99TH ANNUAL RESEARCH REPORT
Rice Research Station

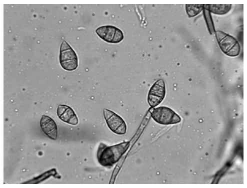
LSU AgCenter
Research & Extension

www.lsuagcenter.com

Crowey, Louisiana

2007

Cover Photos



Pyricularia oryzae fungal spores, the blast causal organism

Ron Regan and Dustin Harrell drill seeding a nitrogen fertility trial on the Kurt Lounsberry Farm near Lake Arthur, La.

Sunny Bottoms and Justin Hensley harvesting rice in the rice weed management program

Female crawfish in an "artificial burrow"

Hedge Hyssop (Gratiola spp.)

99th Annual Research Report

RICE RESEARCH STATION

Crowley, Louisiana

2 0 0 7

Louisiana State University Agricultural Center
William B. Richardson, Chancellor

Louisiana Agricultural Experiment Station
David J. Boethel, Vice Chancellor and Director

Louisiana Cooperative Extension Service
Paul D. Coreil, Vice Chancellor and Director

Southwest Region/Rice Research Station
Steve D. Linscombe, Regional Director/Resident Coordinator

TABLE OF CONTENTS

INTRODUCTION

Research at the Rice Research Station, Crowley, Louisiana, is conducted by scientists with the LSU AgCenter's Louisiana Agricultural Experiment Station. The 2007 rice research program included breeding, biotechnology, variety testing, fertilization, soil and water management, cultural practices, weed control, insect control, disease investigations, rice drying, bird control in rice, and physiology studies. 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, forages, and multi-cropping of crawfish with agronomic crops. Another important area of work is the production and distribution of foundation seed. Although most research work was performed by members of the Rice Station faculty, 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 because of the mission of the Rice Research Station. Research accomplishments and general progress of the Rice Station during 2007 are presented in this report representing the 99th Annual Research Report of the Rice Research Station, Louisiana Agricultural Experiment Station, LSU 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 2007. Approximately 450 people attended the annual Rice Research Station field day to view plots and participate in discussions of research findings. Field days also were conducted in Evangeline, Jeff Davis, Richland, 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 2007.

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 2007 are listed.

MONTHLY RAINFALL DATA
RICE RESEARCH STATION - CROWLEY, LA
2007

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR TOTAL
1	.01	.48		.47		.08		.15	2.00				
2		.21	.01	.21					.16				
3		.01			.02	.03	1.73	.23				.03	
4	.10			.08	1.81	1.95	.05						
5	3.00			.01	.01	1.07	.50						
6	.01						.94		.05				
7	.13						.41		.03				
8	.70			.34	.42				2.52	.28			
9							.23		.19				
10				.79		.90							
11				1.15		.03					.02		
12	.06								.62		.05		
13	.03	.07	.40						2.19		.11	.01	
14			.10						.92			.04	
15			.75		.15	.23	.40	.38			.05		
16	.57				.01	1.24	.05	.08				.41	
17	.16		.01					.01		.02			
18	.04			.45			.02	.05		.87	.14		
19	.48					.23		1.50		.03	1.90		
20	.31					.64	.04	.05				.17	
21	1.09	.20					.43					.45	
22	.98	.03									1.61		
23					.02				.17	.75	.02	.40	
24	.19				.02				.04		.02		
25	.12	.12			.01			1.26	.20		.63		
26				1.13		.15		.09	.10		4.72		
27	.20						.09					1.13	
28	1.50				.70		1.95						
29					1.70	.18	.47	.02				.62	
30					.03	.69	.18	2.08					
31	.10		.02		1.90		.37					.01	
MONTH TOTAL	9.78	1.12	1.29	4.63	6.80	7.42	7.86	5.90	9.19	1.95	9.27	3.27	68.48
2006	2.71	4.83	0.68	4.83	2.80	2.32	6.88	4.98	3.66	11.40	1.95	6.67	53.71

RICE BREEDING

GENETIC IMPROVEMENT OF RICE FOR LOUISIANA PRODUCTION[1]

S.D. Linscombe, X.Y. Sha, S.B. Blanche, K.F. Bearb, C.A. Conner, B.W. Theunissen,
S.J. Theunissen, G.E. Anderson, B.J. Henry, and H.L. Hoffpauir

INTRODUCTION

The primary objective of the Rice Breeding Project is the development of superior varieties for the Louisiana rice industry. The Breeding Project is developing improved genotypes of both long- and medium-grain types, which are both important in the state and region. The project is also placing major emphasis on the development of specialty purpose types.

In addition to the primary objective of varietal development, the Breeding Project also conducts other research that may have direct and/or indirect contributions on varietal development. Included here are studies on milling quality, mutation breeding, date of planting, incorporation of herbicide resistance into rice varieties for use in red rice control programs, and development of lines for crawfish forage production.

The 2007 rice breeding nursery included 103,500 breeding rows, 708 F_1 transplant populations, and 502 space planted F_2 populations. About 700 new crosses were made. On- and off-station testing included over 4,700 yield plots. Yield testing included the Cooperative Uniform Regional Rice Nursery, which contained 200 experimental lines and checks (50 Louisiana entries). The commercial-advanced test was conducted at the Rice Research Station and six off-station locations.

The preliminary yield testing program evaluated 725 lines (mainly of F_5 and F_6 generation), most for the first time. In addition to yield testing, these lines were also evaluated for seedling vigor, milling characteristics, quality parameters, and numerous other agronomic characteristics.

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

COOPERATIVE UNIFORM REGIONAL RICE NURSERY

The Uniform Regional Rice Nursery (URN) is a multi-state yield nursery conducted by public rice breeders at research locations in Arkansas, Louisiana, Mississippi, Texas, California, and Missouri to evaluate experimental lines and commercial varieties. Entries are exposed to different environments over a wide, diverse growing region and allow researchers to evaluate their adaptation in a single row.

The 2007 URN test included 200 experimental lines and varieties planted in six states. The randomized complete block design was applied, with three replications for Groups 1 to 4 and two replications for Groups 5 to 7. Seeding rates were 90 lb for varieties and 38 lb for hybrids.

The 2007 URN results from the Rice Research Station will be reported. All plots were drill seeded on March 13. Groups 1 to 4 were harvested on August 6 and Groups 5 to 7 were harvested on August 7. Tests were conducted using standard agronomic practices (except that no fungicides were applied). Tables 1 to 7 show grain and milling yield and agronomic performance (seedling vigor, days to 50% heading, plant height, and lodging percentage) of entries in the 2007 URN nursery at the Rice Research Station.

Table 1. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 1, Rice Research Station, Crowley, LA.

							Milling Yield (%)					
Entry	**Source**	**Pedigree**	**Vigor†**	**Days to 50% Heading**	**Plant Height (in)**	**Grain Yield (lb/A @ 12%)**	**Whole**	**Total**	**SB‡**	**BPB‡**	**RNB‡**	**NBLS‡**
011	RU0502022	CPRS/KBNT//9502008-A	4	84	39	9066	61.5	70.4	6.5	5.5	2.8	0.8
004	RU0501096	L201/7402003//KATY/NWBT/3/LGRU	4	86	44	8953	63.2	68.7	4.3	4.5	0.5	0.5
018	RU0202008	TRENASSE	5	78	41	8462	59.7	64.6	7.8	7	4	1
008	RU0602103	KATY/CPRS//JKSN/3/AR1188/CCDR	4	83	40	8037	63.0	71.7	6.5	6	4.8	2.3
002	RU0602085	CCDR/9502008-A	4	82	39	7908	59.7	69.5	6.3	5	4.5	2.5
015	RU0604035	RSMT/KATY	3	83	38	7813	57.6	67.8	6.5	6.5	5	3.5
020	CYBT	CYBONNET	4	86	38	7726	66.1	71.6	6	5.3	3.3	1.5
001	RU0301081	NWBT/3/LBNT/9902//LBLE/4/DREW	4	91	46	7477	65.3	71.7	4	4	0.3	0.3
005	RU0602109	9901081/CCDR	5	87	36	7432	63.7	70.1	6.5	6.3	6.5	1.8
007	RU0401087	NWBT/3/LBNT/9902//LBLE/4/LGRU	4	86	41	7424	60.5	72.1	5.3	4.8	4.3	0.3
003	RU0503092	((NWBT/RU8303181)/RSMT))TX7129/CCDR	5	83	41	7337	64.8	70.4	6.5	5.3	4	2.8
013	RU0601013	LBNT/9902/3/DAWN/...//STBN/4/LGRU/5/WLLS	4	85	40	7261	64.2	71.7	5.8	4.5	3.8	0.5
017	SPRN	SPRING	3	77	46	7225	63.3	71.7	5.3	5.3	4.8	1
006	RU0503006	((NWBT/RU8303181)/RSMT))TX7129/CCDR	5	83	44	7207	62.5	68.9	5.8	5.8	3.5	2.5
012	RU0503012	((NWBT/RU8303181)/RSMT))TX7129/CCDR	5	86	40	7082	63.7	71.4	6.5	5	4	2
016	RU0604122	TBNT/LA110//LMNT/3/TBNT	4	84	40	6648	59.1	69.1	6	4.8	5.8	3.5
009	RU0503009	((NWBT/RU8303181)/RSMT))TX7129/CCDR	6	86	36	6549	64.2	71.9	7.5	6.5	4.5	1
014	RU0504083	CPRS/JKSN	5	87	32	6460	66.7	72.8	6.8	7.5	5	4.8
010	RU0601010	DREW/UA99-52	7	88	39	5919	58.1	69.6	6	6	2.3	0
019	PSDO	PRESIDIO	6	85	38	5633	64.3	69.5	5	4.8	3.5	0.3
c.v. %			10.0	1.3	3.3	4.7	2.6	0.86	14.0	16.4	24.1	54.4
$LSD_{0.05}$			0.75	1.8	2.1	577	3.3	1.3	1.2	1.3	1.3	1.3

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 2. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 2, Rice Research Station, Crowley, LA.

Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB‡	BPB‡	RNB‡	NBLS‡
040	FRNS	FRANCIS	3	84	42	8792	63.1	71.1	6.8	4	4.5	0
028	RU0402028	BNGL//MERC/RICO/3/MERC/RICO//BNGL	4	86	36	8387	70.1	72.4	4.5	4.8	0.8	0.3
038	BNGL	BENGAL	4	86	38	8363	69.7	72.7	5	4.3	3.3	1
031	RU0702031	CCDR/5/MARS/…/6/L202/…/7/CCDR/…	4	80	40	7928	62.9	68.3	5.5	6.8	4.5	1.5
037	JPTR	JUPITER	6	86	38	7925	68.1	70.8	3	4	4.5	1.3
036	RU0604156	8902031/NWBT	4	83	35	7600	58.9	69.1	5	5.3	6.8	2.5
039	CL131	CL131	5	85	36	7514	63.9	70.1	7.5	7	3.8	2.8
026	RU0103184	(CPRS/PELDE)/JEFF	6	89	39	7468	68.6	71.1	5.5	6	2	2.3
025	RU0402125	96INT/AHRENT	5	87	40	7406	67.2	70.3	4	4.3	1.5	3
034	RU0702034	JODN/AR1121/7/CCDR/…/6/CCDR/5/MARS/…	4	79	41	7309	64.9	70.6	5	6.8	6	1.3
035	RU0604114	8904186sel919/8803012	4	87	36	7298	57.4	70.2	7.8	6.5	6	0
033	RU0404191	8603006/3/MARS/NWRX//TBNT	4	84	36	7280	64.2	71.5	5	6	6.3	0
021	RU0401084	BRAZ/../3/../..//NTAI/4/BNGL/5/BNGL/RICO	5	86	43	7136	62.6	68.3	7	4.5	0.5	1.3
027	RU0601027	DREW/UA99-52	5	89	40	7111	60.9	68.6	6.5	6	1.5	0.8
023	RU0503095	(CPRS/(KATY//../PCOS))/((CPRS/PELDE)/JEFF))	5	87	43	7082	65.3	71.2	4	5.5	3	1.5
022	RU0502094	CCDR/5/MARS/M201//MARS…	4	85	39	6934	64.9	69.7	6.5	7.5	2.8	1.8
030	RU0601030	WLLS/UA99-52	5	88	39	6462	59.2	70.8	7	6.5	1	1.3
032	RU0303129	(CPRS/PANDA)/JEFF*2	6	84	40	6184	66.6	71.4	5	6.5	3.8	2.5
024	RU0401136	BRAZ/../3/../..//NTAI/4/BNGL/5/BNGL/RICO	6	87	33	6077	67.8	70.8	6	5.5	5.8	0.3
029	RU0003178	(CPRS/PELDE)/JEFF	9	94	38	2930	62.9	69.4	5	5.3	4	0.3
c.v. %			9.7	1.2	4.3	6.8	2.2	1.5	16.1	15.3	28.4	37.3
$LSD_{0.05}$			0.80	1.7	2.7	800	2.9	2.2	1.3	1.2	1.5	1.2

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 3. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 3, Rice Research Station, Crowley, LA.

Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%)		SB‡	BPB‡	RNB‡	NBLS‡
							Whole	Total				
058	CHNR	CHENIERE	5	88	36	7876	63.3	71.5	5.5	6.3	5.5	1
059	CCDR	COCODRIE	4	85	38	7712	63.3	70.8	6	7.3	4.5	2.3
054	RU0504196	CPRS/3/L201//TBNT/BLMT	4	87	40	7564	66.9	70.6	7.8	5.8	2.8	1.5
050	RU0301050	LBNT/9902//NWBT/3/KATY/NWBT/4/DREW	4	88	43	7554	64.2	70.8	6.5	6.8	2.8	0.3
051	RU0602183	9502008-A//AR1188/CCDR	4	83	38	7493	62.5	68.7	7	7	3.8	1.8
042	RU0602189	9502008/CPRS	4	88	39	7302	66.2	71.1	7	7.3	2.5	0.8
055	RU0504193	CPRS/3/L201//TBNT/BLMT	4	84	38	7251	68.0	71.8	6.5	6	1	1.5
060	CL171AR	CL171AR	4	88	40	7228	68.3	72.4	5.3	6.3	3.3	1.8
048	RU0602174	9502008-A//AR1188/CCDR	4	85	39	7197	61.7	67.7	6	6	3.5	2.3
045	RU0302082	9502008-A/DREW	5	88	37	7070	66.9	72.7	5	6	1.5	0.5
053	RU0504156	CPRS/3/L201//TBNT/BLMT	4	85	38	6891	66.2	70.6	7	6.3	2.5	0.5
049	RU0703049	((NWBT/RU8303181)/GFMT)/MDSN	4	87	45	6836	70.0	73.2	6	6.3	0.8	2
047	RU0401145	L201//TBNT/BLMT/3/CPRS	6	87	37	6407	66.0	70.1	6.8	6	2.5	1.3
057	PRSC	PRISCILLA	4	87	39	6290	64.3	70.5	5.3	4.8	1.8	0
046	RU0703046	(VSTA/..//RSMT)/LMNT//CPRS/(KATY//../PCOS)	5	87	37	6252	67.0	70.4	5.8	5.3	1.5	2.5
044	RU0601044	DREW/UA99-52	6	89	37	5812	63.1	70.2	5	6	1.5	0.3
043	RU0403166	Kaybonnet/Zhongyouzao3	6	90	36	5774	69.5	73.0	6.3	7	3.8	1.8
056	SABR	SABER	4	86	41	5704	65.4	68.8	6.8	5.8	2.8	0.3
052	RU0103104	Texmont/TeQing	6	89	35	5536	65.0	71.0	5.8	5.5	2.3	1
041	RU0301041	LMNT//../CICA8/3/DLMT/4/..-(120)/..//BSMT122	5	91	44	4615	65.4	70.3	5	4.3	3	0.3
c.v. %			11.4	1.6	2.7	7.8	1.9	0.96	12.8	12.4	51.5	71.6
$LSD_{0.05}$			0.86	2.3	1.7	872	2.6	1.4	1.1	1.1	2.0	1.2

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 4. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 4, Rice Research Station, Crowley, LA.

Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB‡	BPB‡	RNB‡	NBLS‡
065	RU0602171	BNGL//MERC/RICO/3/EARL	4	86	36	7998	68.7	72.4	6.8	6	4.8	0.3
068	RU0702068	9502065/3/MERC//MERC/…	5	85	39	7443	70.3	74.0	7.8	5.5	2.8	0.8
079	BNKS	BANKS	4	88	45	7387	59.2	68.0	5	5	1	0
076	RU0501102	LGRU-2/DREW	4	85	43	7148	67.8	73.9	6	5.3	2.8	0.8
069	RU0703069	((VSTA/..//RSMT)/..)/(CPRS/(KATY//../PCOS))	5	90	40	6701	66.1	70.2	6.5	6.8	1.3	1.3
077	RU0704077	8203035/8401164	4	94	42	6622	54.5	71.4	4.3	4.8	0.8	0.3
064	RU0401182	DREW/5/NWBT/3/../9695//STBN/4/KATY/STBN	4	89	40	6603	65.6	71.5	6.3	5.5	1.8	1.3
061	RU0601061	RU9201176/3/NWBT/KATY//RA73/LMNT	4	88	44	6569	58.4	70.9	5.3	4.3	1	0
072	RU0703072	((NWBT/RU8303181)/GFMT)/MDSN	5	90	45	6567	68.2	71.7	5.3	5	0.8	2
063	RU0703063	((VSTA/..//RSMT)/..)/(CPRS/(..//GFMT/PCOS))	5	88	39	6552	66.6	70.4	6.8	7.5	0.8	0.8
062	RU0602168	BNGL//MERC/RICO/3/MERC/RICO//BNGL	5	86	35	6490	69.9	72.9	7	4.8	5	0.3
080	WLLS	WELLS	4	89	42	6480	60.2	71.9	5.3	5	2	0
074	RU0504198	RSMT/KATY	4	86	41	6443	63.1	69.9	5.5	6	6	1
066	RU0703066	(LGRU/..)/(RU8803072/(KATY//GFMT/PCOS))	5	88	45	6380	65.2	70.8	5.5	5.8	1.3	0.8
067	RU0401067	BRAZ/TBNT/3/../NV66//../4/BNGL/5/BNGL/RICO	5	81	35	5993	67.8	70.9	5.8	6.8	4.3	0.8
071	RU0702071	BNGL/9502065	5	86	38	5775	65.3	69.1	5.5	4.5	5.3	0
073	RU0604186	MBLE//82CAY21/LMNT	5	90	35	5499	65.4	71.5	8	5.8	3.8	3.3
078	RU0403078	PSCL/JEFF	6	85	37	5248	62.9	71.0	6.5	5	5	0.3
075	RU0603075	4483-1693	5	95	43	4824	53.7	67.5	3.8	3.5	0	0
070	RU0701070	..//KATY/../5/NWBT/..//RA73/../4/LBNT/9902/3/../	5	92	41	4064	61.8	70.6	5	4.3	4.5	1
c.v. %			8.1	1.4	3.1	8.7	4.5	1.6	11.1	13.4	45.4	86.8
$LSD_{0.05}$			0.62	2.0	2.1	913	6.1	2.4	0.92	1.0	1.8	0.89

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 5. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 5, Rice Research Station, Crowley, LA.

Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB‡	BPB‡	RNB‡	NBLS‡
087	RU0701087	GP13416/KATY//PI312777	4	85	44	8914	62.7	70.0	6	7.5	6	0
111	RU0701111	FRNS/6/LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/	4	88	40	8621	65.1	70.5	5	6	7	0.5
097	RU0702097	CPRS/97T1280DH1/3/CPRS/NWBT//KATY	5	90	43	8143	63.0	70.3	4	4	3.5	0.5
115	RU0702115	KATY/CPRS//NWBT/…/3/9502008/4/CLR9	5	84	36	7841	64.5	70.2	7.5	7	6	0
109	RU0702109	9502008-A//AR1188/CCDR	5	82	39	7754	62.5	68.9	8	6.5	2.5	1
105	RU0701105	LBNT/9902//NWBT/3/KATY/NWBT/5/IR36M4/4/L201/	4	89	40	7710	64.7	71.3	4	6.5	1	0
117	CCDR	COCODRIE	4	84	38	7666	61.5	69.1	7	6	5.5	2.5
112	RU0702112	9502008-A/TACAURI//CFX-18	4	82	39	7591	66.5	71.4	7.5	7	5	1.5
106	RU0702106	CPRS/KBNT/4/9502008/3/CPRS//82CAY21/TBNT	4	87	39	7564	64.9	70.6	6.5	6	4	2
101	RU0703101	MDSN/((NWBT/RU8303181)87:15034/RSMT)TX7129	5	85	42	7463	59.8	71.4	7	5.5	2.5	0
102	RU0701102	91642//KATY/NWBT/5/RU9201176/4/KATY/NWBT/3/	4	87	36	7451	52.3	69.3	6	8	3	5
085	RU0702085	AR1188/CCDR//9502008/LGRU	4	86	38	7424	63.4	69.9	8	6	4	0
113	RU0703113	CPRS/LGRU	5	90	40	7373	66.7	71.1	6.5	7	1	0.5
081	RU0501081	19991562	4	81	43	7174	63.9	69.4	5	6	3	1
100	RU0704100	IR36/8603006	4	88	41	7166	65.2	70.9	5	5.5	4	2
088	RU0702088	CCDR/9770532DH1//LGRU	4	90	36	7125	61.6	68.1	4.5	5	4.5	1
096	RU0701096	LBNT/9902//NWBT/3/KATY/NWBT/5/IR36M4/4/L201/	4	87	39	7052	61.3	69.4	4.5	4.5	1	0.5
084	RU0501084	DREW/UA99-52	5	87	40	7039	55.1	67.1	7	6.5	3.5	1
091	RU0702091	CPRS/9901081	5	88	38	7002	65.4	70.3	6	6.5	5.5	0.5
114	RU0704114	DLMT/KATY	4	87	37	6899	65.5	71.7	7	5.5	4.5	0
116	RU0703116	CPRS/LGRU	5	89	38	6766	67.3	70.6	7.5	6.5	2	2.5
086	RU0703086	((NWBT/RU8303181)/GFMT)/MDSN	5	86	44	6733	66.4	71.2	6.5	6.5	3.5	1.5
099	RU0501099	WLLS/PI584698//ZHE733	5	91	42	6656	61.4	70.3	4	3	2	0.5
103	RU0702103	FRAN/CCDR	5	89	38	6649	63.2	70.1	5.5	7	5	1.5
082	RU0702082	AR1142/JODN/4/NWBT/KATY/3/82CAY21/...	5	90	37	6567	63.1	72.0	6	6	5	1
083	RU0704083	TBNT/LA110//LMNT/3/TBNT	4	86	41	6479	60.2	70.9	6.5	7	6.5	3.5
108	RU0601108	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/WLLS	5	91	41	6336	66.5	71.7	4	5.5	1.5	0
104	RU0503178	(GFMT/RU8703196)TX6141/CCDR	5	90	37	6329	65.5	71.3	6	3.5	5	0
094	RU0702094	AR1179/3/CPRS//…/4/WELLS	6	93	38	6053	54.7	67.9	6.5	4	2.5	0
090	RU0601090	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/DREW	4	89	42	5874	61.7	69.6	6	7	1	0
118	HDGO	HILDAGO	7	86	39	5871	62.8	67.7	7.5	6.5	7	4.5
119	L205	L205	3	80	41	5870	61.5	68.6	8	6	6	1.5
098	RU0703098	CPRS/LGRU	5	89	36	5862	65.5	70.9	6	4.5	4.5	2
093	RU0701093	WLLS/ZHE733	5	88	35	5662	65.5	71.6	4.5	6	3.5	2
107	RU0703107	(RU8803072/(KATY//GFMT/PCOS))/DXBL	6	89	38	5325	65.2	71.9	6.5	5.5	4	0
110	RU0703110	(DF5-68)/TX8946	6	89	39	5303	63.5	68.3	6.5	6.5	5.5	1.5
120	DXBL	DIXIEBELLE	6	89	36	4963	61.9	68.6	4	6	5	1
095	RU0603095	Arborio	7	78	49	3993	57.1	69.7	5.5	4	7	3.5
092	RU0703092	(DLMT/(LMNT*3/JSMN))/DF5-68	6	90	41	3688	62.6	67.4	.	.	.	.
089	RU0703089	IAC600	5	75	44	2859	63.5	69.7	7	6.5	3	0.5
c.v. %			11.4	1.3	4.0	8.0	3.9	1.5	13.0	16.2	35.4	51.8
$LSD_{0.05}$			1.0	2.2	3.2	1066	5.0	2.1	1.6	2.0	2.9	1.3

