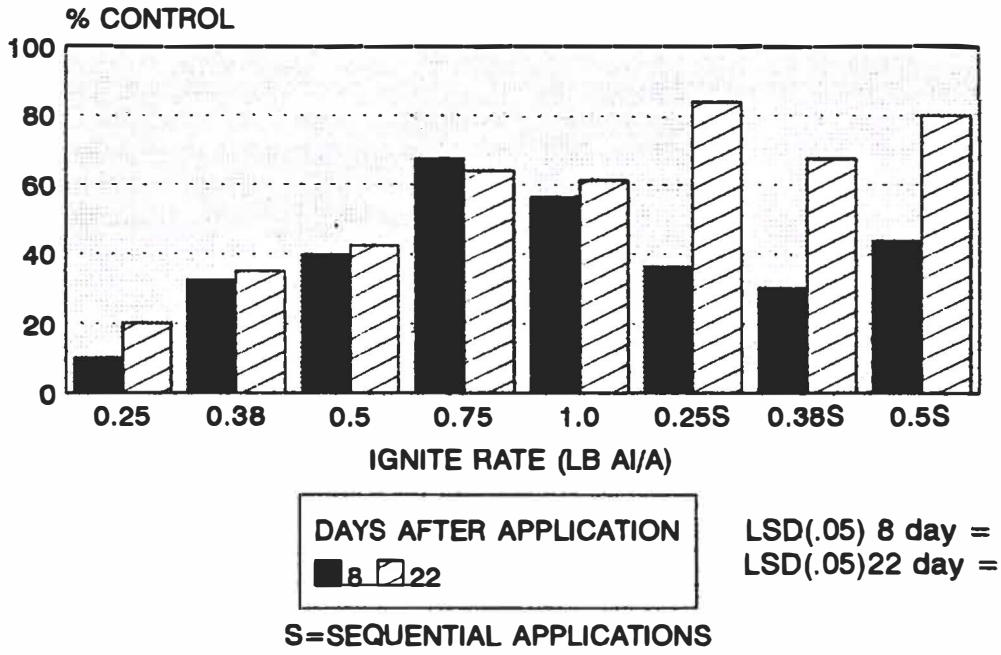


DAYS AFTER APPLICATION
■8 ▨22

S=SEQUENTIAL APPLICATIONS

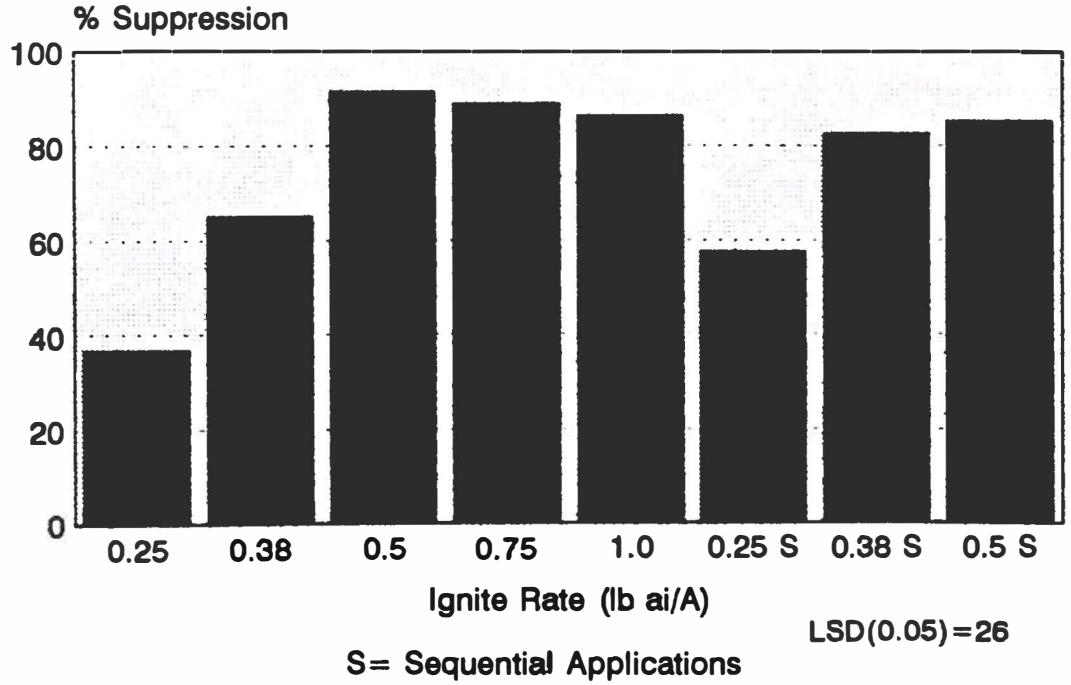
LSD(.05) 8day = 12.3
LSD(.05)22day = 11.2

EFFICACY OF IGNITE ON BOOTING STAGE RED RICE



Efficacy of Ignite on Red Rice Panicle Supression

22 Days After Application



RICE DISEASE CONTROL STUDIES, 1993[1]

D.E. Groth, M. Frey, J. Nugent, P.K. Bollich, S. D. Linscombe, and M.C. Rush

Disease damage to rice can greatly impair productivity and sometimes totally destroy a crop. Direct losses to disease include reduction in plant stands, lodging, spotted kernels, fewer and smaller grains per plant, and a general reduction in plant efficiency. Indirect losses include the cost of fungicides used to manage disease, application costs and reduced yields associated with special cultural practices that reduce disease, but may not be conducive to producing maximum yields.

The major diseases of rice in Louisiana are the fungal diseases blast, caused by Pyricularia grisea; stem rot, caused by Magnaporthe salvinii (Sclerotium oryzae); sheath blight, caused by Thanatephorus cucumeris (Rhizoctonia solani); brown spot, caused by Cochiobolus miyabeanus; narrow brown spot, caused by Sphaerulina oryzina (Cercospora janseana); and kernel smut, caused by Neovossia horrida. Seedling diseases caused by species of Achlya and Pythium are also important in water-seeded rice. Minor diseases include crown rot, causal agent unknown; leaf scald, caused by Gerlachia oryzae; leaf smut, caused by Entyloma oryzae; sheath rot, caused by Sarocladium oryzae; stackburn disease, caused by Alternaria padwickii; sheath spot, caused by Rhizoctonia oryzae; crown sheath rot, caused by Gaeumannomyces graminis var. graminis; black kernel, caused by Curvularia lunata; seedling blights, caused by various fungi; false smut, caused by Ustilaginoidea virens; root rots, caused by several fungi; and several miscellaneous leaf, stem, and glume spotting diseases.

A disorder known as panicle blight has become increasingly important. Little is known about its cause. An undefined pathogen complex acting alone or with insect damage (feeding) also causes the grain and kernel discoloration called "pecky" rice.

The physiological disorders straighthead and bronzing or zinc deficiency occur throughout the southern rice area and are locally severe. Cold injury, salt damage, and nutrient deficiencies often mimic disease symptoms.

Many of these diseases can be controlled using a combination of host resistance, cultural management, and chemical control. The objective of these studies are to develop disease management practices that economically reduce rice diseases and increase the yield and quality of rice.

[1] This research is supported in part by funds provided by rice producers through the Louisiana Rice Research Board and various agricultural chemical companies.

1993 WATER MANAGEMENT X SOIL FUNGICIDE X VARIETY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Cypress, Orion, Bengal, Maybelle, 8902031, and Lemont, 120 lb/A

Planting Method/Date: Water-seeded, Apr 16

Fertilization: Continuous flood and pinpoint flood, preplant 92-48-48, Apr 13; delayed flood, preplant 14-42-42, Apr 13; preflood 78-0-0, May 11

Plot Size: 4.75 x 20 ft

Water Management: Flooded, Apr 14; pinpoint and delayed flood treatments drained, Apr 17, pinpoint flood reflooded, Apr 17; delayed flood reflooded, May 12. Pinpoint and continuous flood drained, May 10 (for herbicide application); reflooded, May 12

Herbicides: 3 qt Propanil/A + 1 qt Basagran, May 11; Londax 1 oz/A, May 3

Insecticides: 17 lb/A Furadan, May 18

Fungicides (Soil): Ridomil 1 pt/A, Apr 14

Application Equipment: CO_2 backpack sprayer, 8002 tips, 15 gal/A

Drained: July 30

Harvest: Aug 18

Experimental Design: Factorial in a split-split block design with four replications

Disease Ratings: Visual water mold signs were noted Apr 26; seedling counts, May 11

Results: See Table 1, 2, and 3.

Comments: Water mold (Pythium spp. and Achylia spp.) severity was low. Stand densities were in the high range. Other diseases were low in severity.

Table 1. The effect of water management, soil applied fungicide and variety on plant stand densities, agronomic characters and yield. Rice Research Station, Crowley, LA. 1993.

Variety	Plants/ft^2	Days to heading	Plant Height (cm)	Lodging (%)	Yield (lb/A)
		Continuous flood			
Untreated soil					
Cypress	36.0	81.2	80.8	0.0	7326
Lemont	26.8	80.5	84.5	0.0	6874
Orion	30.8	83.0	98.8	52.5	7528
Bengal	27.3	84.0	82.3	1.3	7372
Maybelle	30.5	68.5	92.8	0.0	7341
8902031	29.3	73.8	81.3	0.0	8046
Ridomil treated soil					
Cypress	29.4	80.5	87.0	0.0	7813
Lemont	32.0	81.0	84.3	0.0	7247
Orion	33.0	82.5	96.8	27.5	7304
Bengal	25.5	83.8	87.3	0.0	7861
Maybelle	27.8	68.3	94.3	0.0	7234
8902031	28.5	73.8	81.3	2.5	8014
		Pinpoint flood			
Untreated soil					
Cypress	35.5	81.8	85.8	0.0	7694
Lemont	30.0	81.0	80.5	0.0	6768
Orion	31.5	84.0	103.8	38.8	7604
Bengal	23.0	84.0	82.3	0.0	7827
Maybelle	31.0	70.3	94.0	0.0	7236
8902031	28.5	74.5	79.3	2.5	7992

Continued.

Table 1. Continued.

Variety	Plants/ft^2	Days to heading	Plant Height (cm)	Lodging (%)	Yield (lb/A)
Ridomil treated soil					
Cypress	35.5	81.3	82.8	0.0	7593
Lemont	29.8	82.0	85.8	0.0	6917
Orion	35.0	83.5	97.8	13.8	7407
Bengal	27.8	84.8	90.0	0.0	7570
Maybelle	24.3	69.8	93.3	0.0	7370
8902031	29.5	74.8	84.8	0.0	8107
		Delayed Flood			
Untreated soil					
Cypress	26.0	86.3	86.3	0.0	7143
Lemont	23.0	88.0	86.8	1.2	6601
Orion	27.0	86.8	99.5	32.5	6601
Bengal	15.8	87.3	89.3	0.0	6724
Maybelle	24.0	76.3	95.8	1.3	7254
8902031	25.3	81.5	84.3	0.0	7377
Ridomil treated soil					
Cypress	31.3	86.0	88.0	0.0	7288
Lemont	23.5	87.8	87.5	0.0	6551
Orion	27.0	86.3	103.0	23.8	6887
Bengal	22.3	87.5	89.3	0.0	6473
Maybelle	26.6	76.3	98.3	0.0	6741
8902031	28.3	80.0	90.0	0.0	7414
LSD (P=0.05) =	6.2	1.5	6.8	16.4	678
Standard Dev. =	4.4	1.1	4.9	11.7	484.4
CV =	15.6	1.3	5.5	213	6.63

Table 2. Factorial analysis of the effect of water management, soil applied fungicide and variety on plant stand densities, agronomic characters and rice yield. Rice Research Station, Crowley, LA. 1993.

Factor	Plants/ft^2	Days to heading	Plant Height (cm)	Lodging (%)	Yield (lb/A)
Replicate					
1	33.9	80.0	86.3	1.1	7104
2	29.4	80.5	88.9	6.0	7367
3	26.3	81.1	90.2	9.2	7323
4	23.4	80.9	91.0	5.7	7440
LSD (P=0.05) =	2.4	0.3	3.1	4.2	150
Water management					
Cont. flood	29.8	78.3	87.6	7.0	7497
Pinpoint fld.	30.1	79.3	88.3	4.6	7507
Delayed fld.	25.0	84.2	91.5	4.9	6921
LSD (P=0.05) =	3.0	1.3	ns	ns	420
Soil Fungicide					
Untreated	27.8	80.7	88.2	7.2	7295
Ridomil	28.7	80.6	90.0	3.8	7322
LSD(P=0.05) =	ns	ns	ns	2.9	ns
Variety					
Cypress	32.3	82.7	85.1	0.0	7476
Lemont	27.5	83.4	84.9	0.2	6826
Orion	30.7	84.3	99.8	31.5	7222
Bengal	23.6	85.3	86.7	0.2	7305
Maybelle	27.4	71.5	94.7	0.2	7196
8902031	28.2	76.5	83.5	0.8	7825
LSD(P=0.05) =	2.5	0.5	2.7	6.9	270

Table 3. Factorial/split plot ANOVA for the effects of water management, soil applied fungicide, variety and interactions on plant stand densities, agronomic characters and rice yield. Rice Research Station, Crowley, LA. 1993.

Source	df	Plants/ft^2	Days to heading	Plant Height (cm)	Lodging (%)	Yield (lb/A)
Replication	3	0.0001	0.0001	0.0304	0.0135	0.0037
Man	2	0.0096	0.0001	0.0610	0.5756	0.0224
Error A	6					
Fungicide	1	0.2646	0.4121	0.0867	0.0277	0.5831
Man X Fung	2	0.1730	0.4783	0.9115	0.6412	0.1683
Error B	9					
Variety	5	0.0001	0.0001	0.0001	0.0001	0.0001
Man X Var	10	0.6701	0.0001	0.9735	0.8763	0.3549
Fung X Var	5	0.3055	0.5970	0.2887	0.0281	0.8135
M X F X V	10	0.1545	0.9373	0.1368	0.9929	0.6511
Error C	90					

1993 RICE SEED PROTECTANT TEST

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 100 seeds/plot

Planting Method/Date: Water-planted by hand, Apr 4; drill-seeded with a Hege tray planter, Apr 21

Fertilization: Water-seeded, preplant 90-42-42, Apr 2; drill-seeded, 14-42-42, Apr 19

Plot Size: 2.5 ft dia rings (water seeded); 6 ft rows (drill seeded)

Herbicides: Water-seeded, 3 qt Arrosolo, Apr 21; Londax 1 oz/A, May 1
Drill-seeded, 4 qt Propanil + 2 qt Basagran/A, May 26;
1 oz/A Londax, June 8

Insecticides: 17 lb/A Furadan, May 26

Fungicides: Applied to seeds (See Table 3 for rates)

Application Equipment: Rolling jar mixer

Harvest: N/A

Experimental Design: Randomized block design with five replications

Stand counts: Apr 28 and May 14, plant height, May 14

Results: See Table 4.

Comments: Water mold pressure was high in water-seeded rice. Crusting of soil reduced stands in drill-seeded rice.

Table 4. Effect of seed-protectant fungicides on percent (%) germination and plant height, in water- and drill-seeded rice. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate	Germination (%) Water seeded			Plant height (cm) Water seeded		
		Soaked seed	Dry seed	Drill seeded	Soaked seed	Dry seed	Drill seeded
Untreated check		22.5 e	21.3 c	14.0 e	22.5 b	22.8 b	6.3 cde
Vitavax 200 SC	4 oz pr/cwt	27.3 cde	26.5 bc	17.3 cde	23.8 ab	23.5 ab	5.3 e
Vitavax 200 SC FA 12	4 oz pr/cwt 0.1 lb ai/cwt	38.5 ab	35.3 ab	23.0 a-e	24.3 a	24.5 a	5.8 de
Vitavax 200 SC Gib Gro	4 oz pr/cwt 1 lb ai/cwt	24.3 de	28.8 abc	24.3 a-d	23.8 ab	24.8 a	7.3 abc
Kocide	6 oz pr/cwt	43.8 a	37.8 a	31.0 a	24.5 a	24.5 a	6.0 de
Benlate 50 DF	4 oz pr/cwt	26.0 de	29.3 abc	15.0 de	24.0 ab	24.0 ab	6.5 cd
Dithane 75 DF	4.3 oz pr/cwt	41.3 ab	34.3 ab	19.8 b-e	23.8 ab	24.0 ab	7.8 ab
Dithane 75 DF GibGro G/100 lb	4.3 oz pr/cwt 1 lb ai/cwt	33.0 bcd	31.8 ab	26.0 abc	23.8 ab	25.0 a	7.8 abc
Champ Flowable	8 oz pr/cwt	42.8 a	34.8 ab	28.5 ab	23.5 ab	24.5 a	6.3 cde
Champ Flowable GibGro G/100 lb	8 oz pr/cwt 1 lb ai/cwt	41.8 ab	37.3 a	31.5 a	24.5 a	23.8 ab	7.8 ab
Thiram 42 SC	3.3 oz pr/cwt	36.0 abc	29.5 abc	27.5 ab	23.8 ab	24.0 ab	6.8 bcd
Thiram 42 SC FA 12	3.3 oz pr/cwt 0.1 lb ai/cwt	44.0 a	35.0 ab	28.0 ab	23.8 ab	24.0 ab	5.3 e
Thiram 42 SC FA 12 GA3	3.3 oz pr/cwt 0.1 lb ai/cwt 0.3 oz ai/cwt	40.8 ab	35.0 ab	32.3 a	23.5 ab	24.0 ab	7.3 abc
Thiram 42 SC GibGro G/100 lb	3.3 oz pr/cwt 1 lb ai/cwt	27.0 de	34.0 ab	26.0 abc	22.5 b	24.3 ab	8.0 a
LSD (.05) =		8.6	8.6	9.4	1.6	1.5	1.1
Standard Dev. =		6.1	6.0	6.6	1.1	1.0	0.7
CV =		17.3	18.6	26.7	4.6	4.3	11.4

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05)

1993 SEED COATING/PROTECTANT TEST

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Water seeded by hand, Apr 16; drill-seeded, Apr 21

Fertilization: Preplant water seeded 92-42-42, Apr 13; drill seeded 14-42-42, Apr 19; drill seeded topdressed 92-0-0, May 17; 46-0-0, June 3

Plot Size: Water seeded 4 x 20 ft; drill seeded 4 X 16 ft

Herbicides: Water seeded 3 qt Propanil + 1 qt Basagran/A, May 11; 1 oz/A Londax, May 1; drill seeded 4 qt Propanil + 2 qt Basagran/A, May 26, 1 oz/A Londax, June 8

Insecticides: 17 lb/A Furadan, May 26

Fungicides: Applied to seeds (See Table 11 for rates)

Application Equipment: Proprietary

Harvest: Water seeded, Aug 19; drill seeded, Aug 26

Experimental Design: Randomized block design with five replications

Stand counts: May 14

Results: See Table 5.

Comments: Water mold pressure was moderate in water-seeded rice.

Table 5. Effect of Ceprell-coated seed-protectant fungicides on stand establishment and yield in water- and drill-seeded rice. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate pr/cwt	Water seeded			Drill-seeded	
		Plant Stand (#ft^2)	Root rot (0-9)	Yield (lb/A)	Plant Stand (#ft^2)	Yield (lb/A)
Coated seed		28.0	2.8	6583 ab	11.5	7029
Untreated seed		22.8	2.3	6410 ab	9.4	7311
Rovral 4 SC	2.5 oz	22.5	3.0	6677 a	9.8	7175
Rovral 4 SC	1.5 oz	22.0	2.5	6439 ab	8.3	6933
Aliette 80 WP	5.0 oz	26.3	2.5	6569 ab	9.6	7097
Aliette 80 WP Rovral 4 SC	5.0 oz 2.5 oz	20.8	2.0	6270 b	10.1	7368
Aliette 80 WP Rovral 4 SC	5.0 oz 1.5 oz	25.8	2.8	6726 a	11.3	7272
Aliette 80 WP Rovral 4 SC	3.0 oz 3.0 oz	22.5	2.3	6426 ab	11.1	7213
Coated seed/ Soaked		28.3	2.5	6616 ab	na	na
Untreated seed/ Soaked		30.8	2.3	6599 ab	na	na
LSD (.05) =		ns	ns	369	ns	ns
Standard Dev. =		5.1	0.9	254.3	2.5	380
CV =		20.5	36.0	3.89	24.7	5.3

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).

1993 RIDOMIL RATE AND FORMULATION STUDY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Water-seeded, Apr 23

Emergence Date: Apr 30

Fertilization: Preplant 14-42-42, Apr 19; 92-0-0, May 17; 21-0-0, June 3

Plot Size: 4 x 20 ft

Water Management: Flooded, Apr 22; drained, Apr 28; reflooded, May 3; drained, May 16; permanent flood, May 18

Herbicides: 4 qt propanil/A + 2 qt/A Basagran, May 17; 1 oz/A Londax, June 8

Insecticides: 17 lb/A Furadan, May 26

Fungicides: Ridomil (preplant) applied to dry soil, Apr 22

Application Equipment: Soil Treatments: CO_2 backpack sprayer, 8002 tips, 15 gal/A

Drained: Aug 9

Harvest: Aug 26

Experimental Design: Randomized block design with five replications

Disease Ratings: Visual water mold signs were noted Apr 30; seedling counts, May 17

Results: See Table 6.

Comments: Water mold severity was moderate. All stand densities were in the optimum acceptable range. Other disease severities were low.

Table 6. Effect of soil applied Ridomil rate and formulation on plant stand and rice yield. Rice Research Station, Crowley, LA. 1993.

Soil treatment	Rate soil fungicide (lb ai/A)	Plant stand (pl/ft^2)	Yield (lb/A)
Unsprayed		20.4 ab	7496 a
Ridomil 2 EC	0.125 PRPL	16.2 b	7466 a
Ridomil 2 EC	0.250 PRPL	20.6 ab	7417 a
Ridomil 50 WP	0.125 PRPL	21.6 a	7289 a
Ridomil 50 WP	0.250 PRPL	20.2 ab	7058 a
LSD (.05) =		4.7	636
Standard Dev. =		3.5	474.1
CV =		17.9	6.5

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

1993 OFF-STATION SHEATH BLIGHT RESISTANT GERMPLASM EVALUATION

Location: Errol Lounsberry Farm, Lake Arthur, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont and 9202071, 150 lb/A

Planting Method/Date: Water-seeded, Apr 2

Emergence Date: Apr 17

Fertilization: 90-0-0 preplant, Apr 1; Second crop 45-0-0 Aug 5

Plot Size: 8 x 25 ft

Water Management: Flooded, Apr 1; Drained, Apr 4; reflooded, Apr 7

Herbicides: 25 lb Ordram + 1 oz Londax/A, May 4

Insecticides: Furadan 17 lb/A, May 4

Fungicides: Benlate 1.5 lb/A, July

Application Equipment: Airplane

Drained: July 19; Second crop, Oct 8

Harvest: Aug 4; Second crop, Oct 25

Experimental Design: Randomized block with four replications

Disease Ratings: Sheath blight severity (0-9) and incidence (%) July 30

Results: See Table 7.

Comments: Sheath blight severity was high in inoculated plots. Some natural disease developed in uninoculated plots.

Table 7. Evaluation of the sheath blight resistant line 9202071 using inoculated and uninoculated plots as compared to the susceptible variety Lemont. Errol Lounsberry Farm, Lake Arthur, LA. 1993.

Variety/ Inoculation	Sheath blight severity (0-9)	Sheath blight incidence (%)	Yield (lb/A)
Lemont/ Uninoculated	3.8 bc	14 b	6372 b
Lemont/ Inoculated	6.3 a	75 a	5757 c
9202071/ Uninoculated	2.5 c	8 b	6824 a
9202071/ Inoculated	5.3 ab	59 a	6558 ab
LSD (.05) =	2.1	27.2	375
Standard Dev.=	1.2	15.7	216.5
CV =	27.4	40.4	3.4

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

1993 VARIETY TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Various varieties and breeding lines, 3-4 gm/6 ft row

Planting Method/Date: Hege tray planter (drill-seeded), Apr 19

Emergence Date: Apr 27

Fertilization: Preplant 14-42-42, Apr 19; 92-0-0 preflood, May 17; 46-0-0, June 3

Plot Size: 3 - 6 ft rows

Water Management: Flushed, Apr 22, 29 and May 13; permanent flood, May 18

Herbicides: 4 qt Propanil + 2 qt Basagran/A, May 17; 1 oz/A Londax, May 26 and June 8

Insecticides: 17 lb/A Furadan, May 26 and June 8

Fungicides: None

Application Equipment: N/A

Inoculation Dates: Inoculated for sheath blight, June 14 (10-15 ml/row)

Drained: N/A

Harvest: N/A

Disease Ratings: Sheath blight and foliar disease data taken Aug 18; blast data taken Aug 15

Results: See Table 8.

Comments: Sheath blight and blast severities were very high; other diseases were moderate in severity.

Table 8. Reaction of rice varieties to sheath blight, leaf smut, brown spot, narrow brown spot, and rotten-neck blast. Rice Research Station, Crowley, LA. 1993.

Variety	Sheath blight (0-9)	Leaf smut (0-9)	Brown spot (0-9)	Narrow brown spot (0-9)	Rotten-neck blast (%)
Alan	6.5 cd	5.0 a	2.5 abc	3.0 a-f	17.5 f-i
Texmont	8.0 a	1.3 f-j	2.5 a-d	4.0 ab	60.0 a
Maybelle	7.8 ab	3.5 a-d	3.5 abc	4.0 ab	37.5 ab
Jackson	7.3 abc	2.5 c-h	2.5 a-d	3.0 a-f	18.8 fgh
Millie	5.0 f-i	2.0 d-h	1.8 d-j	2.0 b-e	6.30 i-m
Rosemont	7.5 ab	1.5 e-j	3.0 abc	2.8 a-g	46.3 ab
RT 7015	7.8 ab	4.3 abc	3.0 abc	4.4 a	50.0 ab
L-202	7.8 ab	2.3 d-h	2.3 bcd	3.3 a-e	26.3 def
LaGrue	7.0 bc	0.3 ij	1.5 cde	0.5 hi	31.3 de
Gulfmont	8.0 a	3.3 a-e	2.8 abc	3.5 a-d	15.0 f-k
Tebonnet	5.8 def	1.0 g-j	3.0 abc	2.0 c-h	37.5 cd
Lemont	7.5 ab	3.0 b-f	3.0 abc	2.8 a-g	12.5 g-l
Lacassine	8.0 a	0.8 hij	1.5 cde	3.3 a-e	17.7 f-i
Katy	5.8 def	1.0 g-j	2.5 a-d	0.0 m	0.0 k
Cypress	7.5 ab	3.3 a-e	3.5 abc	2.5 a-g	11.3 g-m
Newbonnet	5.8 def	1.3 f-j	2.3 bcd	3.3 a-e	22.5 efg
Della	5.8 de	3.0 b-f	2.0 c-e	0.5 hi	8.8 h-m
Dellmont	7.5 ab	1.3 f-j	2.0 b-e	2.3 b-h	18.8 fgh

Continued.

Table 8. Continued.

Variety	Sheath blight (0-9)	Leaf smut (0-9)	Brown spot (0-9)	Narrow brown spot (0-9)	Rotten-neck blast (%)
Adair	5.8 def	2.8 b-g	4.0 ab	1.8 d-i	13.8 g-k
Jasmine 85	2.0 j	0.0 j	0.0 e	0.0 i	0.0 m
Orion	4.5 hi	4.3 abc	3.0 abc	1.3 f-i	1.3 lm
Rico-1	4.5 hi	2.5 c-h	3.0 abc	1.3 f-i	11.3 g-m
Mars	4.8 ghi	4.3 abc	2.3 bcd	1.8 d-i	13.8 g-k
Mercury	5.8 def	4.5 ab	2.0 b-e	0.5 hi	32.5 de
Saturn	6.0 de	1.5 e-j	4.5 a	3.8 abc	16.3 f-j
Bengal	5.3 e-h	2.0 d-i	2.5 a-d	0.5 h-i	13.8 g-k
8902031	7.3 abc	2.5 c-h	3.5 abc	2.3 b-h	21.3 efg
9202071	6.0 de	0.8 hij	1.5 cde	0.0 i	3.8 klm
9102168	5.8 def	5.0 a	2.8 abc	2.0 c-h	11.3 g-m
8902192	4.3 i	0.0 j	0.5 de	0.0 i	0.0 m
9101142	5.8 def	1.5 e-j	3.3 abc	1.5 e-i	5.0 j-m
9101133	5.8 def	3.3 a-e	3.3 abc	1.0 ghi	11.3 g-m
9302155	5.5 efg	2.0 d-i	2.5 a-d	1.5 e-i	5.0 j-m
LSD (.05) =	0.9	1.8	2.1	1.9	10.7
Standard Dev. =	0.7	1.3	1.50	1.3	7.7
CV =	10.6	55.38	57.37	65.9	42.4

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05). Ratings based on 0-9 scale where 0 = no disease (immune) and 9 = maximum disease (very susceptible).

1993 UNIFORM DISEASE NURSERY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Various varieties and breeding lines, 3-4 gm/6 ft row, two (2) reps

Planting Method/Date: Hege tray planter (drill-seeded), Apr 19

Emergence Date: Apr 27

Fertilization: Preplant 14-42-42, Apr 19; 92-0-0 preflood, May 17; 46-0-0, June 3

Plot Size: 6 ft row

Water Management: Flushed Apr 22, 29, and May 13; permanent flood, May 18

Herbicides: 4 qt Propanil + 2 qt Basagran/A, May 17; 1 oz/A Londax, May 26 and June 8

Insecticides: 17 lb/A Furadan, May 26

Fungicides: None

Application Equipment: N/A

Inoculation Dates: Inoculated for sheath blight, June 14 (10-15 ml/row)

Drained: N/A

Harvest: N/A

Disease Ratings: Sheath blight and foliar disease data taken Aug 19; blast data taken Aug 3-13

Results: See Tables 9-15.

Comments: Sheath blight and blast severities were very high; other diseases were moderate in severity. Some lines were too thin to evaluate for sheath blight.

Table 9. Disease reactions of 1993 uniform rice nursery (URN), Group 1. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
1	6.5	0.5	4.0	5.0	3	3
2	6.5	3.0	5.0	1.0	5	0
3	8.0	2.0	2.5	1.0	4	5
4	5.5	3.0	3.5	1.0	4	13
5	6.0	2.0	4.0	1.0	4	1
6	5.5	1.0	3.0	4.0	2	0
7	7.5	2.0	4.0	3.5	3	30
8	7.0	3.5	5.0	5.0	5	1
9	7.0	1.0	2.0	3.5	3	1
10	8.0	1.5	2.0	3.5	5	4
11	7.5	3.0	3.5	3.5	5	6
12	5.5	1.5	5.0	3.5	3	4
13	5.5	2.0	3.0	2.5	4	1
14	8.0	0.0	5.0	4.5	6	5
Alan	6.5	3.0	2.0	3.5	5	8
Adair	5.5	2.0	2.5	1.0	4	6
Maybelle	8.5	3.0	1.5	5.0	5	21
Rosemont	6.5	0.0	1.0	3.5	6	13
Millie	6.0	0.5	2.0	2.0	4	1
Jackson	7.0	1.0	4.0	4.0	4	1

Table 10. Disease reactions of 1993 uniform rice nursery (URN), Group 2. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
21	6.0	1.0	5.0	3.0	4	6
22	6.5	0.0	6.0	1.0	4	3
23	8.5	3.0	1.0	1.0	6	15
24	6.0	1.0	4.5	2.0	6	5
25	5.0	3.5	4.0	1.5	6	0
26	6.5	0.0	1.0	4.5	4	4
27	6.5	1.0	4.0	2.5	5	14
28	6.5	1.5	5.0	1.0	6	0
29	7.0	0.0	3.0	3.5	6	5
30	6.5	0.0	4.0	3.0	4	8
31	5.0	0.5	3.5	0.5	6	8
32	6.0	1.5	3.5	3.0	6	11
33	7.5	0.0	4.0	4.5	4	13
34	6.5	4.0	4.5	3.0	4	0
35	8.0	2.0	4.0	2.0	4	0
36	5.5	0.0	2.0	3.0	3	5
Orion	6.0	2.0	3.5	2.5	3	0
Bengal	5.0	1.0	3.5	3.5	6	5
Mars	5.5	0.0	4.0	2.0	6	0
LaGrue	7.5	1.0	2.0	1.0	5	8

Table 11. Disease reactions of 1993 uniform rice nursery (URN), Group 3. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
41	6.0	1.0	4.0	3.5	2	4
42	7.5	1.0	2.0	2.5	4	8
43	-	0.5	1.0	1.5	-	0
44	6.0	2.0	3.5	3.0	3	0
45	6.0	2.5	3.5	3.0	2	3
46	-	3.5	3.0	1.5	4	8
47	5.5	2.0	4.5	3.0	3	3
48	6.5	1.5	1.0	0.0	4	0
49	7.0	2.0	2.0	2.0	4	4
50	6.0	1.0	3.0	4.0	2	0
51	8.0	3.0	4.0	1.5	5	0
52	7.0	2.0	3.5	4.0	6	8
53	5.0	0.0	4.0	3.0	3	0
54	7.0	2.5	4.0	4.0	2	13
Lemont	8.0	1.0	2.0	4.5	5	9
Gulfmont	8.0	0.5	3.0	3.5	6	5
Lacassine	7.0	2.0	3.5	4.5	4	14
Katy	4.5	0.0	2.5	3.0	3	4
Cypress	6.0	1.0	1.0	4.5	5	5
Newbonnet	6.5	0.0	5.5	4.0	5	19

Table 12. Disease reactions of 1993 uniform rice nursery (URN), Group 4. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
61	4.5	2.0	3.0	2.0	2	0
62	7.0	3.0	4.0	4.0	4	6
63	5.0	3.0	3.0	2.0	5	1
64	6.0	2.5	3.0	1.5	4	1
65	7.0	0.0	2.0	3.0	2	1
66	-	1.5	0.5	4.0	5	5
67	7.0	3.5	2.0	2.0	6	8
68	7.5	2.0	5.0	1.5	5	23
69	7.0	3.0	3.0	2.0	5	0
70	7.0	0.5	1.5	0.0	6	4
71	6.0	5.0	1.0	0.0	3	0
72	7.0	2.5	2.5	3.5	4	3
73	5.0	2.5	1.5	1.0	4	4
74	6.0	2.0	5.0	4.5	2	4
75	7.0	0.0	1.0	4.5	5	6
76	8.0	1.5	4.0	6.0	5	5
77	8.0	0.0	5.0	5.0	5	19
78	5.0	2.5	1.5	0.0	6	15
Rico-1	5.0	2.0	6.0	3.0	6	1
Toro-2	7.0	0.5	3.5	0.5	6	6

Table 13. Disease reactions of 1993 uniform rice nursery (URN), Group 5. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
81	7.5	1.5	2.5	3.0	4	0
82	8.0	0.0	7.5	5.0	4	25
83	9.0	2.5	2.5	4.0	5	13
84	7.0	2.5	3.5	3.5	4	3
85	8.0	2.0	3.0	2.0	4	0
86	5.5	3.0	2.5	2.0	3	3
87	7.0	0.0	4.5	4.5	2	3
88	8.0	3.0	3.0	2.0	2	13
89	5.5	2.5	3.0	0.5	4	3
90	5.0	0.5	5.5	1.0	4	0
91	8.5	3.0	4.0	3.0	4	8
92	7.5	1.0	3.5	4.0	3	0
93	5.0	2.0	5.0	1.0	4	5
94	8.0	3.0	4.0	5.0	5	5
95	8.0	4.0	3.0	4.0	3	0
96	7.5	1.0	5.5	3.5	2	5
97	7.5	2.0	5.0	3.0	3	3
98	7.0	1.0	3.0	0.0	3	0
99	6.5	0.0	7.0	3.5	4	5
100	7.5	0.5	4.5	1.0	4	5
101	7.0	3.5	2.0	1.5	4	10
102	6.5	0.0	4.5	3.5	4	5
103	7.5	2.0	3.5	3.0	4	3
104	8.0	3.0	2.0	4.0	5	1
105	6.0	2.5	4.0	1.0	6	8
106	6.5	1.0	6.5	2.0	6	0
107	6.0	4.5	0.5	0.0	4	1
108	5.0	0.0	5.5	1.5	5	0
109	7.5	3.0	2.0	4.0	5	15
110	4.5	3.0	5.5	0.0	6	10
111	4.0	1.0	4.0	1.5	5	3
112	5.5	3.0	3.0	0.0	5	0
113	8.0	1.5	0.0	0.0	4	15
114	8.5	3.0	1.5	0.0	5	5
115	5.0	1.0	4.5	3.0	5	3
116	6.0	3.5	3.5	0.0	3	5
Texmont	7.5	1.0	0.5	4.5	5	33
Labelle	8.0	0.0	5.5	4.0	5	3
L203	6.5	3.0	3.0	3.5	6	25
Tebonnet	6.5	0.0	2.5	6.0	3	3

Table 14. Disease reactions of 1993 uniform rice nursery (URN), Group 6. Rice Research Station, Crowley, LA. 1993

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
121	6.0	2.0	2.5	0.0	4	3
122	5.0	0.0	3.0	3.5	4	33
123	7.5	0.0	2.5	4.5	4	8
124	7.0	1.5	2.5	2.5	4	18
125	5.0	2.5	6.0	1.5	5	0
126	7.0	0.0	2.0	2.0	4	30
127	6.5	2.0	1.5	4.0	5	18
128	4.5	1.0	4.0	0.5	5	0
129	5.5	0.0	1.5	1.0	5	5
130	7.5	2.0	2.5	3.0	5	28
131	6.0	0.0	4.0	2.5	5	5
132	6.0	3.0	3.5	1.0	3	0
133	6.5	1.5	5.0	4.5	5	0
134	6.5	2.5	4.0	2.5	5	0
135	7.5	2.0	4.5	4.0	3	13
136	5.0	0.0	4.0	3.0	5	13
137	5.0	3.5	0.0	0.0	4	0
138	8.0	2.5	1.5	1.5	5	8
139	6.5	1.5	2.5	5.0	5	15
140	3.0	5.0	0.0	0.0	5	0
141	6.5	1.5	4.0	3.5	5	8
142	6.0	0.0	5.0	2.0	6	10
143	5.0	1.5	3.0	0.0	5	0
144	6.0	1.5	0.5	0.5	3	0
145	5.0	0.0	2.5	4.0	2	0
146	8.0	3.0	1.0	0.5	3	15
147	7.5	0.0	2.0	1.5	5	0
148	5.0	0.0	5.0	1.5	6	5
149	3.0	1.5	0.0	0.0	3	0
150	7.0	1.0	4.5	4.0	4	3
151	6.5	2.0	4.5	1.0	3	0
152	4.5	3.5	0.0	0.0	4	0
153	6.5	0.0	4.5	3.5	3	30
154	7.5	2.0	2.5	3.0	4	40
155	5.5	1.0	4.0	4.0	3	0
156	6.5	0.0	3.5	2.0	3	0
Dellmont	-	0.0	3.5	4.5	4	8
Rexmont	8.0	1.5	3.0	3.0	4	10
Della	5.5	2.5	4.0	0.0	5	3
Lebonnet	6.0	2.5	4.0	2.5	4	5

Table 15. Disease reactions of 1993 uniform rice nursery (URN), Group 7. Rice Research Station, Crowley, LA. 1993.