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 6. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 6, Rice Research Station, Crowley, LA.

Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB‡	BPB‡	RNB‡	NBLS‡
160	FRNS	FRANCIS	4	85	42	8440	59.9	66.9	6	8	6	0.5
131	RU0702131	MBLE/ALAN/6/CCDR/5/MARS/…/JAF4	5	83	41	8404	57.4	70.2	5.5	6	6	0.5
138	RU0703138	CPRS/3/CPRS/NWBT/KATY	5	86	40	8181	60.5	69.6	7	4.5	4.5	2
133	RU0501133	KATY/NWBT//L201/7402003/3/WLLS	5	87	42	8171	60.6	70.5	4	5.5	1.5	0
125	RU0702125	MBLE/ALAN/4/L201//…/5/MBLE/…/4/CCDR/…	5	83	41	7986	58.0	69.5	7	7	5.5	2
144	RU0703144	CPRS/CCDR	5	86	39	7839	65.5	71.4	7	6	3	1
141	RU0703141	LCSN/LGRU	5	90	41	7756	64.1	69.8	6.5	5.5	4	1
148	RU0701148	IRGA409/RXMT/5/BRAZ/TBNT/3/164986-	5	87	36	7543	56.6	70.1	6	7	3.5	1.5
142	RU0701142	L-29-079/LGRU	6	90	46	7477	61.0	68.8	5.5	5.5	3.5	0.5
122	RU0704122	IR36/8603006	4	86	41	7457	62.5	69.1	6	5.5	5	1.5
121	RU0601121	RU9901127/GP-2	5	85	34	7408	69.4	71.7	6.5	7.5	1	1
134	RU0702134	CCDR/5/MARS/…/6/CCDR/4/CPRS/…	5	80	41	7313	64.4	69.3	8	7	4.5	2
127	RU0701127	LGRU//KATY/STBN/3/NWBT/KATY	5	89	44	7144	58.7	69.0	6	5.5	3.5	0.5
156	RU0704156	CPRS//NWBT/KATY	5	87	36	6869	60.3	71.4	5.5	5.5	4.5	1
128	RU0702125	9602097/...//JAF4/…/6/CCDR/…/7/JAF4	5	86	38	6866	65.0	70.5	6	5	5	1
149	RU0702149	DLRS//KBNT/JODN	5	87	39	6794	63.3	70.2	6.5	5.5	3	3
137	RU0702137	TXMT/…/5/AR1053/7/CCDR/…/6/CCDR/5/MARS/…	6	87	35	6725	66.1	71.5	5	6	4.5	1
135	RU0703135	(AF5-144-1-2)/(DLMT/(LMNT*3/JSMN))	6	89	39	6567	58.6	67.1	6.5	7	4.5	1
147	RU0703147	CPRS/CCDR	5	87	38	6470	60.8	68.3	6.5	6.5	3.5	0
136	RU0501136	STG99F5-13-025/MDRK	7	87	35	6219	65.4	72.3	6.5	7.5	1	0
150	RU0503150	((NWBT/RU8303181)/GFMT))TX7181/CCDR	6	88	39	6131	65.6	71.2	7	5	4	3
123	RU0703123	((NWBT/RU8303181)/GFMT)/MDSN	6	89	40	6011	68.7	72.4	6.5	6.5	2.5	1.5
140	RU0502177	L202/LEAH//TORO/3/IR67016	5	84	39	5984	57.5	69.9	7.5	5.5	5.5	0
158	DLRS	DELLROSE	5	87	44	5965	68.2	72.9	5	5.5	3	0.5
155	RU0602155	05SBYT119	5	88	33	5921	66.9	70.6	5	6	4.5	0
126	RU0503126	((NWBT/RU8303181)/RSMT))TX7144/JEFF	5	91	40	5917	69.0	72.0	7	5	1	0
154	RU0704154	GFMT/TBNT/LA110	5	90	35	5825	66.7	71.4	6.5	6.5	4	0
151	RU0501151	MDRK/UA99-123	5	87	35	5770	62.1	70.1	5.5	6.5	0	0
146	RU0602146	CPRS/LGRU//97KDMX2-5	5	87	39	5756	67.5	71.4	5.5	7	2.5	0.5
159	SBNE	SABINE	5	88	38	5575	67.0	72.1	4.5	6.5	5.5	2
132	RU0703132	(DLMT/(LMNT*3/JSMN))/((CPRS/PELDE)/JEFF)	7	91	41	5378	64.4	69.3	6	5	2.5	0
157	RU0704157	DLMT/KATY	4	89	37	5313	65.3	71.8	5	4.5	4	0
152	RU0702152	06SBYT-67	6	91	38	5299	63.8	68.9	4.5	6	5	0.5
139	RU0501139	SHUFENG121-1655	5	96	43	5229	53.6	67.4	.	.	3	0
143	RU0702143	06TT-11	5	87	32	5204	64.0	70.5	4.5	6	5	0.5
124	RU0701124	DREW/UA99-167	6	85	38	5175	60.0	68.0	5	5	2	0
153	RU0703153	L201/SABR	4	83	40	5165	57.7	66.6	7.5	6.5	5	0
129	RU0703129	(DLMT/(LMNT*3/JSMN))/((CPRS/PELDE)/JEFF)	7	91	40	5121	64.8	69.9	6	6	2.5	0
130	RU0601130	WLLS/INIAP-12//ZHE733	7	94	40	3709	58.2	69.0	.	.	.	.
145	RU0501145	PI584720/ZHE733	6	92	41	3588	61.8	68.2	7.5	4.5	2.5	0.5
c.v. %			14.7	1.5	3.9	8.8	3.3	2.7	12.7	13.2	28.2	139
$LSD_{0.05}$			1.5	2.6	3.0	1139	4.2	2.4	1.6	1.6	2.1	2.2

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 7. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Uniform Regional Rice Nursery, Group 7, Rice Research Station, Crowley, LA.

							Milling Yield (%)					
Entry	Source	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
200	XL723	XL723	5	81	47	9530	62.1	71.7	5.5	2	5	0
165	RU0702165	EARL/9902028	4	81	42	9332	67.5	72.1	5.5	7.5	5	1
180	RU0702180	TACAURI/3/CPRS//82CAY21/TBNT/4/CFX-18	5	83	41	8719	62.1	69.0	7.5	5	5	2.5
167	RU0701167	FRNS/6/LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/	4	87	43	8620	63.0	70.6	6	7	6	0
177	RU0702177	FRANCIS/CLR13	4	81	40	8454	65.3	72.2	6	5	4	1.5
174	RU0702174	CFX-18//CCDR/9770532DH2	4	83	38	8389	61.8	68.5	8	5.5	5.5	2
195	RU0702195	9502008-A/TACAURI//CFX-18	5	83	39	8264	65.4	71.1	7.5	7	5	2.5
179	RU0701179	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/DREW	4	88	43	8124	60.7	70.3	5	5.5	4	1
187	RU0603187	Tesanai2	6	95	47	8069	58.5	67.0	6	6	5	2
188	RU0601188	LGRU//KATY/STBN/5/LGRU//LMNT/RA73/3/LGRU/4	4	89	44	7707	57.9	70.4	5	5.5	5	0
170	RU0601170	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/LGRU/MI	5	89	41	7646	63.3	70.4	5	7.5	4	0.5
192	RU0702192	CFX-26/9702128	5	83	37	7604	65.4	70.4	8	7	5	0.5
162	RU0702162	BNGL//MERC/RICO/3/MERC/RICO//BNGL	5	87	36	7526	67.3	70.4	5.5	7	4.5	1
185	RU0601185	RU9201176/4/LBNT/STBN//NWBT/3/MILL/5/WLLS	4	88	45	7490	60.1	69.1	4	5	3	0
181	RU0703181	CPRS/CCDR	5	87	38	7437	61.7	70.7	6	6	3	0.5
173	RU0501173	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/WLLS	4	86	39	7397	60.7	71.5	5	7.5	4.5	0
172	RU0703172	CCDR/L202	4	88	50	7375	59.5	68.3	6	4	4.5	0.5
189	RU0702189	DREW/CFX-18	5	88	41	7373	66.2	71.8	7	4	3.5	0
164	RU0401164	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/5/WLLS	5	92	45	7367	58.4	68.4	4	6	3.5	0.5
171	RU0702171	BNGL//MERC/RICO/3/MERC/RICO//BNGL	5	87	35	7335	69.7	71.7	5	7	4.5	0.5
168	RU0702168	EARL/9902028	5	87	36	7107	62.9	69.7	7	6.5	6	0.5
183	RU0702183	CFX-26/9702128	5	90	38	7011	61.0	68.4	6.5	7.5	5.5	0
190	RU0703190	CCDR/L202	6	83	38	6835	63.1	70.6	7	6.5	6	0
197	RU0704197	IR36/8603006	4	87	43	6771	63.9	69.3	6	6.5	5	0.5
196	RU0704196	8904186/sel919/NWBT	4	88	38	6721	59.5	70.1	5	6.5	5	1
175	RU0703175	LCSN/LGRU	6	90	46	6685	62.6	69.1	6	5	3.5	0
199	CPRS	CYPRESS	5	88	38	6629	67.3	71.3	7	7	3.5	0.5
184	RU0703184	L201/SABR	4	79	39	6626	64.8	68.5	7	5	5	1
176	RU0701176	LBNT/9902/3/DAWN/9695//STBN/4/LGRU/4/DREW	5	92	43	6552	58.1	66.4	5.5	6.5	2.5	0
161	RU0701161	LGRU/3/LMNT/KATY//LMNT/RA73	3	92	44	6504	58.1	68.1	4.5	4.5	3.5	0
194	RU0704194	88040032/KATY	5	87	40	6373	65.4	70.6	4.5	6.5	3.5	0
191	RU0704191	GFMT/TBNT/LA110	5	89	35	5907	67.6	71.2	6.5	6.5	5	0
182	RU0601182	LBNT/9902/3/DAWN/9695//STBN/4/DLLA/KATY/5/D	5	90	36	5614	60.4	71.2	5	7.5	2.5	0
193	RU0704193	NWBT/C4-63	5	91	44	5580	60.7	68.4	5	4	2	0
186	RU0704186	CPRS//NWBT/KATY	5	90	31	5478	66.5	70.3	6.5	7	3	0
198	RU0704198	9002065/NWBT	4	96	40	5386	61.5	69.1	5.5	4	3.5	0
169	RU0503169	((NWBT/RU8303181)/GFMT))TX7181/CCDR	7	92	42	5168	62.1	69.7	6.5	6.5	5	1
178	RU0703178	HB-1	9	95	44	4160	70.7	58.4	4	7	0	0
163	RU0503163	((NWBT/RU8303181)/GFMT))TX7181/CCDR	6	94	39	3932	62.5	70.3	7	6	5	0.5
166	RU0603166	4484-1665	5	95	42	3437	50.1	63.6	3.5	3.5	2.5	0
c.v. %			7.4	1.3	3.3	10.0	3.6	2.1	12.7	11.8	23.5	105.0
$LSD_{0.05}$			0.70	2.4	2.7	1364	4.6	2.9	1.5	1.4	2.0	1.1