URN No.	Sheath Blight (0-9)	Brown Spot (0-9)	Leaf Smut (0-9)	Narrow Brown (0-9)	Leaf Blast (0-9)	Rotten Neck %
161	7.0	0.0	3.0	2.0	6	20
162	6.0	2.0	1.0	2.0	4	10
163	7.0	1.0	1.5	3.5	4	13
164	4.5	0.5	3.0	2.0	3	10
165	7.5	2.0	3.5	3.0	4	18
166	6.0	0.0	3.5	3.5	3	13
167	5.0	2.5	2.0	3.0	5	30
168	6.5	2.0	3.0	3.5	4	20
169	7.5	1.0	3.0	0.0	4	3
170	7.0	2.0	4.5	0.5	5	63
171	7.5	2.0	6.5	0.5	6	38
172	4.5	2.0	0.5	0.0	2	25
173	6.5	0.5	5.0	2.0	2	43
174	6.5	1.5	3.0	1.5	3	10
175	6.5	1.0	3.5	2.0	4	35
176	4.5	0.5	3.0	4.0	2	5
177	6.5	3.0	1.5	2.0	4	0
178	5.5	0.0	4.5	3.0	4	35
179	6.5	1.0	5.0	4.0	5	30
180	6.5	1.5	3.5	2.0	5	10
181	7.0	1.0	2.5	2.5	2	8
182	6.0	0.0	2.5	2.5	3	20
183	7.5	1.0	4.0	3.0	5	15
184	3.5	4.0	0.0	0.0	2	8
185	7.0	1.5	4.0	2.5	5	13
186	7.0	0.0	2.0	4.0	6	45
187	4.0	0.5	0.0	0.0	4	0
188	5.0	0.0	5.5	4.5	4	25
189	7.5	2.5	3.5	3.0	4	33
190	7.0	0.0	4.0	0.0	5	30
191	7.0	1.5	6.0	4.0	3	40
192	3.5	0.5	0.0	1.0	2	0
193	6.5	1.0	3.5	4.0	4	48
194	6.0	0.0	4.5	3.5	4	33
195	7.0	1.0	0.5	4.0	4	23
196	7.5	2.5	4.0	3.5	4	50
Jasmine 85	3.5	3.0	0.0	0.5	1	0
A-301	5.0	3.5	0.0	0.0	9	30
Gui Chow	2.5	3.5	0.5	0.5	2	5
Teqing	3.0	2.0	0.0	0.0	2	3

1993 FOLIAR DISEASE FUNGICIDE TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Cypress, 120 lb/A

Planting Method/Date: Kincaid cone planter (drill-seeded), Apr 20

Emergence Date: Apr 29

Fertilization: Preplant 14-42-42, Apr 19; 92-0-0, May 17; 46-0-0, June 8

Plot Size: 4 x 16 ft

Water Management: Flushed, Apr 22 & 29 and May 6 & 13; permanent flood, May 20

Herbicides: 4 qt/A Propanil + 2 qt Basagran, May 17; 1 oz/A Londax, May 26 and June 8

Insecticides: Furadan 17 lb/A, May 26 and June 8

Fungicides: Applied at panicle differentiation (PD), June 23; PD + 14 days, July 2; boot (B), July 7; infected, July 9; panicle emergence, July 16; and 70% heading (H), July 19 to foliage;

Application Equipment: CO_2 backpack sprayer, 8002 tips, 15 gal/A

Inoculation Dates: Inoculated for sheath blight, June 8 (100 ml/plot)

Drained: Aug 10

Harvest: Aug 20

Experimental Design: Randomized block design with four replications

Disease Ratings: Sheath blight severity (0-9), Aug 5 (soft dough) and Aug 20 (maturity); infestation levels (percent tillers infected) and leaf smut (0-9), Aug 5

Results: See Table 16

Comments: Sheath blight severity was high; other diseases were low.

Table 16. Effects of rice foliar fungicides on sheath blight and leaf smut control and rice yield and milling. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate	Timing[1]	Sheath blight Severity (0-9) Aug 6	Sheath blight Severity (0-9) Aug 20	Sheath blight Tillers infected (%)	Leaf smut (0-9)	Yield lb/A	Yield increase lb/A	Milling whole (%)	Milling total (%)
Inoculated unsprayed check			6.5 ab	6.8 abc	44.0 a-f	5.8 a	6570.8 n	-0.2 n	61.940 cd	69.020 ab
Uninoculated			5.3 b-g	6.5 a-d	23.5 i-r	5.5 ab	6928.3 i-n	357.3 i-n	61.500 d	68.320 bc
Benlate 50 WP	0.5 lb ai/A	B+H	5.5 a-f	6.0 c-f	32.5 c-m	4.5 c-f	7308.8 b-j	737.8 b-j	62.640 a-d	67.660 c
Tilt 3.6 EC	10 oz pr/A	B	4.5 e-h	5.8 d-g	16.5 m-s	2.5 ijk	7371.0 a-i	800.0 a-i	62.960 abc	68.910 ab
Tilt 3.6 EC	6 oz pr/A	PD+B	4.8 d-g	6.5 a-d	23.5 i-r	3.0 hij	7272.0 d-j	701.0 d-j	62.842 abc	69.525 ab
Tilt 3.6 EC Benlate 50 WP	10 oz pr/A 0.5 lb ai/A	B H	4.5 e-h	5.3 f-i	16.8 m-s	1.5 l	7717.5 a-d	1146.5 a-d	63.260 ab	69.780 a
EXP10370A 50 WG Latron CS-7 8.33 EC	0.5 lb ai/A 0.25 % v/v	B+H B+H	6.0 a-d	6.3 b-e	38.5 a-k	4.8 b-e	7102.5 e-m	531.5 e-m	62.820 abc	69.580 a
EXP01712B 50 WP Latron CS-7 8.33 EC	1 lb ai/A 0.25 % v/v	B+H B+H	4.5 e-h	6.8 abc	22.3 j-r	4.5 c-f	7105.3 e-m	534.3 e-m		
EXP10388A 50 WP Latron CS-7 8.33 EC	.99 lb ai/A 0.25 % v/v	B+H B+H	4.8 d-g	5.5 e-h	16.8 m-s	4.8 b-e	7194.8 e-k	623.8 e-k	63.140 ab	69.540 a
EXP10388A 50 WP Latron CS-7 8.33 EC	1.32 lb ai/A 0.25 % v/v	B+H B+H	4.8 d-g	5.5 e-h	24.8 h-q	4.8 b-e	7226.0 e-k	655.0 e-k		
Rovral 4 SC Latron CS-7 8.33 EC	0.5 lb ai/A 0.25 % v/v	B+H B+H	6.0 a-d	6.0 c-f	46.5 a-d	5.0 a-d	6787.5 k-n	216.5 k-n	62.280 a-d	69.480 ab
Tilt 41.8 GL	6 oz pr/A	PD+B	4.8 d-g	6.5 a-d	23.8 i-r	1.8 kl	7379.3 a-i	808.3 a-i		
TILT 41.8 GL	10 oz pr/A	B	5.0 c-g	6.5 a-d	25.5 g-p	3.3 ghi	7477.3 a-f	906.3 a-f		
Moncut 50 WP	0.35 lb ai/A	PD+14	4.5 e-h	5.3 f-i	20.3 l-s	4.3 def	7787.5 a	1216.5 a	62.140 bcd	69.060 ab
Moncut 70 WG	0.35 lb ai/A	PD+14	4.0 g-j	5.5 e-h	12.3 n-s	4.3 def	7460.5 a-f	889.5 a-f		
Moncut 70 WP	0.35 lb ai/A	PD+14	4.0 g-j	5.0 g-j	27.0 e-n	4.3 def	7114.5 e-m	543.5 e-m		
Moncut 50 WP	0.35 lb ai/A	infect+14	4.5 e-h	5.8 d-g	30.8 d-m	4.8 b-e	7175.3 e-l	604.3 e-l	63.360 a	69.837 a
Moncut 50 WP	0.35 lb ai/A	infect	4.3 f-i	5.3 f-i	17.0 m-s	4.5 c-f	7228.3 e-k	657.3 e-k		

Continued.

Table 16. Continued.

Treatment	Rate	Timing[1]	Sheath blight Severity (0-9) Aug 6	Sheath blight Severity (0-9) Aug 20	Sheath blight Tillers infected (%)	Leaf smut (0-9)	Yield lb/A	Yield increase lb/A	Milling whole (%)	Milling total (%)
Moncut 50 WP	0.50 lb ai/A	infect	4.0 g-j	5.5 e-h	11.8 n-s	4.5 c-f	7494.8 a-e	923.8 a-e	62.770 abc	69.750 a
Moncut 50 WP	0.70 lb ai/A	infect	3.3 hij	4.8 hij	8.5 o-s	4.0 efg	7423.0 a-g	852.0 a-g		
Moncut 50 WP Penetrator 8.33 EC	0.35 lb ai/A 0.25 lb ai/A	infect infect	4.0 g-j	5.0 g-j	7.8 p-s	4.3 def	7473.5 a-f	902.5 a-f		
BAS490 04 4.17 SC Latron CS-7 8.33 EC	0.1 lb ai/A 0.25 % v/v	PD+14 2TRT PD+14	5.5 a-f	6.5 a-d	24.5 h-r	4.0 efg	6992.0 g-n	421.0 g-n		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.2 lb ai/A 0.25 % v/v	PD+14 2TRT PD+14	5.3 b-g	6.3 b-e	24.0 h-r	2.3 jkl	7164.8 e-l	593.8 e-l		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.3 lb ai/A 0.25 % v/v	PD+14 2TRT PD+14	4.3 f-i	6.0 c-f	19.8 l-s	2.5 ijk	7365.8 a-i	794.8 a-i	62.853 abc	69.380 ab
Tilt 3.6 EC Latron CS-7 8.33 EC	6 oz pr/A 0.25 % v/v	PD+14 2 TRT PD+14	4.5 e-h	6.0 c-f	20.8 k-s	1.8 kl	7766.0 ab	1195.0 ab		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.2 lb ai/A 0.25 % v/v	PD PD	6.0 a-d	6.5 a-d	50.5 abc	3.0 hij	6714.5 lmn	143.5 lmn		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.2 lb ai/A 0.25 % v/v	Boot Boot	5.0 c-g	6.3 b-e	29.0 d-n	3.3 ghi	7424.8 a-g	853.8 a-g		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.2 lb ai/A 0.25 % v/v	Pan.Emerge. Pan.Emerge.	4.8 d-g	5.8 d-g	43.3 a-g	2.3 jkl	6870.5 j-n	299.5 j-n		
BAS490 04F 4.17 SC Latron CS-7 8.33 EC	0.2 lb ai/A 0.25 % v/v	PD + Boot PD + Boot	4.8 d-g	6.3 b-e	20.0 l-s	3.8 fgh	7224.3 e-k	653.3 e-k	62.640 abc	69.280 ab
Tilt 3.6 EC Latron CS-7 8.33 EC	6 oz pr/A 0.25 % v/v	PD PD	6.5 ab	7.3 a	27.8 e-n	4.8 b-e	6877.0 j-n	306.0 j-n		
Rovral 4 SC R-11	0.5 lb ai/A 0.125 % v/v	B+H B+H	6.3 abc	6.3 b-e	32.8 c-m	4.5 c-f	7072.3 e-m	501.3 e-m		
Rovral 4 SC Sylgard 309	0.5 lb ai/A 0.063 % v/v	B+H B+H	6.0 a-d	6.3 b-e	26.0 f-o	4.5 c-f	7094.3 e-m	523.3 e-m	62.840 abc	69.460 ab
Rovral 4 SC Sylgard 309	0.5 lb ai/A 0.125 % v/v	B+H B+H	5.3 b-g	6.3 b-e	25.3 g-p	5.3 abc	6922.8 i-n	351.8 i-n	62.260 abc	69.520 ab

Continued.

Table 16. Continued.

Treatment	Rate	Timing[1]	Sheath blight Severity (0-9) Aug 6	Sheath blight Severity (0-9) Aug 20	Sheath blight Tillers infected (%)	Leaf smut (0-9)	Yield lb/A	Yield increase lb/A	Milling whole (%)	Milling total (%)
Rovral 4 SC Sylgard 309 Benlate 50 WP Sylgard 309	0.5 lb ai/A 0.063 % v/v 0.5 lb ai/A 0.063 % v/v	B B H H	5.3 b-g	5.8 d-g	29.0 d-n	5.0 a-d	7276.5 c-j	705.5 c-j	62.300 abc	69.240 ab
Rovral 4 SC Sylgard 309 Benlate 50 WP Sylgard 309	0.5 lb ai/A 0.125 % v/v 0.5 lb ai/A 0.125 % v/v	B B H H	5.5 a-f	6.3 b-e	27.0 e-n	5.3 abc	7060.0 e-m	489.0 e-m		
ICIA5504 50 WG	2.855 oz ai/A	PD	6.5 ab	6.8 abc	39.8 a-j	4.5 c-f	6897.0 j-n	326.0 j-n		
ICIA5504 50 WG	1.427 oz ai/A	PD+14 2 TRT	3.0 ij	5.0 g-j	6.8 qrs	2.3 jkl	7308.0 b-j	737.0 b-j	62.925 abc	69.375 ab
ICIA5504 50 WG	2.855 oz ai/A	PD+14 2 TRT	3.0 ij	4.5 ij	6.5 rs	2.3 jkl	7734.3 abc	1163.3 abc	62.900 abc	69.740 a
ICIA5504 50 WG ICIA5504 50 WG	2.855 oz ai/A 1.427 oz ai/A	PD PD+14 1 TRT	2.8 j	4.3 j	2.8 s	1.8 kl	7411.8 a-h	840.8 a-h	63.170 ab	69.445 ab
Rovral 4 SC	0.5 lb ai/A	PD+B	6.8 a	7.0 ab	44.5 a-e	5.8 a	6857.5 j-n	286.5 j-n		
Rovral 4 SC	0.5 lb ai/A	H	5.8 a-e	6.3 b-e	51.0 ab	4.8 b-e	6934.0 i-n	363.0 i-n		
Rovral 4 SC	0.75 lb ai/A	H	5.3 b-g	6.3 b-e	42.0 a-h	5.0 a-d	7049.3 e-m	478.3 e-m		
Rovral 4 SC	1.0 lb ai/A	H	5.3 b-g	6.0 c-f	37.0 a-l	5.0 a-d	6956.3 h-n	385.3 h-n		
Benlate 50 WP	0.5 lb ai/A	PD+B	6.5 ab	7.0 ab	39.8 a-j	5.0 a-d	6670.3 mn	99.3 mn		
Benlate 50 WP	0.5 lb ai/A	H	5.3 b-g	6.5 a-d	52.5 ab	4.8 b-e	6950.5 i-n	379.5 i-n		
Benlate 50 WP	0.75 lb ai/A	H	5.5 a-f	6.3 b-e	34.5 b-m	4.5 c-f	7022.3 f-n	451.3 f-n		
Benlate 50 WP	1.0 lb ai/A	H	5.8 a-e	6.3 b-e	53.5 a	3.8 fgh	7162.8 e-l	591.8 e-l		
Uninoculated check			5.8 a-e	7.0 ab	43.3 a-g	5.8 a	6787.3 k-n	216.3 k-n		
Inoculated check			6.0 a-d	7.3 a	41.0 a-i	5.8 a	6886.3 j-n	315.3 j-n		
LSD (.05) =			1.2	0.8	16.9	0.9	428.0	428.0	1.113	1.138
Standard Dev.=			.831504	.570250	12.0890	.634313	305.707	305.707	.786755	.805036
CV =			16.50	9.46	42.79	15.62	4.27	51.53	1.26	1.16

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).
Treatment 1 is the standard/comparison treatment.

1993 BLAST FUNGICIDE TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: M201, 120 lb/A

Planting Method/Date: Kincaid cone planter (drill-seeded), Apr 28

Emergence Date: May 5

Fertilization: Preplant 14-42-42, Apr 27; 46-0-0, May 11 and June 16

Plot Size: 4 x 16 ft

Water Management: Permanent flood, May 19; drained, June 14; reflooded, June 16

Herbicides: 4 qt Propanil + 2 qt Basagran/A, May 17; 1 oz/A Londax, May 26

Insecticides: Furadan 17 lb/A, May 26

Fungicides: Panicle differentiation (PD), June 23; 0.5" Boot (0.5 B), June 25; Boot (B), June 29; 10% heading (EH), July 2; 90% heading (90%H), July 5; 100% heading (H), June 6; H+5 days, July 9; H+10, July 12; H+15, July 16, EH+10 days, July 12

Application Equipment: CO_2 backpack sprayer, 8002 tips, 15 gal/A

Drained: July 27

Harvest: Aug 6

Experimental Design: Randomized block design with four replications

Disease Ratings: Blast data taken, July 27

Results: See Table 17

Comments: Blast severity was high; other diseases were low.

Table 17. Effect of fungicides on rotten neck blast control and rice yield on the variety M201. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate	Timing[1]	Sterility (0-9)	Rotten neck blast (%)	Yield (lb/A)	Change from check (lb/A)
Unsprayed check			4.8 a	39.8 bcd	4939.0 nop	0.0 nop
Benlate 50 WP	0.5 lb ai/A	B+H	1.8 i-l	6.8 nop	6229.0 a-f	1290.0 a-f
BAS490F 4.16 SC Latron CS-7 8.33 EC	0.1 lb ai/A 0.25 % v/v	PD+B+H PD+B+H	3.3 def	19.3 h-l	5524.8 i-n	585.8 i-n
BAS490F 4.16 SC Latron CS-7 8.33 EC	0.15 lb ai/A 0.25 % v/v	PD+B+H PD+B+H	3.0 d-g	17.0 h-n	5605.5 g-m	666.5 g-m
BAS490F 4.16 SC Latron CS-7 8.33 EC	0.20 lb ai/A 0.25 % v/v	PD+B+H PD+B+H	2.3 g-j	11.5 j-p	6175.8 a-h	1236.8 a-h
Benlate 50 WP Latron CS-7 8.33 EC	1.0 lb ai/A 0.25 % v/v	PD+B+H PD+B+H	1.8 i-l	4.8 op	6522.0 a-d	1583.0 a-d
EXP01712B 50 WP Latron CS-7 8.33 EC	1.0 lb ai/A 0.25 % v/v	B+H B+H	1.3 klm	5.3 op	5975.3 d-j	1036.3 d-j
EXP10388A 50 WP Latron CS-7 8.33 EC	0.99 lb ai/A 0.25 % v/v	B+H B+H	2.8 e-h	15.8 i-o	5722.5 f-l	783.5 f-l
EXP10388A 50 WP Latron CS-7 8.33 EC	1.32 lb ai/A 0.25 % v/v	B+H B+H	1.5 j-m	2.5 p	6667.8 ab	1728.8 ab
Kasumin 2 EC	3.5 pt pr/A	H+10 2 trt	1.8 i-l	7.5 m-p	5718.3 f-l	779.3 f-l
Kasumin 2 EC	2.6 pt pr/A	H+10 2 trt	2.5 f-i	10.0 k-p	5996.0 c-j	1057.0 c-j
Kasumin 2 EC Topsin 70 WP	2.6 pt pr/A 0.7 lb ai/A	H+10 2 trt H+10	1.8 i-l	9.5 k-p	5791.5 f-l	852.5 f-l
Kasumin 2 EC Topsin M 70 WP	3.5 pt pr/A 0.7 lb ai/A	H+10 2 trt H+10	2.0 h-k	7.3 nop	6146.3 a-h	1207.3 a-h
Topsin 70 WP Dithane 75 DF	0.7 lb ai/A 3.75 lb pr/A	H+10 2 trt H+10	2.0 h-k	7.8 l-p	5774.3 f-l	835.3 f-l
Benlate 50 WP R-11	0.5 lb ai/A 0.125 % v/v	B+H B+H	1.8 i-l	8.8 k-p	6098.3 b-i	1159.3 b-i
Benlate 50 WP Sylgard 309	0.5 lb ai/A 0.063 % v/v	B+H B+H	1.0 lm	7.3 nop	6035.8 c-i	1096.8 c-i
Benlate 50 WP Sylgard 309	0.5 lb ai/A 0.125 % v/v	B+H B+H	1.5 j-m	8.3 k-p	6031.5 c-i	1092.5 c-i
Beam 75 WP	0.25 lb ai/A	B+H	0.8 m	6.0 nop	6757.5 a	1818.5 a
ICIA5504 50 WG ICIA5504 50 WG	2.855 oz ai/A 1.427 oz ai/A	EH 10% EH+10	1.3 klm	4.5 op	6606.0 abc	1667.0 abc
ICIA5504 50 WG	4.282 oz ai/A	EH 10%	2.0 h-k	6.0 nop	5886.5 e-k	947.5 e-k
ICIA5504 50 WG	2.855 oz ai/A	EH+10 2 TRT	1.0 lm	3.3 p	6295.8 a-f	1356.8 a-f
ICIA5504 50 WG	5.708 oz ai/A	EH 10%	1.5 j-m	7.3 nop	6327.3 a-f	1388.3 a-f
Topsin M 70 WP	1.4 lb ai/A	B+H	2.0 h-k	14.0 j-p	6031.5 c-i	1092.5 c-i

Continued.

Table 17. Continued.

Treatment	Rate	Timing[1]	Sterility (0-9)	Rotten neck blast (%)	Yield (lb/A)	Change from check (lb/A)
Topsin M 70 WP	0.7 lb ai/A	B+H	2.0 h-k	11.5 j-p	5816.8 e-l	877.8 e-l
Topsin M 70 WP	0.525 lb ai/A	B+H	3.0 d-g	16.0 i-o	6073.8 b-i	1134.8 b-i
Benlate 50 WP	0.5 lb ai/A	B	3.5 cde	22.8 f-j	5384.0 j-n	445.0 j-n
Benlate 50 WP	0.5 lb ai/A	90% H	2.5 f-i	14.0 j-p	5245.0 l-o	306.0 l-o
Benlate 50 WP	0.5 lb ai/A	0.5 B+90% H	2.0 h-k	7.3 nop	5967.3 d-j	1028.3 d-j
Benlate 50 WP	0.5 lb ai/A	0.5 B	3.8 bcd	27.8 e-h	5252.5 l-o	313.5 l-o
Benlate 50 WP	0.5 lb ai/A	100% H	3.0 d-g	26.3 e-i	5098.5 mno	159.5 mno
Benlate 50 WP	0.75 lb ai/A	90% H	2.5 f-i	11.0 k-p	5582.8 h-m	643.8 h-m
Benlate 50 WP	1.0 lb ai/A	90% H	2.3 g-j	19.0 h-m	5905.3 d-k	966.3 d-k
Benlate 50 WP	0.5 lb ai/A	5 Days PH	3.0 d-g	19.8 g-k	5484.0 i-n	545.0 i-n
Benlate 50 WP	0.5 lb ai/A	10 Days PH	3.8 bcd	32.3 def	5609.3 g-m	670.3 g-m
Benlate 50 WP	0.5 lb ai/A	15 Days PH	3.8 bcd	31.3 d-g	5298.8 k-o	359.8 k-o
Benlate 50 WP	1.0 lb ai/A	B+H	1.3 klm	3.3 p	6428.5 a-e	1489.5 a-e
Benlate 50 WP	1.0 lb ai/A	H+10 2 trt	2.3 g-j	13.8 j-p	6008.3 c-i	1069.3 c-i
Benlate 50 WP Water Sol Film 50 WP	1.0 lb ai/A 1% v/v	B+H B+H	1.8 i-l	6.8 nop	6219.0 a-g	1280.0 a-g
Unsprayed check			4.3 abc	37.3 cde	5082.0 mno	143.0
Unsprayed check			4.5 ab	49.0 ab	4947.3 nop	8.3
Unsprayed check			5.0 a	54.3 a	4726.0 op	-213.0
LSD (.05) =			0.8	10.9	572.6	572.6
Standard Dev. =			.594326	7.75846	409.008	409.008
CV =			24.18	48.11	7.06	47.72

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).
Treatment 1 is the standard/comparison treatment.

1993 FUNGICIDE MILLING TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Kincaid cone planter (drill-seeded), Apr 28

Emergence Date: May 9

Fertilization: Preplant 14-42-42, Apr 27; 46-0-0, May 26 and June 11

Plot Size: 4 x 16 ft

Water Management: Permanent flood, May 19

Herbicides: 4 qt Propanil + 2 qt Basagran/A, May 17; 1.5 oz/A Londax, May 26

Insecticides: Furadan 17 lb/A, May 26

Fungicides: Boot (B), June 29; Heading (H), July 2

Application Equipment: CO_2 backpack sprayer, 26 psi, 8002 tips, 15 gal/A

Drained: July 27

Harvest: Aug 6

Experimental Design: Randomized block design with six replications

Disease Ratings: Sheath blight data taken

Results: See Table 18

Comments: Sheath blight severity was high; other diseases were low.

Table 18. Effect of fungicides on milling of Lemont rice infected with sheath blight, Rice Research Station, Crowley, LA. 1993.

Fungicide treatment	Rate of fungicide (lb ai/A)	Head rice (%)	Sheath blight (0-9)
Unsprayed/ Uninoculated		57.9	3.5
Unsprayed/ Inoculated		47.7	8.0
Benlate 50DF	0.50 B+H	47.2	7.5
Rovral 4F	0.50 B+H	47.4	6.5
Moncut 50 WP	0.35 B	50.5	5.5
LSD (.05) =		3.65	1.6
Standard Dev. =		1.4	0.6
CV =		2.83	10.2

ROTATIONAL CROPS[1]

R.J. Habetz

INTRODUCTION

Soybean [Glycine max (L.) Merr.] acreage has been on a decline in southwest Louisiana. For this reason, more improved production practices are necessary for producers to return a higher profit. Yields were much lower in 1993, mostly due to weather conditions. Planting conditions were favorable in the early planting season but excessive rainfall in June and early July either damaged already growing soybeans or delayed planting, resulting in reduced stands and increased weed pressure. The later growing season was affected by untimely dry conditions that affected yield.

Weed control in soybeans is a major factor in soybean production. Weed research is ongoing at the Rice Research Station. Reduced rates, cultivation, and planting methods all play an important role in profitability.

Grain sorghum [Sorghum bicolor (L.) Moench] is an alternative crop to soybeans in rotation with rice. A statewide variety evaluation in these two crops is conducted in cooperation with the Louisiana Agricultural Experiment Station.

Wheat (Triticum aestivum L.) is another crop grown in southwest Louisiana that can enhance a farming operation. Normally, wheat is double cropped with soybeans. Due to poor stands, the variety test and a fertilizer-fungicide study had lower yields.

All pertinent data from all crops are presented in the following pages.

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[1] 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, South Unit

Soil Type: Crowley silt loam

Seeding Rate: 10 seed/row ft

Planting Date: Group IV, Apr 26, 1993; Groups V, VI, VII, VIII, May 18, 1993

Row Spacing: 32 inches

Fertilizer: 0-80-80 (N-P_2O_5-K_2O) banded at planting

Plot Size: 4 rows x 30 ft

Herbicide: 2.0 pt/A Dual + .66 pt/A Scepter broadcast at planting

Rainfall: Group IV - first week after planting, 1.7 in; 2nd week, 0.0 in; 3rd week, 4.0 in; Groups V-VIII - first week, .4 in; 2nd week, .15 in; 3rd week, 0.0 in

Harvested: At maturity for each variety

Experimental Design: Randomized complete block with four replications

Comments: 1993 was a very normal year as far as planting of the soybean variety test was concerned. Adequate moisture and ideal planting conditions led to a perfect stand. Problems began to occur in early June when excessive rainfall hampered growth. During the months of June and July, 19.2 inches of rain fell. For this reason, due to the amount of damage to plants during this period, a water tolerance rating was recorded on July 14 for each variety in Groups IV, V, and VI. There was not as much damage to the Group VII varieties, and it was also noted that the longer the growing recovery period the less effect the rainfall had on the plants. For example, the Group IV soybeans were almost completely damaged (Table 1) with little recovery while the Group VII varieties recovered fairly well as the yields indicate (Table 2).

Table 1. Performance of commercial varieties grown on a Crowley silt loam soil at the Rice Research Station South Unit, Crowley, LA. 1993.

Maturity group and variety/brand	Yield	Water[1] tolerance rating
	-(bu/A)-	
Group IV		
Riverside RVS 499	28.7 (3)[2]	4.2
Deltapine DPX 3478	21.6 (2)	3.2
Buckshot 44	20.9 (3)	3.0
Hamlin Achiever 480	19.8 (2)	3.0
Pioneer 9501	19.5 (2)	4.5
LA88-22254	19.1 (2)	2.8
HyPerformer Hy 498	18.1 (2)	3.0
Northrup King 548-84	17.8 (2)	4.2
Dyna-Gro 3495	16.5 (3)	3.8
Riverside RVSL 91-46	15.2 (2)	3.0
Hyperformer HB2-X484	15.1 (1)	3.8
LA88-14	14.3 (1)	3.5
Hornbeck HBK 49	12.2 (3)	3.0
Deltapine DP 3499	11.5 (1)	3.2
Deltapine 3456	----[3]	3.2
Hartz H 4464	----	3.0
Terral TVX 4990	----	2.8
Pioneer 9442	----	2.5
Chesapeake	----	2.0
DeKalb CX 469C	----	2.0
Northrup King RA 452	----	1.8
Terral TVX 4565	----	1.8
LA88-32	----	1.5
Terral TVX 4452	----	1.2

[1] Water damage rating: 1 = all plants dead; 5 = no apparent damage.
[2] Indicates number of reps used in calculation for yield.
[3] Not enough seed to calculate yield.

Table 2. Performance of commercial varieties grown on a Crowley silt loam soil at the Rice Research Station South Unit, Crowley, LA. 1993.

Maturity group and variety/brand	Yield	Plant height	Lower pod height	Water[1] tolerance rating	Maturity date
	-(bu/A)-	----------(in)----------			
Group V					
Terra-Vig 5693	40.7	18	1	3.8	9/28
LA88-25723	40.3	28	3	3.5	10/07
Hartz HX 51208	39.1	22	1	4.3	10/05
Delta King 5850	37.2	27	2	4.3	10/07
Hyperformer HSC 557	36.6	25	3	3.8	9/28
Hartz Variety H5088	35.5	21	1	4.3	9/28
Kunkle KSC 517	35.1	21	1	4.3	9/28
LA88-22718	33.8	24	3	3.5	10/05
Deltapine 105	32.0	20	2	3.5	9/24
Agratech 575	31.0	17	1	3.0	9/28
Hartz Variety H5545	29.0	21	2	3.8	9/28
Hutcheson	28.8	15	1	3.8	9/25
Pioneer Variety 9592	28.5	21	2	2.8	9/26
Hartz Variety H5810	28.3	24	2	3.3	9/28
Riverside RVSL 90-94	27.6	15	2	4.0	10/02
Hyperformer HSC 591	27.4	25	2	3.8	10/07
D87-4647	27.3	19	2	4.3	10/08
Terra-Vig 5452	26.8	19	2	3.5	10/06
Hartz HX 50266	26.7	20	2	4.0	10/04
Riverside RVS 577	26.4	18	2	3.5	9/25
Walters	26.2	18	2	3.5	10/05
Hartz Variety H5042	26.1	24	2	3.8	9/27
Riverside RVSL 77	25.4	14	1	4.3	10/06
Hartz HX 512175	25.3	20	2	3.3	10/04
Pioneer Variety 9593	25.2	20	2	4.0	10/05
Northrup King Coker 6955	24.7	15	1	3.8	9/26
Delta King 551	24.1	23	1	3.8	10/05
Dyna-Gro 3576	23.6	13	1	3.3	9/26
Hartz Variety H5350	23.1	15	2	2.8	10/05
Hartz HX 4561604	22.7	22	3	2.5	9/25
Buckshot 507	21.9	23	2	1.8	9/28
Deltapine DPX 3589	21.5	23	2	4.3	10/12
Hyperformer HSC 579	21.3	19	1	3.0	10/05
Hyperformer HB3-X594	19.6	20	2	3.8	10/23

Continued.

Table 2. Continued.

Maturity group and variety/brand	Yield	Plant height	Lower pod height	Water[1] tolerance rating	Maturity date
	-(bu/A)-	----------(in)----------			
Variety V (continued)					
Agratech AT 2555	19.5	16	1	2.0	9/28
Holladay	19.3	15	1	2.5	10/05
Deltapine 415	19.0	13	2	2.8	9/24
Asgrow 5979	18.4	19	3	2.0	9/27
Terral TVX 5150	17.6	19	3	2.8	10/05
Northrup King S59-60	17.3	19	1	3.8	10/07
Asgrow 5885	17.3	17	1	3.5	10/07
FFR 542	15.3	11	1	1.8	9/28
Pioneer Variety 9584	14.9	24	2	3.3	10/18
Hartz HX 10198	14.2	16	1	3.8	10/07
FFR 563	14.1	20	2	2.8	10/22
Deltapine DPX 3553	14.0	16	2	2.0	10/02
Northrup King Coker 485	13.8	12	1	3.0	10/15
Hyperformer HB3-X541	13.6	25	2	2.8	10/25
Buckshot EK58	11.6	21	1	3.8	10/21
Hyperformer HB3-X601	8.4	21	2	2.5	10/17
Agratech AT 2665	8.3	18	2	2.0	10/14
Terra-Vig 5676	8.2	21	2	2.0	10/18
Kunkle KSC 515	7.6	15	1	2.5	10/07
Terra-Vig 5555	6.9	21	1	2.3	10/28
Hartz Variety H5070	6.7	12	1	2.5	10/01
LSD (0.1)	9.9				
CV (%)	37.6				
Group VI					
Hartz 6200	41.5	26	2	4.3	9/28
Hartz 6686	39.9	21	2	4.8	10/28
G 83-198	35.2	24	1	4.0	10/06
Terral TVX 6565	33.9	22	2	4.8	10/07
Vernal	33.5	33	3	4.3	10/07
Hornbeck HBK 67	30.0	23	2	4.0	10/26
Carl	30.0	27	2	3.9	10/02

Continued.

Table 2. Continued.

Maturity group and variety/brand	Yield	Plant height	Lower pod height	Water[1] tolerance rating	Maturity date
	-(bu/A)-	----------(in)----------			
Variety VI (continued)					
Pioneer Variety 9692	29.9	24	2	4.5	10/19
Kunkle KSC 611	29.8	23	3	3.3	10/06
LA88-24530	29.2	24	4	3.8	10/05
Deltapine DPX 3606	29.1	22	3	4.5	10/07
Riverside RVS 678	28.7	23	2	4.3	10/26
Hyperformer HB3-X602	28.0	22	2	4.5	10/23
Deltapine 3627	27.1	21	1	4.5	10/07
Hyperformer HB3-X683	26.1	22	1	3.3	10/08
Riverside RVS 699	24.9	24	3	4.8	10/26
LA88-X2	24.4	12	1	2.0	10/18
Pioneer Variety 9641	24.4	21	2	2.8	10/05
Bryan	23.4	29	1	3.5	10/28
Agratech AT X3660	23.0	10	1	3.8	10/06
Kunkle KSC 607	23.0	16	1	4.3	10/30
Asgrow 6785	22.6	27	2	4.0	10/17
Terra-Vig 6792	22.2	22	1	3.3	10/07
Buckshot 67	21.7	36	3	2.5	10/18
LA88-55	21.0	22	3	3.0	10/26
Hyperformer HY 677	21.0	17	1	3.5	10/15
Terra-Vig TVX 6253	20.9	24	3	2.8	10/27
LA88-24535	20.5	21	3	3.3	10/07
Northrup King S62-66	20.3	19	1	4.0	10/26
Buckshot 66	19.5	22	2	2.8	10/25
Brim	18.6	25	3	3.3	10/22
V86-815	17.3	17	1	3.0	10/05
Hartz Variety H6252	17.3	20	1	2.5	10/30
Asgrow 6961	17.2	24	3	3.8	10/26
Hartz Variety H6500	17.0	13	1	2.5	10/14
Terra-Vig 6653	16.6	12	2	2.8	10/19
Deltapine DP 3682	10.0	15	1	1.5	10/24
FFR 695	9.2	16	1	1.3	10/25
LSD (0.1)	12.1				
CV (%)	42.8				

Continued.

Table 2. Continued.