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

COMMERCIAL-ADVANCED YIELD TRIALS

The Commercial-Advanced yield trial (CA) is a multi-location test conducted by the Rice Breeding Project in the major rice-growing regions in Louisiana. The objective of this study is to evaluate the adaptation and stability of entries for several important characteristics. Data evaluated includes grain yield, whole and total milling percentages, seedling vigor, maturity, plant height, lodging resistance, ratoon crop potential, and resistance to sheath blight, bacterial panicle blight, rotten neck blast, and narrow brown leaf spot diseases. Entries include commercial varieties, hybrids, and advanced experimental lines.

Test locations in 2007 included the Rice Research Station at Crowley (RRS) and four on-farm test sites in Evangeline, Vermilion, Morehouse, and Richland parishes. Each location represents a different environment and allows researchers to evaluate entries with different planting dates, soil types, climatic conditions, management systems, disease pressure, and numerous other variables.

Standard agronomic procedures (except that no fungicides were applied) were used at each individual location. Sixty entries were tested in a randomized complete block design with three replications at all locations and plots were 4.66 x 16 ft. Variety and hybrid plots were drill-seeded at 90 and 38 lb/A, respectively. Dr. Don Groth and the Rice Pathology Project provided the sheath blight, rotten neck blast, bacterial panicle blight, and narrow brown leaf spot disease ratings.

Planting dates were: RRS, March 19; Evangeline, April 23; Vermilion, March 21; Morehouse, May 2; and Richland, March 28. Harvest dates were: RRS, August 7; Evangeline, August 15; Vermilion, August 3; Morehouse, September 5; and Richland, August 21. Results from these tests are shown in Tables 2 to 6.

Table 1. Entry number, pedigree, grain type, and source information for entries in the Commercial-Advanced Trial, 2007.

Entry	Pedigree	Grain Type†	Source‡
201	CL131	L	LAES
202	CL161	L	LAES
203	CL151	L	LAES
204	CL171	L	AAES
205	TRENASSE	L	LAES
206	SPRING	L	AAES
207	COCODRIE	L	LAES
208	CHENIERE	L	LAES
209	CYPRESS	L	LAES
210	WELLS	L	AAES
211	BANKS	L	AAES
212	CYBONNET	L	AAES
213	JUPITER	M	LAES
214	BENGAL	M	LAES
215	PIROGUE	S	LAES
216	PRESIDIO	L	TAES, USDA
217	DELLROSE	L(A)	LAES
218	CATAHOULA	L	LAES
219	CLXL729	L	RiceTec
220	CLXL730	L	RiceTec
221	XL723	L	RiceTec
222	XP744	L	RiceTec
223	CLXP745	L	RiceTec

Continued.

Table 1. Continued.

Entry	Pedigree	Grain Type[†]	Source[‡]
224	CCDR/9502008-A	L	LAES
225	9901081/CCDR	L	LAES
226	KATY/CPRS//JKSN/3/AR1188/CCDR	L	LAES
227	CPRS/KBNT//9502008-A	L	LAES
228	9502008/CPRS	L	LAES
229	9502008-A//AR1188/CCDR	L	LAES
230	9502008-A//AR1188/CCDR	L	LAES
231	AR1142/JODN/4/NWBT/KATY/3/82CAY21/...	L	LAES
232	AR1188/CCDR//9502008/LGRU	L	LAES
233	CCDR/9770532DH1//LGRU	L	LAES
234	CPRS/9901081	L	LAES
235	AR1179/3/CPRS//…/4/WELLS	L	LAES
236	CPRS/97T1280DH1/3/CPRS/NWBT//KATY	L	LAES
237	CFX-26/9702128	L	LAES
238	DREW/CFX-18	L	LAES
239	CFX-26/9702128	L	LAES
240	CCDR/5/MARS/M201//MARS…	L	LAES
241	96INT/AHRENT	L	LAES
242	NEPTUNE	M	LAES
243	CCDR/5/MARS/…/6/L202/…/7/CCDR/…	L	LAES
244	JODN/AR1121/7/CCDR/…/6/CCDR/5/MARS/…	M	LAES
245	TXMT/…/5/AR1053/7/CCDR/…/6/CCDR/5/MARS/…	M	LAES
246	L202/LEAH//TORO/3/IR67016	L(AE)	LAES
247	CPRS/LGRU//97KDMX2-5	L(A)	LAES
248	BNGL//MERC/RICO/3/MERC/RICO//BNGL	M	LAES
249	BNGL//MERC/RICO/3/EARL	M	LAES
250	9502065/3/MERC//MERC/…	M	LAES
251	BNGL/9502065	M	LAES
252	BNGL//MERC/RICO/3/MERC/RICO//BNGL	M	LAES
253	YD-4/RSMT	L	LAES
254	XP723xCLXP730	L	LAES
255	XP723xCCDR	L	LAES
256	XP723xURN152	L	LAES
257	CLXP730xCCDR	L	LAES
258	CLXP730xURN152	L	LAES
259	CCDRxURN152	L	LAES
260	8603006/3/MARS/NWRX//TBNT	L	MAFES

[†] L = Long grain, M = Medium grain, and S = Short grain, (A = Aromatic, E = Elongating).
[‡] AAES, Rice Research and Extension Center, Arkansas Agricultural Experiment Station, Stuttgart, AR; LAES, Rice Research Station, Louisiana Agricultural Experiment Station, LSU Agricultural Center, Crowley, LA; MAFES, Delta Research and Extension Center, Mississippi Agricultural and Forestry Experiment Station; TAES, USDA, Texas A&M Research and Education Center, Texas Agricultural Experiment Station, U.S. Department of Agriculture, Beaumont, TX; and RiceTec, RiceTec Inc., Alvin, TX.

Table 2. Grain and milling yield and agronomic performance of entries in the 2007 Commercial-Advanced Yield Trial, Rice Research Station, Crowley, LA.

Entry	Source	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total
220	CLXL730	5	84	47	9451	2745	12196	58.8	68.6
221	XL723	5	81	46	9328	2601	11929	58.6	70.3
219	CLXL729	5	83	43	9196	2967	12163	61.3	70.4
254	XP723xCLXP730	5	83	47	9104	2714	11818	60.2	72.4
257	CLXP730xCCDR	4	83	47	8988	2343	11330	59.3	68.9
256	XP723xURN152	4	82	43	8933	2505	11438	58.0	68.6
258	CLXP730xURN152	4	83	48	8862	2388	11250	53.8	68.3
223	CLXP745	6	81	46	8783	2265	11047	58.9	72.1
255	XP723xCCDR	4	83	44	8728	2180	10908	60.2	70.7
211	BANKS	4	88	44	8714	2165	10879	61.4	70.3
222	XP744	5	82	45	8694	2347	11041	59.9	72.2
252	RU0702162	4	85	37	8593	2189	10783	67.4	73.8
208	CHENIERE	4	87	37	8572	1517	10088	62.2	72.1
250	RU0702068	4	86	40	8561	1632	10192	69.0	73.9
203	CL151	4	83	38	8438	1953	10391	59.5	67.4
202	CL161	4	87	41	8381	2050	10431	65.2	70.8
236	RU0702097	5	89	41	8370	1920	10290	60.0	68.1
205	TRENASSE	5	79	41	8274	1636	9910	59.0	65.6
213	JUPITER	6	86	38	8239	1471	9710	65.8	71.2
214	BENGAL	4	86	38	8227	1536	9763	69.1	72.0
253	RU0602152	4	84	40	8207	2248	10455	53.1	63.1
231	RU0702082	4	86	36	8121	1847	9968	65.2	70.5
259	CCDRxURN152	3	81	39	8111	1968	10079	60.2	68.0
243	RU0702031	4	81	40	8106	1879	9986	63.1	68.9
201	CL131	4	82	37	8106	1401	9507	64.0	70.0
227	RU0502022	4	83	36	8069	2452	10522	62.5	69.7
249	RU0602171	4	86	37	8033	2153	10186	67.2	71.9
207	COCODRIE	4	84	37	8031	1826	9857	63.5	71.7
232	RU0702085	4	84	37	7978	2025	10003	59.9	68.7
238	RU0702189	4	87	43	7963	2079	10042	66.3	71.7
239	RU0702192	5	82	39	7926	2331	10257	65.9	70.4
228	RU0602189	4	85	36	7900	2393	10293	66.4	71.9
204	CL171	4	87	40	7807	2408	10215	66.6	72.0
224	RU0602085	4	81	37	7794	1493	9287	59.5	68.5
237	RU0702183	4	88	40	7732	2110	9842	57.7	65.8
212	CYBONNET	4	85	38	7702	2126	9829	68.2	72.3
244	RU0702034	4	80	41	7701	1869	9569	62.0	68.9
230	RU0602183	5	83	36	7696	1873	9570	64.0	70.7
251	RU0702071	4	85	38	7670	1559	9229	63.7	68.0
233	RU0702088	4	88	36	7654	2294	9949	64.3	70.8
225	RU0602109	3	82	35	7642	1423	9064	62.2	69.6
240	RU0502094	3	83	41	7638	1874	9512	63.6	69.7
242	NEPTUNE	4	87	36	7630	2145	9775	69.3	72.4
210	WELLS	4	88	41	7603	2111	9714	59.8	71.7
248	RU0602168	5	87	35	7565	2142	9707	68.1	72.2
229	RU0602174	5	82	38	7563	1665	9228	62.4	70.0
209	CYPRESS	5	88	38	7510	1923	9433	66.7	70.6
226	RU0602103	4	82	40	7472	1710	9183	63.5	70.1
206	SPRING	3	78	46	7447	2146	9593	61.6	72.1
234	RU0702091	4	85	39	7352	2433	9785	64.9	71.2
235	RU0702094	4	92	38	7271	1960	9230	56.4	69.6
218	CATAHOULA	5	87	37	7220	2300	9521	67.9	73.6
241	RU0402125	5	88	40	7088	952	8040	55.5	71.1

Continued.