Maturity group and variety/brand	Yield	Plant height	Lower pod height	Water[1] tolerance rating	Maturity date
	-(bu/A)-	----------(in)----------			
Groups VII and VIII					
Hartz Variety H7190	48.2	18	3	---	11/04
Hyperformer HSC721	44.2	28	5	---	11/05
Hartz Variety H7550	41.9	31	7	---	11/09
Cook	41.7	22	4	---	11/10
LA88-29003	41.5	19	3	---	10/27
Agratech AT 740	41.0	22	2	---	10/31
Agratech AT 700	41.0	25	2	---	11/05
Dyna-Gro 3682	39.1	25	4	---	10/29
LSU X100	39.0	21	2	---	10/27
Kunkle KSC 707	39.0	20	3	---	11/05
Pioneer Variety 9761	39.0	24	4	---	10/30
Hyperformer HB3-X782	38.7	25	3	---	10/23
Riverside RVS 757	36.6	22	3	---	11/06
Deltapine DP 3733	36.3	23	3	---	10/26
Northrup King S75-55	33.4	22	2	---	10/31
Stonewall	33.0	20	1	---	10/30
Hyperformer HB3-X798	33.0	28	3	---	10/23
LA78-5286	33.0	28	4	---	10/25
Hornbeck HBK79	31.5	27	5	---	11/06
Haskell	29.5	20	3	---	11/05
Hyperformer HB2-X733	28.9	15	1	---	10/26
LA88-36	27.9	21	2	---	11/06
Hyperformer HSC 741	25.4	26	3	---	11/08
LSD (0.1)	9.0				
CV (%)	20.9				

[1] Correlation (yield - water damage) 0.68.

GRAIN SORGHUM VARIETY TEST

R.J. Habetz and M.J. Kang

Location: Rice Research Station South Unit

Soil Type:

Planting Date: Apr 26, 1993

Row Spacing: 32 inches

Fertilizer: 28-84-84 (N-P_2O_5-K_2O) banded at planting; 80-0-0 (21%), May 26

Plot Size: 4 rows x 30 ft

Treated: 3 pt/A atrazine applied broadcast after planting

Rainfall: 1st week after planting, 1.7 in; 2nd week, 0.0 in; 3rd week, .4 in

Harvested: Sept 13

Experimental Design: Randomized complete block with four replications

Comments: Hybrid yields for 1993 were considerably lower than those in previous years (Tables 1 and 2). At planting, adequate moisture was available, which resulted in a good stand. Through the months of June and July over 19 inches of rain were recorded. This resulted in plants being stressed for an extended period of time. After this, the test went through periods of drought, especially at the later stages of maturity.

Table 1. Performance of early-medium, bird susceptible grain sorghum hybrids at the Rice Research Station South Unit, Crowley, LA. 1993.

Company/Brand	Hybrid	Mean yield			Grain moisture	Test weight	Plant height
		1993	2-yr	3-yr			
		lb/A			%	lb/bu	in
HyPerformer	HY1320	3033	—	—	17.7	53.4	54
Northrup King	KS714Y	2961	—	—	17.3	54.0	48
Deltapine	G-522DR	2868	3308	3611	17.5	53.7	44
Northrup King	KS710	2868	3466	—	17.4	53.1	41
Pioneer Hybrid	8333	2864	3401	3555	17.3	52.9	43
Seed Production	Penngrain DR	2819	3088	—	17.0	53.8	47
HyPerformer	HSC Cherokee	2771	3158	3374	17.3	53.4	50
Cargill	837	2738	3142	—	17.2	53.6	54
Terral	TV960	2733	3310	—	17.4	53.9	47
Pioneer Hybrid	8212Y	2710	3016	—	17.4	53.0	44
Asgrow Seed	A603	2668	2999	—	17.3	53.5	44
Oro	Amigo	2655	3058	—	17.2	52.5	53
Pioneer Hybrid	8118	2653	2946	—	17.5	53.3	54
DeKalb	DK60	2638	2789	2860	17.6	53.1	55
Terral	TVX9241	2614	—	—	17.3	52.7	52
Pioneer Hybrid	8310	2609	3081	—	17.3	53.4	48
Asgrow Seed	Topaz	2578	3187	3478	17.2	53.0	38
DeKalb	DK54(X-176)	2561	—	—	17.4	53.0	64
Terral	TVX9734	2530	—	—	17.4	53.1	50
Terral	TVX9421	2526	—	—	17.3	52.8	44
Capehart	Contender	2512	3048	3479	17.2	53.3	47
Pioneer Hybrid	8305(X5319)	2496	—	—	17.6	53.2	51
DeKalb	DK-56	2496	3003	3648	17.3	53.3	49
Oro	Ultra	2486	—	—	17.3	52.4	48
Terral	TVX9443	2476	—	—	17.3	53.2	48
Terral	TV1050	2350	2930	—	17.3	52.9	48
Deltapine	1552	2320	2902	3307	17.1	52.6	38
Terral	TV900	2288	2972	—	17.3	52.8	48
Terral	TVX9342	2253	—	—	17.5	53.4	45
Mean		2623	—	—	17.3	53.2	48
CV(%)		11.2			1.8	1.3	—
LSD (0.1)		345			NS	NS	—

Table 2. Performance of full-season, bird-susceptible grain sorghum hybrids at the Rice Research Station South Unit, Crowley, LA. 1993.

Company/Brand	Hybrid	Mean yield			Grain moisture	Test weight	Plant height
		1993	2-yr	3-yr			
		lb/A			%	lb/bu	in
Deltapine	G-1616	2491	2833	—	17.3	53.2	47
HyPerformer	HSC Wings	2374	2689	2893	17.0	53.1	53
ICI	5319	2262	—	—	17.0	52.4	48
Triumph	Two 80-D	2166	—	—	17.2	52.7	44
Capehart	Champion	2081	2555	3047	16.9	52.4	57
Capehart	Challenger	2006	2518	3126	17.1	52.7	54
Capehart	Cream	1987	2194	—	17.4	53.4	38
DeKalb	DK-64	1794	2558	3135	17.1	52.9	52
Capehart	Exp. 93-2	1758	—	—	17.3	52.7	52
Mean		2102			17.1	52.8	49
CV (%)		11.1			2.3	1.0	—
LSD (0.1)		283			NS	NS	—

WHEAT VARIETY TEST

R.J. Habetz and S.A. Harrison

Location: Rice Research Station

Soil Type: Crowley silt loam

Seeding Rate: 90 lb/A

Planting Date: Dec. 2, 1992

Fertilizer: 450# 7-21-21 at planting; topdress 75 lb/A (21%), Mar 8, 1993

Herbicide: Glean (Pre) .50 oz/A broadcast after planting

Plot Size: 4 rows x 25 ft

Harvested: June 6

Experimental Design: Randomized complete block with four replications

Comments: Heavy rainfall immediately after planting resulted in a poor stand. Only three of the four replications were harvested. LA8513A63-3-3-X, Florida 304, Terral X1011, and Stoneville/FFR EX801 were the four highest yielding varieties for 1993 (Table 1), but the differences were not significant. Disease pressure was light partly due to waterlogging, which resulted in plants that were nitrogen stressed and did not have large amounts of healthy green tissue to support a disease epidemic.

Northrup King/Coker 9835, Stoneville/FFR EX801, Agripro/Savannah, Florida 304, and Terral 877 had 2-year mean yields greater than 51.0 bu/A (Table 2). Disease pressure was low for the past 2 years. Leaf rust was the only disease for which significant differences existed between varieties, and the highest leaf rust incidence was 8%.

Table 1. Performance of entries in the wheat performance trials at the Rice Research Station, Crowley, LA. 1993.

Brand/Variety	Yield[1]	Test weight	Head day[2]	Plant height	Leaf rust[3]	Septoria[4]	Bacteria[5]
	-bu/A-	-lb/bu-		—in—	—%—	----------(1-9)----------	
LA8513A63-3-3-X	39.1	54.0	107	34	2	2.5	1.0
Florida 304	38.4	54.1	110	36	0	2.5	1.0
Terral X1011	38.1	53.8	109	35	1	1.0	1.0
Stoneville/FFR EX801	38.0	54.6	88	33	0	3.5	2.0
Northrup King/Coker 9105	37.3	54.0	102	35	0	2.5	1.5
881060	36.7	55.1	113	34	0	2.5	2.0
McNair 1003	34.8	54.1	104	38	6	4.0	2.5
Bayles	34.5	53.9	104	37	0	4.0	1.5
Terral 877	34.4	53.8	87	39	1	3.0	1.0
Northrup King/Coker 9134	34.0	53.9	112	35	0	1.5	1.0
Hartz/H3400	33.5	54.1	115	34	1	2.5	1.0
Northrup King/Coker 9835	32.4	53.8	107	33	0	2.5	1.0
Northrup King/Coker 9877	32.4	53.5	---	39	15	3.0	2.0
LA861A23-3-1-X	32.3	53.9	112	41	0	2.0	1.5
AR26413B	32.3	53.2	102	33	10	4.5	1.5
LA8576A43-1-1-X	32.1	53.1	94	34	0	3.5	1.0
LA8644A3-1-1-X	31.2	54.4	113	38	0	2.5	1.0
Pioneer 2566	31.0	53.8	115	34	0	1.0	1.0
Northrup King/Coker 9766	30.5	54.0	117	33	1	1.5	2.0
AgriPro/Savannah	29.8	53.9	91	33	1	3.5	1.0
Stoneville/FFR 525W	29.7	54.4	107	41	10	2.0	1.0
Buckshot's DS 2368	29.7	53.9	103	36	0	2.0	1.0
SC850559	29.6	53.9	90	35	0	2.0	1.5
LA862A16-3-2-X	28.4	53.9	113	34	0	2.5	1.0
LA8576A53-2-1-X	27.6	53.7	104	40	0	3.0	1.0
LA8644A13-4-1-X	24.5	54.1	109	33	0	3.0	1.0
Buckshot's DS 860073	22.7	54.5	110	35	0	1.0	1.0
Mean	32.4	54.0	105	36	2	2.5	1.3
CV (%)	19	1	---	---	118	26	45
LSD (0.10)	NS	NS	---	---	4	1.1	NS

[1] Yields in bu/A adjusted to 13% moisture.
[2] Days after December 31 until 50% heading.
[3] Percent of upper three leaves affected. Rated on 4-29-93.
[4] Septoria leaf and glume blotch rated on 4-29-93, on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.
[5] *Xanthomonas* (bacterial streak) rated on 4-29-93, on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.

Table 2. Performance of entries in the wheat performance trials at the Rice Research Station, Crowley, LA, for 2 years.

Brand/Variety	Yield[1]	Test weight	Head day[2]	Plant height	Leaf rust[3]	Septoria[4]	Bacteria[5]
	-bu/A-	-lb/bu-		--in--	--%--	----------(1-9)----------	
Northrup King/Coker 9835	53.7	55.3	98	33	0	3.5	2.0
Stoneville/FFR EX801	52.2	55.6	98	33	1	3.8	2.0
AgriPro/Savannah	52.2	55.6	89	33	1	4.2	2.5
Florida 304	51.6	55.7	100	36	0	3.8	1.0
Terral 877	51.2	55.8	87	39	1	3.2	1.0
Northrup King/Coker 9105	50.4	54.5	96	35	1	2.8	2.5
Northrup King/Coker 9877	48.3	55.5	91	39	8	3.2	4.0
Bayles	48.0	54.7	96	37	0	4.0	2.2
Buckshot's DS 2368	47.9	55.6	94	36	0	2.2	1.0
Northrup King/Coker 9766	42.4	55.1	105	33	1	2.0	3.8
Stoneville/FFR 525W	41.9	56.1	102	41	7	2.0	1.5
Mean	49.1	55.4	95	36	2	3.2	2.2
CV (%)	16	1	---	---	88	29	53
LSD (0.10)	NS	NS	---	---	2	NS	NS

[1] Yield in bu/A adjusted to 13% moisture. Yield differences are not significant at the 10% probability level.
[2] Days after December 31 until 50% heading.
[3] Percent of upper three leaves affected. Rated on 4-29-93.
[4] Septoria leaf and glume blotch rated on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.
[5] *Xanthomonas* (bacterial streak) rated on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.

WHEAT NITROGEN-FUNGICIDE TEST

R.J. Habetz and S.A. Harrison

Location: Rice Research Station

Soil Type: Crowley silt loam

Plot Size: 4 x 25 ft

Planting Date: Dec 2, 1992

Herbicide: Glean (Pre) .50 oz/A broadcast after planting

Fertilizer: 450 lb 7-21-21 at planting

Treatments: **Varieties**: Coker 9877, Coker 9105, FFR 525W, Buckshot 2368,

Fungicides: None, two applications of Dithane (2.0 lb/A) plus Bayleton (4 oz/A)

Comments: Heavy rainfall probably led to a shortage of N, which resulted in lower yields (Table 1). The 120 lb/A N treatments were generally highest yielding, with the exception of Northrup King/Coker 9877 without a fungicide, which was limited by leaf rust infection. The average yields across varieties and fungicide levels were 38.4, 46.8, and 50.6 bu/A, for 60, 90, and 120 lb/A of N, respectively. Fungicide application did not increase yields, averaged across varieties and N levels. Disease pressure was relatively low. There were significant differences among the four varieties for grain yield, primarily due to the low yield of Coker 9877, which resulted from leaf rust infection.

Table 1. Performance of the nitrogen by fungicide study at the Rice Research Station, Crowley, LA. 1993.

Variety	Fungicide[1]	Nitrogen[2]	Yield[3]	Test weight	Plant height	Heading day[4]	Leaf rust[5]	Septoria[6]	Bacteria[7]
			-bu/A-	-lb/bu-	--in--		--%--	----------(1-9)----------	
Coker 9105	N	120	57.4	54.4	32	71	0	2.0	1.0
Coker 9105	F	120	56.8	54.5	32	--	6	2.0	1.0
Buckshot 2368	N	120	54.3	54.8	32	69	0	2.0	1.0
Coker 9105	F	90	53.1	54.1	34	--	0	2.0	1.5
Buckshot 2368	F	120	53.0	54.5	32	--	0	2.0	1.5
FFR 525 W	F	120	51.9	56.2	34	--	3	1.0	1.0
FFR 525 W	N	120	50.9	56.1	34	77	6	1.0	1.0
FFR 525 W	N	90	49.9	55.8	34	76	6	1.0	1.0
Coker 9105	N	90	48.9	53.0	32	71	0	2.0	1.0
Buckshot 2368	F	90	48.1	55.2	32	--	0	2.5	1.5
FFR 525W	F	90	47.9	55.8	33	--	3	1.0	1.0
Buckshot 2368	N	90	44.9	55.3	32	67	2	2.5	1.5
Coker 9105	N	60	42.1	53.6	32	69	0	3.0	1.0
Coker 9877	F	120	42.0	53.1	34	--	15	1.5	3.0
Coker 9877	F	90	41.8	54.3	34	--	10	1.5	3.0
Buckshot 2368	F	60	40.9	54.5	32	--	0	2.0	1.5
FFR 525W	N	60	40.7	55.3	34	74	3	1.0	1.0
Coker 9105	F	60	40.3	54.0	33	--	0	2.0	2.0
Coker 9877	N	90	40.0	53.9	34	77	18	1.5	3.5
Coker 9877	N	120	38.8	53.3	34	77	30	1.5	2.5

Continued.

Table 1. Continued.

Variety	Fungicide[1]	Nitrogen[2]	Yield[3]	Test weight	Plant height	Heading day[4]	Leaf rust[5]	Septoria[6]	Bacteria[7]
			-bu/A-	-lb/bu-	--in--		--%--	----------(1-9)----------	
Coker 9877	N	60	38.4	53.9	32	75	15	2.0	3.0
Buckshot 2368	N	60	37.0	54.9	32	64	0	3.0	1.5
Coker 9877	F	60	34.3	53.5	32	--	5	1.5	3.5
FFR 525W	F	60	33.8	55.4	34	--	1	1.0	1.0
Test Mean			45.3	54.6	33	72	5	1.8	1.7
CV (%)			12	2	4	--	89	27	44
Treatment Means									
Fungicide			45.3	54.6	33	--	4	1.7	1.8
None			45.3	54.5	33	--	7	1.9	1.6
60 lb N			38.4	54.4	33	--	3	1.9	1.8
90 lb N			46.8	54.7	33	--	5	1.8	1.8
120 lb N			50.6	54.6	33	--	8	1.6	1.5
Coker 9877			39.2	53.6	33	--	15	1.6	3.1
Buckshot's DS 2368			46.4	54.8	32	--	1	2.3	1.4
FFR 525W			45.8	55.8	34	--	4	1.0	1.0
Coker 9105			49.8	53.9	32	--	1	2.2	1.2

[1] N = no fungicide applied; F = two applications of Dithane (2 lb) + Bayleton (3 oz). [2] 60 = 60 lb/A of topdress nitrogen; 90 = 60 + 30 split; 120 = 60 + 60 split. [3] Yield in bu/A adjusted to 13% moisture. [4] Days after December 31 until 50% heading. [5] Percent of upper three leaves affected by leaf rust. [6] Septoria leaf and glume blotch complex rated on a scale of 1 to 9, with a 1 indicating that no disease occurred and a 9 indicating very severe disease on the upper leaves and heads. [7] *Xanthomonas* (bacterial streak) rated on a scale of 1 to 9, with a 1 indicating no disease and a 9 indicating severe disease on the upper leaves and head.

SOYBEAN CULTURAL PRACTICE STUDY

R.J. Habetz

Location: Rice Research Station South Unit

Soil Type: Crowley silt loam

Variety/Seeding Rate: Centennial; drill, 85 lb/A; row, 50 lb/A

Row Spacing: Drill, 7 in; rows, 30 inches

Planting Date: May 20, 1993

Fertilizer: 400 lb 0-20-20 broadcast

Treated: As per treatment; all preemergence herbicides applied at planting; applied POT half-rate, June 16; annual grass (AG), 2-3 in; applied POT full rates, June 21; AG, 4-5 in

Rated: Pre and 1/2 rate, June 15; full rate, July 6

Plot Size: 10 x 25 ft

Harvested: Oct 20

Experimental Design: Randomized complete block with four replications.

Comments: This study was initiated to compare planting methods, cultivation, and herbicide control using both pre and POT herbicides. Some research has shown that with drill planted soybeans better weed control is possible. The biggest difference in this test was herbicide use. The POT treatments showed a significant increase in weed control over the pre treatments (Table 1). A detrimental effect was seen when plots were cultivated due to the fact that rainfall occurred immediately after cultivation so a transplant affect resulted. There was little difference in the drill planted (33.8 bu/A) and 30-inch bedded (34.7 bu/A) treatments, but the 30-inch flat planted (29.3 bu/A) soybean yields were lower, followed by 30-inch bedded + cultivate (27.2 bu/A), and 30-inch flat + cultivate (25.6 bu/A).

It must be noted that this is preliminary data with further research to continue.

Table 1. Performance of soybean cultural practices at the Rice Research Station South Unit, Crowley, LA. 1993.

Treatment	Rate of Application	Time of Application	Weed Control 7/6	Yield
	–lb ai/A–		—%—	-bu/A-
Drill- Dual + Sencor	2.0 + .38	PRE	71.3	31.0
Drill- Dual + Sencor Scepter	2.0 + .38 .125	PRE POT	76.3	36.5
Drill- Fusilade 2000 + Reflex	.06 + .188	POT	71.3	28.9
Drill- Fusilade 2000 + Reflex	.125 + .375	POT	90.0	38.9
Flat Row- Dual + Sencor	2.0 + 3.8	PRE	52.5	31.5
Flat Row- Dual + Sencor Scepter	2.0 + 3.8 .125	PRE POT	45.0	25.3
Flat Row- Fus. 2000 + Reflex	.06 + .188	POT	58.8	32.3
Flat Row- Fus. 2000 + Reflex	.125 + .375	POT	81.3	28.1
Flat Row- Cultivate Dual + Sencor	2.0 + .38	PRE	61.3	31.6
Flat Row- Cultivate Dual + Sencor Scepter	2.0 + .38 .125	PRE POT	51.3	24.0
Flat Row- Cultivate Fusilade 2000 + Reflex	.06 + .188	POT	60.0	23.0
Flat Row- Cultivate Fusilade 2000 + Reflex	.125 + .375	POT	81.3	23.6
Bedded Row- Dual + Sencor	2.0 + .38	PRE	67.5	30.5
Bedded Row- Dual + Sencor Scepter	2.0 + .38 .125	PRE POT	77.5	34.6
Bedded Row-Fus.2000+Reflex	.06 + .188	POT	87.5	34.9
Bedded Row-Fus.2000+Reflex	.125 + .375	POT	91.3	38.8
Bedded Row- Cultivate Dual + Sencor	2.0 + .38	PRE	48.8	20.5
Bedded Row- Cultivate Dual + Sencor Scepter	2.0 + .38 .125	PRE POT	51.3	21.5
Bedded Row- Cultivate Fusilade 2000 + Reflex	.06 + .188	POT	83.8	35.7
Bedded Row- Cultivate Fusilade 2000 + Reflex	.125 + .375	POT	88.5	31.2
LSD (.05)			13.6	9.1
CV (%)			13.8	21.5

SOYBEAN FUNGICIDE STUDY

R.J. Habetz and J.S. Russin

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety: Group V, Deltapine 105; Group VI, Hartz 6686

Row Spacing: 32 in

Planting Date: May 11, 1993

Herbicide: Dual 2.0 pt/A + .5 lb/A Sencor at planting

Sprayed: Group V - R3, July 29; R5, Aug 6; Group VI - R3, Aug 6; R5, Aug 16

Rated: Sept 2

Plot Size: 2 rows x 20 ft

Experimental Design: Randomized complete block with four replications

Comments: Stand was poor due to heavy rainfall. Aerial blight ratings were taken on two replications (Tables 1 and 2).

Table 1. Disease ratings for Deltapine 105 soybeans treated at the R3 and/or R5 growth stages. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate	Time of application	Aerial[1] blight
	-(lb/A)-		-(0-5)-
Check	----	----	4.0
Benlate 50 DF	.50	R3 R5	5.0
Benlate 50 DF	.75	R3	4.0
Benlate 50 DF	.75	R5	2.5
Sodium Bicarbonate	.50	R3 R5	4.0
Sodium Bicarbonate	.50	R3	1.5
Sodium Bicarbonate	.50	R5	2.0
Sodium Bicarbonate	.75	R3 R5	2.0
Sodium Bicarbonate	.75	R3	5.5
Sodium Bicarbonate	.75	R5	3.5
LSD (0.10)			3.6

[1] Aerial blight ratings based on incidence (0-5) x severity (0-5).

Table 2. Disease ratings for Hartz 6686 soybeans treated at R3 and/or R5 growth stages. Rice Research Station, Crowley, LA. 1993.

Treatment	Rate	Time of application	Aerial[1] blight
	-(lb/A)-		-(0-5)-
Check	----	----	3.5
Benlate SP	8 g + 36.3 g Film	R3 R5	6.0
Benlate SP	3 lb + 4.54 g Film	R3 R5	2.5
Benlate 50 DF	8 lb	R3 R5	2.0
Benlate 50 DF	1 lb	R3 R5	1.5
Tilt gel	4 oz	R3	2.5
Tilt	4 oz	R3	1.0
Benlate 50 DF	0.5 lb	R3	1.0
LSD (0.10)			3.1

[1] Aerial blight ratings based on incidence (0-5) x severity (0-5).

OFF-STATION VARIETY DISEASE STUDY

R.J. Habetz

Location: Richard Hardy Farm

Soil Type: Silty loam

Row Spacing: 32 in

Seeding Rate: 10 seed/row ft

Planting Date: May 12, 1993

Plot Size: 4 rows x 30 ft

Herbicide: 2.0 pt/A Dual

Experimental Design: Randomized complete block design with four replications.

Comments: Heavy amounts of rainfall almost completely terminated this test. Yields were unable to be taken because of poor stand. Disease ratings were taken but results were questionable due to stress of plants from adverse conditions. Most varieties showed high amounts of disease with few showing some resistance. Also, a USDA advanced strains test was planted with similar results. Continuation of these studies will be conducted because of the potential of high incidence of disease in this location.

SOYBEAN WEED CONTROL RESEARCH

R.J. Habetz and J.L. Griffin

INTRODUCTION

In 1993, weed research emphasis was applied mainly to control weeds in the rice producing area, such as red rice, sesbania, redweed, and mexicanweed (Texasweed). Research also continued for control of weeds at reduced rates.

Research to control red rice, which is a major problem in southwest Louisiana, was conducted at different stages of plant growth. A test was initiated to control red rice at the 4- to 6-inch stage of plant development, and the same test conducted at the 10- to 12-inch stage of growth of red rice. Sesbania and redweed were also rated for control using broadleaf herbicides.

In a continuing study to control mexicanweed, all treatments showed a lower control than in 1992. Also, a study was initiated to measure weed control using different maturity groups of soybeans.

Specific information for each experiment is individually presented followed by a table of results.

Weed control ratings for all experiments are based on a scale of 0 to 100% where 0 equals no control and 100 equals complete control.

Experiment: Soybean Red Rice Antagonism Test Number 1

Location: Reggie Zaunbrecher Farm

Soil Type: Silt loam

Row Spacing: Drill

Plot Size: 5 x 25 ft

Treated: POT 1, July 22; POT 2, July 23

Weed Size: Red rice (RR), 4-6 in; redweed (RW), 1-2 in; sesbania (SB), 3-4 in

Sprayer: CO_2 backpack sprayer, 15 GPA, 8003 nozzles, 25 psi

Rated: Aug 6 and Aug 19

Experimental Design: Randomized complete block, four replications

Table 1. Controlling red rice and broadleaf weeds with combination herbicides. Reggie Zaunbrecher Farm. 1993.

Treatment[1]	Rate of Application	Time of Application	Weed Control 8/6 RR	8/6 RW	8/6 SB	8/19 RR	8/19 RW	8/19 SB
	--lb ai/A--		----------(%)----------					
Fusilade 2000 + Reflex	.25 + .375	POT 1	77	84	82	64	81	72
Fusilade 2000 Reflex	.25 .375	POT 1 POT 2	78	90	77	67	80	62
Fusilade 2000 Reflex	.25 .375	POT 2 POT 1	81	85	81	72	84	78
Select + Cobra	.094 + .20	POT 1	78	83	80	56	80	73
Select Cobra	.094 .20	POT 1 POT 2	79	82	77	66	69	64
Select Cobra	.094 .20	POT 2 POT 1	86	86	80	75	78	76
Assure II + Classic	.056 + .008	POT 1	68	90	86	76	84	80
Assure II Classic	.056 .008	POT 1 POT 2	97	93	84	88	80	72
Assure II Classic	.056 .008	POT 2 POT 1	83	91	85	76	82	74
Scepter	1.25	POT 1	93	90	83	88	80	54
LSD (.05)			7.7	9.3	7.1	10.1	8.1	10.4
CV (%)			6.5	7.3	6.0	9.5	7.0	10.1

[1] Agridex crop oil concentrate added at 1 qt/A to all treatments.

Experiment: Soybean Red Rice Antagonism Test Number 2

Location: Reggie Zaunbrecher Farm

Soil Type: Silt loam

Row Spacing: Drill

Plot Size: 5 x 25 ft

Treated: POT 1, Aug 4; POT 2, Aug 6

Weed Size: Red rice (RR), 10-12 in; redweed (RW), 2-4 in; sesbania (SB), 4-6 in

Sprayer: CO_2 backpack sprayer, 15 GPA, 8003 nozzles, 25 psi

Rated: Aug 20

Experimental Design: Randomized complete block, four replications

Table 2. Controlling red rice and broadleaf weeds with combination herbicides at higher plant heights. Reggie Zaunbrecher Farm. 1993.

Treatment[1]	Rate of Application	Time of Application	Weed Control 8/20 RR	RW	SB
	--lb ai/A--		----------(%)----------		
Fusilade 2000 + Reflex	.25 + .375	POT 1	73	84	72
Fusilade 2000 Reflex	.25 .375	POT 1 POT 2	65	81	74
Fusilade 2000 Reflex	.25 .375	POT 2 POT 1	73	79	66
Select + Cobra	.094 + .20	POT 1	68	81	71
Select Cobra	.094 .20	POT 1 POT 2	68	79	66
Select Cobra	.094 .20	POT 2 POT 1	64	77	67
Assure II + Classic	.056 + .008	POT 1	58	68	73
Assure II Classic	.056 .008	POT 1 POT 2	75	77	72
Assure II Classic	.056 .008	POT 2 POT 1	72	72	70
Scepter	1.25	POT 1	67	65	56
LSD (.05)			11.6	12.5	130
CV (%)			11.7	11.3	130

[1] Agridex crop oil concentrate added at 1 qt/A to all treatments.

Experiment: Soybean Broadleaf Tankmix Test

Location: Lafayette Parish

Soil Type: Silt loam

Row Spacing: Drilled

Plot Size: 5 x 25 ft

Treated: July 6

Weed Size: Mexicanweed (MW), 3-6 in

Sprayer: CO_2 backpack sprayer, 15 GPA, 8003 nozzles, 25 psi

Rated: July 20

Experimental Design: Randomized complete block, four replications

Table 3. Controlling mexicanweed in soybeans with post overtop broadleaf tankmix herbicides. Lafayette Parish. 1993.

Treatment	Rate of Application	Weed Control 7/20
	--lb ai/A--	--------(%)-------
Storm	.75 pt/A	18.8
Cobra	.20 pt/A	43.8
Scepter	.125 pt/A	65.0
Reflex	.375 pt/A	57.5
Classic	.008 oz/A	35.0
Cobra + Classic	.10 pt/A + .008 oz/A	45.0
Cobra + Classic	.20 pt/A + .004 oz/A	38.8
Cobra + Classic	.10 pt/A + .004 oz/A	26.3
Cobra + Reflex	.10 + .375 pt/A	52.5
Cobra + Reflex	.20 + .188 pt/A	55.0
Cobra + Reflex	.10 + .188 pt/A	51.3
Cobra + Scepter	.10 + .125 pt/A	67.5
Cobra + Scepter	.20 + .06 pt/A	65.0
Cobra + Scepter	.10 + .06 pt/A	38.8
Classic + Scepter	.004 oz/A + .125 pt/A	53.8
Classic + Scepter	.008 oz/A + .06 pt/A	57.5
Classic + Scepter	.004 oz/A + .06 pt/A	66.3
Classic + Reflex	.004 oz/A + .375 pt/A	33.8
Classic + Reflex	.008 oz/A + .188 pt/A	38.8
Classic + Reflex	.004 oz/A + .188 pt/A	26.3
Scepter + Reflex	.06 + .375 pt/A	48.8
Scepter + Reflex	.125 + .188 pt/A	65.0
Scepter + Reflex	.06 + .188 pt/A	60.0
Check (weedy)	----------	10.0
LSD (.05)		21.0
CV (%)		31.84

[T] X-77 nonionic surfactant added at 0.25% (v/v) to all treatments.

Experiment: Maturity Groups Test

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety: Group IV, Pioneer 9442; Group VI, Centennial

Planting Date: Group IV, Apr 20; Group VI, May 14

Row Spacing: Drill

Plot Size: 5 x 25 ft

Treated: All PRE plots at planting, POT - Group IV, May 10; Group VI, June 17

Weed Size: Annual grasses (AG), 3 to 4 inches

Sprayer: Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi

Rated: Group IV, May 24; Group VI, June 30

Table 4. Comparison of soybean maturity groups for annual grass control.

Treatment[1]	Rate of Application	Time of Application	Grass Control	Yield
	—lb al/A—		—%—	-bu/A-
Group IV				
Dual + Sencor	2.0 + .38	PRE	87.8	8.2
Dual + Sencor Storm	2.0 + .38 .75	PRE POT	87.3	8.2
Fusllade 2000 + Reflex	.125 + .375	POT	88.8	8.1
Check (Weedy)			10.0	4.0
Group VI				
Dual + Sencor	2.0 + .38	PRE	90.8	38.6
Dual + Sencor Storm	2.0 + .38 .75	PRE POT	93.3	38.7
Fusllade + Reflex	.125 + .375	POT	93.5	40.6
Check (Weedy)			84.0	35.3
LSD (.05)			7.6	4.7
CV (%)			6.5	13.9

[1] X-77 nonionic surfactant added at 0.25% (v/v) to all treatments.

Experiment: Soybean Reduced Rates Test

Location: Reggie Zaunbrecher Farm

Soil Type: Silt loam

Row Spacing: Drill (7 in)

Plot Size: 5 x 25 ft

Treated: July 27

Weed Size: Redweed (RW), 1-2 in; sesbania (SB), 3-4 in; jointvetch (JV), 3-4 in

Sprayer: CO_2 backpack sprayer, 15 GPA, 8003 nozzles, 25 psi

Rated: First, Aug 10; Second, Aug 24

Experimental Design: Randomized complete block, four replications

Table 5. Controlling broadleaf weeds with reduced rate herbicides.

Treatment[1]	Rate of Application	Weed Control 8/10 RW	8/10 SB	8/10 JV	8/24 RW	8/24 SB	8/24 JV
	---lb ai/A---	----------(%)----------					
Storm	.37 pt/A	89	80	25	82	81	31
Storm	.18 pt/A	66	48	17	62	42	24
Reflex	.188 pt/A	57	44	22	55	45	28
Reflex	.094 pt/A	55	38	25	46	36	28
Cobra	.10 pt/A	49	44	36	44	40	36
Cobra	.05 pt/A	45	46	39	40	44	35
Scepter	.06 pt/A	62	32	22	64	28	21
Scepter	.03 pt/A	66	30	25	60	28	26
Classic	.004 oz/A	76	70	59	61	61	56
Classic	.002 oz/A	71	55	45	61	42	39
Cobra + Classic	.10 pt/A + .004 oz/A	74	80	71	62	71	64
Cobra + Classic	.05 pt/A + .002 oz/A	82	78	64	70	66	51
Check (weedy)		10.0	10.0	10.0	10.0	10.0	10.0
LSD (.05)		21.4	17.4	12.6	16.6	14.2	17.4
CV (%)		24.0	24.0	24.5	20.8	21.5	34.9

[1] X-77 nonionic surfactant added at 0.25% (v/v) to all treatments.

INTERNATIONAL RICE TRAINING PROGRAM

Joseph A. Musick

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 57 participants, representing 13 countries, were guests at the Rice Research Station in 1993. This was a decrease of 1 participant compared with 1992. Brazil provided the largest number of visitors (18) this year.

Table 1. Number of participants by country. Rice Research Station, Crowley, LA. 1993.

Country	Number of participants
Argentina	5
Brazil	18
Egypt	9
Italy	2
Japan	2
Korea	1
Malaysia	4
Nicaragua	4
Pakistan	2
Senegal	3
Spain	1
West Africa	1
West Indies	5
TOTAL	57

Table 2 presents information regarding the number of participants according to sponsoring organizations. The largest number was sponsored by private companies (29).

Subject matter of interest to the participants varied from general rice production practices to specific interests, such as plant breeding, water management, processing, marketing, and control of rice diseases, insects, and weeds. There was also interest in crawfish, soybeans, biotechnology, rice genetics, milling, and grading.

Table 2. Number of visitors by sponsoring organizations. Rice Research Station, Crowley, LA. 1993.

Sponsoring organization	Number sponsored
Governments (Foreign)	16
LSU Agricultural Center	2
LSU International Programs	3
Private Companies	29
Self	2
USAID	3
USIA/USDA	2
TOTAL	57

AQUACULTURE RESEARCH

ANNUAL SUMMARY OF ENVIRONMENTAL CONDITIONS AND CRAWFISH PRODUCTION

W.R. McClain, K.R. Taylor, and J.J. Sonnier

Following (Table 1) is the average weekly data for environmental conditions and crawfish catch, 1992-93 season, crawfish research project, Rice Research Station, Crowley, LA. The summary is composed of averages across all experimental plots and management conditions.

Pond History: Sixteen 0.4-acre and two 1.0-acre experimental ponds were in production the previous season. Four 1.0-acre rice-field ponds were fallow for 1 year prior to planting of rice. Brood crawfish from previous treatments were randomly mixed and distributed in all flooded ponds prior to water draw-down in May 1992.

Soil Type: Crowley silt loam

Water Source: Well water that traveled through 3600 feet of earthen canals prior to its entrance to crawfish ponds

Pond Area: Sixteen 0.4-acre ponds; six 1.0-acre ponds

Forage Crops: Rice ('Mars'): 6.4 acres
Ratoon Rice ('Mars'), managed regrowth after grain harvest: 6 acres

Permanent Flood Date: 1 Oct 1992

Crawfish Harvest: Trapping strategy was used as a treatment effect in some ponds. A rotational strategy (5 days/week every 4th week) was used in 4.8 acres and a conventional strategy (3 days/week every week) was used in the remainder of ponds. Trapping began 18 Jan 1993 and continued through 7 May 1993. Twenty five traps/A were used for a total of 20 days (500 trap-sets/A) in the rotational systems and 48 days (1200 trap-sets/A) in the conventionally harvested fields.

Crawfish Grades: All crawfish harvested were subjected to a grader (passive, water type), and sorted into 4 size grade categories as follows: "Jumbo" - $\leq$ 15 count/lb, "Large" - 16-20 count/lb, "Medium" - 21-28 count/lb, and "Peeler" - > 28 count/lb.

Trap Type: 3-funnel pyramid

Bait Used: Manufactured bait (Purina, Purina Mills, Inc., St. Louis, MO, and Acadiana Choice, Peoples Moss Gin, Inc., Palmetto, LA)

Table 1. Annual summary of average weekly environmental conditions and crawfish production. Rice Research Station, Crowley, LA. 1993.

Weeks	Soil[1] Temperature Min.	Soil[1] Temperature Max.	Air Temperature Min.	Air Temperature Max.	Water Temperature Min.	Water Temperature Max.	Weekly D.O.[2] (mg/l)	Average Monthly Forage Biomass (g/m²)	Water Pumped (gal/A)	Total Rainfall (inches)	Large Crawfish Count (#/trap)	Juvenile Crawfish Count (#/dip)	Crawfish Harvest (lb/A)	Crawfish Size (cnt/lb)	Total Trap-sets (#/A/wk)
	----------deg.F----------														
June 1-7	71.3	82.4	69.1	83.4						4.90					
June 8-14	77.1	87.0	74.0	87.0						2.30					
June 15-21	79.4	94.0	74.0	92.0						0.20					
June 22-28	80.3	96.1	71.6	89.4					153,061	0.15					
June 29-July 5	79.0	88.3	75.0	88.1						1.30					
July 6-12	82.6	101.1	72.9	93.1					63,336	0.00					
July 13-19	79.4	92.0	72.7	89.7						4.80					
July 20-26	77.9	88.3	73.4	88.4						2.50					
July 27-Aug 2	78.1	92.4	73.7	90.4						0.50					
Aug 3-9	78.3	93.0	73.1	90.9						0.60					
Aug 10-16	80.4	91.4	70.6	89.3						1.20					
Aug 17-23	76.7	93.0	67.3	86.4						0.00					
Aug 24-30	74.3	85.9	69.0	85.7						2.60					
Aug 31-Sept 6	75.0	88.6	70.1	87.9						0.00					
Sept 7-13	77.3	90.4	71.1	89.3						0.20					
Sept 14-20	76.9	88.7	70.9	87.3						0.70					
Sept 21-27	72.9	82.9	67.6	82.7						2.30					
Sept 28-Oct 4	66.9	82.4	58.0	80.7				225.62	140,952	0.00					
Oct 5-11	76.7	83.0	58.3	81.3					229,047	0.00					
Oct 12-18	63.7	76.9	57.0	78.4					46,984	0.40					
Oct 19-25	61.4	75.7	55.1	79.1	73.9	64.9	4.0	300.01	93,968	0.90	1.6	1.0			
Oct 26-Nov 1	68.9	81.0	62.3	82.4	77.0	68.4	3.2		46,984	0.00	2.8	0.7			
Nov 2-8	54.3	67.0	43.6	64.7	68.9	56.3	6.6			3.30	3.2	0.7			
Nov 9-15	54.7	65.4	47.4	68.4	65.3	56.5	6.0			2.05	3.7	0.6			
Nov 16-22	57.1	67.1	52.6	72.6	64.8	55.2	6.6	360.76		2.20	5.7	0.8			
Nov 23-29	49.3	58.7	36.9	53.7	69.8	54.5	6.2			0.80	8.2	0.8			
Nov 30-Dec 6	47.3	58.4	41.0	61.3	58.1	43.9	8.3		46,984	0.00	6.9	1.1			

Continued.

Table 1. Continued.

Weeks	Soil[1] Temperature Min.	Soil[1] Temperature Max.	Air Temperature Min.	Air Temperature Max.	Water Temperature Min.	Water Temperature Max.	Weekly D.O.[2] (mg/l)	Average Monthly Forage Biomass (g/m²)	Water Pumped (gal/A)	Total Rainfall (inches)	Large Crawfish Count (#/trap)	Juvenile Crawfish Count (#/dip)	Crawfish Harvest (lb/A)	Crawfish Size (cnt/lb)	Total Trap-sets (#/A/wk)
	----------deg.F----------														
Dec 7-13	46.7	56.7	40.0	59.1	59.5	45.9	9.1			1.60	8.3	0.5			
Dec 14-20	52.7	60.9	50.4	63.9	59.9	48.9	8.4	305.19		1.20	8.5	0.7			
Dec 21-27	57.1	63.9	51.0	64.4	63.5	49.1	4.5			0.00	-.-	0.8			
Dec 28-Jan 3	56.1	61.7	50.7	63.3	--.-	--.-	-.-			0.00	-.-	-.-			
Jan 4-10	54.3	60.1	49.7	61.7	63.0	50.4	6.6		52,857	4.70	6.9	1.4			
Jan 11-17	48.6	55.4	41.6	54.4	58.1	49.1	8.1			0.80		1.8			
Jan 18-24	53.0	63.6	47.4	69.1	59.0	45.5	5.3	263.78		5.75		1.8	16.55	26.0	82
Jan 25-31	43.6	56.7	35.7	57.3	68.0	41.9	12.0			0.00		1.6	13.40	28.3	82
Feb 1-7	47.7	60.7	41.7	63.4	59.0	46.0	6.6		46,984	0.00		1.9	18.07	29.1	82
Feb 8-14	48.7	63.9	40.3	67.9	59.0	48.2	6.3			0.85		1.8	16.68	27.2	82
Feb 15-21	47.7	51.1	43.0	60.4	67.1	49.6	9.0			0.60		1.2	17.24	30.0	82
Feb 22-28	51.0	61.4	43.6	64.4	73.4	41.0	7.3	204.20	46,984	2.00		1.0	18.46	28.4	82
Mar 1-7	50.4	63.0	44.6	64.6	61.7	45.5	7.2			1.95		0.9	28.88	27.0	82
Mar 8-14	50.4	65.0	43.0	64.1	72.1	51.8	4.6		46,984	0.00		1.1	28.47	24.6	82
Mar 15-21	49.6	62.7	47.7	63.4	66.2	35.6	8.9	118.98	59,464	2.20		1.0	34.89	25.7	82
Mar 22-28	58.1	70.4	53.1	72.6	69.8	55.0	3.9		46,984	0.40		1.0	39.89	24.0	82
Mar 29-Apr 4	61.1	77.1	54.6	73.7	80.6	59.9	3.0			0.00		0.8	46.33	22.4	82
Apr 5-11	55.7	65.6	52.0	67.3	78.8	51.8	7.8			7.50		0.3	54.70	21.9	82
Apr 12-18	59.1	75.3	54.4	74.6	83.8	55.4	6.5		144,909	2.10		0.5	54.52	21.4	82
Apr 19-25	61.6	79.7	57.0	75.1	82.0	53.4	5.5	37.75	114,523	0.00		0.9	56.92	22.6	82
Apr 26-May 2	68.7	83.1	61.9	79.7	86.9	60.8	6.4		69,956	0.00		0.4	48.16	21.3	82
May 3-9	67.3	82.3	63.9	81.0	86.5	64.9	4.4		58,730	1.70			55.02	23.9	82
May 10-16	69.6	86.9	60.6	82.1	90.5	64.4	3.9		58,730	0.00			43.52	26.7	75
May 17-23	71.6	87.3	61.1	82.3	91.4	62.6	7.5	2.88	73,412	0.40			101.95	26.9	75
May 24-31	72.4	84.6	68.0	82.6	88.0	68.7	5.0		228,849	0.20			116.05	29.5	75
TOTAL									1,870,682	67.85			809.71		1537

[1] Soil temperature was measured at a depth of 4 inches.
[2] Dissolved oxygen readings were taken about 8:00 a.m.

EFFECTS OF ROTATIONAL HARVESTS WITH SUPPLEMENTAL FEEDING ON CRAWFISH PRODUCTION

W.R. McClain, R.P. Romaire, R.C. Reigh, K.R. Taylor, J.J. Sonnier

INTRODUCTION

A major problem in the farming of crawfish in Louisiana is the excessive production of small, low-value crawfish. Grading crawfish according to size has recently become a standard industry practice where producers are paid premium prices for the larger size grades and penalized for the smallest grades. Premature depletion of vegetative food resources and/or high population densities of crawfish often result in the harvest of small or "stunted" crawfish. These conditions often affect large acreage and many farmers. Producers of large volumes of small crawfish are at a serious economic disadvantage.

Management strategies to address these concerns effectively have not yet been developed. Investigations by Louisiana Agricultural Experiment Station researchers have shown that increased annual yields sometimes occurred with the use of supplemental feeds, but that increase was with crawfish in the smaller size classes. Furthermore, the use of prepared, formulated feeds in production ponds have not been economically feasible. Several studies, where growth of individual crawfish was examined under very controlled conditions, often showed an increase in size or growth rate with the use of supplemental feeds.

Under traditional cultural practices, ponds are harvested mostly weekly (3 - 6 days/week). This may affect crawfish size-at-harvest by removing some crawfish before they reach a larger size. The effectiveness of supplemental feeds under this harvest strategy may be compromised by the premature removal of many crawfish.

This study was conducted to evaluate the effectiveness of increasing the average size-at-harvest of crawfish when ponds were harvested on a rotational basis and supplemental feed was fed during the interim. A rotational schedule of daily harvest (5 days/week) for one week was followed by three weeks of non-harvest. This rotation was repeated throughout the season. Supplemental feeds were fed 3 days/week during the "off" weeks. Two types of supplemental feeds were tested -- high protein (25% crude protein) formulated feed and low-cost raw soybeans.

Pond Area: Sixteen 0.4-acre ponds

Forage Crop: Rice ('Mars') planted at 110 lb/A

Planting Date: 10 Aug 1992

Seeding Method: Broadcast then lightly covered

Fertilizer: 23-12-12 at 260 lb/A preplant incorporated
21-0-0 at 200/A (topdress) 29 Sept

Herbicide(s): Stam + Basagran (4 qt + 3 pt/A) at early tillering

Insecticide: None

Permanent Flood: 1 Oct

Crawfish Harvest: 18 Jan - 7 May 1993
Conventional Harvest: 3 days/wk, every week, Total of 48 trap-days
Rotational Harvest: 5 days/wk, every 4th week, Total of 20 trap-days

Trap Type and Density: 3-funnel pyramid at 25 traps/A

Crawfish Grades: All crawfish harvested were subjected to a grader (passive, water type), and sorted into 4 grade categories as follows: "Jumbo grade" - ≤ 15 count/lb, "Large grade" - 16-20 count/lb, "Medium grade" - 21-28 count/lb, "Peeler grade" - > 28 count/lb.

Feed: 25% crude protein crawfish feed (Peoples Moss Gin Co.,Palmetto, LA) and raw heat-damaged soybeans. Fed selected ponds on rotational schedule beginning 15 February 1993 and ending 7 May 1993.

Exp. Design: Randomized complete block (four replications)

Treatments: Rice only with conventional harvest, rice only with rotational harvest, rice + formulated feed (20 lb/A, 3 days/wk, M-W-F) with rotational harvest, rice + soybeans (20 lb/A, 3 days/wk, M-W-F) with rotational harvest

Parameters: Crawfish production, crawfish size, proportional yields according to size

Comments: This research focussed on boosting the effectiveness of supplemental feeds in increasing the average size-at-harvest of crawfish. This was attempted by using a rotational harvest approach, whereby harvest was suspended during the feeding interval to allow crawfish time to reach a larger size prior to re-initiation of harvest. The use of feeds with an intermittent harvest approach resulted in an increase in the proportion of larger crawfish in the catch. The conventional harvest practice without feed yielded 19.3% of the catch in the two largest size categories. The rotational harvest strategy with pelleted feed resulted in 31.5% of the catch in the two largest grade categories. However, the rotational harvest, or intermittent approach, alone (without feed) also resulted in a proportional increase of large crawfish (25.1% in the top 2 grades). There was a moderate increase (6.4%) in the proportion of crawfish in the larger two grades when feed was used compared to the rotational harvest alone. There appeared to be little difference in the proportional yields from the two feed types, indicating that low-cost soybeans might be more cost-effective.

A major disadvantage with the rotational harvest strategy (with or without feed) used in this study was the reduction in total annual yields. Yields were reduced an average of 46.5%, mainly from the "medium" grade, when the intermittent harvest schedule was used. This reduction in yield was probably caused by the reduction in total trapping days. Traps were harvested a total of 48 days per season in conventionally managed ponds and a total of 20 days per season in ponds harvested in the rotational manner, a 58.3% reduction in harvest frequency. The frequency of harvest/no-harvest needs further investigation to determine the most effective frequency ratios. However, the intermittent harvest aspect from this research verified independent observations made by some producers. Intermittent harvest often results in increased percentage of larger crawfish in the catch.

Although this study documented benefits from a biological standpoint, economic evaluations are needed with further research. With current demands for the larger crawfish and the corresponding economic incentives, the practice of intermittent harvest with and without supplemental feeds needs further verification and refinement.

Table 1. Mean total yields, proportional percentages, and average size-at-harvest of crawfish from a conventional and rotational harvest practice with and without supplemental feeds. Means followed by the same letter within a row was not significantly different ($P \geq 0.05$). Rice Research Station, Crowley, LA. 1993.

Grade Category	Conventional W/O Feed			Rotational W/O Feed			Rotational W/Manufactured Feed			Rotational W/Soybeans as Feed		
	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)
1. Jumbo	12.7[A]	2.2	12.4	11.5[A]	3.3	12.4	18.7[A]	5.9	12.5	14.7[A]	5.2	12.5
2. Large	101.3[A]	17.1	18.7	75.5[A]	21.8	18.0	81.7[A]	25.6	18.0	68.8[A]	24.4	18.3
3. Medium	412.4[A]	69.8	28.1	211.3[B]	61.1	27.5	182.0[B]	56.9	27.3	165.6[B]	58.7	27.2
4. Peeler	64.6[A]	10.9	36.4[1]	47.6[A]	13.8	36.4[1]	37.2[A]	11.6	36.4[1]	33.0[A]	11.7	36.4[1]
TOTAL	591.0[A]			345.9[B]			319.6[B]			282.1[B]		

[1] Crawfish in grade category 4 from all treatments were pooled and average size determinations were assessed from pooled samples.

EFFECTS OF SUPPLEMENTAL FEEDING ON CRAWFISH REPRODUCTION

W.R. McClain, R.P. Romaire, R.C. Reigh, K.R. Taylor, J.J. Sonnier

INTRODUCTION

Production of crawfish from commercial ponds in Louisiana is dependent on recruitment of young-of-the-year (YOY) crawfish from broodstock that burrowed the previous spring/early summer. Recruitment of YOY is unpredictable and is often highly variable. This results in uncertain annual harvests of crawfish with far ranging economical consequences. Low annual yields with small (or negative) returns frequently result from too few YOY. Recruitment of too many YOY causes an over-population condition which results in the production of small, often stunted, crawfish that are sub-marketable or of low-value.

The number of YOY is dependent mainly on the number of broodstock surviving in burrows, the spawning success, and survival of the young. Little is known of the "normal" values for these parameters or to what extent they can be affected by environmental conditions. A more thorough understanding of the reproductive biology of crawfish is needed before management practices can be implemented to optimize numbers of YOY.

Physiological condition of broodstock at the time of burrowing may impact reproductive performance since crawfish must rely on reserves while in the burrow. Nutritional conditions in a culture pond at the end of the season (time of burrowing) are usually limiting. Therefore this study used artificial burrows maintained in the laboratory to evaluated the effects of supplemental feeds on crawfish condition and reproductive efficiency.

Mature female crawfish were collected from the experimental ponds of the previous study "EFFECTS OF ROTATIONAL HARVESTS WITH SUPPLEMENTAL FEEDING ON CRAWFISH PRODUCTION". After termination of that study, but before broodstock were collected, feeding regime was changed on one half of the replications in each treatment. For 3 weeks prior to collection, two ponds per treatment were maintained on the feeding regime while the other two ponds were switched (i.e., some were maintained on feed, some were maintained without feed, some were switched from being fed to non-fed, and some were switched from non-fed to being fed). One group of crawfish was collected, dissected, and physiological condition determined at the beginning of the burrow period. Another group was collected for evaluation of reproductive performance, after which, physiological condition was determined.

Artificial Burrows: 3"W X 4"H PVC cylinders that housed individual crawfish. System was maintained in the laboratory under constant temperature and subdued light.

Collection Date: 31 May 1993

Temperature: 24 ± 2°C

Water: Well water (passed through a commercial water softener) was maintained at 1/2" in artificial burrows.

Experimental Design: Completely randomized design (44 replications per treatment)

Treatments: See previous study "EFFECTS OF ROTATIONAL HARVESTS WITH SUPPLEMENTAL FEEDING ON CRAWFISH PRODUCTION" for clarification of first treatment phase. Second treatment phase was feed or no feed for 3 weeks prior to broodstock collection. Combined treatments were:

Long-Term Feed: Rot./Pellets
Rot./Soybeans

Long-Term No Feed: Conv./No Feed
Rot./No Feed

Short-Term Feed: Conv/No Feed-then-Pellets
Rot./No Feed-then-Pellets

Short-Term No Feed: Rot./Pellets-then-No Feed
Rot./Soybeans-then-No Feed

Feed: 25% crude protein crawfish feed (Peoples Moss Gin Co., Palmetto, LA) and raw heat-damaged soybeans.
First treatment phase: see previous study
Second treatment phase: 35 lbs/A, 5 days/week, 3 weeks

Spawning Period: **First spawn**: Observed 13 July 1993
Last spawn: Observed 18 October 1993

Parameters: Crawfish weight at collection, weight loss after spawning, length, survival of brood females, spawning success, fungal infection of eggs, incubation period, number of young hatched, hepatopancreas and abdominal muscle moisture and ratio as percent of body weight

Comments: Physiological condition of crawfish at time of collection is presented in Table 1. Crawfish receiving feed generally had higher tissue ratios and lower tissue moisture levels and the difference was most pronounced with access to feed long-term. Female crawfish collected at the end of the production season had significantly higher tissue ratios and significantly lower hepatopancreas moisture than males indicating they were preparing for their reproductive role.

Supplemental feeds had little impact on broodstock survival or spawning success (Table 2). However, there appeared to be a trend in conditioning factors of crawfish receiving feeds. Higher tissue ratios and lower moisture levels (indicators of better condition) were generally improved in crawfish that received the most supplemental feed. Although not

evident with greater reproductive success in this study, better conditioned broodstock would likely have an advantage under prolonged periods within burrows.

Fecundity, or the number of juveniles successfully reaching stage 3, were not affected by feed but were significantly affected by the presence of fungal organisms (Table 3). On average, 36% of the crawfish that spawned was affected by fungus. The fungus completely destroyed about 9% of the egg masses. Partial infestation (27% of those spawning) accounted for about a 40% reduction in the number of young reaching stage 3. It also increased the mean incubation period by 1 day. Higher incidence of fungus was observed on egg masses from crawfish that were originally fed but were without feed immediately prior to collection. It is unclear why this occurred.

These results of the reproductive performance of crawfish from artificial burrows in a laboratory setting may not be indicative of actual occurrences in the field. Further research is needed.

Table 1. Mean physiological condition of mature female crawfish collected at the end of the production season (May 31, 1993) from various culture environments. Twenty crawfish per treatment were collected. Means followed by the same letter within a column by treatment category were not significantly different ($P \geq 0.05$). Rice Research Station, Crowley, LA. 1993.

Treatments		Tissue Ratio[3]		Tissue Moisture	
Production[1] period	Pre-collection period[2]	Hep.	Tail	Hep.	Tail
Conv./No Feed	No Feed	3.51^{BC}	2.15^{BC}	53.83^{B}	78.94^{B}
Conv./No Feed	Feed	2.68^{CD}	1.94^{D}	58.91^{AB}	80.35^{A}
Rot./No Feed	No Feed	2.80^{BCD}	2.03^{CD}	57.27^{AB}	78.88^{B}
Rot./No Feed	Feed	2.49^{D}	1.97^{CD}	60.61^{A}	80.45^{A}
Rot./Pellets	No Feed	3.58^{B}	2.14^{CD}	54.46^{AB}	78.38^{B}
Rot./Pellets	Feed	3.33^{BC}	2.15^{BC}	55.24^{AB}	79.09^{B}
Rot./Soybeans	No Feed	5.46^{A}	2.34^{AB}	41.68^{C}	78.87^{B}
Rot./Soybeans	Feed	4.74^{A}	2.37^{A}	45.02^{C}	79.30^{B}
Combined Treatments[4]					
Long-Term Feed		4.03^{A}	2.26^{A}	50.13^{B}	79.19^{B}
Long-Term No Feed		3.15^{B}	2.09^{B}	55.55^{A}	78.91^{B}
Short-Term Feed		2.59^{B}	1.96^{B}	59.74^{A}	80.40^{A}
Short-Term No Feed		4.52^{A}	2.24^{A}	48.07^{B}	78.62^{B}

[1] Production strategy (rotational or conventional harvest method/supplemental feed) employed (through May 7, 1993) in ponds from which crawfish were collected.
[2] Short-term (3-week) treatment prior to collection (May 31, 1993) of crawfish.
[3] Dry hepatopancreas or abdominal muscle (tail) weight as percentage of wet body wt.
[4] Data combined according to nutritional regimes of production and pre-collection periods.

Table 2. Mean reproductive success and physiological condition of mature female crawfish collected (May 31, 1993) from various culture environments and housed in simulated burrows in the laboratory. Forty-four crawfish per treatment were collected. Means followed by the same letter within a column by treatment category were not significantly different (P≥0.05). Rice Research Station, Crowley, LA. 1993.

Treatments						Spawned group					Non-Spawned group				
Production[1] period	Pre-collection[2] period	Initial weight	Total length	Survival	Spawned	Weight[3] loss	Tissue ratio[4] Hep.	Tissue ratio[4] Tail	Tissue moisture Hep.	Tissue moisture Tail	Weight[3] loss	Tissue ratio[4] Hep.	Tissue ratio[4] Tail	Tissue moisture Hep.	Tissue moisture Tail
		(g)	(mm)	(%)	(%)	(%)			(%)	(%)	(%)			(%)	(%)
Conv./No Feed	No Feed	20.2	82.2	75	48	5.2^{b}	0.71^{bc}	0.79^{a}	80.8^{ab}	85.9^{ab}	5.8^{a}	0.70^{a}	1.16^{bc}	83.0^{a}	84.5^{bc}
Conv./No Feed	Feed	19.3	81.5	77	41	6.6^{b}	0.83^{ab}	0.90^{a}	80.4^{abc}	85.9^{ab}	4.9^{a}	0.72^{a}	1.38^{ab}	83.6^{a}	84.8^{bc}
Rot./No Feed	No Feed	20.8	82.5	70	48	6.1^{b}	0.72^{bc}	0.97^{a}	81.7^{ab}	85.5^{bc}	5.9^{a}	0.56^{a}	0.79^{a}	84.4^{a}	84.6^{bc}
Rot./No Feed	Feed	19.4	81.6	89	61	5.0^{b}	0.77^{bc}	0.88^{a}	81.2^{ab}	85.8^{ab}	5.9^{a}	0.92^{a}	1.67^{a}	80.8^{a}	82.9^{a}
Rot./Pellets	No Feed	22.6	85.9	61	39	5.7^{b}	0.52^{c}	0.59^{a}	84.5^{a}	88.6^{a}	5.8^{a}	0.55^{a}	1.10^{bc}	85.8^{a}	86.3^{ab}
Rot./Pellets	Feed	19.2	82.2	70	34	4.4^{b}	0.70^{bc}	0.86^{a}	81.4^{ab}	82.8^{a}	5.5^{a}	0.65^{a}	1.29^{ab}	84.0^{a}	85.1^{abc}
Rot./Soybeans	No Feed	21.0	83.1	45	30	11.4^{a}	0.83^{ab}	0.91^{a}	78.4^{bc}	85.4^{bc}	6.8^{a}	0.53^{a}	1.07^{bc}	86.9^{a}	87.4^{a}
Rot./Soybeans	Feed	23.1	83.5	57	36	5.6^{b}	1.09^{a}	1.04^{a}	75.6^{c}	85.0^{bc}	7.1^{a}	0.87^{a}	1.21^{abc}	79.3^{a}	85.2^{abc}
Combined Treatments[5]															
Long-Term Feed				64	35	5.0^{b}	0.90^{a}	0.95^{a}	78.4^{a}	83.9^{b}	6.1^{a}	0.73^{a}	1.26^{ab}	82.3^{a}	85.2^{b}
Long-Term No Feed				73	48	5.6^{b}	0.71^{a}	0.88^{a}	81.3^{a}	86.0^{ab}	5.8^{a}	0.63^{a}	0.99^{b}	83.7^{a}	84.5^{b}
Short-Term Feed				83	51	5.6^{b}	0.79^{a}	0.89^{a}	80.9^{a}	85.8^{ab}	5.3^{a}	0.80^{a}	1.51^{a}	82.4^{a}	84.0^{b}
Short-Term No Feed				53	34	8.3^{a}	0.66^{a}	0.74^{a}	81.7^{a}	87.1^{a}	6.2^{a}	0.55^{a}	1.09^{b}	86.2^{a}	86.7^{a}
Group Mean[6]						6.0^{NS}	0.77^{NS}	0.87^{B}	80.7^{B}	85.7^{NS}	5.8^{NS}	0.69^{NS}	1.24^{A}	83.4^{A}	85.0^{NS}

[1] Production strategy (rotational or conventional harvest method/supplemental feed) employed (through May 7, 1993) in ponds from which crawfish were collected.
[2] Short-term (3-week) treatment prior to collection (May 31, 1993) of crawfish for spawning.
[3] Percentage weight loss from time of collection (May) to termination (Sept.-Oct.).
[4] Dry hepatopancreas or abdominal muscle (tail) weight as percentage of wet body weight at termination (Sept.-Oct.).
[5] Data combined according to nutritional regimes of production and pre-collection periods.
[6] Parameters averaged according to spawning status.
[NS] Indicates no significant differences among like parameters within group mean row.

Table 3. Mean fecundity of female crawfish collected (May 31, 1993) from various culture environments and housed in simulated burrows in the laboratory. Means followed by the same letter within a column by treatment category were not significantly different (P≥0.05). Rice Research Station, Crowley, LA. 1993.

Treatments			No fungus detected			Partial fungal infestation			Full fungal infestation
Production[1] period	Pre-collection[2] period	No. spawned	%[3]	No. juveniles hatched	Incubation[4] period	%[3]	No. juveniles hatched	Incubation[4] period	%[3]
Conv./No Feed	No Feed	21	61.9	205.5[a]	18.8[a]	38.1	123.3[a]	21.1[a]	0
Conv./No Feed	Feed	18	72.2	144.6[a]	19.6[a]	16.7	44.7[a]	20.3[a]	11.1
Rot./No Feed	No Feed	21	80.9	180.2[a]	19.8[a]	14.3	211.3[a]	20.3[a]	4.8
Rot./No Feed	Feed	27	81.5	226.5[a]	18.7[a]	14.8	115.7[a]	20.5[a]	3.7
Rot./Pellets	No Feed	17	35.3	219.8[a]	20.0[a]	47.1	76.4[a]	20.7[a]	17.6
Rot./Pellets	Feed	15	80.0	173.4[a]	19.9[a]	0	-----	----	20.0
Rot./Soybeans	No Feed	13	30.8	177.7[a]	19.7[a]	53.8	104.8[a]	20.0[a]	15.4
Rot./Soybeans	Feed	16	68.8	166.4[a]	20.0[a]	31.2	153.6[a]	20.0[a]	0
Combined Treatments[5]									
Long-Term Feed		31	74.2	170.0[a]	19.9[a]	16.1	153.6[a]	20.0[a]	9.7
Long-Term No Feed		42	71.4	197.1[a]	19.4[a]	26.2	152.7[a]	20.8[a]	2.4
Short-Term Feed		45	77.8	197.6[a]	19.0[a]	15.6	89.5[a]	20.4[a]	6.6
Short-Term No Feed		30	33.3	201.1[a]	19.9[a]	50.0	85.3[a]	20.4[a]	16.7
Group Mean[6]				191.6[A]	19.4[B]		114.8[B]	20.5[A]	

[1] Production strategy (rotational or conventional harvest method/supplemental feed) employed (through May 7, 1993) in ponds from which crawfish were collected.
[2] Short-term (3-week) treatment prior to collection (May 31, 1993) of crawfish for spawning.
[3] Percent of number spawned.
[4] Days from spawning to egg hatching.
[5] Data combined according to nutritional regimes of production and pre-collection periods.
[6] Parameters averaged according to fungal group.
[NS] Indicates no significant differences among like parameters within group mean row.

EFFECTS OF INTERCROPPING CRAWFISH IN RICE FIELDS

W.R. McClain, P.K. Bollich, and D.C. Huffman

INTRODUCTION

This research was a continuation to address a very common and consequential problem in crawfish aquaculture of Louisiana. High population densities of crawfish will often prematurely deplete the vegetative food resources in a pond. As a result, crawfish growth ceases or slows considerably and producers harvest small (often stunted) crawfish of low-market-value. This puts them at a major economic disadvantage because, frequently, this occurs before the bulk of the harvest has been removed. Costly supplemental feeding and density reduction measures have been tried after the problem occurred with little or no benefits. Transferring, or "relaying," these small low-value crawfish from a poor environment to an improved environment has been shown to be very effective in achieving further growth.

Because of common resource requirements, many producers of crawfish also cultivate rice; in fact, crawfish culture is frequently used by rice producers in crop rotational practices. Due to an overlap in crawfish and rice seasons, it is common to have newly established rice fields at a time when crawfish stunting normally occurs in forage-depleted crawfish ponds. This provides an opportunity to utilize the vegetative growth phase of rice production as a valuable resource for obtaining additional growth and increasing the market value of crawfish.

Previous research has shown that "relaying" crawfish into the improved environment of a rice field can substantially increase the market value of crawfish. Moreover, earlier results indicated that it is possible to achieve very favorable rice yields after crawfish have been reharvested. Integrating crawfish and rice as an intercropping approach in this nontraditional manner may have very favorable economic impacts to farming systems, which are already somewhat integrated.

Since this intercropping concept involves a new approach not yet tried in industry, and with only early evaluations, much more research is required before recommendations can be made. The latest research was conducted to further evaluate additional biological aspects of this non-traditional practice. Comparisons of two stocking rates and two seedbed preparation techniques were made on crawfish and rice yields. Conditions in Louisiana often dictate that a seedbed for rice planting be tilled under flooded conditions. This practice is commonly referred to as "mudding in" and can account for a substantial percentage of the seedbeds, particularly in the crawfish culture regions of Louisiana. Therefore, this technique was used a one treatment factor is this study. Crawfish were stocked at either 500 or 750 lb/A in rice planted plots where the seedbed tillage was accomplished under flooded conditions. Rice was also planted in stale seedbeds (no tillage) where crawfish were stocked at 750 lb/A.

Field Area: Six 0.5-acre fields and two 0.67-acre fields

Forage Crop(s): Rice ('Mars')

Planting Date: 15 Apr 1993 (Replanted the two stale seedbed fields, 29 Apr due to poor stand)

Seeding Rate: 150 lb/A

Seeding Method: Water seeded (pre-sprouted seed)

Fertilizer: 23-12-12 at 200 lb/A, 18 May; 45-0-0 at 175 lb/A (topdressed), 31 May

Herbicide(s): **Flooded-tilled seedbed**: Stam + Basagran (3 qt + 1 pt/A), 17 May; **Stale seedbed**: None

Insecticide: None

Permanent Flood: 28 May (8-10 inches)

Relay: 1 Jun - 7 Jun (500 or 750 lb/A)

Relay Crawfish: Average size - 33.7 crawfish/lb, purchased from commercial operation

Rice Stage at Relaying: Tillering

Enclosures: Cylindrical small-mesh (5 mm) wire, 0.5 m^2 surface area, placed over rice forage in ponds (stocked at same rate as treatment, used for mortality estimates)

Crawfish Harvest: 19 Jul - 6 Aug (Total of 20 trap-days) 32 traps/A

Crawfish Grades: "Jumbo" - < 15 count/lb, "Large" - 15-19 count/lb, "Medium" - 20-26 count/lb, "Peeler" - > 26 count/lb

Feed: None

Bait: Manufactured

Rice Harvest: 17 Aug

Exp. Design: Forced randomization (three replications for tilled field treatments, two replications for stale seedbed)

Treatments: Flooded-tilled seedbed - low crawfish stocking rate (500 lb/A), Flooded-tilled seedbed - high crawfish stocking rate (750 lb/A), Stale seedbed - high crawfish stocking rate

Parameters: Crawfish mortality and production, Rice production

Comments: These results comprised the third year of study for which the mortality, growth, and retrieval rates of crawfish relayed into and reharvested from rice fields were determined. Average crawfish size in this study nearly doubled (from 34 to 18 crawfish/lb) and retrieval rates, based on total weight, ranged from 74.7 to 98.6% (Table 1). Mortality due to handling and stress may be one reason why retrieval weights were not higher. Mortality was estimated to be 31% during the first 24 hr and totaled 48% for 7 days following the transfer process (Table 2). Crawfish were purchased from a commercial supply and may have been predisposed to rough handling and hot dry conditions after harvest. Trapping does not harvest all the animals present in a pond and trapping was suspended when the catch was low enough to become uneconomical. However, there appeared to be a relationship between percent mortality and percent retrieval weights.

Average yields of 560 and 550 lb of crawfish per acre were achieved from the tilled and non-tilled fields, respectively, and yields from the tilled fields stocked at the lower rate averaged 493 lb/A. Yields were not significantly different. Yields corresponding to size partitions were also not significantly different, due to treatment, and averaged 35, 47, 14, and 4% for the "Jumbo" ($\leq$15 per lb), "Large" (16 - 20 per lb), "Medium" (21-25), and "Peeler" (>25 per lb) grades, respectively. Rice yields were respectable considering little pesticides were used. Yields across treatments averaged 3,085 lb/A and 3,664 lb/A if the trapping lane area was not included. The state average yield per acre for 1992 was 4,629 pounds. Rice yields in this experiment were lower when rice was planted in stale seedbeds although crawfish yield (or size) was little affected. Crawfish production was most efficient at the lower stocking rate in this study.

Table 1. Mean total yields, proportional percentages, and average size-at-harvest of crawfish from tilled fields stocked at 750 lb crawfish/A (high rate) and 500 lb/A (low rate) and stale seedbeds stocked at the high rate. Rice Research Station, Crowley, LA. 1993.

Grade	High stocking rate (tilled seedbed)			Low stocking rate (tilled seedbed)			High stocking rate (stale seedbed)		
	Avg. yield	% of total	Avg. size	Avg. yield	% of total	Avg. size	Avg. yield	% of total	Avg. size
	(lb/A)		(count/lb)	(lb/A)		(count/lb)	(lb/A)		(count/lb)
1. Jumbo	209.0	37.3	13.6	163.2	33.1	13.7	186.0	33.8	13.6
2. Large	258.8	46.2	17.0	228.7	46.4	16.9	260.0	47.3	17.2
3. Medium	69.8	12.5	26.1	78.9	16.0	26.2	78.9	14.4	26.1
4. Peeler	22.6	4.0	33.9[1]	22.0	4.5	33.9[1]	25.0	4.5	33.9[1]
Total	560.2			492.8			549.9		
Rice Yield	3356			3227			2671		

[1] Crawfish in grade category 4 from all treatments were pooled and average size determinations were assessed from pooled samples.

Table 2. Estimated short- and long-term mortality of relayed crawfish. Rice Research Station, Crowley, LA. 1993.

Treatment	Mortality (%)	
	1-Day	7-Day
High Stocking Rate (tilled seedbed)	37.2	54.4
Low Stocking Rate (tilled seedbed)	25.0	40.0
High Stocking Rate (stale seedbed)	30.0	50.0
Mean	30.7	48.1

COMPARISON OF CRAWFISH PRODUCTION FROM PERMANENT PONDS AND PONDS IN CRAWFISH/RICE ROTATIONS

W.R. McClain, K.R. Taylor, J.J. Sonnier

INTRODUCTION

Crawfish ponds are generally categorized as wooded, semi-wooded, and open ponds. Open ponds are further categorized as marsh ponds, permanent ponds, and rice-field ponds. The most common and those with the highest production are the permanent and rice-field types. Permanent crawfish ponds are generally constructed solely for the purpose of cultivating crawfish and consist of permanent levees and drain structures. Rice-field ponds are those where crawfish are double-cropped with rice in rotational crop systems. Two major differences exist in the management practice for these production scenarios. Permanent ponds are stocked initially and utilized for production year after year without additional stockings. Rice-field ponds are usually stocked after each rotation. Rice when used in permanent ponds is planted solely for the purpose of supplying forage for the crawfish's nutrition needs and grain production is not a concern. Rice-field ponds utilize the stubble and any regrowth, obtained after the rice harvest, as forage substrate.

A typical rice/crawfish rotation schedule may be: rice production (April - July), rice forage regrowth (August - September), crawfish production (October - May), fallow field (June - March), rice production (April -July), etc. In unique situations (usually when crawfish production or prices are low) crawfish ponds may be drained early (March or April) to accommodate a rice crop. A permanent crawfish pond is flooded during the fall/winter/spring and a forage crop is planted each summer. These varying production scenarios usually create differences in the amount of broodstock present (thus YOY recruitment) and in the quality and quantity of nutritional resources during the season.

Few direct comparisons of crawfish production from the different management approaches have been made. Therefore this study was conducted to make some simple comparisons from various management scenarios utilizing rice as the forage crop. Production from a simulated permanent pond (3rd season of continuous production) was compared with that from three types of rice-field ponds. One rice-field type was previously used to intercrop crawfish during the vegetative growth phase. The unharvested crawfish therefore served as the broodstock for the subsequent crawfish season. Another set of rice-field ponds had no introduction of crawfish but relyed on the presence of indigenous broodstock. Both of these rice-field types had been fallow previous to the rice crop and rice was planted in a well tilled seedbed. A third pond type consisted of crawfish ponds drained early whereby rice was immediately planted in the stale but mucky seedbed. Crawfish were relayed (and reharvest) prior to the rice harvest in this type.

Pond Area: **Permanent ponds**: four 0.4-acre ponds
Rice-field ponds: six 1-acre ponds

Forage Crop: Rice ('Mars')

Planting Date: **Permanent ponds**: 10 Aug 1992
Rice-field ponds: 23 Mar 1992

Seeding Rate: **Permanent ponds**: 110 lb/A
Rice-field ponds: 150 lb/A

Seeding Method: **Permanent ponds**: Broadcast then lightly covered
Rice-field ponds: Water seeded (pre-sprouted seed)

Fertilizer: **Permanent ponds**: 23-12-12 at 260 lb/A preplant incorporated, 21-0-0 at 200 lb/A (topdress) 29 Sept
Rice-field ponds: 23-12-12 at 400 lb/A preplant incorporated, 45-0-0 at 75 lb/A (topdress) 15 May and 21-0-0 at 200 lb/A 14 Aug

Herbicide(s): Stam + Basagran (4 qt + 3 pt/A) at early tillering

Insecticide: None

Permanent Flood: 1 Oct

Crawfish Harvest: 18 Jan - 7 May 1993 (3 days/wk), Total of 48 trap-days

Trap Type and Density: 3-funnel pyramid at 25 traps/A

Crawfish Grades: All crawfish harvested were subjected to a grader (passive, water type), and sorted into 4 grade categories as follows: "Jumbo grade" - < 15 count/lb, "Large grade" - 15-20 count/lb, "Medium grade" - 21-28 count/lb, "Peeler grade" - > 28 count/lb.