Table 2. Continued.

Entry	Source	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total
215	PIROGUE	5	86	40	6831	1303	8133	63.1	71.3
216	PRESIDIO	4	83	39	6779	2919	9698	61.8	68.9
260	RU0404191	4	83	37	6760	2302	9062	59.5	70.9
245	RU0702137	4	85	35	6541	2175	8716	65.0	70.3
217	DELLROSE	5	86	43	6395	2684	9079	68.0	72.9
247	RU0602146	5	86	38	6294	2455	8748	67.2	72.0
246	RU0502177	5	84	40	6190	2219	8409	55.2	67.1
c.v. %		11.0	1.6	3.8	10.8	5.8	6.9	4.8	2.2
$LSD_{0.05}$		0.8	2.2	2.4	294	799	1084	6.4	3.4

[†] Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

Table 3. Grain and milling yield and agronomic performance of entries in the 2007 Commercial-Advanced Yield Trial, Evangeline Parish, LA.

Entry	Source	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Total
221	XL723	6	74	46	8670	58.9	72.1
219	CLXL729	5	74	46	8604	60.0	70.6
220	CLXL730	5	75	48	8404	54.7	71.7
256	XP723xURN152	5	71	46	8309	55.8	69.8
222	XP744	5	71	46	8214	60.0	73.9
254	XP723xCLXP730	6	75	47	8182	55.6	71.8
257	CLXP730xCCDR	4	75	45	8073	59.5	70.0
258	CLXP730xURN152	5	71	48	8041	52.0	68.5
223	CLXP745	5	71	47	7996	47.3	74.3
255	XP723xCCDR	5	73	42	7869	60.0	71.9
250	RU0702068	5	76	38	7812	57.1	67.2
227	RU0502022	4	74	37	7758	58.7	69.8
253	RU0602152	5	68	38	7592	53.9	64.5
252	RU0702162	5	76	35	7585	60.3	67.0
226	RU0602103	4	73	38	7481	61.5	70.4
230	RU0602183	5	74	36	6930	61.6	70.5
229	RU0602174	5	73	37	6913	61.3	69.1
224	RU0602085	5	72	35	6876	60.8	68.1
249	RU0602171	5	76	34	6864	64.0	70.1
207	COCODRIE	4	72	36	6859	59.9	67.9
232	RU0702085	4	73	35	6789	61.4	69.0
205	TRENASSE	5	66	37	6698	58.1	68.4
214	BENGAL	4	77	38	6631	59.8	66.9
242	NEPTUNE	5	79	34	6604	65.1	69.5
218	CATAHOULA	4	76	38	6582	61.9	72.2
239	RU0702192	5	70	35	6562	61.4	69.2
245	RU0702137	5	77	39	6525	59.8	69.2
243	RU0702031	5	72	37	6518	61.7	71.0
203	CL151	5	74	38	6516	62.2	71.1
259	CCDRxURN152	5	71	36	6504	59.4	69.5
248	RU0602168	5	76	33	6470	62.5	72.0
209	CYPRESS	5	77	37	6442	62.5	70.1
228	RU0602189	5	75	36	6412	61.5	69.2
225	RU0602109	4	72	36	6403	58.2	67.4
251	RU0702071	4	76	35	6356	65.3	69.8

Continued.

Table 3. Continued.

Entry	Source	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total
211	BANKS	5	80	42	6329	52.4	65.0
208	CHENIERE	4	76	35	6291	61.1	72.9
240	RU0502094	4	73	37	6290	62.0	70.2
213	JUPITER	6	78	37	6105	59.6	66.2
206	SPRING	5	67	41	6104	62.9	71.8
244	RU0702034	4	70	38	5945	58.8	66.8
202	CL161	4	77	37	5934	62.9	72.2
210	WELLS	4	78	41	5770	54.7	70.6
233	RU0702088	5	77	36	5733	57.8	69.1
231	RU0702082	5	78	35	5623	62.7	71.1
237	RU0702183	4	79	39	5594	57.4	66.6
216	PRESIDIO	4	72	35	5529	61.7	71.3
201	CL131	5	75	32	5505	63.0	71.9
247	RU0602146	6	77	37	5491	57.7	68.3
236	RU0702097	5	81	41	5439	48.9	64.1
212	CYBONNET	5	77	36	5430	65.7	72.9
204	CL171	4	77	39	5366	54.7	69.7
260	RU0404191	5	79	36	5320	55.3	69.8
238	RU0702189	5	79	38	5035	57.8	67.9
246	RU0502177	5	74	39	5031	59.5	71.8
234	RU0702091	5	75	38	4852	44.7	62.2
217	DELLROSE	6	77	38	4804	62.1	70.3
235	RU0702094	5	82	37	4603	47.1	64.7
241	RU0402125	5	78	35	4092	58.6	68.3
215	PIROGUE	6	78	38	3209	49.1	65.1
c.v. %		11.7	1.7	4.4	9.2	6.6	2.8
$LSD_{0.05}$		0.92	2.0	2.8	956	7.8	3.6

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

Table 4. Grain and milling yield, agronomic performance, and disease resistance of entries in the 2007 Commercial-Advanced Yield Trial, Vermilion Parish, LA.

Entry	Source	Vigor†	Days to 50% Heading	Plant Height (in)	Lodging	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB†	BPB†
223	CLXP745	8	82	43	3	8771	56.3	69.9	5	2
220	CLXL730	5	84	44		8715	58.1	68.7	6	2
219	CLXL729	6	83	43		8693	56.9	67.9	6	1
222	XP744	7	81	44	8	8607	58.1	70.7	6	2
221	XL723	5	83	45		8496	61.9	70.7	6	2
254	XP723xCLXP730	6	84	46		8473	61.4	71.3	6	2
258	CLXP730xURN152	5	82	45		7192	59.1	68.4	7	3
255	XP723xCCDR	4	84	43	5	6891	60.9	70.7	7	3
256	XP723xURN152	5	82	42	10	6806	57.9	67.9	7	4
257	CLXP730xCCDR	5	85	45	8	6562	58.3	68.1	7	3
253	RU0602152	5	79	40	27	5854	58.7	67.0	7	4
213	JUPITER	6	88	38		5819	56.3	61.7	6	1
252	RU0702162	4	87	36		5648	53.7	59.9	6	4
248	RU0602168	6	88	36		5632	59.9	65.3	5	4
250	RU0702068	5	85	38		5624	56.3	62.3	6	5
242	NEPTUNE	6	88	36		5611	53.4	59.6	5	3
214	BENGAL	5	87	38		5483	52.9	58.6	6	4

Continued.

Table 4. Continued.

Entry	Source	Vigor†	Days to 50% Heading	Plant Height (in)	Lodging	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB†	BPB†
211	BANKS	5	83	42		5383	47.0	62.6	6	5
232	RU0702085	5	81	38	7	5363	54.8	65.7	7	4
216	PRESIDIO	4	80	37		5354	61.4	70.0	8	5
215	PIROGUE	6	88	40		5317	56.4	66.4	4	2
236	RU0702097	6	87	43		5308	49.5	63.2	6	5
218	CATAHOULA	6	81	36	32	5226	60.6	69.3	7	4
243	RU0702031	5	81	36		5187	60.7	68.5	7	5
208	CHENIERE	5	84	35	3	5159	59.2	67.5	7	4
241	RU0402125	6	85	41		5157	46.6	59.4	6	4
251	RU0702071	4	85	38		5143	53.4	61.1	6	4
210	WELLS	5	85	44		5102	52.3	65.2	7	6
229	RU0602174	5	80	36	17	5054	57.8	66.3	7	5
249	RU0602171	4	86	36		5003	56.4	63.3	6	5
259	CCDRxURN152	4	82	38		4998	55.8	64.0	7	4
205	TRENASSE	6	76	37	38	4946	61.3	68.3	8	5
247	RU0602146	5	82	36	10	4881	58.7	68.0	6	3
228	RU0602189	6	82	36		4834	53.3	64.6	7	5
203	CL151	5	82	40	3	4779	54.9	65.1	8	6
260	RU0404191	5	81	37	3	4767	54.0	67.3	7	4
245	RU0702137	5	80	35		4748	60.9	64.2	8	5
246	RU0502177	6	82	38	17	4627	56.7	68.8	8	4
225	RU0602109	5	81	34		4627	57.0	66.7	7	5
207	COCODRIE	5	81	36	10	4612	55.0	65.8	8	5
237	RU0702183	6	84	39		4589	47.9	60.4	7	6
244	RU0702034	5	78	39	27	4523	59.1	68.7	8	3
227	RU0502022	5	81	38	42	4486	57.6	67.7	8	4
235	RU0702094	6	89	39		4440	36.6	56.1	6	4
238	RU0702189	6	86	41	3	4427	55.1	65.7	7	5
217	DELLROSE	6	83	39	18	4406	59.5	68.5	7	4
234	RU0702091	6	82	38		4400	53.3	63.1	7	6
206	SPRING	4	77	39	63	4385	57.0	69.9	8	3
201	CL131	5	82	36	12	4274	62.5	69.1	8	5
233	RU0702088	5	85	38	3	4273	47.0	59.0	7	6
239	RU0702192	6	80	36	12	4241	62.8	68.3	8	6
231	RU0702082	5	86	37		4220	51.0	61.5	7	6
240	RU0502094	5	82	38	23	4176	58.9	67.1	8	5
230	RU0602183	6	80	36	8	4135	57.1	67.0	8	6
204	CL171	4	84	40		4018	54.3	64.8	7	5
209	CYPRESS	7	86	39		3908	55.3	64.1	7	6
224	RU0602085	5	80	35	15	3827	61.0	68.7	8	5
226	RU0602103	6	80	39	20	3799	58.8	67.2	8	5
202	CL161	4	86	39	3	3798	58.2	67.3	8	6
212	CYBONNET	5	82	35	3	3794	62.5	69.3	8	6
c.v. %		10.3	1.5	4.6	104	6.7	4.9	2.8	6.4	18.4
$LSD_{0.05}$		0.9	1.9	2.9	11.8	575	5.5	3.7	0.7	2.0

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

Table 5. Grain and milling yield and agronomic performance of entries in the 2007 Commercial-Advanced Yield Trial, Morehouse Parish, LA.