Feed: None

Exp. Design: Forced randomization (Permanent ponds, four replications; Rice-field ponds, two replications)

Treatments: Permanent Pond; Rice-field Pond / Relay (1,000 lb crawfish/A); Rice-field Pond / No Relay; Crawfish / Rice-field Pond/ Relay (1,000 lb crawfish/A)

Parameters: Crawfish production, crawfish size, proportional yields according to size

Comments: Results are summarized in Table 1. Production was greater in the rice-field ponds although not always significant. The major differences occurred in the production of crawfish in the larger size grades. Yields of crawfish from the permanent pond in the "Jumbo" and "Large" size classes were significantly lower. It is unclear why this occurred but these results seem to be consistent with what some commercial producers have observed. Population density and food resources are two factors that affect yield and size-at-harvest. The permanent pond had a lower population of harvestable crawfish but appeared to have a greater amount of subharvestable individuals. The rice-field ponds had much greater forage biomass during the early fall but it disappeared more rapidly during the spring (Table 2). Forage substrates in the permanent ponds had greater persistence during the spring, the most critical period for nutritional resources.

Although no significant difference was observed in total yield of crawfish from the different rice-field ponds, there were some differences in the yield within the larger grades. There appear to be only minor reductions from ponds without a relay operation. The biggest reduction occurred in rice-field ponds where the rice crop was establish immediately following a crawfish operation. This method of establishing the rice crop in a stale seedbed that had not lay fallow for a period of time before planting rice also resulted in reduced rice yields and return yields from a crawfish relay operation (see 84th Annual Research Report, Rice Research Station).

These results indicate that there might be some inherent physical or chemical benefit to crawfish growth and yields when a pond is fallow for a year prior to production. However, there is little evidence to support this idea, thus further investigation may be warranted.

Table 1. Mean total yields, proportional percentages, and average size-at-harvest of crawfish from permanent ponds and rice-field ponds with and without previous relay operations. Means followed by the same letter within a row were not significantly different ($P \geq 0.05$). Rice Research Station, Crowley, LA. 1993.

Grade Category	Permanent Pond			Rice-field Pond / Relay			Rice-field Pond / No Relay			Crawfish / Rice-field Pond / Relay		
	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)	Yield (lb/A)	Yield (% of Total)	Avg. Size (Count/lb)
1. Jumbo	12.7^{D}	2.2	12.4	164.4^{A}	19.1	12.9	85.0^{B}	11.5	12.5	52.9^{C}	7.4	12.8
2. Large	101.3^{C}	17.1	18.7	305.9^{A}	35.5	18.2	244.2^{B}	33.0	18.3	207.9^{B}	29.1	18.4
3. Medium	412.4^{A}	69.8	28.1	348.0^{A}	40.5	27.1	365.9^{A}	49.4	26.8	404.9^{A}	56.7	27.4
4. Peeler	64.6^{A}	10.9	35.6[1]	42.1^{A}	4.9	35.6[1]	45.5^{A}	6.1	35.6[1]	48.7^{A}	6.8	35.6[1]
TOTAL	591.0^{B}			860.4^{A}			740.6^{AB}			714.4^{AB}		

[1] Crawfish in grade category 4 from all treatments were pooled and average size determinations were assessed from pooled samples.

Table 2. Mean forage biomass at each sample period during the season for rice planted in permanent crawfish ponds and ratoon growth in rice-field ponds. Means followed by the same letter within a column were not significantly different ($P \geq 0.05$). Rice Research Station, Crowley, LA. 1993.

Pond Type	Pre-flood	October	November	December	January	February	March	April	May
Permanent	1024^{B}	1630^{B}	2880^{A}	2676^{A}	2523^{A}	1944^{A}	1276^{A}	459^{A}	36^{A}
Rice-Field	2694^{A}	4072^{A}	3670^{A}	2785^{A}	2127^{A}	1659^{A}	775^{B}	174^{B}	13^{A}

EVALUATION OF GRADING, DEPURATION, AND STORAGE TIME ON CRAWFISH MORTALITY DURING COLD STORAGE

W. Ray McClain, K.R. Taylor, and J.J. Sonnier

INTRODUCTION

Approximately 60% of the Louisiana crawfish production is sold in live form and the majority of these are marketed locally through private households and restaurants. Crawfish are packaged in mesh sacks and stored in coolers until sold. The storage time may be only a few hours or as long as 1 week. Environmental conditions in the cooler are maintained at temperatures of 35-40°F with high relative humidity to insure maximum shelf life of live crawfish.

Crawfish are sometimes held in purging systems (where feed is withheld) for 24-48 hr prior to being placed in coolers. This procedure greatly reduces the contents of the gut, which renders a cleaner, more attractive product. Purging has been surmised to increase the shelf life of crawfish held in a cooler because it greatly reduces fecal contamination and also washes the gill area. It has been theorized that since the gill area is likely to be freer of mud and debris, oxygen transfer might be enhanced.

Grading of crawfish by size has become the most recent development in the Louisiana crawfish industry. Currently, crawfish are graded into three or four sizes. The largest are used in the export market as whole, cooked product. The medium sizes are used in the domestic restaurant and live market trades as whole, spicy boiled crawfish. The smaller size is processed for the abdominal (tail) meat.

The shelf life of live crawfish during refrigerated storage is a key factor for merchants. These dealers must know how long they can safely store crawfish in cold storage without impacting survival and quality. Little is known of the relationship between grading or purging and their effect on crawfish shelf life. This study was conducted to document the effects of grading, purging, and storage time on crawfish mortality during cold storage.

Culture Conditions: Typical rice-forage crawfish ponds

Crawfish Harvest: From baited pyramid traps
1992: Approx. 1238 lb of crawfish (24,761 individuals) were examined
1993: Approx. 1838 lb of crawfish (36,828 individuals) were examined

Experimental Design: **1992**: Completely randomized design
1993: 3 X 3 Factorial Arrangement

Treatments: 1. **Control** = crawfish exposed to no additional handling after harvest
2. **Graded** = crawfish exposed to a grader soon after harvest
3. **Graded/Purged** = crawfish held for 24 hr in a flow-through purge system after being graded

Parameters: Crawfish mortality after purging and cold storage. Percent maturity was also determined -- **1992**: Cold storage = 6 days
1993: Cold storage = 2, 4, and 6 days

Cooler: Walk-in type (temp. = 40 ± 0.4 F). Contents were wet daily

Grader: Passive, water-type, developed by LSU Agricultural Center (see 84th Annual Research Report, Rice Research Station)

Purge System: Flow-through, rectangular (770 L) with submerged baskets and profuse supplemental aeration -- **Flow rate**: 2.12 L/min (turnover = 6.05 hr)
Loading rates: 1.4-4.4 lb crawfish/ft^2

Water Analysis: Determined by Hach DRELL/5, Hach Chemical Co., Loveland, Colorado

Test dates: **1992**: 3/11, 3/26, 4/1, 4/8, 4/15, 4/22;
1993: 1/18, 2/1, 2/15, 3/1, 3/15, 4/12, 4/26, 5/17

Comments: Results are presented in Table 1 and Figures 1 and 2. There is much evidence from this study to refute the idea that purging may be beneficial in increasing the shelf life of crawfish during cold storage. The opposite appears to be likely. Findings from this study demonstrate that substantial loss can occur both during and after the purging process and that purging to improve the product does exact a cost by increasing mortality. Purging prior to cold storage usually insures that crawfish have been handled and subjected to stress for an additional day (or longer) compared with other crawfish held for the same length of time in cold storage.

Overall, mortality losses were generally highest early in the harvest season and declined over time. This may explain why mean mortalities for 1992 were lower than those for 1993. The earlier study lacked data from January, February, and the beginning of March. Data collected during this period in 1993 had the highest mortalities. It is not clear why the mortalities were higher during the January - March period. The profile of mortality and maturity over time suggests that when a high percentage of the catch was mature (4/12-5/17), the overall mortality during handling and storage was substantially decreased. This may be corroborated by the data that showed a disproportionate share of immature crawfish in the dead group, demonstrating that immature crawfish were more susceptible to the stress of purging and cold storage.

Utilizing the passive grading technique of allowing crawfish to sort themselves underwater appeared to have had little effect on shelf life of crawfish during cold storage. Individual differences did sometimes occur at various test dates, but they were inconsistent with storage time and no trend was obvious. Time during cold storage was a significant factor affecting live crawfish shelf life, regardless of postharvest treatment. The expected trend of increased mortality with storage time was apparent with a significant increase at the 6-day period.

Further research is needed to better define the causes affecting survival and shelf life of live crawfish and means to improve conditions, especially in regards to purging. While the impact of a water-based grader on crawfish shelf life during cold storage appears negligible, little is known of the effects from other types of graders used in the industry. Since grading is fast becoming an industry standard, further investigations are needed.

Figure 1. Percent mortality of crawfish during depuration and exposure to either 2, 4, or 6 days of cold storage in 1993. Data for the cold storage periods represent means across postharvest treatments at each test date of the study period. Rice Research Station, Crowley, LA.

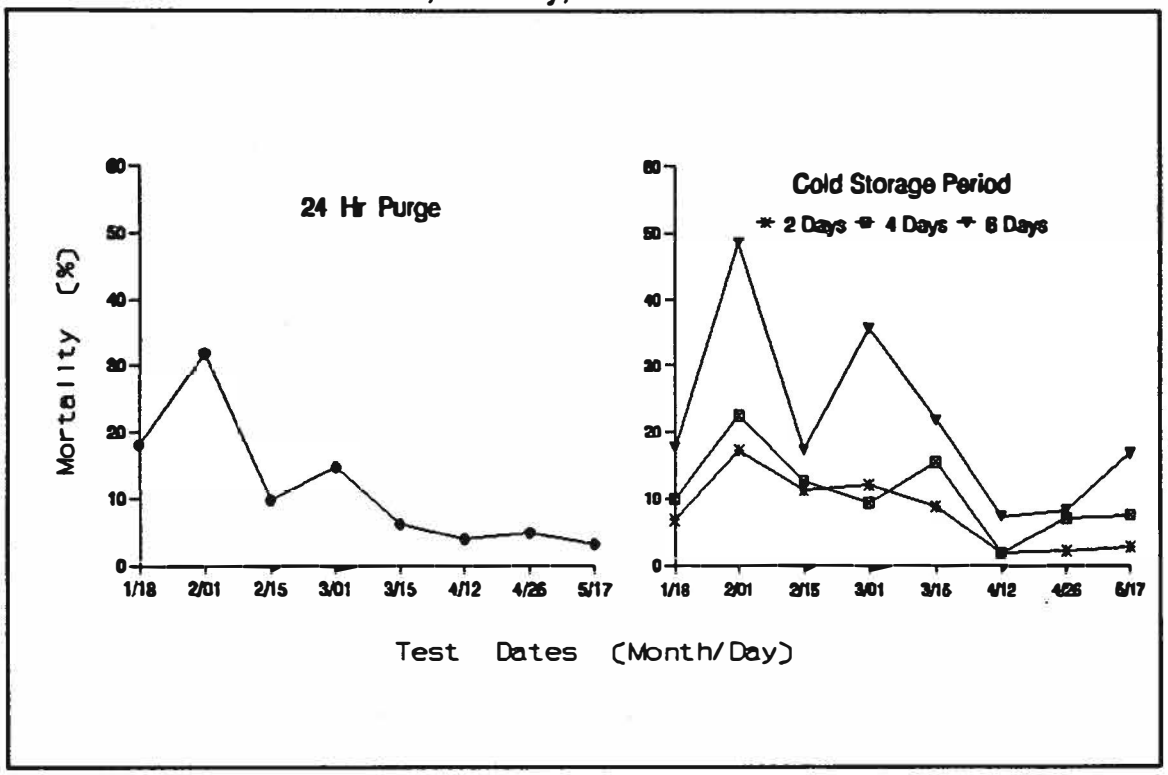


Figure 2. Mean percent of mature crawfish in the original catch (mature in catch), mortality (dead), and maturity of the dead group (mature/dead) for each test date of the study period, 1993. Rice Research Station, Crowley, LA.

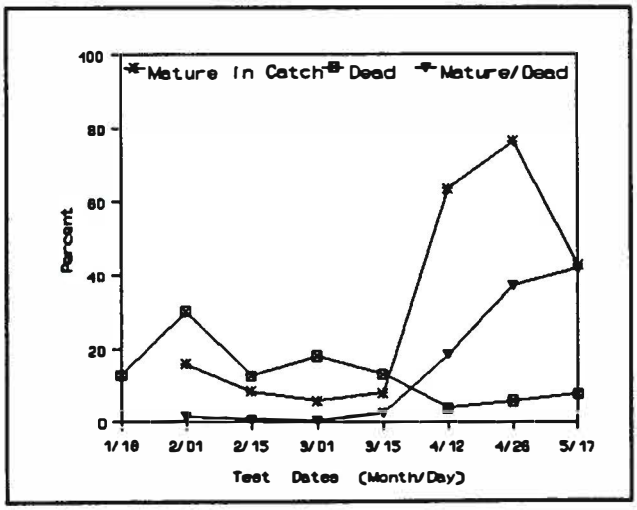


Table 1. Mean percent mortality of crawfish exposed to increasing periods of cold storage (4 ± 0.2°C) after different post-harvest treatments. Significant differences ($P \leq 0.05$) among post-harvest treatments (within columns) and storage times (within rows) are indicated with alphabetical and numerical superscripts, respectively. Rice Research Station, Crowley, LA. 1993.

Post-Harvest Treatment	24-hr Purge	Period of Cold Storage			
		2-day	4-day	6-day	Mean
1992					
Control	-------	-----	-----	6.9^{B}	-----
Graded	-------	-----	-----	11.1^{B}	-----
Graded/Purged	3.33	-----	-----	19.9^{A}	-----
Mean				12.6	
1993					
Control	-------	4.0^{B2}	8.7^{B2}	18.8^{A1}	10.5^{B}
Graded	-------	5.5^{B2}	7.2^{B2}	18.3^{A1}	10.3^{B}
Graded/Purged	11.6	14.1^{A1}	16.5^{A1}	27.9^{A1}	19.5^{A}
Mean		7.8^{2}	10.8^{2}	21.7^{1}	

MALEIC HYDRAZIDE AND RICE BIOMASS PRODUCTION AND PERSISTENCE FOR CRAWFISH

R.T. Dunand, W.R. McClain, R.R. Dilly, Jr.,
G.A. Meche, K.R. Taylor, and J.J. Sonnier

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Mars

Seeding Rate: 100 lb/A

Planting Date: See Treatments

Row Spacing: 7 inches

Seeding Depth: 1 inch

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting; urea (46% N) at 100 lb/A by hand, 14 Aug; ammonium sulfate (21% N) at 200 lb/A by airplane, 29 Sept

Plot Size: 3667.5 ft^2 - 14.67 (2 - 10-row drill strips separated by a 3-ft alley) x 250 ft

Treated Area: 3667.5 ft^2 - 14.67 (2 - 10-row drill strips separated by a 3-ft alley) x 250 ft

Treatment(s):

Planting Date

Early planting, 23 June
Late planting, 10 Aug

Plant Growth Regulator

Maleic Hydrazide (1.5 lb/A) - Royal MH 30 SG (2.5 lb/A)

Timing

Early boot (1/2 inch panicle), 1 Sept
First heading, 18 Sept

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 24 hours after application

Growth Regulator(s): RELEASE (0.35 oz/cwt)

Herbicide(s): Stam (2 qt/A) by airplane, 10 July; Stam (5 qt/A) + Basagran (2 pt) by airplane, 20 July; Stam (1 gal/A) by airplane, 30 July; Stam M4 (3 qt/A) + Basagran (2 pt/A) by airplane, 24 Aug; Stam M4 (3 qt/A) + Basagran (2 pt/A) by airplane (late planting only), 21 Sept

Insecticide(s): None

Fungicide(s): Dithane (4 oz/cwt)

Emergence: Early planting, 29 June
Late planting, 26 Aug

Permanent Flood: 30 Sept

Harvest Date: Biomass sampling - 29 Sept (preflood), 20 Oct, 17 Nov, 14 Dec, 12 Jan, 9 Feb, 9 Mar, and 6 Apr

Harvested Area: Sept - Feb sampling: 7 ft^2 - 7 (12 rows - center 6 rows from each 10-row strip) x 1 ft

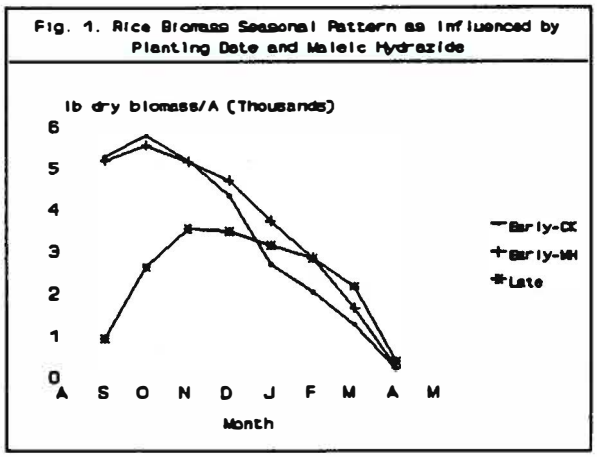
Mar sampling: 14 ft^2 - 7 (12 rows - center 6 rows from each 10-row strip) x 2 ft

Apr sampling: 35 ft^2 - 7 (12 rows - center 6 rows from each 10-row strip) x 5 ft

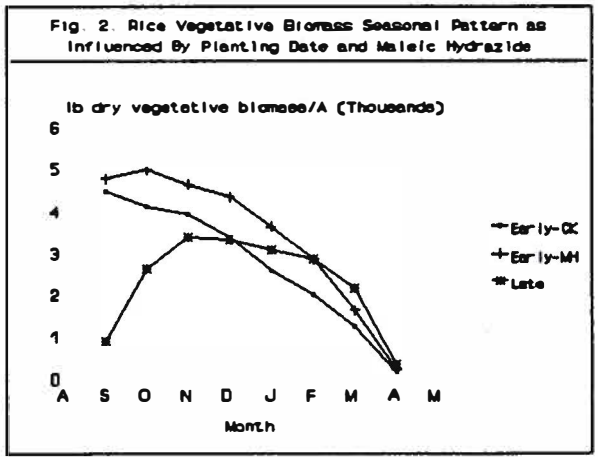
Exp. Design: Randomized complete block and four replications

Comments: Rice biomass was monitored on a monthly basis from September 1991 through April 1992. Biomass evaluations were made on total dry weight, vegetative (leaves and stems) dry weight, and reproductive (panicles and grain) dry weight. Dry weight determinations were made after drying tissue in a forced-air oven at 70°C for 48 hours.

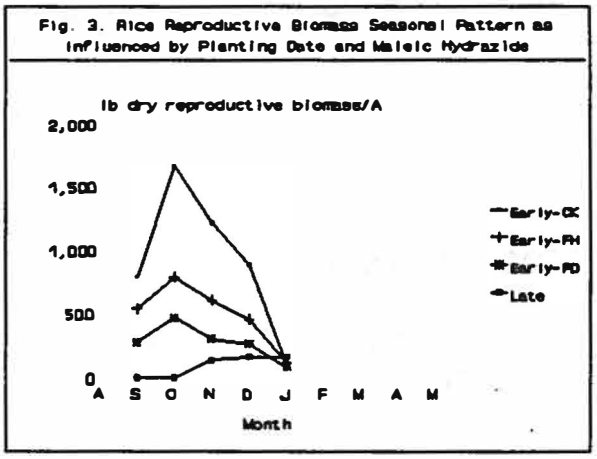
Total Dry Weight. Changes in rice biomass during the crawfish season were observed, and date of planting and maleic hydrazide influenced rice biomass (Figure 1). Planting early resulted in total rice biomass being highest during the early part of the season, peaking in October and steadily declining afterwards. Maleic hydrazide reduced the rate of decline and resulted in an increase in biomass from December 1991 through March 1992. The effect of maleic hydrazide was independent of time of application, and applying maleic hydrazide at panicle differentiation or first heading increased total rice biomass equally well. To simplify presentation, an average of the results from the two maleic hydrazide treatments is presented. In late-planted rice, biomass was low initially and increased rapidly, peaking in November and declining at a slower rate than the early planted. Maximum biomass production in the late-planted treatment was much lower than in the early-planted treatments, and the slower rate of decline in the late-planted treatment resulted in higher biomass near the end of the season in March and April.



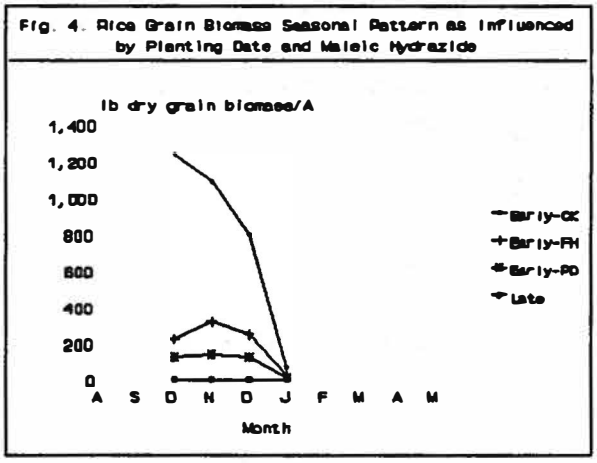
Vegetative Dry Weight. The pattern of vegetative biomass during the crawfish season was similar to total biomass patterns (Figure 2). The major difference was maleic hydrazide caused a season-long improvement in early-planted rice. Beginning in September and continuing to April, vegetative biomass was higher in early-planted rice treated with maleic hydrazide compared with early-planted rice, that was not treated with maleic hydrazide. Late-planted rice had higher vegetative biomass in April and May than early-planted rice. These results indicate maleic hydrazide can increase vegetative biomass without affecting total biomass.



Panicle Dry Weight. Maleic hydrazide and late planting affected the pattern of reproductive biomass during the crawfish season (Figure 3). Reproductive biomass increased in early-planted rice, peaking in October and declining to negligible levels by January. Maleic hydrazide reduced reproductive biomass, and the effect of maleic hydrazide was dependent on time of application. The earlier maleic hydrazide application at panicle development reduced panicle dry weight more than the application made 2 weeks later at first heading. Reproductive biomass was negligible in late-planted rice due to lateness of heading. Maleic hydrazide suppressed reproductive development that contributed to the increase in vegetative biomass noted above.



Grain Dry Weight. The affect of maleic hydrazide and late planting on reproductive biomass was due primarily to reduced grain production. In late-planted rice, grain production was highest in October and declined to negligible levels in January (Figure 4). Maleic hydrazide decreased grain production, and the application of maleic hydrazide at panicle development was more effective than the application at first heading. Grain was absent in late-planted rice.



Overall, the early-planted rice treated with maleic hydrazide gave the best seasonal pattern compared with early- and late-planted rice without maleic hydrazide. The early-planted rice treated with maleic hydrazide had high biomass early in the season, had the highest biomass during mid-crawfish season (December, January, and February), and had an intermediate level of biomass during April and May. The maleic hydrazide treatments had more vegetative biomass, which is considered a better quality biomass. Vegetative biomass degrades more slowly than reproductive biomass (grain) and provides a steady supply of forage to a flooded crawfish environment. Grain, on the other hand, is a concentrated source of biomass and provides a more massive influx of biomass upon breakdown. This high influx can reduce oxygen levels while degrading in the water and negatively affect crawfish growth. The application of maleic hydrazide minimizes this problem by suppressing grain production while at the same time increasing vegetative biomass production.

FORAGE CROPS BIOTECHNOLOGY RESEARCH

S.S. Croughan

BERMUDAGRASS

Cooperators: P.D. Colyer, G. Cuomo, M.M. Eichhorn, Jr., J. Hafley, and S.S. Quisenberry

Over 1500 bermudagrass somaclones had been produced in earlier research. In 1993, screening for increased resistance to fall armyworm and leaf spot disease was completed. The best 120 somaclones (Table 1) were selected and increased for further testing. The 39 somaclones selected for leaf spot performance were retested for level of resistance and the top 13 retained for advanced testing. These 13 lines will be screened for resistance to several isolates of the pathogen *Bipolaris cynodontis* to confirm levels of resistance. While most somaclones were selected for improvements in one trait, two lines (61 and 783) appear potentially improved in all three parameters.

DALLISGRASS

Cooperators: J. Hafley and R. Hintz

A project was initiated in 1993 for developing improved germplasm of dallisgrass through biotechnology. Dallisgrass (*Paspalum dilatatum*) is a deep-rooted perennial grass grown in the southeastern United States for pastures. Its advantages include the ability to withstand heavy grazing and the production of good quality forage that often retains its quality into the late summer. Dallisgrass has been shown to be highly competitive with 'Alicia' bermudagrass in maintaining cows and calves under high stocking rates. The Louisiana Cattlemen's Association has requested increased research in this area. They feel that dallisgrass has a large economic potential for their industry.

There are several areas in which improvements are needed in the current varieties of dallisgrass. Dallisgrass has poor seed quality and slow germination, making it extremely difficult to establish. Dallisgrass is also susceptible to ergot (*Claviceps paspali*), anthracnose (*Colletotrichum graminicola*), and leaf blight (*Helminthosporium micropus*). Increased resistance to any of these diseases would increase yield and quality of the forage.

Dallisgrass reproduces by apomixis, reducing natural variability that could be useful in a breeding program. Current cultivars were produced through selection of naturally occurring ecotypes. Biotechnology may provide an additional source of useful germplasm for dallisgrass improvement. Somaclonal variants can be produced through tissue culture and evaluated for potential improvements in agronomic characteristics. This technique has proven successful in a number of other crops. For example, at the Rice Research Station, several hybrid bermudagrass and alfalfa somaclones have been identified with increased disease and insect resistance.

An initial experiment evaluated the production of somaclonal variants from germinated dallisgrass seeds. The advantage of using seeds as an explant source is that they can be germinated year-round, allowing initiation of cultures for somaclone production at any time.

Method: Seeds were surfaced sterilized in 25% bleach solution for 20 minutes, rinsed with sterile water, then placed in sterile petri dishes containing 0.1 mM $CaSO_4$. The dishes were placed in an incubator with a 12-hour day length, and a temperature regime of 35°C day and 25°C night until germination. The interface (5-10 mm) between the root and shoot of week-old seedlings was removed and plated on Murashige and Skoog based medium with 3% sucrose and 1 mg/l 2,4-dichlorophenoxyacetic acid (2,4-D). Callus that formed was transferred to medium with lower 2,4-D to trigger regeneration. Regenerated plants were potted and transferred to the greenhouse.

Results and Discussion: Seed germination rates were low (<10%) requiring large numbers of seeds to be sterilized. Contamination rates of cultures were also extremely high (approximately 50%). While seed-derived cultures allow flexibility in time of initiation, the low germination and high contamination rates make this an inefficient system for somaclone production. Eighty-nine somaclones were produced however, and transferred to the forage agronomist for initial evaluations. Seventy-one of these were transferred to the Iberia Research Station and spaced planted in the spring of 1993. After grazing, 58 somaclones survived and were rated September 1 for palatability (amount of grazing). Plant regrowth vigor was rated October 4, the plants clipped, and the amount of dry matter measured. Several somaclones had good vigor ratings and regrowth potential, with one, G12, holding some promise (Table 2).

Immature inflorescences also were evaluated as an explant source for somaclone production. A disadvantage of inflorescences is that they are difficult to obtain in large numbers from greenhouse grown material and are only available for a limited time during the growing season.

Method: Immature inflorescences were collected from field- and greenhouse-grown dallisgrass before the inflorescence emerged. The stems containing immature inflorescences were sterilized in a bleach solution and rinsed with sterile water. The inflorescences were aseptically removed and plated on Murashige and Skoog based callus induction media, with either 3 or 6% sucrose and either 2, 5, or 10 mg/l 2,4-D.

The cultures were maintained in a dark incubator at 27°C. Callus that formed was transferred to similar medium with lower levels of 2,4-D. Once early stages of embryo development were observed, the cultures were transferred to an illuminated incubator on medium with lower sucrose and no hormones to further the development of regenerate plants. Potted regenerated plants were transferred to the greenhouse when they were approximately 5 cm tall.

Results and Discussion: Inflorescence from common dallisgrass were collected from the field at the Iberia (Jeanerette), Rice (Crowley) and Central (Baton Rouge) research stations in Louisiana. Inflorescences were also collected from greenhouse-grown dallisgrass. The plants in the greenhouse included common dallisgrass, two hexaploid ecotypes, and a somaclone. Contamination rates were low (<2%) and callus production rates high (80%) when using immature inflorescences as the explant source. Callus induction was best on medium with 3% sucrose and 2 or 5 mg/l 2,4-D. Cultures are currently at the stage of embryo development and plants are starting to be produced. While availability of inflorescence may limit when cultures can be initiated, the amount of regenerable callus obtained is high. The number of somaclones that will be obtained from this method appear to be much higher than those obtained from seedling interface-derived callus. Regenerated plants will be split and duplicate sets planted in the field at the Central and Iberia research stations in the spring of 1994.

Table 1. Bermudagrass somaclones identified as having potential improvements in fall armyworm (FAW) resistance, leaf spot disease resistance, or improved nutritional characteristics. Rice Research Station, Crowley, LA. 1993.

Somaclones derived from cultivar Brazos

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
40	quality	41	quality	46	disease
66	quality	68	quality	87	quality
105	disease	109	disease	128	FAW
697	disease	698	disease	722	quality
725	disease	750	disease	757	quality
762	quality	828	quality	836	quality
838	quality	872	quality	920	disease
923	disease	957	disease	997	quality
998	quality	999	quality	1017	disease
1018	FAW	1021	disease	1112	quality
1117	FAW	1133	FAW	1137	FAW
1152	quality	1172	FAW	1189	disease
1210	disease	1214	disease	1238	FAW
1242	FAW	1244	FAW	1256	FAW
1265	disease	1267	disease	1268	FAW
1269	quality, disease	1290	quality	1291	disease
1320	FAW	1372	FAW	1407	FAW
1561	quality	1563	FAW	1575	FAW
1577	FAW	1580	FAW	1591	disease

Somaclones derived from breeding line OSU LCB W-26

ID #	trait(s)
61	quality, FAW, disease

Somaclones derived from breeding line OSU 74x12-1

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
131	FAW	137	quality	145	quality
166	quality	171	quality	191	quality, disease
207	FAW	208	disease	214	quality
226	FAW	267	quality	287	quality
333	quality	336	quality	364	disease
369	disease	372	quality, disease	392	quality
407	FAW	431	quality	433	quality
494	quality				

Table 1. (continued)

Somaclones derived from cultivar Grazer

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
17	disease	484	quality	612	disease
687	quality	979	disease		

Somaclones derived from cultivar Coastal

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
591	quality, disease	592	disease	690	quality
1204	disease	1382	FAW	1414	FAW
1422	FAW	1434	FAW	1439	FAW
1442	disease	1444	disease	1453	disease
1464	FAW	1477	disease	1497	quality
1498	FAW	1513	FAW	1538	FAW
1567	FAW				

Somaclones derived from cultivar Hardie

ID #	trait(s)	ID #	trait(s)
778	quality	783	quality, FAW, disease
1571	FAW		

Somaclones derived from cultivar Oklan

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
947	quality	948	quality	952	FAW

Somaclones derived from cultivar Alicia

ID #	trait(s)	ID #	trait(s)	ID #	trait(s)
912	FAW	915	FAW	1368	FAW
1370	FAW	1410	FAW	1411	quality, FAW
1481	disease	1486	FAW	1490	FAW
1568	quality, disease				

Table 2. Palatability and regrowth ratings of dallisgrass somaclones. Iberia Research Station, Jeanerette, LA. 1993.

Somaclone ID#	PAL[1] 9/1	VIG[2] 10/4	DRY[3] grams	Somaclone ID#	PAL 9/1	VIG 10/4	DRY grams
1	7	2	8.6	44	4	4	10.0
2	5	2	29.6	45	5	2	15.8
3	6	3	23.2	46	6	3	18.0
4	6	3	15.8	47	0	1	14.1
5	7	3	13.2	48	5	4	14.7
6	8	2	6.4	51	.[4]	.	.
7	6	3	16.9	52	.	.	.
8	2	3	25.4	53	5	4	14.6
9	6	3	18.2	54	7	3	13.0
10	5	3	26.2	55	8	2	4.9
11	5	3	12.8	56	5	2	5.2
12	6	4	21.5	57	9	1	2.4
13	6	3	17.6	58	8	3	10.8
14	5	2	13.0	59	5	1	13.3
15	6	3	16.8	60	6	3	18.4
16	6	2	18.5	61	7	2	11.7
17	3	2	17.8	65	5	2	12.4
18	10	2	5.0	66	6	2	13.4
19	3	4	31.2	67	5	4	22.6
20	6	2	9.0	68	2	4	15.7
21	8	2	14.8	69	6	3	16.5
24	5	3	11.0	70	8	.	.
25	6	3	15.1	72	2	3	15.5
26	7	1	7.4	73	6	3	12.6
27	3	3	6.8	74	6	2	12.0
28	4	2	4.8	75	6	4	12.8
31	6	2	9.4	78	3	3	19.4
39	7	3	6.1	79	5	2	10.6
43	5	3	17.5	80	5	3	9.7

[1] Palatability rating (9/1/93): 10 = completely grazed, 0 = no grazing
[2] Regrowth vigor rating (10/4/93): 5 = excellent regrowth, 0 = no regrowth
[3] Dry weight in grams
[4] Missing data

SOYBEAN BIOTECHNOLOGY RESEARCH [1]

S.S. Croughan

Cooperators: D.J. Boethel, B.G. Harville, J.S. Russin, and S. Yao

The objective of this project is to produce improved germplasm that can be incorporated into cultivar development programs. The main approach utilized is somaclonal variation, in which progeny from regenerated plants are evaluated for improvements. Plants are regenerated from callus derived from immature cotyledons. The seed collected from these plants is used in different screening tests. In 1993, approximately 300 new somaclones have been produced to date from about 50 different varieties and breeding lines (Table 1). Seed from 93 previously developed somaclones was given to the Louisiana Agricultural Experiment Station soybean breeder (Table 2). Somaclones were planted at the Central Research Station at Baton Rouge, LA. Plants appeared normal and identical in basic agronomic characteristics to the cultivar from which they were derived and no deleterious mutations were evident. Seed from 97 somaclones was given to the Louisiana Agricultural Experiment Station soybean entomologist for screening for soybean looper resistance (Table 2).

Methods for screening soybean somaclones for aerial blight resistance are being developed. In cooperation with the Louisiana Agricultural Experiment Station soybean pathologist a greenhouse method was evaluated for screening germplasm. Six plants, one per 1-gallon pot, were grown in the greenhouse. Two isolates of aerial blight were grown on PDA plates for 36 hours and 3 mm plugs obtained from the edge of fungal growth were used to inoculate leaves. Plants were maintained under a mist system in the greenhouse and lesions measured after 24 and 48 hours. A second method was also evaluated in which leaves were removed from greenhouse-grown plants, placed on moistened filter paper in petri dishes, and inoculated with fungal plugs. Dishes were incubated at 27°C with 14 hours of light. Lesions were measured after 24 and 48 hours. The method in which leaves are placed in petri dishes appears to be the more reliable technique. The environment can be controlled more precisely and more replicates can be utilized.

Research on the development of an anther culture system for soybeans is continuing. Table 3 lists the various germplasm sources used for anther culture research in 1993. Almost 90,000 anthers were cultured in 1993. Immature flower buds were collected from both greenhouse- and field-grown plants, surface sterilized, and the anthers plated on nutrient medium. Callus was removed when it was

[1] This research is supported in part by funds provided by Louisiana producers through the Louisiana Soybean and Grain Research and Promotion Board.

approximately 3 mm in size and classified as to the type of callus. Callus was transferred to various nutrient media to induce regeneration. Table 4 shows the rate of callus production over 70 days after anthers were plated, averaged over nine different germplasm sources. Most calli were produced and the greatest number of embryos were obtained after 20-30 days on the standard induction medium. Adding an additional auxin source did not change the callus production rate or number of embryos formed. Changing the type of auxin, or increasing the cytokinin and decreasing the auxin, reduced the rate of callus production 10% and significantly decreased the number of embryos that formed. If the type of auxin was changed and the cytokinin was removed completely, very little callus was produced and no embryos were formed. Adding a high concentration of glutamine was detrimental, reducing callus production and embryo formation, but by adding casein hydrolysate with a low concentration of glutamine, callus production increased and a relatively high number of embryos were obtained. We are continuing to obtain embryos and small plantlets with roots. Research is now focussed on increasing the efficiency of embryo production and the survival rate of regenerated plantlets.

Table 1. Soybean germplasm used for somaclone production. Rice Research Station, Crowley, LA. 1993.

Germplasm	#cotyledons plated	#plants to date
Maturity Group O		
Glenwood	100	0
Dassel	100	3
Maturity Group II		
Conrad	120	0
Chapman	150	4
Kenwood	60	0
Maturity Group III		
Edison	70	6
Maturity Group IV		
Chesapeake	80	0
DeKalb CX469C	20	0
Deltapine DPX 3478	80	0
Deltapine DP 3499	400	6
HyPerformer HSC 401	50	1
LA88-14	140	0
LA88-32	440	4
LA88-22254	420	0
Terral TVX4296	80	1
Terral TVX4452	40	0
Terral TVX4565	160	6
Maturity Group V		
Buckshot EK58	280	0
DeltaKing 551	120	1
DeltaKing 5850	400	0
FFR 563	400	7
Forrest	1,320	10
Hartz VAR H5042	480	23
Hartz VAR H5545	400	0
Hartz VAR H5810	400	1
Holladay	400	10
HyPerformer HB3X541	160	1
HyPerformer HB3X594	400	2
HyPerformer HB3X601	360	30
Kunkle KSC 517	400	1
LA88-22718	400	3
LA88-25723	220	3
Pioneer 9584	400	6
Terra Vig 5555	200	0
Terra Vig 5676	400	3
Terral TVX 5150	240	0
Walters	840	1

Germplasm	#cotyledons plated	#plants to date
Maturity Group VI		
AT X3660	400	18
Carl	400	40
G83-198	400	4
Hartz VAR H6252	400	1
Hornbeck HBK67	400	2
HyPerformer HB3X602	380	1
Kunkle KSC 611	400	0
LA88-4030	160	3
LA88-24530	380	0
LA88-24535	400	5
LA88-407101	1,060	6
LA88-408814	4,790	38
Pioneer 9692	400	0
Riverside 678	360	0
Terra Vig 6792	280	0
Terral TVX 6565	400	3
Tracy M	1,660	8
V86-815	400	1
Maturity group VII		
AT 740	400	0
Buckshot 723	4,110	4
HyPerformer HB3X782	400	0
HyPerformer HB3X798	400	3
HyPerformer HSC 721	1,940	3
Kunkle KSC 707	400	0
LA78-5286	2,450	14
LA88-36	400	1
LA88-29003	400	0
LSU X100	400	0
Northrup King Coker 6847	1,460	3
Northrup King S75-55	400	1

Table 2. Soybean somaclones distributed to the Louisiana Agricultural Experiment Station entomology project for soybean looper resistance screening and/or to the soybean breeding project for initial field evaluation.

ID #	Somaclone derived from	Ento. project	Breeding project
		# seed	
212	Centennial	25	50
214	Asgrow 7986	0	47
215	RingAround 452	25	93
218	Braxton	25	0
222	Centennial	25	0
227	D88-5522	25	100
228	D88-5522	25	100
230	N86-7682	25	50
231	N86-7682	25	90
232	D88-5522	25	50
233	D88-5522	25	100
234	Asgrow 4906	25	100
235	N86-7682	25	100
236	D88-5522	25	100
240	N86-7682	25	100
242	D88-5522	25	100
243	N86-7682	25	100
244	D88-5522	25	100
245	Asgrow 4906	25	91
246	N86-7682	25	89
247	D88-5522	25	100
248	Asgrow 4906	25	100
249	Asgrow 4906	25	100
250	Asgrow 4906	25	100
251	Asgrow 4906	25	100
252	N86-7682	25	100
253	N86-7682	25	100
254	Asgrow 4906	25	100
255	D88-5522	25	100
256	Asgrow 4906	25	100
257	Asgrow 4906	25	100
258	Asgrow 4906	25	100
261	Asgrow 4906	25	100
262	Asgrow 4906	25	100
266	Asgrow 4906	25	100
267	D88-5522	25	100
268	Asgrow 4906	25	100
269	Asgrow 4906	25	94
270	Asgrow 4906	25	100
271	Asgrow 4906	25	90
272	D88-5522	25	90
273	KY85-11020	25	85
275	D88-5522	25	91
276	Hartz 6686	0	50
277	D88-5522	25	96
278	Asgrow 4906	25	94
279	Asgrow 4906	25	97
280	S88-1855	25	94
281	Asgrow 4906	25	98
285	Asgrow 4906	25	95
286	Centennial	0	50
287	Centennial	25	50
289	Centennial	0	50
291	Hartz 6686	25	50
292	Centennial	0	50
293	Centennial	25	50
297	Centennial	25	0
298	Centennial	25	100
300	Centennial	25	0
302	Centennial	0	50
303	Centennial	25	100
304	Centennial	25	50
305	Centennial	25	100
306	Thomas	0	50
307	Centennial	25	100
308	Centennial	25	0
309	Thomas	25	50
321	Asgrow 4906	25	50
322	Asgrow 4906	25	0
330	Asgrow 4906	25	0
333	Asgrow 4906	25	0
337	Asgrow 4906	0	50
341	Asgrow 4906	25	0
342	Asgrow 4906	25	0
343	Asgrow 4906	25	0
365	Asgrow 4906	25	50
367	Asgrow 4906	25	100
400	Asgrow 4906	0	50
430	Asgrow 4906	25	50
594	Asgrow 4906	25	0
606	Asgrow 4906	25	100
609	Asgrow 4906	25	50
614	Asgrow 4906	25	50
626	Asgrow 4906	25	100
632	Asgrow 4906	25	100
640	Asgrow 4906	25	0
644	Asgrow 4906	25	50
646	Asgrow 4906	25	0
661	Asgrow 4906	0	100
667	Asgrow 4906	25	0
669	Asgrow 4906	0	50
686	Asgrow 4906	25	0
712	Asgrow 4906	25	50
713	Asgrow 4906	25	50
717	Asgrow 4906	0	50
719	Asgrow 4906	25	0
724	Asgrow 4906	25	0
732	Asgrow 4906	0	50
733	Asgrow 4906	0	50
734	Asgrow 4906	25	50
737	Asgrow 4906	25	50
740	Asgrow 4906	25	50
741	Asgrow 4906	25	0
742	Asgrow 4906	25	100
744	Asgrow 4906	0	50
753	Asgrow 4906	25	100
757	Asgrow 4906	25	100
760	Asgrow 4906	0	50
761	Asgrow 4906	0	100
763	Asgrow 4906	25	0
764	Asgrow 4906	0	100
768	Asgrow 4906	25	0
769	Asgrow 4906	25	100
776	LA88-20637	25	0
777	LA88-20637	25	0

Table 3. Germplasm used for anther culture research from either field- or greenhouse grown plants. Rice Research Station, Crowley, LA. 1993.

Germplasm	Field- (F) or greenhouse- (G) grown plants	# anthers plated
LA88-14	F	4,720
LA88-32	F	780
LA88-32	G	2,655
LA88-55	F	860
LA88-22254	F	1,300
LA88-22718	F	600
LA88-24530	F	600
LA88-24535	F	600
LA88-25723	F	600
LA88-407101	G	5,550
LA88-407101	F	2,060
LA88-408802	F	2,520
LA88-408814	G	25,060
LA88-408814	F	3,680
LA88-408827	F	2,860
D87-4647	F	600
LA88-32 X ASGROW 4906	G	280
LA88-32 X HSC 401	G	3,200
HSC 401 X ASGROW 4906	G	2,200
HSC 721 X HSC 401	G	200
COKER S48-84 X ASGROW 4906	G	820
EDISON X LA88-407101	G	60
CHAPMAN X LA88-408814	G	220
CONRAD X LA88-408814	G	620
GLENWOOD X LA88-408814	G	80
KENWOOD X LA88-408814	G	180
BUCKSHOT 732	G	5,240
BURLISON	G	260
CENTENNIAL	G	140
CHAPMAN	G	860
CHESAPEAKE	F	2,980
COKER S48-84	F	1,380
CONRAD	G	480
DPX 3478	F	1,400
EDISON	G	280
FORREST	G	240
HARTZ H4464	F	580
HSC 401	G	1,220
HSC 401	F	580
KENWOOD	G	320
PIONEER 9442	F	1,580
PIONEER 9501	F	500
PIONEER 9641	G	3,620
RING AROUND 452	F	500
RVS 499	F	600
TERRAL TVX 4565	F	1,240
TRACY M	G	920
WALTERS	F	300
WILLIAMS 82	G	770

Table 4. Nutrient media test for callus induction and number of embryos obtained, combined for nine greenhouse-grown soybean germplasm sources, replicated three times. Rice Research Station, Crowley, LA. 1993.

Overall percentage of anthers forming callus	Percentage (± std.error) of anthers forming callus							Total number of embryos
	Number of days after anthers plated							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	
Standard induction medium:								
41.0±1.7	2.7±0.7	46.7±3.3	27.7±2.3	12.3±0.3	6.3±1.9	3.0±0.6	1.3±0.3	49
Additional auxin added to standard medium:								
41.0±5.2	2.7±0.3	51.0±2.6	27.0±1.2	11.0±0.6	4.3±0.9	2.7±0.3	1.1±0.5	46
Type of auxin changed in standard medium:								
30.0±0.6	1.7±0.3	36.3±3.8	32.3±0.9	16.3±0.7	7.7±1.9	4.3±0.9	1.3±0.3	0
Cytokinin concentration increased and auxin concentration decreased in standard medium:								
29.3±2.0	1.0±0.6	32.0±4.0	35.7±1.2	16.0±1.5	9.3±1.8	4.3±0.7	2.0±1.0	7
Cytokinin removed and type of auxin changed in standard medium:								
0.25±0.05	-	-	-	-	-	-	-	0
High concentration of glutamine added to standard medium:								
0.73±0.32	-	-	-	-	-	-	-	0
Casein hydrolysate and low concentration of glutamine added to standard medium:								
26.7±4.8	4.0±1.0	56.0±3.5	25.0±2.5	8.3±0.9	4.7±0.7	1.7±1.2	0.5±0.2	38

ECONOMICS OF ENTERPRISE SELECTION AND WHOLE FARM DECISION MAKING IN THE LOUISIANA RICE GROWING AREAS[1]

Arthur M. Heagler and G. Grant Giesler[2]

Enterprise budget projections for 1994 were developed for rice, soybeans, milo, corn, wheat, and wheat-soybean double cropping systems. A summary of the enterprise budgeting analysis for rice in Louisiana is presented in Table 1. Budgeting results for the other enterprises in Southwest Louisiana are shown in Table 2. Owner-operator and tenant-operator situations were budgeted for each enterprise, and other than for rice, output from all enterprises was valued solely at a projected market price. Rice income was calculated by adding the product of the projected market price of $8.00 per hundredweight and the actual yield to the deficiency payment, then subtracting the checkoff of $0.06 per hundredweight. The deficiency payment was calculated by multiplying the area average proven yield times the difference between the target price and the projected market price ($2.71 per hundredweight).

Under these assumptions, sufficient revenue was available to cover direct expenditures for all rice enterprises. All other enterprises yielded positive returns over direct expenses with the exception of row planted tenant operator soybeans, tenant milo, and tenant wheat. 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 included all soybean enterprises except owner operator drill plant and no till, all wheat situations, the tenant milo enterprise, and tenant corn and tenant wheat-soybean situations. It should be noted that total specified expenses do not include an estimation of per acre overhead costs. When these costs are included, only Southwest owner-operator drill planted rice, "no till" rice, and stale seedbed rice, Central owner-operator rice and Northeast owner-operator rice (both drill and water planted) show positive returns.

Detailed enterprise budgets and supporting data were published in A.E.A. Information Series Number 122, January, 1994.

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 water planted rice with a deep well water source were estimated to be approximately $1.84, $2.91, and $1.54 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for deep well systems were estimated to be approximately $2.76, $3.66, and $2.45 for diesel, electric, and natural gas power units, respectively. Per acre inch direct irrigation costs for water planted rice with a surface irrigation

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[1]Research supported in part by funds provided by Louisiana rice producers through the Louisiana Rice Research Board.

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water source were estimated to be approximately $0.81, $1.11, and $0.67 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for surface systems were estimated to be approximately $1.32, $1.51, and $1.16 for diesel, electric, and natural gas power units, respectively.

For Northeast Louisiana, cost estimates were developed for diesel and electric power systems using both deep well and surface water sources. Per acre inch direct irrigation costs for drill planted rice with a deep well water source were estimated to be approximately $0.60 and $0.91 for diesel and electric systems, respectively. Total per acre inch irrigation costs for deep well systems were estimated to be approximately $0.99 and $1.21 for diesel and electric power units, respectively. Per acre inch direct irrigation costs for drill planted rice with a surface water source were estimated to be approximately $ 0.51 and $0.55 for diesel and electric systems, respectively. Total per acre inch irrigation costs for surface systems were estimated to be approximately $0.80 and $0.75 for diesel and electric power units, respectively. For Central Louisiana, cost estimates were developed for water planted rice with a deep well water source and a diesel power unit. Per acre inch direct and total irrigation costs for this system were $1.00 and $1.51, respectively.

Detailed results of the irrigation cost analysis are reported in A.E.A. Information Series Number 122, January 1994.

1992 yield and cultural practice data from an ongoing study evaluating different methods of water weevil control, were analyzed during early 1993. The methods of water weevil control examined were 1) check plot, 2) one treatment of carbofuran, 3) water removal seven days after threshold infestation level, reflood in 14 days, 4) water removal seven days after threshold infestation level, reflood in 15 days, 5) water removal seven days after threshold infestation level, reflood in 16 days, and 6) water removal seven days after threshold infestation level, reflood in 17 days. The highest yields were associated with treatment 2, followed by treatments 5, 6, 4, 1, and 3, respectively. Using procedures analogous to those utilized in A.E.A. Information Series 122, enterprise budgets incorporating cultural practices specific to each treatment were constructed for each regime. Results show that although treatment 2 possessed the highest yield, it was not sufficient to offset its higher costs. Treatment 5 had higher net returns than treatment 2 because of its comparable yield, but lower costs. Analysis of results from this year and three previous years suggests that, depending on current year weather patterns, a system of control practices may be preferred to a specific practice. Draining and reflooding may be a viable management practice in dry years, but it does appear to be extremely time specific and inherently more risky than treatment with carbofuran. A summary of the economic analysis is provided in Table 3.

A related study analyzed 1992 physical data regarding the impact of planting date and treatment with carbofuran on yields and net returns. Results show that carbofuran increases yields within each date, but did negatively impact net returns on the earliest date. The impact of planting date on net returns continues to overshadow the consistently positive effects of treatment with carbofuran on yield and its typically positive effect on returns. Table 4 presents a summary of the economic analysis.

Table 1. A Summary of Projected Costs and Returns per Acre for Rice Production in Louisiana, 1994.

Crop Description	Yield Per Acre	Unit	Total Income	Direct Expenses	Returns Over Direct Expenses	Fixed Expenses	Total Expenses	Returns Over Total Expenses
			Dollars per Acre					
Rice Enterprises: a/								
Southwest Louisiana								
Water Plant, Owner b/	48.00	cwt.	496.73	360.47	136.26	79.22	439.69	57.04
Water Plant, Tenant c/	28.80	cwt.	298.04	233.56	64.48	47.14	280.70	17.34
Water Plant, "No Till", Owner b/	48.00	cwt.	496.73	358.90	137.83	80.92	439.82	56.91
Water Plant, Stale Seedbed, Owner b/	48.00	cwt.	496.73	360.46	136.27	82.51	442.97	53.76
Drill Plant, Owner b/	51.00	cwt.	520.55	342.82	177.73	82.45	425.27	95.28
Drill Plant, Tenant c/	30.60	cwt.	312.33	219.45	92.88	50.37	269.82	42.51
Drill Plant, "No Till", Owner b/	51.00	cwt.	520.55	348.42	172.13	85.58	434.00	86.55
Drill Plant, Stale Seedbed, Owner b/	51.00	cwt.	520.55	353.25	167.30	86.74	439.99	80.56
Second Cutting, Owner b/	16.00	cwt.	127.04	71.74	55.30	17.59	89.33	37.71
Second Cutting, Tenant c/	9.60	cwt.	76.22	43.14	33.08	17.59	60.73	15.49
Northeast Louisiana								
Water Plant, Owner b/	54.50	cwt.	536.50	285.61	250.89	63.25	348.86	187.64
Water Plant, Tenant c/	32.70	cwt.	321.90	234.43	87.47	47.40	281.83	40.07
Drill Plant, Owner b/	54.50	cwt.	536.50	281.62	254.88	67.58	349.20	187.30
Drill Plant, Tenant c/	32.70	cwt.	321.90	228.31	93.59	51.73	280.04	41.86
Central Louisiana								
Water Plant, Owner b/	50.00	cwt.	501.06	309.16	191.90	60.69	369.85	131.21

* Returns over total expenses do not include estimated overhead costs.

a/ Income for rice was calculated by adding the product of the assumed market price of $8.00 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying the proven yield times the difference between the market price and target price, $2.71 per hundredweight.

b/ Land costs are not included for owner-operators.

c/ Rental arrangements for rice in Southwest Louisiana were 1/5 crop share for land and 1/5 crop share for water with both landlord and waterlord paying 1/5 of fertilizer, chemicals, and drying and storage costs and the waterlord paying all of the irrigation fuel. 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 paying 1/5 of the drying and storage costs.

Table 2. A Summary of Projected Costs and Returns per Acre for Soybean, Corn, Milo, Wheat, and Wheat-Soybean Double Crop Production, Southwest Louisiana, 1994.a/

Crop Description	Yield Per Acre	Unit	Total Income	Direct Expenses	Returns Over Direct Expenses	Fixed Expenses	Total Expenses	Returns Over Total Expenses
			Dollars per Acre					
Soybean Enterprises:								
6-Row, Owner b/	24.50	bu.	147.00	121.03	25.97	33.28	154.31	-7.31
6-Row, Tenant c/	19.60	bu.	117.60	119.54	-1.94	33.28	152.82	-35.22
Drill Plant, Owner b/	27.00	bu.	162.00	127.94	34.06	32.06	160.00	2.00
Drill Plant, Tenant c/	21.60	bu.	129.60	126.30	3.30	32.06	158.36	-28.76
Drill Plant, No Till, Owner b/	27.00	bu.	162.00	114.92	47.08	26.01	140.93	21.07
Corn Enterprises:								
6-Row, Owner b/	100.00	bu.	250.00	178.15	71.85	39.71	217.86	32.14
6-Row, Tenant c/	80.00	bu.	200.00	174.32	25.68	39.71	214.03	-14.03
Milo Enterprises:								
Drill Plant, Owner b/	37.00	cwt.	148.00	118.75	29.25	29.17	147.92	.08
Drill Plant, Tenant c/	29.60	cwt.	118.40	118.75	-.35	29.17	147.92	-29.52
Wheat Enterprises:								
Drill Plant, Owner b/	34.00	bu.	110.50	90.96	19.54	27.08	118.04	-7.54
Drill Plant, Tenant c/	27.20	bu.	88.40	90.96	-2.56	27.08	118.04	-29.64
Wheat-Soybean Double Crop								
Wheat-Soybean, Owner b/	34+25	bu.	260.50	184.76	75.74	49.67	234.43	26.07
Wheat-Soybean, Tenant c/	27.2+20	bu.	208.40	184.76	23.64	49.67	234.43	-26.03

* Returns over total expenses do not include estimated overhead costs.

a/ Crop prices used were $6.00 per bushel for soybeans, $2.50 per bushel for corn, $4.00 per hundredweight for milo and $3.25 per bushel for wheat.

b/ Land costs are not included for owner operators.

c/ 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.

Table 3. Water Management Study Average yields and projected income, costs, and returns per hectare and benefit-cost and cost-income ratios, Rice Research Station, Crowley, LA, 1992 (1993 price projections).[a/]

TREATMENT	CARBOFURAN	CHECK	14 DAY	15 DAY	16 DAY	17 DAY
YIELD (kg/ha)	3636	3107	3042	3112	3534	3419
GROSS REVENUE ($/ha)	965	889	880	890	950	934
DIRECT COSTS ($/ha)	756	697	711	714	730	725
RETURNS OVER DIRECT COSTS ($/ha)	209	192	168	176	220	209
FIXED COSTS ($/HA)	186	186	190	190	190	190
TOTAL COSTS	942	883	902	904	920	915
NET RETURNS OVER TOTAL COSTS	23	6	-22	-14	30	19
BENEFIT/COST RATIO	1.024	1.007	.975	.984	1.033	1.021
COST/INCOME RATIO	.976	.993	1.025	1.016	.968	.980

[a/] Carbofuran = carbofuran applied (0.56 kg [A.I.] per ha) at rice water weevil threshold (5 larvae per core) 19 June 1992; Check = no treatment; 14 Day = water removal @ 7 days post threshold (19 June 1992), reflooded 6 July 1992; 15 Day = water removal @ 7 days post threshold (19 June 1992), reflooded 7 July 1992; 16 day = water removal @ 7 days post threshold (19 June 1992), reflooded 8 July 1992; 17 Day = water removal @ 7 days post threshold (12 June 1992), reflooded 9 July 1992.

Table 4. Planting Date Study Average yields and projected income, costs, and returns per hectare and benefit-cost and cost-income ratios, Rice Research Station, Crowley, LA, 1992 (1993 price projections).[a/]

	DATE 1:		DATE 2:		DATE 3:	
TREATMENT	TREATED	UNTREATED	TREATED	UNTREATED	TREATED	UNTREATED
YIELD (kg/ha)	4734	4720	4522	3375	3945	2822
GROSS REVENUE ($/ha)	1122	1120	1092	927	1009	848
DIRECT COSTS ($/ha)	826	788	859	738	834	714
RETURNS OVER DIRECT COSTS ($/ha)	296	332	232	190	175	134
FIXED COSTS ($/HA)	186	186	187	187	187	187
TOTAL COSTS	1012	974	1046	924	1021	900
NET RETURNS OVER TOTAL COSTS	110	146	46	3	-12	-53
BENEFIT/COST RATIO	1.108	1.150	1.044	1.003	.988	.942
COST/INCOME RATIO	.902	.870	.958	.997	1.012	1.062

[a/] Treated plots, carbofuran (0.56 kg [A.I.] per ha); Date 1 planted 16 April 1992, Date 1 treated 25 May 1992; Date 2 planted 7 May 1992, Date 2 treated 8 June and 30 June 1992; Date 3 planted 28 May 1992, Date 3 treated 25 June and 30 July 1992.

RICE INSECTS RESEARCH

EVALUATION OF GAUCHO, SEED TREATMENT FOR THE CONTROL OF THE RICE WATER WEEVIL IN WATER- AND DRILL-SEEDED RICE

W.C. Rice, G.B. Trahan, and P.A. Bollich

Water-Seeded Plot Treatment

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: Cypress, 100 lb/A

Planting Method and Date: Water seeded by hand, Apr 23, 1993; seeds were soaked for 24 hours beginning Apr 21 and ending on Apr 22. Seeds were kept moist for 24 hours prior to seeding.

Experimental Design: Four replications, four treatments, split plot design; flood as main effect

Plot Size: 4 x 25 ft

Water Management: Flooded, Apr 23; drained, Apr 26; flushed, Apr 29; permanent flood, May 7; drained, Aug 4

Fertilization: Triple 13 was applied at a rate of 45-45-45 with a Kincaid drill, Apr 21. A topdressing of NH_3SO_4 (21-0-0) was applied at a rate of 90-0-0, May 21, and at a rate of 60-0-0, June 10

Herbicide: N/A

Insecticide: Gaucho (formerly NTN 33893) 2 fl oz/cwt and 4 fl oz/cwt, Apr 15; Seed treatment done by Gustafason
Furadan 3G 0.6 lb ai/A, May 28

Sampling: Five cores/plot, May 20 and 26, June 4, 11, 17, and 25, and July 6

Harvested: Aug 18, whole plots harvested with Hege combine

Drill-Seeded Plot Treatment

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: Cypress, 100 lb/A

Planting Method and Date: Drill seeded with cone seeder, Apr 22, 1993, with 8-inch row spacings.

Experimental Design: Four replications, four treatments, split plot design; flood as main effect

Plot Size: 4 x 25 ft

Water Management: Flushed, Apr 23 and 29, May 7 and 14; permanent flood, May 21; drained, Aug 9

Fertilization: Triple 13 was applied at a rate of 45-45-45 with a Kincaid drill, Apr 21. A topdressing of NH_3SO_4 (21-0-0) was applied by hand at a rate of 90-0-0, May 21, and at a rate of 30-0-0, June 10

Herbicide: Propanil 3 lb ai/A, May 18

Insecticide: Gaucho (formerly NTN 33893) 2 fl oz/cwt and 4 fl oz/cwt, Apr 15; Seed treatment done by Gustafason
Furadan 3G 0.6 lb ai/A, May 28

Sprayer: CO_2-driven, hand-held, 23 psi, 15 GPA, 110015 nozzles

Sampling: Five cores/plot, June 4, 11, 17, and 25, and July 6

Harvested: Aug 18, whole plots harvested with Hege combine

Summary: Gaucho (formerly NTN 33893) was evaluated as a seed treatment for the control of the rice water weevil (RWW). This is the second year of evaluation of NTN 33893 in a drill-seeded condition and the first year in which it was evaluated under water-seeded conditions. Drill- and water-seeded field conditions were evaluated. No significant RWW larvae control was observed in water-seeded rice when compared with the check plots (Fig. 1). In water-seeded rice, no significant yield responses were seen with the Gaucho or carbofuran treatments. In drill-seeded rice, however, a statistically significant control of RWW larvae was observed over that of the check plots at various times in the study (Fig. 2). This correlates well with larval control observed in previous studies. Larval control was observed early during plant development. Control of larvae by Gaucho exceeded that of Fur 3G at one point. Significant differences in plant height were

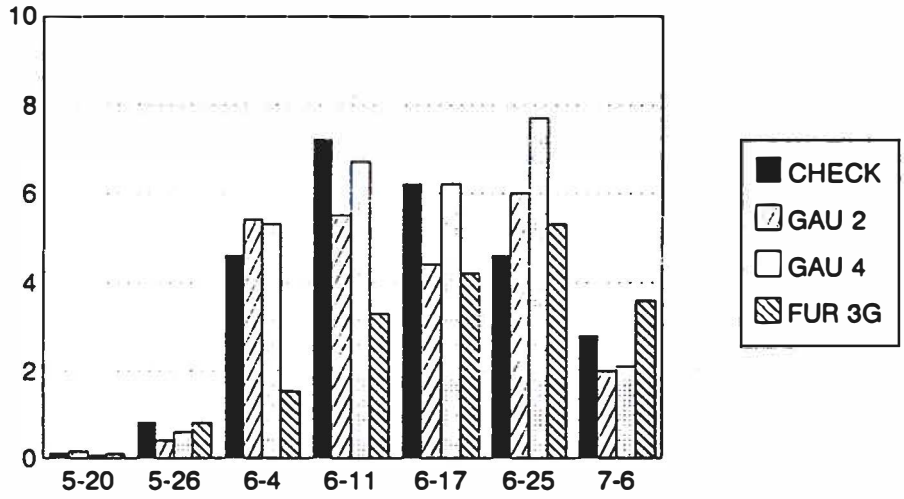
observed in drill-seeded rice but not in water-seeded rice. Significant differences in yield were observed in drill-seeded rice and are reflected in the following order: 1) Gaucho at 4 fl oz/cwt, 2) Gaucho at 2 fl oz/cwt, 3) Fur 3G, and 4) check. Two factors possibly affected the yield response observed with respect to Gaucho. First, in the drill-seeded condition, permanent flood occurs 2 weeks after the application of the permanent flood in water-seeded rice. Thus, plants are more fully developed prior to exposure to RWW larvae. Second, early control of RWW larvae was observed in drill-seeded versus water-seeded rice, thus, effectively delaying insect damage an additional 2 weeks. When higher levels of RWW larvae infestation occur, the plant is more fully mature and can possibly tolerate greater insect pressure.

Table 1. Evaluation of Gaucho Seed Treatments as a Control of the rice water weevil. Rice Research Station, Crowley, LA. 1993.

Trt #	Variety	Height -(cm)-	Yield (lb/A)
1	Drill	89.2 bc	7437.02 d
1	Check		
2	Drill	91.8 a	8320.75 ab
2	Gaucho		
3	Drill	90.9 ab	8578.47 a
3	Gaucho		
4	Drill	88.9 c	7972.83 bc
4	Fur3g		
5	Water seeded	83.4 d	7415.80 d
5	Check		
6	Water seeded	83.0 d	7418.90 d
6	Gaucho		
7	Water seeded	83.4 d	7789.25 cd
7	Gaucho		
8	Water seeded	84.3 d	7617.85 cd
8	Fur3g		
LSD (.05) =		1.9	468.69
Standard Dev. =		1.30178	318.666
CV =		1.50	4.08

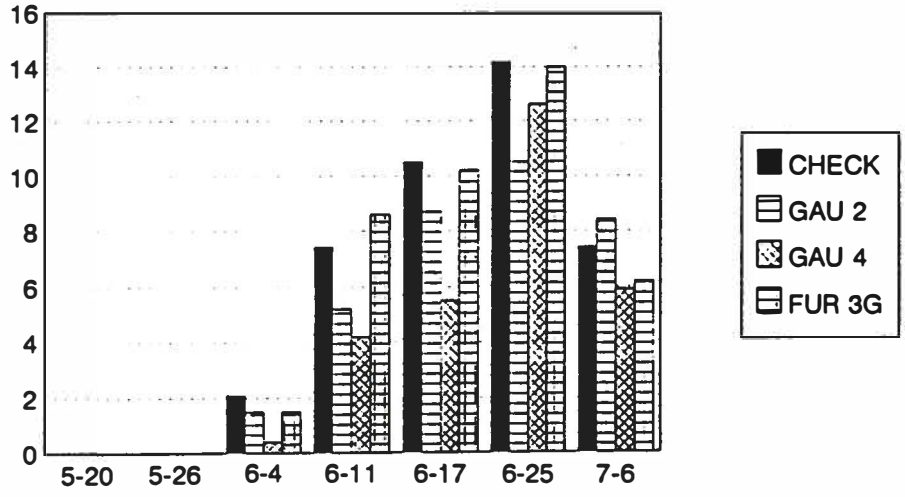
Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).

GAUCHO
LARVAE/PLANT



WATER SEEDED

GAUCHO
LARVAE/PLANT



DRILL SEEDED

ISOLATION AND IDENTIFICATION OF FUNGAL PATHOGENS TO THE RICE WATER WEEVIL

W.C. Rice, G.B. Trahan, and P.A. Bollich

INTRODUCTION

Rice, an important cereal grain, is the primary source of carbohydrate and protein for approximately one half of the world's population. Approximately 90% of the world's rice is produced and consumed in Asia. U.S. rice accounts for 1.4% of world production, and about 20% of all rice in international trade. Roughly 60% of the U.S. rice crop is exported (typically valued at $1 billion annually). Several insects can reduce stands, decrease yield, and reduce quality. The rice water weevil (RWW) L. oryzophilus (Kuschel) is the most severe insect pest of rice in North America. The larvae of the RWW cause significant damage to the root systems of cultivated rice in the United States. Average yield reductions of 10 to 30% have been observed in Louisiana in rice crops not treated with insecticides effective against the RWW. The only currently effective and registered insecticide, granular carbofuran, will be restricted from field use after August 15, 1995. There are no other effective insecticides available and none are anticipated until at least the year 2000. Carbofuran is used on approximately 20% of the U.S. rice acreage. Total dollar loss to U.S. producers without the use of carbofuran is estimated to be $50 million annually. Cultural practices to limit the RWW are limited, difficult to implement due to dependence on weather conditions, and are generally impractical due to loss of fertilizer (nitrogen), herbicide loss, and partial effectiveness of the treatment.

Screening of germplasm collections has revealed only a small number of varieties with only moderate resistance to the RWW. None of the lines evaluated demonstrated high levels of resistance. As of Circa 1983, nine of 7220 plant isolates have shown moderate resistance to the RWW. The RWW resistant germplasm CI11048 was crossed with various commercial cultivars to generate some 7000 anther culture lines. Around 300 lines were judged agronomically useful and are being advanced for further testing.

The control and/or suppression of a destructive insect pest with an environmentally safe, effective microbial insecticide is one goal of this program. A number of biological agents are registered with the environmental protection agency for the control of other pest insects in a variety of agricultural, horticultural, and forestry settings. Bacteria, viruses, fungi, and parasitic wasps are among some of the agents registered or being used for control purposes. To date, no systematic study has been undertaken to identify and screen for entomopathogenic agents effective against the RWW. Effort has been devoted to assess the ability of predators to alter the population levels of the RWW. No significant predators and parasites of the RWW were observed. The life history of the RWW makes this approach unlikely. The primary focus of this project will be the biological control of the RWW using entomopathogens, such as fungi, bacteria, and viruses. Registration of biological agents can be accomplished in a 3- to 5-year time frame versus an 8- to 12-year time frame for chemical insecticides.

METHODS

A RWW overwintering site on the Rice Research Station in Crowley, Louisiana was sampled at periodic intervals over the course of two winters (Fig. 1). On each date, four $1m^2$ samples of leaf litter were collected by raking until the soil was exposed. The leaf litter and debris were transferred to individual 40-gal rubber garbage cans and tap water at 36°C was added until the litter was submerged. An aluminum trash can lid containing a wire screen with an exit provided by a funnel to collect the RWW was floated on the surface. Upon emergence from diapause, adult RWW climb to the top of the funnel where they are collected. Subsequently, adult RWW were transferred to glass jars (approximately 30 to 50 per jar) containing fresh rice leaves, and a 15 x 17" Kimwipe saturated with sterile water. The jars were then closed and incubated at 25°C. The jars were periodically monitored for dead/diseased individuals, which were subsequently removed. A number of RWW cadavers were observed with a white fungus sporulating between the body segments. Adult RWW cadavers were individually suspended in 0.1% Tween 80, vortexed vigorously, and the supernatant was plated on an agar media (oatmeal-dodine-chlorotetracycline) selective for Beauvaria species was used for the isolation and initial propagation of the fungi. For subsequent growth, Sabaroud's dextrose Agar plates containing chlorotetracycline were used. Conidia were dispersed in 0.1% Tween 80 and adjusted to 10^7 conidia/ml.

Submersion Bioassay

Adult RWW were placed into a 15 ml polypropylene test tube bontaining 1 ml of a solution of conidia (at $1x10^7$) and then were placed on wet Whatman filters in 100 mm petri dishes containing fresh rice leaves. Petri dishes containing adult RWW were placed in tupperware containers and incubated at 28°C. Filters were rewetted as necessary.

Droplet Bioassay

Conidia were serially diluted to the appropriate concentration in sterile 0.1% Tween 80 to prevent aggregation. Adult RWW were transferred to sterile 100 mm Falcon petri dishs (10 adults/dish) containing a prewetted Whatman filter paper (wetted with 1 ml sterile H_2O) microliter pipetman was used to place a 10 μl drop of the desired dose of Conidia on the dorsal side of the RWW. Fresh rice leaves were placed in the dish and changed every 2 to 3 days, and the filter was rewetted as necessary. The plates were placed in tupperware containers, partially sealed and transferred to a 27°C incubator. Insect mortality was determined at 3, 5, 7, and 10 days post inoculation. Probit analysis was used to determine LD_{50} values (BMDP, Statistical Software, Inc.). To accurately assess mortality, a sterile artist's brush was used to place the adult on its back. Viable adult RWW will right themselves within 15 minutes.

RESULTS AND DISCUSSION

Little is known about the percentage of RWW surviving the winter. Preliminary experiments addressing this issue were initiated. The highest number of adult RWW were collected in the months of November and December (Fig. 1). The Rice Research Station received 10 inches of rain and the collection site was under several feet of water. The rain may, in part, be responsible for the sharp decline in adult RWW that was noted in January. Additional overwintering sites were located for comparison. In late March, a cold snap occurred and this was followed by an increase in the number of RWW collected from the Rice Research Station. This possibly indicates unsuspected movement of adult RWW during the overwintering season. When held/stressed in the laboratory, a small percentage (<1%) of the adult RWW died within 2 weeks. Fungi were observed sporulating from a number of these dead adults in as short as 4 to 5 days after collection (e.g., Sample 111892), while other samples took as long as 2 weeks to show external signs of fungal infection. Several were plated on media selective for Beauveria species, which resulted in the growth of white fungal colonies. Based upon growth on dodine containing media and fungal morphology, these isolates are tentatively being identified as Beauveria species.

Conidia from selected isolates were recovered and preliminary bioassays were conducted using field collected RWW as host insects. Increased mortality was observed over that of the controls (Table 1).

Table 1. Bioactivity of selected isolates using submersion bioassay. Percentage of Cadaver sporulation at 5 days. Rice Research Station, Crowley, LA. 1993.

Isolate	Rep 1	Rep 2	Rep 3
111892a	80%	100%	Nd*
22492B	60%	60%	20%
Control	40%	0%	0%

* not determined.

Based upon initial DNA restriction fragment patterns (data not shown) and bioactivity, three fungal isolates were selected for further development. These isolates were incorporated into an oil based formula and in a wettable powder by Mycotech (Butte, Montana).

Results of bioactivity of these formulated fungal preparations are presented in Table 2. Isolate 4193A as an oil and as a wettable powder gave similar results while isolate 111892A was approximately seven times more active as an oil formulation than as a wettable powder. Isolate 22292A was evaluated only as a wettable power.