Entry	Source	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)
219	CLXL729	80	46	9463
220	CLXL730	80	49	9446
213	JUPITER	80	41	9227
223	CLXP745	76	49	9183
254	XP723xCLXP730	80	49	9158
221	XL723	78	48	8999
250	RU0702068	80	40	8753
242	NEPTUNE	81	38	8674
251	RU0702071	78	40	8661
215	PIROGUE	79	42	8640
252	RU0702162	82	41	8553
222	XP744	75	49	8537
205	TRENASSE	74	43	8337
255	XP723xCCDR	78	44	8207
257	CLXP730xCCDR	80	47	8086
258	CLXP730xURN152	73	48	8042
256	XP723xURN152	72	46	7994
248	RU0602168	80	37	7956
214	BENGAL	80	40	7868
236	RU0702097	83	40	7641
226	RU0602103	76	40	7626
249	RU0602171	79	38	7603
232	RU0702085	79	39	7573
227	RU0502022	79	39	7421
229	RU0602174	76	38	7416
224	RU0602085	77	38	7354
260	RU0404191	82	39	7297
203	CL151	80	40	7284
225	RU0602109	77	36	7254
230	RU0602183	78	38	7213
207	COCODRIE	79	38	7157
237	RU0702183	81	37	7155
239	RU0702192	76	38	7039
259	CCDRxURN152	71	40	6990
228	RU0602189	80	38	6912
216	PRESIDIO	78	37	6912
210	WELLS	81	39	6904
243	RU0702031	76	39	6871
245	RU0702137	80	37	6866
241	RU0402125	81	37	6843
244	RU0702034	74	40	6840
234	RU0702091	80	38	6827
208	CHENIERE	79	38	6800
211	BANKS	82	46	6731
253	RU0602152	72	41	6716
201	CL131	79	36	6686
206	SPRING	70	44	6652
233	RU0702088	82	37	6630
246	RU0502177	77	42	6625
204	CL171	82	38	6579
240	RU0502094	80	40	6536
235	RU0702094	86	37	6465
218	CATAHOULA	83	37	6424
202	CL161	83	38	6286

Continued.

Table 5. Continued.

Entry	Source	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)
212	CYBONNET	81	37	6240
231	RU0702082	83	24	6213
247	RU0602146	78	40	5910
209	CYPRESS	84	38	5893
217	DELLROSE	79	42	5878
238	RU0702189	85	40	5608
c.v. %		1.1	6.9	3.4
$LSD_{0.05}$		1.5	1030	2.0

[†] Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

Table 6. Grain and milling yield and agronomic performance of entries in the 2007 Commercial-Advanced Yield Trial, Richland Parish, LA.

Entry	Source	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)
223	CLXP745	87	44	7960
254	XP723xCLXP730	90	45	7237
258	CLXP730xURN152	89	44	7231
220	CLXL730	91	44	7157
222	XP744	87	46	7048
221	XL723	90	43	6949
219	CLXL729	90	42	6886
257	CLXP730xCCDR	92	45	6845
213	JUPITER	90	36	6715
255	XP723xCCDR	89	43	6645
256	XP723xURN152	87	44	6359
203	CL151	91	39	6244
259	CCDRxURN152	89	36	6113
250	RU0702068	89	34	5937
202	CL161	95	38	5877
243	RU0702031	91	38	5837
207	COCODRIE	94	36	5757
260	RU0404191	95	36	5747
215	PIROGUE	87	35	5731
232	RU0702085	95	35	5661
249	RU0602171	90	31	5649
224	RU0602085	90	34	5649
237	RU0702183	94	36	5611
227	RU0502022	92	35	5573
251	RU0702071	89	35	5513
205	TRENASSE	86	38	5497
235	RU0702094	101	34	5459
226	RU0602103	93	36	5418
248	RU0602168	90	32	5402
241	RU0402125	94	38	5398
211	BANKS	97	41	5387
242	NEPTUNE	92	33	5383
231	RU0702082	100	34	5371
252	RU0702162	92	34	5365
228	RU0602189	94	35	5277
225	RU0602109	92	34	5250

Continued.

Table 6. Continued.

Entry	Source	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)
240	RU0502094	96	38	5178
239	RU0702192	90	35	5174
236	RU0702097	95	38	5157
233	RU0702088	96	34	4994
208	CHENIERE	95	35	4906
234	RU0702091	94	36	4900
212	CYBONNET	94	37	4812
247	RU0602146	90	35	4804
217	DELLROSE	90	39	4781
253	RU0602152	86	38	4775
230	RU0602183	92	35	4712
246	RU0502177	88	39	4707
238	RU0702189	98	39	4700
245	RU0702137	95	32	4696
216	PRESIDIO	91	36	4681
244	RU0702034	90	37	4628
201	CL131	92	33	4559
229	RU0602174	94	36	4504
209	CYPRESS	95	34	4461
210	WELLS	97	37	4404
204	CL171	94	38	4346
214	BENGAL	92	33	4194
218	CATAHOULA	95	34	4185
206	SPRING	87	40	3865
c.v. %		2.4	4.5	17
$LSD_{0.05}$		3.7	2.7	1884

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

PRELIMINARY YIELD TRIALS

The preliminary yield trials consist primarily of promising breeding nursery material that is ready to be tested in replicated (PY) or non-replicated (SP) yield trials. The material in these trials was screened for agronomic and grain characteristics in nurseries prior to this phase of testing. Promising experimental lines were evaluated for seedling vigor, maturity, plant height, lodging resistance, grain yield of main and ratoon crops, whole and total milling percentages, and disease resistance.

These tests were conducted using standard agronomic practices (except that no fungicide was applied) at the Rice Research Station in Crowley, Louisiana. A randomized complete block design was used for the replicated PY trials, and a completely randomized design was used for the non-replicated SP trials to arrange the test entries. Plots were 4.66 x 16 ft and two replications were used in the PY trials only. Varieties were drill seeded at 90 lb/A on March 19 and harvested on August 8 to 9. Dr. Don Groth and the Rice Pathology Project provided the disease ratings for sheath blight, rotten neck blast, bacterial panicle blight, and narrow brown leaf spot.

Trial	Group	Entry No.	Type
PY	1	501-525	Long grain
PY	2	526-550	Long grain
PY	3	551-575	Long grain
PY	4	576-600	Long grain
PY	5	601-625	Long grain
PY	6	626-650	Long grain
PY	7	651-675	Long grain
PY	8	676-700	Long grain
PY	9	701-725	Long grain
PY	10	726-750	Long grain
PY	11	751-775	Long grain
PY	12	776-800	Long grain
PY	13	801-825	Specialty
PY	14	826-850	Medium grain
PY	15	851-875	Medium grain
SP	1	1-50	Long grain
SP	2	51-239	Long grain and Specialty
SP	3	251-325	Medium grain

PY Groups 1 to 8 and SP Group 1 will be presented in Tables 1 to 9 in this section. In the "Development of Improved Long-Grain and Special Purpose Rice Varieties for Louisiana" section, PY Groups 9 to 13 are presented on pages 42 to 46 and SP Group 2 is presented on pages 48 to 51. In the "Medium-Grain Rice Breeding" section, PY Groups 14 to 15 and SP Group 3 are presented on pages 37 to 40.

Table 1. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 1, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
525	TRENASSE	6	88	37	7530	1849	9379	60.4	67.2	5	5	3	1
521	MILL/4/DREW/3/9602103/CPRS//…	4	89	37	7020	2063	9082	64.4	73.3	6	6.5	5.5	2
503	CCDR//AR1188/CCDR	6	91	38	7006	2076	9082	65.2	71.7	8	6.5	5.5	2.5
524	CCDR/3/KATY/CPRS//JKSN	5	90	38	6795	1461	8256	61.0	66.8	7.5	6.5	4	1.5
520	KATY/CPRS//JKSN/3/AR1188/CCDR	5	94	38	6732	1603	8335	64.5	70.9	8	6.5	4	1.5
512	CCDR/LGRU	7	95	40	6633	1271	7904	64.8	70.1	7.5	5.5	5.5	2
510	AR1188/CCDR/4/KBNT/3/CPRS//82CAY21	5	95	40	6632	1632	8264	63.7	70.3	8	5	5	3
518	CCDR/3/KATY/CPRS//JKSN	6	92	39	6540	2201	8742	62.5	67.6	7	6	5	1
523	FRAN/ARNT	5	93	35	6535	1914	8449	62.0	70.5	6	6.5	3	0.5
501	LCSN/CPRS//9502008-A	5	94	39	6459	1976	8435	57.2	69.7	6	5	5.5	1
514	FRAN//9502008/LGRU	5	91	36	6422	2891	9313	65.4	73.3	7	6	5.5	0
513	DREW/WELLS	6	98	40	6316	2200	8515	65.2	70.7	6.5	5.5	4	2.5
517	CPRS/9901081	6	94	35	6236	2016	8252	61.9	73.6	7	6.5	5	0
505	CPRS/NWBT//KATY/3/ARNT	6	96	37	6191	1546	7737	65.7	72.5	6	6	5.5	1.5
502	9502008-A//AR1188/CCDR	5	94	40	6147	1678	7824	63.4	72.1	7.5	6.5	4	1.5
519	KATY/CPRS//NWBT/KATY/3/CPRS	5	98	37	6100	2329	8429	58.5	67.6	6.5	6.5	4.5	3
511	CPRS/CH1	7	98	36	6060	2241	8302	62.9	69.9	7	7	3	1.5
516	LMNT/20001-5/3/LMNT/L-202/4/JKSN/CPRS	6	97	39	6012	3060	9072	60.3	69.4	6	5.5	4.5	0
522	9302065/CPRS	4	95	32	5961	2342	8303	66.3	71.4	6.5	7.5	3.5	2.5
515	248WE16m-7	6	99	36	5712	2693	8405	63.4	71.0	6	5	3	1.5
508	9602065/3/KATY/CPRS//JKSN	6	100	36	5187	2888	8076	63.8	71.6	7.5	6.5	3	1.5
506	NWBT//KATY/EP227/3/9702128	6	99	33	5170	2336	7505	58.6	68.7	6	6.5	3.5	1
509	NWBT/KATY/3/82CAY21/../4/DREW	6	101	35	5166	2028	7194	64.5	70.2	6.5	7	3	2.5
504	CCDR/9901081	6	94	32	4994	2638	7632	59.8	68.8	6.5	6.5	4	0.5
507	9502008-A/DREW//FRAN	6	101	34	4721	2510	7231	56.1	67.1	6.5	6	3.5	0.5
c.v. %		8.3	1.7	5.1	6.5	15.4	6.6	4.3	3.0	12.4	13.0	31.2	57.3
$LSD_{0.05}$		0.93	3.4	3.9	824	679	1126	5.6	4.4	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 2. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 2, Crowley, LA.