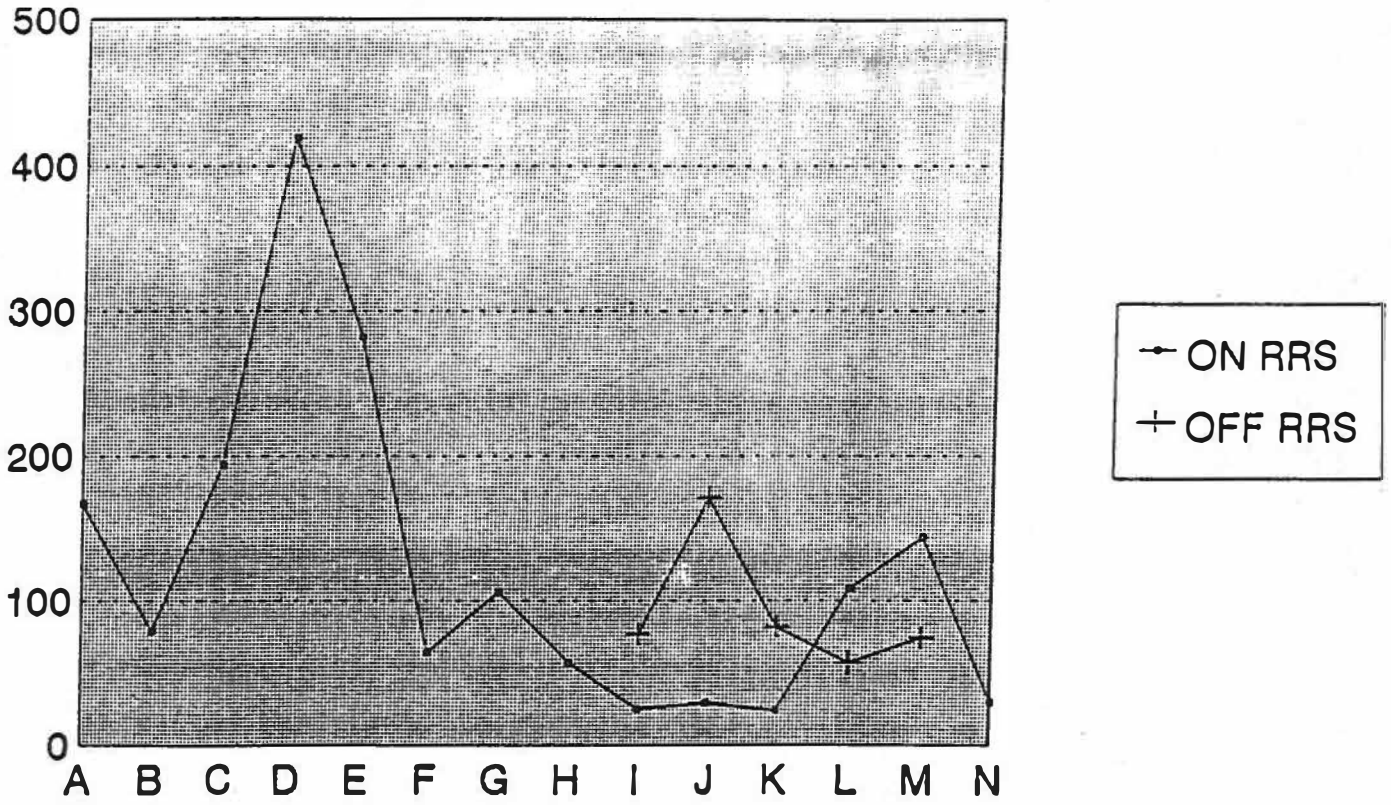
Table 2. Bioassay of Beauveria isolates formulated as a wettable powder WP or as an oil base. Rice Research Station, Crowley, LA. 1994.

Isolate/Formulation	Dose 50	SE
4193A OIL	107,522	58,968
4193A WP	107,182	43,745
111892A WP	242,674	62,113
111892A WP	281,331	110,120
111892A OIL	33,670	15,570
22292A WP	183,006	53,298

Nearly 50 fungal isolates (primarily Beauveria) have been recovered (data not shown) from adult RWW over a 2-year period. A subgroup of these isolates were used to determine their pathogenicity against the adult RWW. As wettable powders, they are similar in activity (within a 2-fold range). The bioactivity observed at this dose is comparable with that described in other insect fungal systems. Infectious conidia could be successfully produced as an oil formula and as a wettable thus opening up the possibility for commercial production.

RWW OVERWINTERING POPULATIONS

AVERAGE # OF RWW ADULTS COLLECTED (4REPS/SAMPLE)



SAMPLES COLLECTED BI-WEEKLY STARTING 10-8-92(A), 1-6-93(G)

PRELIMINARY FIELD EVALUATION OF MYCOINSECTICIDES FOR THE CONTROL OF FUNGAL PATHOGENS FOR THE RICE WATER WEEVIL

W.C. Rice, G.B. Trahan, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: Mars, 100 lb/A

Planting Method and Date: Drill seeded using a cone planter, 7-inch row spacing, June 6, 1993

Experimental Design: Four replications, nine treatments

Plot Size: 49 inches x 15 ft

Water Management: Flushed, June 11, June 15, and July 2; permanent flood, July 13; drained Sept 13

Fertilization: Triple 13 was applied at a rate of 45-45-45 with a Kincaid drill, June 11. A topdressing of NH_3SO_4 (21-0-0) was applied at a rate of 90-0-0, July 13

Herbicide: Propanil 3 lb ai/A, June 30, with a CO_2 sprayer with a 110015 nozzle at 24½ psi at 15 GPA

Insecticide: See attached sheet for mycoinsecticide; Furadan 3G (0.6 lb ai/A), July 28.

Sampling: Larvae - Five cores/plot, July 27, Aug 3, and Aug 10 and 17
Leaf samples collected, July 16 and 19
RWW adults collected, July 16 and 20

Harvested: Oct 4, whole plots harvested with Hege combine

Comments: In order to assess the potential of infectious conidia for the control of RWW populations, replicated plots were treated with three isolates of Beauveria formulated either as a wettable powder (WP) or as an oil based formulation (oil). Two separate applications of conidia at a rate of 2.5×10^{13} conidia per acre were applied on July 12 and 16. Immediately after the July 16 application, adult RWW were collected (5/plot) from the control and treated plots and placed in 100 mm petri dishes as previously described (See RWW bioassay). Adults were held for 10 days and a final mortality determination was made.

Formulation had no significant effect on the bioactivity of the isolates (Table 1). Only isolate 111892A, on July 16, gave a significantly higher adult RWW mortality observed over that of the control (Tables 1 and 2). There were no significant differences on mortality between treatments from RWW adults collected on July 20 although overall mortality levels were elevated over that of initial control plots. This suggests that movement between plots of infected weevil had occurred. An alteration of field plot design will be made to more fully monitor the bioactivity of field applications of fungi against the RWW.

When the replicated plots were first sampled, RWW larvae had already exceeded economic threshold, thus, compromising the yield evaluation (Fig. 1, Table 3). This early infestation was due to heavy rains and flooding of the field prior to normal flood. High levels of RWW larvae due to this infestation preclude determination of larval control due to the application of entomopathogenic fungi (Fig. 1). Only carbofuran significantly decreased RWW larvae counts and affected yield. Since one isolate was able to provide significant adult RWW control, the effect of application times, ultra low volume applications, and additional isolates will be determined. The stability of fungal conidia on rice leaves under field conditions will also be evaluated.

Table 1. Adult rice water weevil mortality field application. Rice Research Station, Crowley, LA. 1993.

Trt. No.	Treatment Name	Days after application 0	4
	TABLE OF R MEANS		
Replicate 1		30.8	35.5
Replicate 2		51.9	51.6
Replicate 3		54.0	42.6
Replicate 4		49.9	48.1
	EFFECT OF FORMULATION		
1	WP	45.7	41.8
2	Oil	47.6	47.1
	EFFECT OF TREATMENT		
1	Control	29.1	43.0
2	111892A	70.0	53.0
3	22292A	54.3	40.1
4	4193A	33.1	41.8

Table 2. Adult rice water weevil mortality field application. Rice Research Station, Crowley, LA. 1993.

Trt. No.	Treatment Name	Days after application 0	4
1	Control	21 b	41 a
2	Carbofuran	25 b	53 a
3	Oil Control	38 ab	46 a
4	22292A Oil	52 ab	50 a
5	4193A Oil	36 ab	29 a
6	111892 Oil	65 ab	64 a
7	22292A WP	57 ab	31 a
8	4193A WP	31 ab	54 a
9	111892A WP	75 a	42 a
LSD (.05) =		42	44
Standard Dev. =		28.9611	30.1617
CV =		65.49	66.49

Means followed by the same letter do not significantly differ (P = .05, Duncan's MRT).

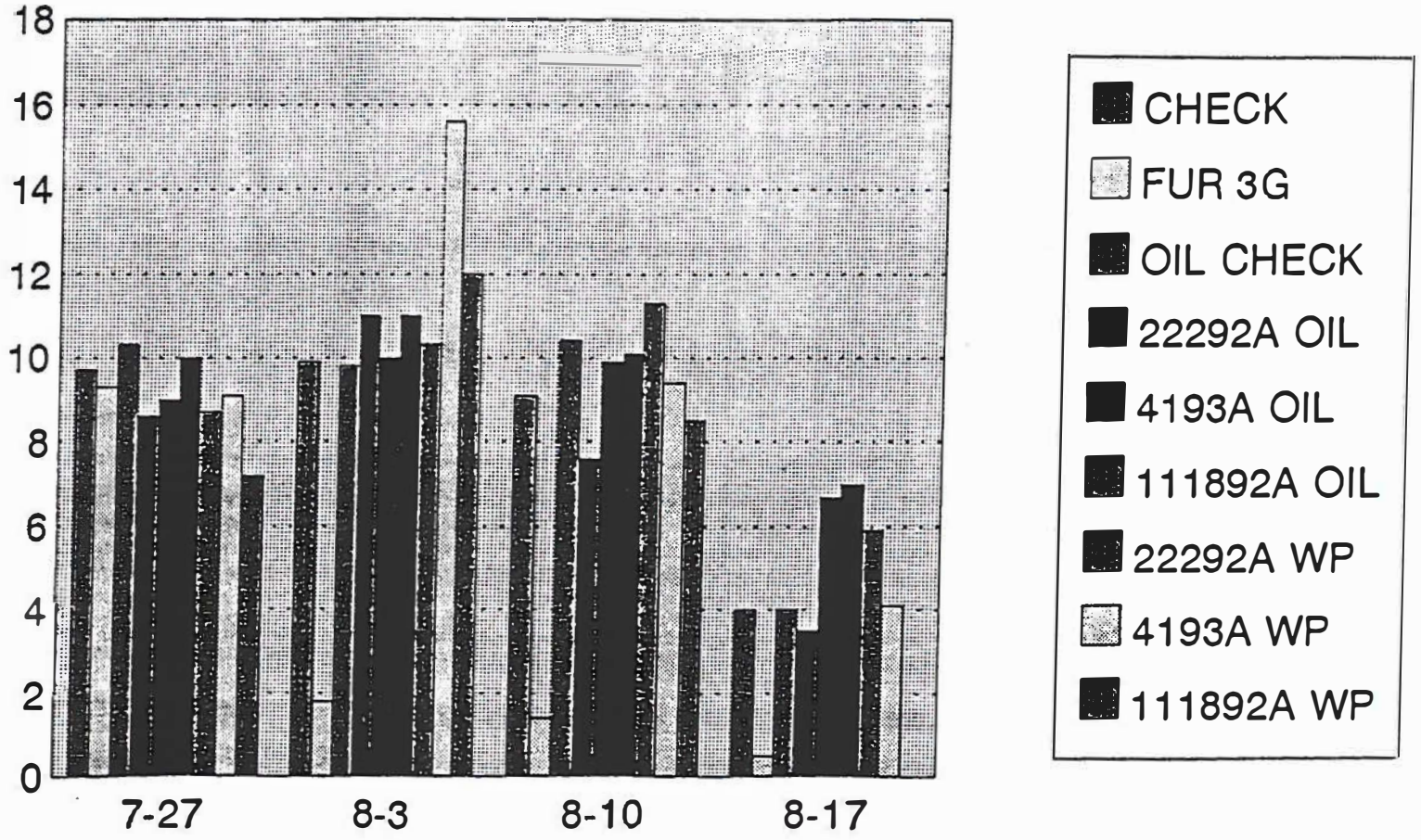
Table 3. Effect of Mycoinsecticide treatments on plant height and yield. Rice Research Station, Crowley, LA. 1993.

Trt. No.	Treatment Name	Height	Yield
		--(cm)--	-(lb/A)-
1	Control	97.8 a	4344.7 b
2	Carbofuran	102.3 a	5150.2 a
3	Oil Control	99.7 a	4497.3 ab
4	22292A Oil	97.7 a	4174.4 b
5	4193A Oil	98.2 a	4186.1 b
6	111892 Oil	100.0 a	4283.4 b
7	22292A WP	99.3 a	4266.1 b
8	4193A WP	99.3 a	4432.0 ab
9	111892A WP	98.2 a	4376.8 b
LSD (.05) =		4.6	706.3
Standard Dev. =		3.17331	486.788
CV =		3.20	11.03

Means followed by the same letter do not significantly differ (P = .05, Duncan's MRT).

MYCOINSECTICIDE

RWW LARVAE/PLANT



DELAYED FLOOD AND PLANT GROWTH REGULATORS (GIBBERELLIC ACID) AS MANAGEMENT TOOLS FOR THE CONTROL OF THE RICE WATER WEEVIL

W.C. Rice, R.T. Dunand, G.B. Trahan, R.R. Dilly, Jr., G.A. Meche, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: Lemont, 100 lb/A

Planting Method and Date: Drill seeded with Kincaid drill, May 11, 1993, with 7-inch row spacing

Fertilization: 13-13-13 at 300 lb/A drilled at planting, ammonium sulfate (21% N) at 450 lb/A by gandy, June 2 (normal flood treatments) and ammonium sulfate (21% N) at 450 lb/A by hand, June 17

Plot Size: 117 ft^2 - 4.67 (7 rows) x 25 ft

Treatment(s): Flood Dates: Normal, June 3; delayed, June 17

Insecticide: Applied at economic injury level
Normal: Carbofuran (0.6 lb/A), June 22
Delayed: Furadan (20 lb/A), July 6

Plant Growth Regulator
Gibberellic acid (22 ppm) - RELEASE (0.35 oz/cwt)
Gibberellic acid (1.5 g/A) - RyzUp (1.5 fl oz/A)

Timing: Seed treatment, 15 Apr
Normal flood: 3- to 4-leaf, June 2
Delayed flood: 4- to 5-leaf, June 10

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No rainfall within 24 hours after foliar treatments.

Herbicide(s): Normal flood / Stam M4 (3 qt/A) by hand, May 26 and June 2
Delayed flood / Stam M4 (3 qt/A) by hand, May 26 and June

Insecticide(s): See treatments above.

Fungicide(s): Dithane (4 fl oz/cwt) seed treatment

Emergence: May 21

Permanent Flood: See treatments

Harvest Date: Aug 31

Experimental Design: Randomized complete block design and four replications. Split plot arrangement of treatments (Main plot = flood date; subplots = insecticide and plant growth regulator treatments).

Comments: Seedling Vigor. Plant height was evaluated at 31 and 53 days after planting (DAP) (Table 1). At 31 DAP, plant height on average was higher in the normal flood treatments compared with the delayed flood treatments. The opposite was noted at 53 DAP. This is related to RyzUp and time of application of RyzUp. RyzUp increased plant height significantly at both 31 and 53 DAP. The increase at 31 DAP was 3 cm, and at 53 DAP, the increase was 11 cm. At 31 DAP, the normal flood treatments had been exposed to RyzUp for 9 days compared with 2 days in the delayed flood treatments. RyzUp activity peaks about 10 to 14 days after application. At 53 DAP, the delayed flood treatments had been exposed to RyzUp for 13 days compared with 20 days in the normal flood treatments.

Delayed flood and plant growth regulators (PGRs) were used in conjunction to evaluate their effectiveness for control of the rice water weevil (RWW) larvae and to reduce economic damage. GA as both a seed treatment (Release) and as a foliar application (RyzUp) was used. Delayed flood condition was applying flood 2 weeks later than normal flood, which was at the 2- to 3-leaf stage. Significant increases in plant height were observed in the delayed flood conditions (Table 2). Furadan, Release, and RyzUp had no effect on plant height. In comparison, grain yield was significantly increased by Furadan and a combination of Release seed treatment followed by seedling treatment with RyzUp under normal flood system. Furadan increased yield about 1200 lb/A, and the GA combination treatment increased yield almost 900 lb/A. The surprising observation was that in delayed flood, grain yield was unaffected by insecticide or PGRs. Grain yield was increased by nearly 1100 lb/A in delayed flood treatments. Significant differences in RWW larval counts were observed between the normal flood and delayed flood conditions that could be attributed to the timing of the flood conditions. Plant maturity and time of exposure to RWW larvae may be an important factor in preventing economic injury.

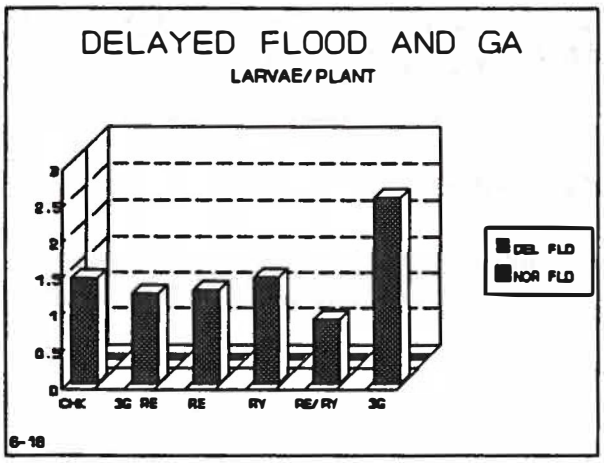
Table 1. Effect of GA on mean midseason plant height. Rice Research Station, Crowley, LA. 1993.

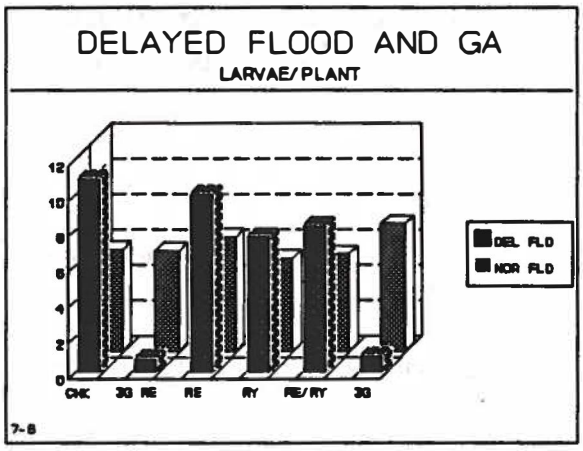
Treatment	Plant height	
	June 11	June 22
	(cm)	
Normal Flood	37 a	59 b
Delayed Flood	30 b	62 a
Control	33 b	57 b
RELEASE	31 b	57 b
Furadan 3G		
RELEASE	31 b	57 b
RyzUp	36 a	69 a
RELEASE	36 a	68 a
RyzUp		
Furadan 3G	32 b	58 b

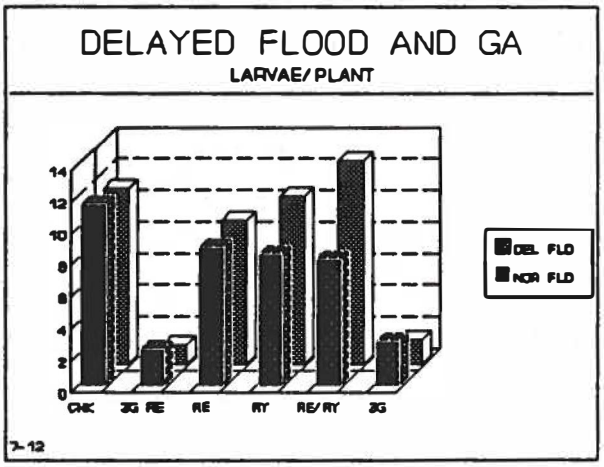
Table 2. Effect of water management and plant growth regulators on yield. Rice Research Station, Crowley, LA. 1993.

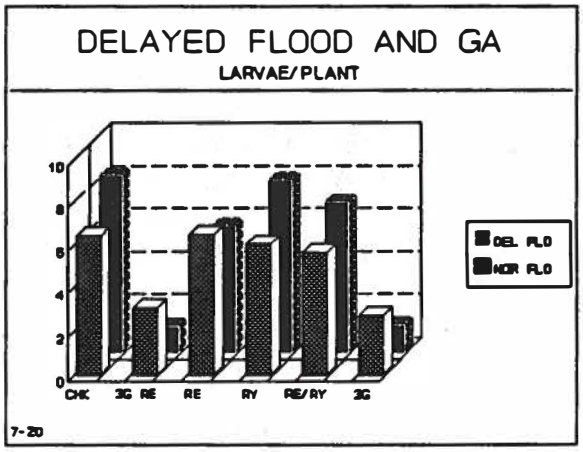
Treatment Number	Treatment	Height -(cm)-	Yield -(lb/A)-
1 1	Normal Flood Control	76.8 d	4797.18 c
2 2	Normal Flood Furadan 3G RELEASE	82.5 abc	5965.55 a
3 3	Normal Flood RELEASE	77.7 d	4814.29 c
4 4	Normal Flood Ryzup	77.2 d	5145.53 bc
5 5	Normal Flood RELEASE/Ryzup	79.2 bcd	5663.27 ab
6 6	Normal Flood Furadan 3G	78.6 cd	6182.18 a
7 7	Delayed Flood Control	83.7 a	5586.97 ab
8 8	Delayed Flood Furadan 3G RELEASE	83.2 ab	5865.22 a
9 9	Delayed Flood RELEASE	82.1 abc	5748.19 ab
10 10	Delayed Flood Ryzup	84.9 a	5586.32 ab
11 11	Delayed Flood RELEASE/Ryzup	84.3 a	5886.88 a
12 12	Delayed Flood Furadan 3G	83.8 a	5977.25 a
LSD (.05) =		3.8	567.37
Standard Dev. =		2.63876	392.942
CV =		3.25	7.01

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).


DELAYED FLOOD AND GA
LARVAE/ PLANT
DEL FLD
NOR FLD
CHK
3G RE
RE
RY
RE/RY
3G
6-18


DELAYED FLOOD AND GA
LARVAE/ PLANT
DEL FLD
NOR FLD
CHK
3G RE
RE
RY
RE/RY
3G
7-8


DELAYED FLOOD AND GA
LARVAE/ PLANT
DEL FLD
NOR FLD
CHK
3G RE
RE
RY
RE/RY
3G
7-12


DELAYED FLOOD AND GA
LARVAE/ PLANT
DEL FLD
NOR FLD
CHK
3G RE
RE
RY
RE/RY
3G
7-20

EVALUATION OF A SEMIDWARF ZENITH SOMACLONE (SDZS) LINE FOR RICE WATER WEEVIL RESISTANCE:

PART 1: TOLERANCE

W.C. Rice, G.B. Trahan, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: All varieties seeded at 100 lb/A

Planting Method and Date: Drill seeded using a Hege drill, 7-inch row spacing, May 12, 1993

Experimental Design: Four replications, 12 varieties, two treatments

Plot Size: 6 x 6 ft

Water Management: Flushed, May 14, May 21, June 1, and June 8; permanent flood, June 15; drained Sept 8

Fertilization: Triple 13 was applied at a rate of 45-45-45 with a motorized gandy, May 16; NH_3SO_4 (21%) was applied at a rate of 75-0-0, June 14

Herbicide: Propanil 3 lb ai/A, May 26 and June 11

Insecticide: Carbofuran 4F 1 lb ai/A with a CO_2 sprayer with a 110015 nozzle at 25 psi at 15 GPA, June 14

Sampling: Five cores/plot, July 8

Harvested: Sept 14, whole plots harvested with Kubota combine

Table 1. Evaluation of a semidwarf Zenith somaclone (SDZS) for rice water weevil resistance. Rice Research Station, Crowley, LA. 1993.

Variety	Check		Carbofuran	
	Height	Yield	Height	Yield
	-(cm)-	-(lb/A)-	-(cm)-	-(lb/A)-
1403	127.6 cde	3833.76 efg	129.3 cd	4433.93 d
1711	112.1 fg	4195.90 def	122.3 de	5936.90 b
MARS	99.6 ij	3506.73 gh	106.3 ghi	4134.72 def
LEMONT	80.6 l	3479.70 gh	91.1 k	4523.06 d
ZENITH	120.9 e	3527.60 gh	130.3 c	4318.16 de
SDZS	98.9 j	4638.94 d	107.4 fgh	6283.13 ab
TC112	111.2 fg	3075.55 hi	124.3 cde	4494.84 d
TC4745	100.8 hij	5208.13 c	112.1 fg	6546.14 a
95-2836	146.8 b	2918.56 i	145.9 b	3652.84 fg
AL-6029	156.4 a	4623.16 d	159.5 a	5992.21 b
2218	83.6 l	4598.81 d	94.4 jk	5944.00 b
95-3527	112.0 fg	2604.57 i	113.8 f	3006.45 hi
LSD (.05)	6.6	513.92	6.6	513.92
Standard Dev.	4.67643	363.400	4.67643	363.400
C.V.	4.03	8.27	4.03	8.27

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).

Table 2. Evaluation of a semidwarf Zenith somaclone (SDZS) for rice water weevil resistance. Rice Research Station, Crowley, LA. 1993.

Variety	Larvae/plant	
	Check	Carbofuran
1403	23.092 de	1.132 f
1711	48.194 a	1.167 f
MARS	29.750 b-e	1.274 f
LEMONT	19.694 e	1.056 f
ZENITH	29.020 cde	1.589 f
SDZS	32.196 bcd	1.056 f
TC112	21.361 de	0.472 f
TC4745	35.597 bc	0.840 f
95-2836	31.028 bcd	1.011 f
AL-6029	40.743 ab	1.688 f
2218	34.326 bc	0.639 f
95-3527	19.583 e	0.847 f
LSD (.05)	9.813	9.813
Standard Dev.	6.93873	6.93873
C.V.	44.13	44.13

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).

PART 2: ANTIBIOSIS/ANTIXENOSIS

W.C. Rice, G.B. Trahan, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate: All varieties seeded at 100 lb/A

Planting Method and Date: Drill seeded using a Hege drill, 7-inch row spacing, May 12, 1993

Experimental Design: Four replications, seven varieties

Plot Size: 6 x 6 ft

Water Management: Flushed, May 14, May 21, June 1, and June 8; permanent flood, June 15; drained Sept 8

Fertilization: Triple 13 was applied at a rate of 45-45-45 with a motorized gandy, May 16; NH_3SO_4 (21%) was applied at a rate of 75-0-0, June 14

Herbicide: Propanil 3 lb ai/A, May 26 and June 11, with a CO_2 sprayer with a 110015 nozzle at 26 psi at 15 GPA

Insecticide: None

Sampling: Five cores/plot, July 8

Harvested: Sept 14, whole plots harvested with Kubota combine

Comments: The semidwarf Zenith somaclone developed by Dr. Chuck Rush and designated here as SDZS was evaluated for rice water weevil (RWW) resistance, resistance here being classically defined as either tolerance or antibiosis/antixenosis. Tolerance was determined using replicated carbofuran-treated and untreated plots. Carbofuran had a significant effect on larval population (Table 2). When grain yield of treated and untreated plots were compared, only line 95-3527 (Table 1) did not show significant differences indicating tolerance to the RWW. However, line SDZS gave significantly increased grain yield over that of its parent line Zenith. Five lines, 2218, AL-6029, TC4745, SDZS, and 1711, though not tolerant showed a good yield response, with SDZS and TC4745 showing the greatest yield response.

Antibiosis/antixenosis was determined using untreated replicate plots and measuring larval counts per plant. The highest number of RWW larvae was observed on the SDZS line (Table 3). This line still gave the highest significant yield response (Table 4) despite high larval count. This suggests a type of resistance not fitting the classical definitions of tolerance or antibiosis. Line 2218 also is able to tolerate high levels of RWW larvae and still maintain good yields (Tables 1 and 2).

Table 3. Evaluation of a semidwarf Zenith somaclone (SDZS) for rice water weevil resistance. Rice Research Station, Crowley, LA. 1993.

Trt #	Variety	Larvae/plant
1	SDZS	41.4028 a
2	TX13079	27.3036 ab
3	TX12685	34.3611 ab
4	TX12630	31.5903 ab
5	ZENITH	29.0208 ab
6	LEMONT	21.0014 b
7	MARS	24.6861 b
LSD (.05) =		13.5165
Standard Dev. =		9.09813
CV =		30.42

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).

Table 4. Evaluation of a semidwarf Zenith somaclone (SDZS) for rice water weevil resistance. Rice Research Station, Crowley, LA. 1993.

Trt #	Variety	Height	Yield
		-(cm)-	(lb/A)
1	SDZS	94.1 bc	4914.23 a
2	TX13079	98.2 b	3437.08 b
3	TX12685	89.0 c	3714.88 b
4	TX12630	98.1 b	3197.16 b
5	ZENITH	119.2 a	3261.67 b
6	LMNT	81.9 d	3326.56 b
7	MARS	99.5 b	3441.34 b
LSD (.05) =		7.1	548.50
Standard Dev. =		4.75240	369.20
CV =		4.89	10.22

Means followed by same letter do not significantly differ (P=.05, Duncan's MRT).

EVALUATION OF WORLD COLLECTION LINES FOR THE CONTROL OF THE RICE WATER WEEVIL

W.C. Rice, G.B. Trahan, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil: Crowley silt loam, pH: 6.0-6.5

Variety/Seeding Rate:

Planting Method and Date: Drill seeded using a Hege drill, June 10, 1993

Experimental Design: Four replications, 120 treatments

Plot Size: 3 1/2 x 2 ft

Water Management: Flushed, June 6, June 15, and July 2; permanent flood, July 6

Fertilization: 23-12-12 was applied at a rate of 100-52-52 with a motorized gandy, July 6

Herbicide: Propanil, 3 lb ai/A, June 30, with a CO_2 sprayer with a 110015 nozzle at 24½ psi at 15 GPA

Insecticide: None applied.

Sampling: Larvae - 1 core/plot, July 27

Harvested: Individual panicle rows harvested as they became available.

Comments: Selected lines from the USDA world collection of rice were evaluated for rice water weevil (RWW) resistance. The number of RWW larvae per plant was determined and the resulting value was transformed (Table 1, natural log) to reduce the amount of variability in the sample population.

Five arbitrary groups were determined based on the range of RWW observed per plant. These group values are as follows: 1) ≥35 (3.55), 2) 25-35 (3.21-3.55), 3) 15-25 (2.70-3.21), 4) 10-15 (2.30-2.70), and 5) less than 10 (<2.30) larvae per plant. The number of larvae per plant ranged from 6 to 45. Lines PI 402523, PI 403943, PI 404090, PI 406055, and PI 406102 had 10 larvae or less per plant. However, lines PI 402523 and PI 406055 did not mature or germinated poorly. Line PI 406102 has poor agronomic traits in that it is a tall plant (150 cm). Line PI 404090 is short (69 cm) and headed at 75 days while PI 403943 was 82 cm tall and headed at 92 days. Lines PI 404090 and PI 403943 will be reevaluated in larger plot tests to verify the RWW larval counts observed here.

Table 1. World collection lines evaluated for rice water weevil resistance, plant height, and days to 50% heading. Rice Research Station, Crowley, LA. 1993.

Treatment	PI#	RWW larvae/plant	Plant Height	Days to 50% heading
			-----(cm)-----	
1	PI 401420	3.707	66	80
2	PI 401421	3.384	75	81
3	PI 401423	3.407	53	66
4	PI 401424	2.916	71	81
5	PI 401425	2.702	67	67
6	PI 401426	3.222	79	81
7	PI 401428	2.894	72	70
8	PI 401429	--------	---	---
9	PI 401430	2.890	71	69
10	PI 401431	2.797	66	79
11	PI 401432	2.645	67	72
12	PI 401435	3.196	88	103
13	PI 401436	2.875	97	96
14	PI 401437	3.002	75	72
15	PI 401438	2.909	85	72
16	PI 401439	3.634	91	81
17	PI 401440	--------	---	---
18	PI 401441	3.299	81	103
19	PI 401442	3.234	70	87
20	PI 401443	2.631	80	76
21	PI 401444	3.421	80	92
22	PI 401445	--------	---	---
23	PI 401446	--------	---	---
24	PI 401447	3.073	78	92
25	PI 401448	3.152	107	78
26	PI 401449	3.179	102	84
27	PI 401451	2.804	70	92
28	PI 401452	2.805	60	70
29	PI 401453	2.926	107	92
30	PI 401455	2.689	72	76
31	PI 401456	3.111	90	81
32	PI 401457	--------	---	---
33	PI 401458	2.640	63	64
34	PI 401745	2.338	91	95

Continued.

Table 1. Continued.

Treatment	PI#	RWW larvae/plant	Plant Height	Days to 50% heading
			-----(cm)-----	
35	PI 401746	2.565	139	98
36	PI 401748	3.458	---	---
37	PI 401750	3.124	84	85
38	PI 402505	2.673	88	95
39	PI 402506	2.891	76	103
40	PI 402508	2.989	73	105
41	PI 402509	2.806	84	92
42	PI 402510	2.701	---	---
43	PI 402512	3.163	81	103
44	PI 402513	3.136	89	92
45	PI 402514	2.466	---	---
46	PI 402523	1.792	---	---
47	PI 402532	2.904	82	103
48	PI 402533	2.895	78	---
49	PI 402951	3.359	106	93
50	PI 403943	2.236	82	92
51	PI 404088	--------	---	---
52	PI 404089	2.644	81	87
53	PI 404090	2.106	69	75
54	PI 404094	3.488	75	75
55	PI 404096	2.567	98	92
56	PI 405072	3.234	70	72
57	PI 405076	3.105	82	95
58	PI 405077	3.190	82	95
59	PI 405078	2.910	90	100
60	PI 405079	2.823	81	89
61	PI 405080	3.189	94	98
62	PI 406026	2.677	126	---
63	PI 406035	3.220	122	92
64	PI 406036	2.767	124	89
65	PI 406037	3.448	71	84
66	PI 406040	3.171	102	92
67	PI 406041	3.048	74	81
68	PI 406055	1.792	---	---
69	PI 406061	2.851	125	95

Continued.

Table 1. Continued.

Treatment	PI#	RWW larvae/plant	Plant Height	Days to 50% heading
			-----(cm)-----	
70	PI 406071	2.903	100	78
71	PI 406073	3.035	142	92
72	PI 406074	2.704	119	92
73	PI 406083	3.107	100	76
74	PI 406084	2.801	107	79
75	PI 406087	3.094	100	94
76	PI 406089	3.361	118	98
77	PI 406093	2.588	96	92
78	PI 406094	2.462	75	81
79	PI 406095	2.480	99	92
80	PI 406102	1.992	150	98
81	PI 406104	2.341	101	---
82	PI 408350	2.851	82	103
83	PI 408351	3.208	77	103
84	PI 408353	2.860	75	95
85	PI 408354	3.412	83	95
86	PI 408355	3.196	79	---
87	PI 408356	3.076	71	95
88	PI 408357	2.558	84	92
89	PI 408358	3.070	---	---
90	PI 408360	3.657	---	---
91	PI 408361	3.338	---	---
92	PI 408362	2.960	74	---
93	PI 408364	2.883	72	100
94	PI 408365	3.214	---	---
95	PI 408366	3.305	---	---
96	PI 408367	3.227	---	---
97	PI 408370	3.270	---	---
98	PI 408371	2.975	---	---
99	PI 408373	2.673	99	103
100	PI 408377	2.357	81	---
101	PI 408378	3.042	81	103
102	PI 408379	3.211	94	92
103	PI 408380	3.164	94	133
104	PI 408381	3.372	86	103

Continued.

Table 1. Continued.

Treatment	PI#	RWW larvae/plant	Plant Height	Days to 50% heading
			-----(cm)-----	
105	PI 408383	2.915	96	103
106	PI 408384	3.492	89	103
107	PI 408385	2.650	84	---
108	PI 408386	2.702	101	---
109	PI 408387	2.971	100	---
110	PI 408388	2.941	87	---
111	PI 408389	2.569	97	103
112	PI 408390	3.185	106	103
113	PI 408391	2.985	80	103
114	PI 408392	2.613	81	89
115	PI 408393	3.141	76	103
116	PI 408394	2.787	74	---
117	PI 408395	3.068	91	103
118	PI 408396	3.328	84	103
119	PI 408397	3.088	95	---
120	PI 408363	3.128	---	---
CV (%)		18.66326	7.640821	5.563114
LSD (0.05)		0.0047	0.0001	0.0001

Control of Rice Water Weevil Using Insecticides and Water Management

J. D. Barbour, M. A. Muegge, G. B. Trahan, and P. A. Bollich

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety: Cypress

Seeding Rate: 100 lb/A

Plot Size: 4' x 25', individually leveed

Planting Method: Drill seeded using a Kincaid drill with 7 in. row spacing

Planting Date: 12 May 1993

Water Management: Varies with treatment. See below

Fertilizer Management: 45 lb N/A pre-plant incorporated (N:P:K = 13:13:13)
90 lb N/A hand-broadcast on 22 June (N:P:K = 21:0:0)

Herbicides: Propanil; 3 lb AI/A applied 26 May using a CO_2 backpack sprayer

Fungicides: Benlate; 0.5 lb AI/A applied 28 June by air

Insecticides: Furadan 3G, Furadan, Payload 15G

Treatments:
1: Pinpoint flood, no drain, no insecticide
2: Pinpoint flood, no drain, Furadan 3G; 0.6 lb AI/A hand-broadcast postflood on 11 June
3: Pinpoint flood, drain at RWW threshold (5 RWW larvae/core), no insecticide
4: Pinpoint flood Payload 15G; 2.6 lb AI/A hand broadcast postflood on 11 and 25 June
5: Pinpoint flood Payload 15G; 5.2 lb AI/A hand broadcast postflood on 11 June
6: Pinpoint flood with delayed permanent flood, no drain, no insecticides

Experimental Design: Randomized complete block with four replicates

Harvested: Water removed 23 Aug. Harvested 1 Sept

Comments: Insecticides and water management were evaluated for control of rice water weevil (RWW). Treatment effects on numbers of RWW larvae per core, and yield parameters (plant height, number of panicles per meter^2, number of grains per panicle, and yield) were determined by ANOVA. Because no significant differences in larva numbers or plant parameters were found among the Payload treatments (Nos. 4 & 5), these were pooled and orthogonal contrasts used to separate the following means: untreated vs treated plots (No. 1 vs 2 - 6); insecticide vs water management treated plots (Nos. 2 & 4+5 vs 3 & 6); Furadan 3G vs Payload 15G treated plots (No. 2 vs 4+5); delayed flood vs drained plots (No. 3 vs 6). Means were declared significantly different at the 0.05 probability level.

Mean numbers of RWW larvae core for the contrasted means are presented in Table 1. There were no significant differences in the number of RWW larvae per core in control compared with treated plots sampled on 9 June before insecticides or drainage treatments were applied. However, numbers of RWW larvae were significantly lower in treated compared with control plots in post-treatment samples on 16, 23, and 30 June. No significant differences in RWW numbers were observed when insecticide-treated plots were compared with water management-treated plots on any of the sample dates. Within insecticide-treated plots, no significant differences in numbers of RWW larvae were observed in Furadan compared with Payload-treated plots in pre-treatment samples on 9 June . However, numbers of RWW larvae were significantly lower in Furadan-treated compared with Payload-treated plots on all post-treatment samples. Numbers of RWW larvae in Payload-treated plots were as high or higher than those in control plots on all sample dates. Within water management treatments, numbers of RWW larvae were significantly lower in delay flood plots than in

drain plots for all sample dates. Numbers of RWW larvae in drain plots were as high or higher than those in control plots for all sample dates.

Mean values of rice yield and yield parameters for the contrasted means are presented in Table 2. Plant height, but not the number of panicles/yd^2, the number of grains/panicle, or rice yield, was significantly higher in treated compared with control plots. No differences in yield parameters or rice yield could be declared at the 0.05 % probability level when insecticide-treated plots were compared with water management-treated plots. However, the number of grains/panicle was significantly higher in insecticide-treated plots than in water management-treated plots at the 0.05 probability level. Within insecticide-treated plots, plant height, but not the number of panicles/yd^2, the number of grains/panicle, or yield, was significantly higher in Furadan-treated than in Payload-treated plots. Within water management treatments, all yield parameters and yield were significantly higher in delay flood plots than in drain plots.

Table 1. Mean number of rice water weevil larvae per core for contrasted treatment pairs on sample date. Rice Research Station, Crowley, LA, 1993.

Contrast	Date							
	9 June		16 June		23 June		30 June	
	Means	P > F	Means	P > F	Means	P > F	Means	P > F
Control vs treated	5.1 vs 4.5	**0.6106**	21.0 vs 13.6	**0.0025**	24.9 vs 12.8	**0.0003**	26.6 vs 16.8	**0.0003**
Insecticide vs water management[1]	4.6 vs 4.3	**0.7858**	11.8 vs 17.1	**0.4141**	12.2 vs 13.3	**0.6707**	17.6 vs 15.9	**0.4007**
Furadan vs Payload	4.1 vs 5.1	**0.5402**	3.4 vs 20.0	**0.0003**	1.8 vs 22.8	**0.0001**	5.1 vs 30.1	**0.0001**
Delay vs drain	0.5 vs 8.1	**0.0001**	2.1 vs 17.1	**0.0007**	3.6 vs 23.0	**0.0001**	1.8 vs 30.0	**0.0001**

[1]Furadan and Payload were hand broadcast 2 weeks post-flood @ 0.6 and 5.0 lb ai/a, respectively.

Table 1. Mean value for rice yield parameters for contrasted treatment pairs. Rice Research Station, Crowley, LA, 1993.

Contrast	Yield Parameter							
	Plant height (inches)		Panicles/yd^2		Grains/panicle		Yield(lbs/acre)	
	Means	P > F	Means	P > F	Means	P > F	Means	P > F
Control vs treated	30.8 vs 32.7	**0.0001**	410.2 vs 405.9	**0.8062**	58.5 vs 61.4	**0.2597**	7810.0. vs 7726.7	**0.8062**
Insecticide vs water management[1]	32.6 vs 32.8	**0.4484**	411.4 vs 400.4	**0.4943**	63.6 vs 59.2	**0.0580**	7831.4 vs 7622.0	**0.4943**
Furadan vs Payload	34.2 vs 31.0	**0.0001**	420.2 vs 402.5	**0.4369**	65.0 vs 62.1	**0.3674**	8000.4 vs 7662.4	**0.4369**
Delay vs drain	33.7 vs 31.9	**0.0001**	432.0 vs 368.8	**0.0142**	55.2 vs 63.1	**0.0175**	8224.0 vs 7019.9	**0.0142**

[1]Furadan and Payload were hand broadcast 2 weeks post-flood @ 0.6 and 5.0 lb ai/a, respectively.

Control of Rice Water Weevil Using Different Furadan Formulations

J. D. Barbour, M. A. Muegge, G. B. Trahan, and P. A. Bollich

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety: Cypress

Seeding Rate: 100 lb/A

Planting Method: Drill seeded using a Kincaid drill with 7-in. row spacing

Planting Date: 12 May 1993

Water Management: Flushed on 21 and 28 May. Permanent flood applied 7 June

Fertilizer Management: 45 lb N/A pre-plant incorporated (N:P:K = 13:13:13)
90 lb N/A hand-broadcast on 22 June (N:P:K = 21:0:0)

Herbicides: Propanil; 3 lb AI/A applied 26 May using a CO_2 backpack sprayer

Fungicides: Benlate; 0.5 lbAI/A applied 28 June by air

Insecticides: Furadan 3G, Furadan 4F foliar, Furadan 4F impregnated on fertilizer (NH_3SO_4)

Treatments:
1: Furadan 3G; 0.6 lb AI/A hand-broadcast post-flood
2: Furadan 4F ;1.0 lb AI/A pre-flood foliar spray applied using a back sprayer (15 gpa, 26psi)
3: Furadan 4F; fertilizer impregnated; 1.0 lb AI/A hand broadcast14 days post-flood
4: Untreated check

Experimental design: Randomized complete block with four replicates

Harvested: Water removed 23 August. Harvested 1 Sept

Comments: Different formulations and application methods of the insecticide,

Furadan, were evaluated for control of rice water weevil (RWW). Statistical analysis was performed using ANOVA succeeded by orthogonal contrasts to separate the following mean comparisons: 1) Untreated vs Treated; 2) Furadan 4F foliar spray vs Furadan 4F impregnated on fertilizer and broadcast applied; 3) Furadan 3G vs Furadan 4F foliar and broadcast applied. Contrasts were performed for all collection dates except 22 June, because application of the broadcast treatments was not made until after the plots were sampled. Therefore, these plots were considered as untreated and the following contrast performed: 1) Furadan 4F foliar application vs Untreated. All analyses were conducted at the 0.05 probability level.

All Furadan-treated plots had significantly lower RWW populations when compared to the untreated control plots on 29 June, 7 July, and 13 July. Foliar application of Furadan 4F significantly lowered RWW populations compared with untreated plots on 22 June. RWW populations in plots treated with foliar application of Furadan 4F were not significantly different from plots treated with broadcast applications of fertilizer-impregnated Furadan 4F at any sampling date. Plots treated with Furadan 3G did not provide significantly better or worse RWW control when compared with foliar and broadcast Furadan 4F applications. Plants were significantly shorter in the control plots compared with plants in the insecticide-treated plots; however, plant height was not significantly different among the foliar applied Furadan 4F and broadcast applied Furadan 4F plots, or among Furadan 3G and Furadan 4F plots. Yield did not differ significantly among treated and untreated plots.

Table 1. Mean number of rice water weevil larvae per core and mean yield parameters (±SE). Rice Research Station, Crowley, LA, 1993.

Pesticide	Larvae per core				Plant Parameters	
	Jun 22	Jun 29	Jul 7	Jul 13	Plant height (cm)	Yield (kg/ha)
Untreated	4.9 ± 0.72	11.9 ± 1.0	15.2 ± 2.2	16.6 ± 2.4	80.9 ± 0.63	5621.6 ± 99.0
Furadan 3G[1]	6.5 ± 1.1	1.5 ± 0.31	2.4 ± 1.2	2.9 ± 0.57	81.7 ± 0.98	5852.0 ±279.0
Furadan 4F[2]	5.8 ± 1.2	1.6 ± 0.58	0.6 ± 0.34	2.5 ± 0.40	81.2 ± 0.93	6076.7 ± 45.2
Furadan 4F[3]	1.3 ± 0.43	2.1 ± 0.66	2.9 ± 0.89	3.7 ± 1.2	78.3 ± 0.65	5952.0 ± 42.9

1 Hand broadcast 14 d post-flood @ 0.6 lb AI/A.

2 Mixed with fertilizer and hand broadcast 14 d post-flood @ 1.0 lb AI/A.

3 Applied as a foliar spray 3 d pre-flood @ 1.0 lb AI/A.

Effects of Planting Date on Rice Water Weevil: Numbers of Feeding Scars, Eggs, and Larvae

J. D. Barbour, M. A. Muegge, G. B. Trahan, and P. A. Bollich

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety: Cypress

Seeding Rate: 160 lb/A

Planting Method: Water seeded; pre soaked seed was broadcast by hand onto grooved plots (7 in. row spacing) covered with ca. 4 in. of water

Planting dates:

early planting	23 Apr 1993
middle	7 May 1993
late	21 May 1993

Water Management: Pinpoint flood with flushes and permanent flood applied as follows:

	Flush	Permanent flood
Early planting	30 Apr	7 May
Middle planting	14 May	21 May
Late planting	28 May	4 Jun

Fertilizer Management: 45 lb 13:13:13 (N:P:K)/A pre-plant incorporated.
90 lb 13:13:13 (N:P:K:)/A ca 3 weeks post-flood

Herbicides: None applied

Insecticides: Furadan 3G @ 0.6 lb AI/A applied to insecticide plots

Treatments: 6: 3 planting dates (early, middle, and late) x 2 insecticide (treated, untreated)

Experimental Design: Split-plot with three replicates (=blocks)
Main plot = planting date (3 levels)
Subplot = insecticide (2 levels)

Harvested: Not harvested

Comments: Effects of planting date and Furadan 3G on numbers of rice water weevil (RWW) feeding scars on the newest unfurled leaf, numbers of RWW eggs per stem, and numbers of RWW larvae per core were evaluated. Neither planting date or Furadan significantly affected the number of feeding scars left by adult RWW on the newest unfurled leaf (Table 1) or the number of RWW eggs per stem (Table 2). Furadan, but not planting date, significantly affected the number of RWW larvae per core (Table 3). The number of RWW larvae per core was significantly higher in plots not receiving Furadan 3G compared with Furadan-treated plots.

Table 1. Mean number of RWW feeding scars/10 leaves[1]. Rice Research Station, Crowley, LA, 1993.

Insecticide	Planting date			
	Early	Middle	Late	**Insecticide means**
Furadan	3.07	4.44	3.44	**3.68** a
None	3.68	4.87	4.33	**4.28 a**
Planting date means	**3.36 A**	**4.68 A**	**3.89 A**	

[1] Horizontal and vertical means separated by upper and lower case letters respectively ($P \leq 0.05$).

Table 2. Mean number of RWW eggs/ five stems[1]. Rice Research Station, Crowley, LA, 1993.

Insecticide	Planting date			
	Early	Middle	Late	**Insecticide means**
Furadan	1.78	1.28	1.11	**1.47 a**
None	1.07	1.54	3.00	**1.59 a**
Planting date means	**1.42 A**	**1.41 A**	**2.06 A**	

[1] Horizontal and vertical means separated by upper and lower case letters respectively ($P \leq 0.05$).

Table 3. Mean number of RWW larvae/core[1]. Rice Research Station, Crowley, LA, 1993.

Insecticide	Planting date			
	Early	Middle	Late	**Insecticide means**
Furadan	3.44	2.22	3.50	2.96 **b**
None	7.43	9.31	6.42	8.01 **a**
Planting date means	**5.39 A**	**5.76 A**	**4.96 A**	

[1] Horizontal and vertical means separated by upper and lower case letters respectively ($P \leq 0.05$).

Spatial Distribution and Sequential Sampling of the Rice Water Weevil

M. A. Muegge, J. D. Barbour, G. B. Trahan, and P.A. Bollich

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety: Cypress

Seeding Rate: 100 lb/A

Plot Size: 4 x 35 ft

Planting Method: Drill seeded using a Kincaid drill with 7 inch row spacing

Planting Date: 21 May

Water Management: Flushed 25 May, and 1 and 8 June. Permanent flood applied 15 June

Fertilizer Management: 45-45-45 lb/A (N:P:K = 13:13:13) preplant incorporated
90 lb/A N (N:P:K = 21:0:0) applied 14 June using a motorized gandy

Herbicides: Propanil; 3 lb AI/A applied 11 June using a CO_2 backpack sprayer

Fungicides: Benomyl (0.5 lb AI/A) applied aerially 28 June.

Insecticides: None

Treatments: None

Experimental Design: Randomized block design with stratification

Comments: Larva data for each date and over all dates were not significantly different from the negative binomial distribution (χ^2 = 2.2, 1.1, 0.68, 0.53, 0.46, and 0.35 respectively). The values obtained for the aggregation indices; "*k*" of the negative binomial, "b" of Taylor's power law, and "β" of Iwao's patchiness regression, suggest that RWW larva populations were approximately randomly distributed at high densities becoming more clumped at low densities (Table 1). The sequential sampling plans, SPRT and 2-SPRT, were developed from the

common *k* (determined from the larva data), and the economic threshold of 5 larva/core and 2 larva/core. The SPRT and 2-SPRT perform similarly except the 2-SPRT terminates at a maximum sample number needed to make a control decision (Figure 1).

Table 1. Aggregation indices for by date larva data. Rice Research Station, Crowley, LA, 1993.

		Aggregation Indices				
Date		b	R^2	β	R^2	*k*
July	9	0.99	0.08	0.99	0.90	8.68
	16	0.27	0.02	0.89	0.87	6.63
	23	0.23	0.004	0.94	0.78	5.13
	30	2.0	0.34	1.12	0.61	3.18
August	6	1.9	0.55	1.64	0.87	3.31

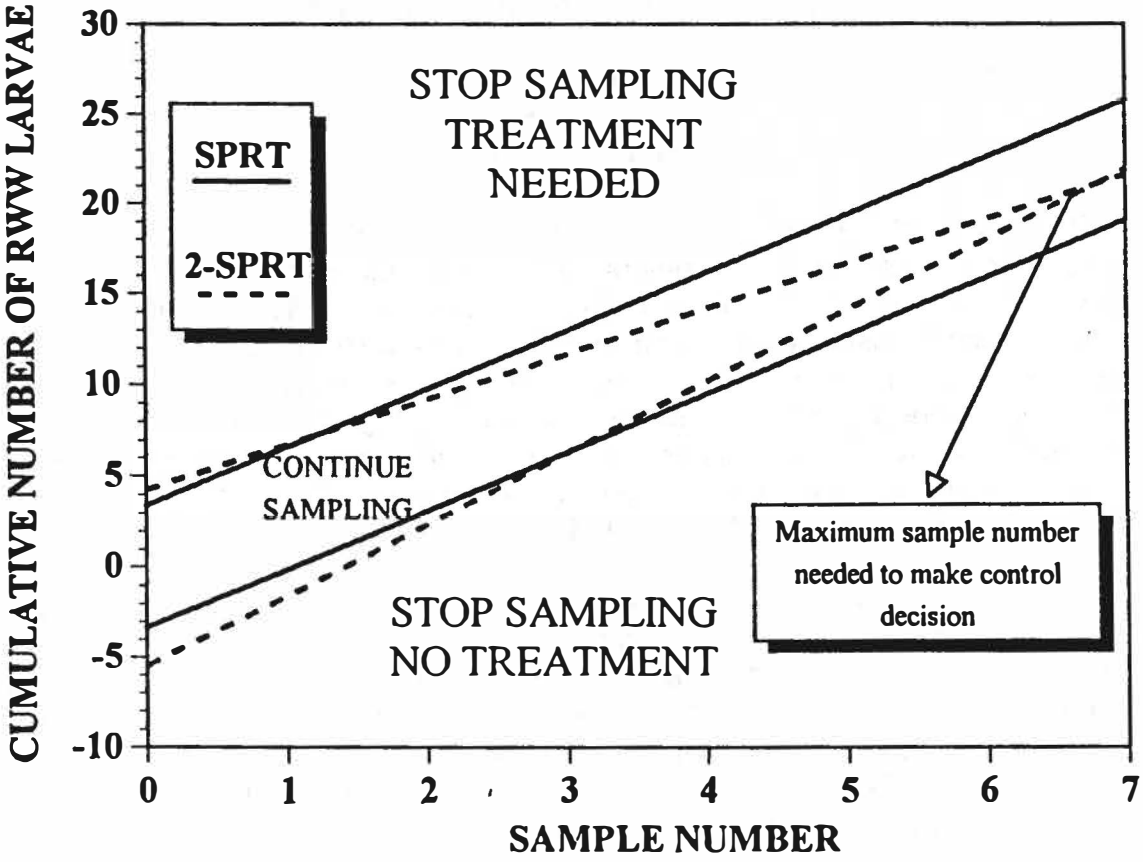


Fig. 1. SPRT & 2-SPRT for rice water weevil. Common K=7.97.

SOMACLONAL VARIATION FOR IMPROVEMENT OF SHEATH BLIGHT RESISTANCE IN RICE[1]

M.C. Rush, Q.J. Xie, S.D. Linscombe, K.P. Seilhan, and James Oard

INTRODUCTION

The sheath blight resistant lines LSBR-5 and LSBR-33, derived from the Labelle somaclone LR163, were registered as elite lines in 1992 (1). These lines were used in crosses with the long-grain cultivars Labelle and Lemont. Panicle rows from these crosses were grown through the late 1980s and early 1990s and selected for sheath blight resistance, agronomic acceptability, and yield potential. Selected lines were passed on to the rice breeding program for yield testing and further selection. In 1993, 71 lines were harvested from these panicle rows, and from other sheath blight resistant materials developed in our program, for testing by the breeding program in 1994 (Table 1).

In 1993, three segregates from crosses between LSBR-5 and Lemont were included in the Cooperative Uniform Regional Rice Nursery (URN) as entries from the rice breeding program at the LSU Agricultural Center, La. Agri. Exp. Stn., Rice Research Station (RRS). These lines were assigned the URN numbers 71, 149, and 152. These three lines were also planted in yield tests in five parishes by the rice breeding program. One test was at the RRS and tests were planted in East Carroll, Morehouse, Rapides, and Vermilion parishes.

A set of lines from these crosses were compared for sheath blight resistance with the susceptible commercial cultivars Labelle (source of LSBR-5), Lemont, Lacassine, and Cypress; as well as with the variety Katy that shows a moderate level of sheath blight resistance (Table 2). Data were also collected on disease incidence at weekly intervals after plots were inoculated until maturity.

In 1993, F_2 populations were grown from crosses among our resistant lines and between lines and commercial cultivars (Table 3). Panicles were selected from inoculated F_2 plants that appeared to be resistant to sheath blight. These panicles will be used to grow F_3 panicle rows in 1994 for evaluation for sheath blight resistance and agronomic characters. An additional 105 crosses were made among sheath blight resistance sources and commercial varieties in 1993 (Table 4). Progeny (F_1 plants) were grown in the greenhouse to produce seeds for growing F_2 populations from these crosses in the field in 1994. Material from these crosses and other sources of sheath blight resistance will be used in a modified recurrent selection scheme over the next few years to develop lines having all of the currently available sheath blight resistance genes.

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[1]This research supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

RESULTS AND DISCUSSION

The 71 lines harvested for further testing by the rice breeding program in 1994 are listed in Table 1. Pedigree or source and sheath blight rating are given for each line.

According to data collected by cooperators in the URN, the lines URN 71, URN 149, and URN 152 yielded in general with the commercial variety checks and had sheath blight and blast resistance. These three lines also yielded well when planted in the parish tests. In general, the lines yielded with Cypress, the long-grain cultivar check (Table 5). The ratoon potential of these lines was excellent.

Data from the set of sheath blight resistant lines compared with commercial varieties are shown in Table 2. The lines showed significant resistance when compared with the susceptible commercial cultivars and they yielded well. Spread of the disease through the inoculated plots is shown as increasing disease incidence in Figure 1 for selected varieties and lines.

More than 4500 panicles were selected from F_2 populations in 1993 to grow F_3 panicle rows in 1994. Seeds were obtained from F_1 plants of about 100 crosses for planting F_2 populations in 1994. The F_1 plants from a few crosses made in 1993 were sterile or nearly sterile.

LITERATURE CITED

1. Xie, Q.J., S.D. Linscombe, M.C. Rush, and F. Jodari-Karimi. 1992. Registration of LSBR-33 and LSBR-5 sheath blight-resistant germplasm lines of rice. Crop Sci. 32:507.

Table 1. Rice lines given to the breeding program in 1993 for testing in 1994.

1993 LINE NUMBER	PEDIGREE	SHEATH BLIGHT RATING*
93R0456	LSBR-5 X LMNT	4
93R0484	LSBR-5 X LMNT	2
93R0523	LSBR-5 X LMNT	3
93R0545	LSBR-5 X LMNT	2
93R0561	LSBR-5 X LMNT	3
93R0804	LSBR-5 X LMNT	2
93R0826	LSBR-5 X LMNT	3
93R1461	LMNT X LSBR-5	2
93R1924	LMNT X LSBR-5	3
93R2049	20d WHITE	3
93R2076	24d RED, LONG	2
93R2143	24d RED, MEDIUM	2
93R2194	24d RED, MEDIUM	2
93R2249	22d WHITE	1
93R2495	LBLE X LSBR-33	1
93R2529	LBLE X LSBR-33	1
93R2569	LBLE X LSBR-33	2
93R2608	LBLE X LSBR-33	2
93R2632	LBLE X LSBR-33	2
93R2836	LBLE X LSBR-33	2
93R2983	LBLE X LSBR-33	4
93R3014	LBLE X LSBR-33	2
93R3088	LBLE X LSBR-33	1
93R3127	LSBR-33 X LMNT	3

Table 1. Continued.

1993 LINE NUMBER	PEDIGREE	SHEATH BLIGHT RATING*
93R3139	LSBR-33 X LMNT	3
93R3163	LSBR-33 X LMNT	2
93R3243	LSBR-33 X LMNT	2
93R3254	LSBR-5 X LMNT	3
93R3264	LSBR-5 X LMNT	1
93R3284	LSBR-5 X LMNT	4
93R3298	LSBR-5 X LMNT	2
93R3358	LSBR-5 X LMNT	3
93R3366	LSBR-5 X LMNT	2
93R3377	LSBR-5 X LMNT	2
93R3383	LSBR-5 X LMNT	2
93R3393	LSBR-5 X LMNT	2
93R3421	LSBR-5 X LMNT	2
93R3443	LSBR-5 X LMNT	2
93R3452	LSBR-5 X LMNT	2
93R3462	LSBR-5 X LMNT	3
93R3479	LSBR-5 X LMNT	1
93R3488	LSBR-5 X LMNT	2
93R3494	LSBR-5 X LMNT	4
93R3549	LMNT X LSBR-5	3
93R3562	LMNT X LSBR-5	2
93R3586	LMNT X LSBR-5	3
93R3601	LSBR-5 X LMNT	2
93R3651	LMNT X LSBR-5	3

Table 1. Continued.

1993 LINE NUMBER	PEDIGREE	SHEATH BLIGHT RATING*
93R3662	LMNT X LSBR-5	2
93R3678	LMNT X LSBR-5	1
93R3768	LMNT X LSBR-5	2
93R3828	LSBR-5 X LMNT	1
93R3861	LSBR-5 X LMNT	3
93R3874	LSBR-5 X LMNT	2
93R3939	LSBR-5 X LMNT	2
93R3985	20d RED, MEDIUM	1
93R3993	24d RED	3
93R4002	24d RED, LONG	2
93R4119	24d RED, LONG	2
93R4121	24d WHITE, LONG	1
93R4162	24d RED	2
93R4339	38d WHITE, LONG	1
93R4355	38d WHITE, LONG	1
93R4714	31d	3
93R4876	LSBR-5 X LMNT	3
93R4882	LSBR-5 X LMNT	3
93R4902	LSBR-5 X LMNT	2
93R4985	24d WHITE	5
93R5012	24d RED, LONG	3
93R5102	24d WHITE	5
93R5119	24d RED	2

* Sheath blight ratings are on a 0-9 scale, where 0 = no disease and 9 = tillers dead.

Table 2. Mean sheath blight ratings and total yields in plots inoculated with *Rhizoctonia solani* at the Rice Research Station in 1993.

Entry	Sheath Blight Rating[§]		Total Yield[†]	
91SP067	2.25	ab*	8997	abc*
91SP065	3.25	ab	10,023	a
91SP091	3.50	b	8923	abc
URN 149	4.00	bc	9140	ab
Katy	5.00	cd	7592	def
91SP086	5.50	d	8656	bcd
URN 71	5.50	d	8623	bcd
Cypress	6.75	e	8360	bcde
Labelle	7.00	ef	7986	cdef
Lemont	7.50	ef	7170	ef
Lacassine	8.00	f	6797	f

§ Rating is on a 0-9 scale where 0 = no disease and 9 = tillers dead at maturity.

† Yield expressed in kg/ha at 12% moisture.

* Means separation based on Duncan's Multiple Range Test, $\alpha = 0.05$.

Table 3. 1992 crosses used to generate F_2 populations planted in 1993, with parent pedigrees.

Cross	Parent Pedigrees	Parent Sheath Blight Rating (0-9)†
92-0978/LMNT	92-0007 = LBLE/LSBR-33	-
93-0948/LCSN	92-0044 = LBLE/LSBR-33	-
92-0955/92-5952	92-0072 = LBLE/LSBR-33	-
92-5904/92-0955	92-0128 = LBLE/LSBR-33	-
92-0128/LMNT	92-0231 = LSBR-5/LMNT	-
92-5945/LCSN	92-0592 = LSBR-5/LMNT	1
LMNT/92-3747	92-0651 = LSBR-5/LMNT	2
92-3747/CPRS	92-0948 = LSBR-5/LMNT	3
92-3747/LMNT	92-0955 = LSBR-5/LMNT	2
92-1831/92-3736	92-0978 = LSBR-5/LMNT	2
92-3736/92-0007	92-1595 = LMNT/LSBR-5	3
92-3736/92-0128	92-1831 = 68Cr3332/LBLE (red)	4
92-3736/92-5003	92-1906 = 68Cr3332/NTAI (white)	4
92-3736/LMNT	92-1938 = rice x grass - 60	2
92-3736/CPRS	92-3736 = LSBR-5/LMNT	3
LMNT/92-0044	92-3747 = LSBR-5/LMNT	3
92-0651/LMNT	92-5003 = LSBR-5/LMNT	2
92-1938/92-3736	92-5904 = TDCN/STBN	2
92-1938/LMNT	92-5945 = TDCN/STBN	1
92-1938/92-0007	92-5952 = TDCN/STBN	1
92-1938/92-0592		
92-0231/92-1595		
CPRS/92-0072		
CPRS/92-1906		

† Based on 0 to 9 scale where 0 = no disease and 9 = dead at maturity.

Table 4. Crosses among sheath blight resistance sources and commercial varieties made in 1993.

Parent†		Date of Cross	Number of Seeds
Female	Male		
CPRS	92-0044	9-8-93	15
CPRS	92-0072	9-8-93	40
CPRS	93-0187	8-4-93	19
93-0482	CPRS	7-22-93	40
CPRS	93-2004	8-8-93	14
CPRS	93-2034	7-25-93	22
CPRS	93-2132	8-8-93	17
93-2155	CPRS	7-23-93	12
CPRS	93-2177	8-8-93	14
		8-4-93	4
CPRS	93-2211	7-25-93	6
CPRS	93-2376	8-8-93	6
CPRS	93-3313	8-4-93	21
		8-8-93	31
93-3813	CPRS	8-3-93	18
CPRS	93-3965	8-8-93	15
CPRS	LSBR-5	9-8-93	16
CPRS	LA2071	8-8-93	14
LA2071	CPRS	8-13-93	21
CPRS	LEAH	8-8-93	10
LGRU	CPRS	8-13-93	2
CPRS	TQNG	8-4-93	11
93-0157	KATY	7-22-93	13
93-0674	KATY	7-22-93	52
93-0683	KATY	7-27-93	17

Table 4. Continued.

Parent†		Date of Cross	Number of Seeds
Female	Male		
KATY	93-0867	7-25-93	14
93-2202	KATY	7-25-93	12
KATY	93-2376	8-8-93	12
93-3313	KATY	8-3-93	11
KATY	93-3664	8-8-93	13
		8-11-93	3
KATY	93-6034	8-11-93	3
KATY	LSBR-5	8-11-93	11
PS065	KATY	7-22-93	30
PS068	KATY	7-27-93	2
PS091	KATY	7-22-93	44
PS149	KATY	7-27-93	16
LA2071	KATY	7-22-93	62
		8-13-93	22
SL50 (9302048)	KATY	8-13-93	10
KATY	SL76 (9302155)	8-11-93	25
KATY	LEAH	8-8-93	15
LMNT	KATY	8-11-93	11
LMNT	92-0044	9-12-93	40
LMNT	92-0072	9-12-93	15
93-2037	LMNT	7-23-93	12
93-2155	LMNT	7-25-93	96
LMNT	93-2202	7-25-93	22
93-3313	LMNT	8-3-93	6

Table 4. Continued.

Parentt			
Female	Male	Date of Cross	Number of Seeds
93-3828	LMNT	8-1-93	81
LMNT	93-3965	8-11-93	17
LMNT	92-5059	9-12-93	14
PS067	LMNT	7-12-93	4
LMNT	LA2071	8-11-93	12
LMNT	LA0149	8-11-93	15
PS149	LMNT	7-27-93	26
LMNT	JA85	8-4-93	12
		8-11-93	11
LCSN	93-2145	7-25-93	28
LCSN	93-3664	8-8-93	10
LCSN	93-3965	8-8-93	6
PS087	LCSN	7-22-93	60
LCSN	LA2071	8-8-93	5
LCSN	LEAH	8-8-93	18
LA2071	LEAH	8-13-93	6
LGRU	LA2071	8-13-93	4
LA2071	LGRU	8-13-93	25
LGRU	LSBR-5	8-13-93	3
93-3813	MBLE	8-3-93	28
MBLE	93-3982	8-3-93	14
MBLE	JA85	8-3-93	18
MBLE	TQNG	8-1-93	4
93-0708	NBNT	7-29-93	4

Table 4. Continued.

Parent†		Date of Cross	Number of Seeds
Female	Male		
NBNT	TQNG	8-1-93	10
RSMT	LSBR-5	8-11-93	4
RSMT	SL76 (9302155)	8-11-93	4
RSMT	JA85	8-11-93	19
RSMT	KATY	8-11-93	26
BNGL	93-0187	8-4-93	3
BNGL	93-2169	8-4-93	8
BNGL	93-2177	8-14-93	8
BNGL	JA85	8-4-93	8
93-0439	GCHW	7-29-93	30
93-3828	GCHW	8-1-93	35
93-3313	JA85	8-3-93	8
93-3813	JA85	8-3-93	30
JA85	TQNG	8-1-93	10
SL50 (9302048)	93-6034	8-13-93	3
SL50 (9302048)	LSBR-5	8-13-93	15
SL50 (9302048)	CPRS	8-13-93	4
SL50 (9302048)	JA85	8-13-93	12
93-0491	TQNG	8-1-93	5
93-0745	TQNG	8-1-93	13
93-3313	TQNG	8-3-93	4

Table 4. Continued.

Parent†		Date of Cross	Number of Seeds
Female	Male		
93-3828	TQNG	8-1-93	48
93-0439	93-2256	7-29-93	5
93-0439	93-2264	7-29-93	6
93-0708	93-2264	7-29-93	47
93-0745	93-3982	8-1-93	20
93-2006	PS683	7-30-93	12
93-3313	93-2243	8-3-93	8
PS067	93-2256	7-29-93	18
93-3828	93-2264	8-1-93	18
93-3313	93-3965	8-3-93	6
93-3813	93-3982	8-3-93	35

† Advanced lines used as parents are:
SL50 = line from Steve Linscombe (KATY/CPRS) (9302048), 1993 hybridization block; SL76 = line from Steve Linscombe (KATY/CPRS) (9302155), 1993 hybridization block; PS065, PS067, PS068, PS087, PS091, PS149, and PS683 are lines from Paul Seilhan's 1993 research plots.

† Panicle lines used as parents are:
92-0044 (LBLE/LSBR-33); 92-0072 (LBLE/LSBR-33); 92-0077 (LBLE/LSBR-33); 92-5059 (LMNT/LSBR-5); 93-0157 (LSBR-5/LMNT); 93-0187 (LSBR-5/LMNT); 93-0439 (LSBR-5/LMNT); 93-0482 (LSBR-5/LMNT); 93-0491 (LSBR-5/LMNT); 93-0674 (LSBR-5/LMNT); 93-0683 (LSBR-5/LMNT); 93-0708 (LSBR-5/LMNT); 93-0745 (LSBR-5/LMNT); 93-0867 (LSBR-5/LMNT); 93-2004 (20d = [Taducan/Starbonnet]); 93-2006 (20d); 93-2034 (20d); 93-2037 (20d); 93-2132 (24d, red = [H_4/CODF//IR661-1-140]); 93-2145 (24d, red); 93-2155 (24d, red); 93-2177 (24d, red); 93-2202 (24d, red); 93-2211 (24d, red); 93-2243 (22d, white = [H_4/CODF//Nortai]); 93-2256 (22d, white); 93-2264 (22d, white); 93-2376 (LBLE/LSBR-33); 93-3313 (LSBR-5/LMNT); 93-3664 (LMNT/LSBR-5); 93-3813 (LSBR-5/LMNT); 93-3828 (LSBR-5/LMNT); 93-3965 (20d); 93-3982 (20d); 93-6034 (CICA 6/LBLE); 9302048 (KATY/CPRS; 1993 BP-HYB NO. 50); 9302155 (KATY/CPRS; 1993 BP-HYB NO. 76).

Table 5. Yields in lb/A @ 12% moisture of three sheath blight resistant lines in five Louisiana parishes†.

	Acadia			Vermilion			East Carroll	Morehouse	Rapides	First Crop Mean
Line or Variety	First Crop	Ratoon Crop	Total	First Crop	Ratoon Crop	Total				
CPRS	7937	994	8931	7424	3620	11,044	8340	9089	6431	7844
URN 71	7690	1500	9190	7205	4780	11,985	7168	8201	6021	7257
URN 149	7332	1610	8942	7620	4375	11,995	7976	8206	6751	7577
URN 152	7524	1434	8957	7080	3907	10,987	8884	8793	6396	7735

† Tests conducted by the rice breeding program of the Rice Research Station; Crowley, LA.

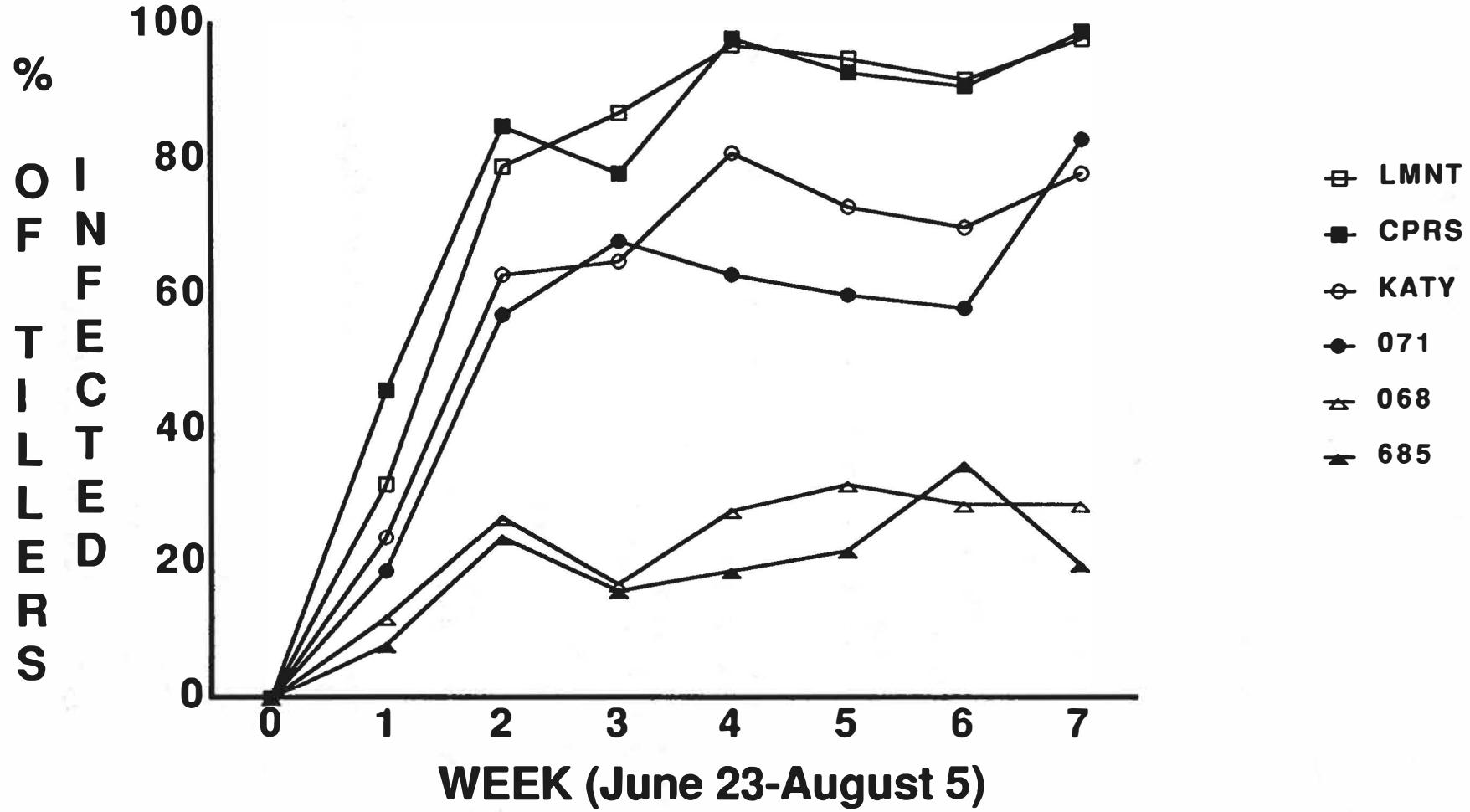


Figure 1. Sheath blight incidence for selected varieties and lines grown at the Rice Research Station during 1993.

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