			Days to 50%	Plant Height	Grain Yield (lb/A @ 12%)			Milling Yield (%)					
Entry	**Pedigree**	**Vigor†**	**Heading**	**(in)**	**Main**	**2nd**	**Total**	**Whole**	**Total**	**SB‡**	**BPB‡**	**RNB‡**	**NBLS‡**
550	CATAHOULA	5	90	40	7623	2475	10098	65.4	71.4	7.5	6	3	0
542	CCDR/3/KATY/CPRS//JKSN	5	89	40	7553	2270	9823	64.6	69.7	6.5	5.5	5	1.5
526	WELLS/DXBL	5	95	41	7538	2795	10332	59.7	71.9	5.5	5.5	4.5	0
538	WELLS/MBLE	5	91	39	7464	3125	10589	59.8	72.6	5	5	4.5	1
530	LM-1//CPRS/KBNT	5	93	36	7311	3145	10456	59.5	70.2	5.5	5	2	0
527	WELLS//LGRU/CPRS	5	91	38	7308	1450	8758	60.3	69.6	6	6	5.5	2
541	CCDR/3/CPRS/NWBT//KATY	5	90	35	7249	2486	9735	66.4	71.6	6.5	5	4	0.5
546	KATY/CPRS//JKSN/3/AR1188/CCDR	5	89	37	7223	2018	9241	65.1	71.0	6.5	6	4.5	1.5
533	KATY/CPRS//JKSN/3/AR1188/CCDR	5	93	37	6968	1446	8414	65.5	72.0	6	5	4.5	3
536	KATY/CPRS//NWBT/KATY	6	97	35	6901	1582	8484	64.8	70.3	6	6	4.5	3
549	LBNT/9902/3/DAWN/9695//…/4/9502008/3/…	6	91	35	6866	2458	9324	59.0	68.3	6.5	6.5	5.5	0
540	LGRU//CCDR9770532DH2	5	92	37	6655	2636	9291	63.7	71.2	6.5	6	4.5	0.5
534	LGRU/ARNT	5	92	39	6517	2130	8647	65.6	71.5	5.5	7	5	5.5
545	JODN/3/KATY/CPRS//NWBT/KATY	5	93	37	6493	1809	8302	59.3	66.7	6.5	6	5	3
548	CCDR/MBLE	5	92	31	6389	1888	8277	62.3	68.9	7.5	6	6	2.5
544	CPRS/KBNT//9502008-A/DREW	5	99	35	6352	1532	7884	66.4	72.0	6.5	6	3.5	2.5
531	NWBT/KATY//CPRS/3/LCSN	6	101	37	6263	1881	8143	59.9	68.6	5.5	4	5	1
535	LBNT/9902/3/DAWN/9695//…/4/9502008/3/…	5	97	35	6041	1869	7909	61.5	68.7	5.5	5.5	3.5	0
529	CPRS/KBNT/4/9502008/3/CPRS//…	5	97	38	5995	1925	7920	63.3	68.7	4.5	5	3	3
547	LGRU//CPRS/KBNT	5	99	32	5748	2870	8618	62.9	70.6	3.5	4	1.5	0
537	LGRU/ARNT	7	98	39	5687	1897	7584	60.2	68.1	5.5	6.5	3.5	4
539	JEFF/3/9502008//KATY/902207x2	5	98	35	5128	2452	7580	56.3	66.3	5.5	6.5	12	1.5
528	JEFF/3/9502008//KATY/902207x2	5	99	35	5100	2653	7752	66.8	71.7	6	5	3.5	2
543	9302065/LGRU	4	99	34	4804	2759	7563	62.7	70.9	5.5	5.5	4.5	3.5
532	9302065/LGRU	5	100	32	4611	2518	7129	65.9	72.2	5.5	6	3.5	3.5
c.v. %		10.4	2.1	3.5	6.4	19.2	7.7	5.0	3.0	12.4	13.0	31.2	57.3
$LSD_{0.05}$		1.1	4.0	2.6	850	889	1391	6.5	4.3	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 3. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 3, Crowley, LA.

			Days to	Plant	Grain Yield (lb/A @ 12%)			Milling Yield (%)					
Entry	**Pedigree**	**Vigor†**	**50% Heading**	**Height (in)**	**Main**	**2nd**	**Total**	**Whole**	**Total**	**SB‡**	**BPB‡**	**RNB‡**	**NBLS‡**
575	CL151	6	89	41	7871	1783	9654	63.9	71.0	7	6.5	4	1.5
556	NWBT/KATY//CPRS	5	88	37	7233	1485	8719	62.2	69.2	7	6.5	5	4
555	NWBT/KATY//CPRS/3/FRAN	5	88	35	7020	1714	8733	60.4	68.6	5.5	5.5	4	4
561	WELLS//LGRU/JODN	5	95	35	6906	2530	9435	58.1	70.0	5	6.5	5.5	0
565	MILL/4/DREW/3/9602103/CPRS//…	5	89	34	6755	2555	9309	68.3	72.6	7.5	7	5.5	2
552	MILL//9502008/LGRU	5	91	38	6675	2869	9544	67.0	70.9	7	7	5.5	2.5
566	CCDR/3/KATY/CPRS//JKSN	6	91	38	6427	1682	8109	60.6	66.7	6.5	6	4.5	1
563	SABER/DREW	4	95	38	6390	1767	8157	64.7	70.9	5	6	4.5	3
554	LGRU//CCDR9770532DH2	5	97	33	6385	2084	8469	61.6	70.9	6.5	7	5.5	1
560	9502008-A//AR1188/CCDR	6	92	38	6281	1614	7895	62.0	69.0	7	5.5	5	1.5
557	LM-1//CPRS/KBNT	5	93	35	6236	2103	8339	67.5	74.6	6	6.5	5	2
569	WELLS/EP144	4	94	34	6033	2384	8418	55.9	72.8	6.5	5	2	0
567	9502008-A//AR1188/CCDR	6	91	39	5998	1754	7752	61.4	68.6	5.5	5.5	5	1.5
570	CPRS/KBNT//9502008-A/DREW	5	98	34	5868	1330	7198	64.3	71.2	5.5	5	3	2
559	LM-1//CPRS/KBNT	6	95	31	5675	1742	7417	61.4	69.0	6.5	7	4	1.5
573	CPRS/KBNT//9502008/LGRU	5	100	34	5671	1630	7301	60.1	67.4	7	6	4	3
571	MILL//9502008/MILL	5	94	33	5590	2480	8071	65.0	71.6	6.5	5.5	4	0.5
574	LGRU/EP144	6	93	35	5484	2480	7965	.	.	6	7	4.5	0.5
572	LGRU//AR1188/CCDR	6	93	36	5479	2083	7562	57.1	68.0	7.5	6.5	3.5	1
564	JEFF/3/9502008//KATY/902207x2	5	97	35	5173	2115	7288	60.1	69.6	6	5.5	2.5	1
558	CPRS/9901081	6	93	32	4836	2499	7335	64.2	71.3	5	7.5	2	0
553	LGRU//CCDR9770532DH2	6	99	37	4754	2695	7449	62.5	70.8	7	6.5	4	0
551	WELLS/LSCN	6	95	33	4746	2525	7271	64.2	73.9	6.5	6	2.5	0
568	MBLE/CCDR	7	95	33	4342	1900	6242	.	.	6.5	6	5.5	4
562	CCDR/LGRU	7	100	34	4216	2384	6600	.	.	5.5	5	3.5	1
c.v. %		13.5	1.8	3.3	6.7	16.6	6.4	2.7	2.4	12.4	13.0	31.2	57.3
$LSD_{0.05}$		1.5	3.5	2.4	821	716	1062	4.2	4.2	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 4. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 4, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
600	COCODRIE	5	91	37	7185	1642	8827	62.1	69.0	7	5.5	5.5	1.5
584	WELLS//LGRU/CPRS	6	90	37	6980	1174	8154	61.0	70.4	7.5	6.5	6	0.5
581	MILL//9502008/LGRU	5	88	37	6964	2700	9664	65.7	71.3	7	6.5	5.5	0.5
598	9302065/CCDR	4	91	38	6917	2440	9357	66.1	70.8	6	6	3	1.5
592	KATY/CPRS//NWBT/3/9502008/LGRU	5	92	38	6892	2179	9072	62.6	67.9	7	5	5.5	4
593	9502008-A//AR1188/CCDR	5	89	37	6822	1750	8572	61.8	67.4	6	6	4.5	2.5
579	MILL/JEFF	4	88	32	6802	2820	9622	68.3	73.4	6	6	5	2
590	NWBT/KATY//CPRS	5	88	34	6719	1686	8405	61.8	68.6	7.5	7	5	4.5
585	CCDR/DREW	5	89	37	6664	1833	8498	66.1	70.8	7	7	4.5	1
599	AR1142/JODN/4/NWBT/KATY/3/82CAY21/...	5	91	38	6461	2181	8642	62.9	68.2	7.5	6.5	4	0.5
588	9302065/CCDR	5	94	37	6437	2278	8715	61.8	72.1	6.5	5.5	5.5	1
577	WELLS/MBLE	6	93	36	6402	1611	8013	62.1	67.2	5	7	4.5	0.5
583	KATY/CPRS//NWBT/KATY	5	96	34	6335	1511	7846	64.0	69.8	6	6	5.5	2
595	CCDR/4/CPRS/3/KBNT//AR1188	6	89	38	6278	2335	8613	66.6	71.9	7	7	5.5	2
594	MBLE/CCDR	6	90	37	6183	2204	8387	66.3	71.0	7	5.5	5	0.5
582	CPRS/97T1280DH1/3/CPRS/NWBT//KATY	5	94	35	5962	2989	8951	59.6	71.4	5	6.5	4	3.5
578	LGRU//CCDR9770532DH2	6	98	36	5932	1535	7468	63.7	68.7	5.5	7	5.5	2
587	CCDR/3/CPRS/NWBT//KATY	6	94	34	5865	1760	7625	67.8	70.9	7	7	4	3
591	KATY/CPRS//NWBT/KATY	5	95	34	5830	1444	7274	64.9	70.5	6.5	7	6	2.5
596	CPRS/97T1280DH1//CPRS/LGRU	6	98	37	5307	3486	8793	59.9	68.8	5.5	4.5	3	0
580	CPRS/KBNT//902207X2/LGRU	6	101	38	5282	1714	6995	63.0	69.6	6.5	5.5	2.5	1
586	CCDR/LGRU	6	97	36	5208	2935	8143	.	.	6.5	5.5	5	1
589	FRAN/TACAURI	5	95	39	5177	2593	7770	62.6	70.7	6.5	6	3.5	0
576	MBLE/9502008-A	6	99	34	4721	1524	6244	.	.	6.5	6.5	4	1.5
597	9302065//9002007x2/LGRU	6	99	32	4059	1950	6010	62.3	69.7	6	5	6	0
c.v. %		8.8	2.2	3.7	7.3	10.3	6.4	4.0	2.2	12.4	13.0	31.2	57.3
$LSD_{0.05}$		0.93	4.3	2.7	926	445	1079	6.0	3.4	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 5. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 5, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)			Milling Yield (%)		SB‡	BPB‡	RNB‡	NBLS‡
					Main	2^{nd}	Total	Whole	Total				
625	CHENIERE	4	91	37	7552	1459	9012	64.9	71.9	5.5	4.5	5.5	1.5
614	LGRU/WELLS	4	92	44	7457	2721	10178	58.1	70.8	5.5	4.5	6	1
620	FRANCIS/4/TACAURI/3/CPRS//82CAY21/TBNT	4	91	40	7434	1973	9407	59.1	67.2	5	6	5.5	0
605	CPRS/KBNT//DREW	5	92	40	7350	2899	10249	65.5	70.6	5	5.5	2	1
606	CCDR/3/KATY/CPRS//JKSN	5	91	38	7197	1466	8663	63.7	68.8	8	6.5	4	1
607	CCDR//AR1188/CCDR	5	90	37	6906	2216	9123	62.8	69.2	7.5	5.5	4.5	1.5
624	9502008-A/DREW/3/NWBT/KATY//9902207x2	6	91	38	6821	1986	8807	67.6	72.4	7	5	4	1
611	MILL/CCDR	5	90	36	6756	2066	8821	66.6	72.1	6.5	7.5	5	3.5
622	CPRS/3/NWBT/KATY//9902207x2	5	91	39	6570	1808	8378	63.7	69.5	7	5	4	2
621	CCDR//9502008-A/TACAURI	6	92	36	6371	2265	8636	63.7	69.3	5	5.5	3	0
604	MBLE/CCDR	5	90	35	6222	1617	7839	65.3	71.1	6	7	4.5	1
623	TACAURI//CPRS/82CAY21/TBNT/3/NWBT/…	5	91	39	6162	1500	7661	61.2	67.8	7	5.5	4.5	3
609	JKSN/CPRS	5	91	35	6118	2887	9005	69.3	72.3	7.5	7	5.5	2
618	LGRU//AR1188/CCDR	6	91	37	6007	2691	8699	66.0	71.2	7	5.5	4	0.5
601	NWBT/KATY//CPRS	6	89	35	5959	756	6715	63.7	69.3	7	6	4	3.5
616	KATY/CPRS//NWBT/KATY	5	97	35	5863	2074	7937	61.8	67.9	6	5.5	5.5	3.5
610	CPRS/3/CPRS/NWBT/KATY	5	95	33	5824	2074	7898	64.9	70.7	7	6.5	5.5	0
619	CPRS/KBNT//DREW	5	97	36	5799	1491	7290	64.5	69.5	6.5	5.5	3.5	4
603	CPRS/KBNT/4/9502008/3/CPRS//…	5	99	32	5643	1607	7250	58.2	65.9	7	6.5	3.5	3
617	MILL/4/9502005/3/CPRS//82CAY21/TBNT	5	91	34	5373	2513	7886	66.7	70.6	7	7	4.5	0.5
612	JKSN/9302065	5	93	34	5355	2363	7718	70.2	73.4	6	5.5	4.5	3.5
608	9302065/CPRS	5	98	33	5076	1919	6994	59.4	68.0	7.5	6.5	3	1.5
615	JKSN/DREW	5	99	33	4292	2346	6638	59.7	67.5	5.5	5.5	3.5	2
613	9302065/4/DREW/3/KBNT//KATY/CPRS	5	100	35	4152	2523	6676	67.3	72.2	5.5	3.5	4.5	3
602	CPRS/97T1280DH1//CPRS/LGRU	5	98	33	4119	1984	6102	58.7	69.6	5	4	2	2.5
c.v. %		8.9	1.5	3.4	10.0	17.8	10.7	3.9	3.1	12.4	13.0	31.2	57.3
$LSD_{0.05}$		0.89	2.9	2.5	1263	750	1801	6.0	5.2	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 6. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 6, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)			Milling Yield (%)		SB‡	BPB‡	RNB‡	NBLS‡
					Main	2nd	Total	Whole	Total				
635	NWBT/KATY//9902207x2/3/9502008-A/DREW	5	87	37	7941	2583	10523	64.6	72.4	7.5	5	4.5	1.5
646	9502008-A/DREW/3/NWBT/KATY//9902207x2	6	89	39	7709	1640	9349	63.7	70.5	6	6	4.5	3.5
631	CPRS/SABER	5	89	38	7193	2086	9279	64.0	69.4	7.5	6.5	4.5	2.5
630	AR1121/3/CPRS//82CAY21/TBNT/4/CCDR	6	89	38	7069	2515	9583	65.4	72.0	6	6	5	1.5
648	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	90	38	7019	1936	8955	64.0	70.2	7	6	5	2
632	CCDR/4/CPRS/3/KBNT//AR1188	5	89	40	6950	2094	9044	65.7	70.4	6.5	6.5	6	3
641	AR1121/3/CPRS//82CAY21/TBNT/4/CPRS	5	92	38	6948	1883	8831	66.2	71.7	6.5	6	4.5	2.5
643	CPRS/3/NWBT/KATY//9902207x2	5	93	37	6794	2568	9362	65.7	70.7	7.5	6	4	1.5
633	FRANCIS/9302065	4	93	35	6750	3035	9785	64.0	72.7	5.5	6	3.5	1
639	9502008//KATY/9902207x2/3/CPRS/DREW	5	91	38	6666	2648	9314	64.2	69.7	7.5	6.5	5	0.5
647	TACAURI//CPRS/82CAY21/TBNT/3/CCDR	6	89	37	6562	1317	7878	64.7	72.2	7	5.5	3	2
649	KATY/CPRS//NWBT/…/3/9502008/4/CCDR	6	94	37	6246	1401	7647	57.7	65.6	7.5	6	5.5	2
628	9502008/AR1121//CPRS/(KATY//GFMT/PCOS)	6	94	37	6213	1530	7742	61.7	68.2	5.5	5.5	2.5	1.5
645	CCDR//9502008-A/TACAURI	6	91	35	6174	1811	7985	63.5	70.4	7.5	6	5.5	0.5
627	TACAURI//CPRS/82CAY21/TBNT/3/CHENIERE	5	92	34	6160	1735	7895	64.4	70.6	6	4.5	2.5	1
642	9502008//KATY/9902207x2/3/CPRS/DREW	6	96	36	6100	1687	7788	.	.	6	5.5	4.5	3
626	CCDR/MBLE	7	91	35	5869	1651	7520	70.3	74.4	8	5.5	6	2.5
637	CPRS/LGRU	5	97	39	5857	1566	7423	59.8	67.8	6	5.5	3	3
629	AR1121/3/CPRS//82CAY21/TBNT/4/…	6	90	38	5794	2746	8540	67.6	72.1	6	6	4	1
640	MBLE/CCDR	6	90	35	5663	1569	7232	65.4	71.0	7	6.5	4.5	2
638	TACAURI//CPRS/82CAY21/TBNT/3/CCDR	6	94	37	5655	1817	7472	61.7	68.2	6.5	6	3.5	1
650	CYPRESS	6	96	37	5645	1645	7289	68.2	72.8	6.5	6	2.5	2
636	CCDR/4/CPRS/3/KBNT//AR1188	5	90	35	5630	2050	7680	66.2	71.6	6	4.5	4.5	2
644	AR1121/3/CPRS//82CAY21/TBNT/4/…	6	92	37	5486	2000	7486	62.6	69.7	7	6.5	2	0.5
634	TACAURI/3/CPRS//82CAY21/TBNT/4/CPRS//…	6	93	36	5451	1769	7220	65.3	71.2	6	5.5	4	1.5
c.v. %		9.7	1.5	3.4	8.0	19.9	7.6	4.5	2.8	12.4	13.0	31.2	57.3
$LSD_{0.05}$		1.0	2.8	2.5	1048	1809	1313	6.8	4.7	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 7. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 7, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
675	XP730	5	90	48	8852	2673	11525	62.5	70.2	5	2	3.5	0.5
668	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	89	38	7665	2057	9722	64.9	70.6	7.5	5	5.5	3
672	CPRS/3/NWBT/KATY//9902207x2	5	90	36	7633	1970	9603	64.2	68.9	6.5	6.5	5	1
655	NWBT/KATY//9902207x2/3/CCDR	5	89	39	7532	2349	9881	67.3	73.1	7.5	6	3.5	2
673	NWBT/KATY//9902207x2/3/CPRS	5	88	35	7341	1654	8995	65.9	71.8	7.5	6.5	5.5	1
659	9502008//KATY/9902207x2/3/9502008/CPRS	5	89	37	7266	1912	9178	64.7	69.8	7.5	5	4.5	1
656	TACAURI/3/CPRS//82CAY21/TBNT/4/CCDR	5	89	36	7073	1946	9019	67.3	72.7	6.5	5	3	1.5
653	9502008/CPRS/4/CPRS//82CAY21/TBNT/3/AR11..	5	89	37	7041	1449	8490	63.7	71.3	6	6.5	6.5	4.5
657	CPRS/LGRU	5	92	37	7008	2081	9088	66.1	71.1	6	6.5	3	2
662	9502008/CPRS/4/CPRS//82CAY21/TBNT/3/AR11.	5	88	39	6980	2897	9878	66.7	71.1	7.5	5	4.5	3.5
664	TACAURI/3/CPRS//82CAY21/TBNT/4/JKSN	5	91	37	6918	1863	8781	61.5	69.7	5.5	6	4.5	3
671	TACAURI//CPRS/82CAY21/TBNT/3/CHENIERE	5	90	39	6854	1777	8631	67.6	71.6	5	5	5	0
661	CHENIERE/4/9502008/3/CPRS//82CAY21/TBNT	5	93	36	6850	2482	9332	62.4	68.0	6	4	3	0
652	NWBT/KATY//9902207x2/3/CPRS	5	92	38	6571	1624	8196	65.7	71.7	8	5.5	5.5	2.5
651	CCDR/4/AR1121/3/CPRS//82CAY21/TBNT	6	90	39	6500	2166	8666	70.7	74.3	7	5.5	6	1
665	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	91	39	6410	1896	8307	65.5	70.5	8	6	4	2
658	TACAURI//CPRS/82CAY21/TBNT/3/CCDR	6	91	36	6110	2343	8454	.	.	6	6.5	3	1.5
660	AR1121/3/CPRS//82CAY21/TBNT/4/CCDR	6	90	36	6087	1258	7345	62.2	68.6	6.5	5	5.5	1.5
674	CCDR//9502008-A/TACAURI	5	92	37	5942	1870	7812	66.3	71.7	6.5	6.5	3.5	1.5
670	TACAURI//CPRS/82CAY21/TBNT/3/CCDR	6	92	35	5682	1639	7321	61.8	68.4	6.5	5	2.5	0.5
663	AR1121/3/CPRS//82CAY21/TBNT/4/…	6	92	38	5381	2156	7537	67.4	72.9	5	6.5	3.5	1.5
666	TACAURI/3/CPRS//82CAY21/TBNT/4/CPRS//…	6	95	39	5254	1931	7185	63.2	70.0	6	7	3	2.5
669	9502008//KATY/9902207x2/3/JEFF	5	94	36	5247	1773	7020	64.7	71.0	6.5	4.5	2	1.5
654	AR1121/3/CPRS//82CAY21/TBNT/4/CPRS//…	5	93	38	5112	1778	6890	73.6	79.1	7	6.5	5	4
667	CCDR//9502008-A/TACAURI	6	92	35	4768	1539	6307	65.5	71.8	7.5	6	5	1.5
c.v. %		7.8	1.8	3.7	6.8	16.3	7.3	3.8	2.4	12.4	13.0	31.2	57.3
$LSD_{0.05}$		0.83	3.0	2.8	925	661	1289	5.6	3.9	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.

‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 8. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 8, Crowley, LA.

					Grain Yield (lb/A @ 12%)			Milling Yield (%)					
Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Main	2nd	Total	Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
700	XP723	5	88	41	8944	3327	12271	64.9	72.3	6	2.5	3	0.5
684	NWBT/KATY//9902207x2/3/CPRS	4	88	38	7744	1982	9726	66.9	72.1	7	6	4.5	1
683	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	90	38	7384	2387	9771	66.1	72.4	8	5	5.5	1
694	CPRS/3/NWBT/KATY//9902207x2	6	89	38	7059	1785	8844	65.7	70.8	7.5	6	4.5	1
677	CHENIERE/3/CPRS//82CAY21/TBNT	7	89	40	7056	1724	8781	62.9	69.2	7.5	5	5	0.5
682	NWBT/KATY//9902207x2/3/9502008-A/DREW	4	90	37	6943	2347	9289	65.0	70.3	7	6.5	5	1.5
699	CCDR/4/CPRS/3/MBLE//LMNT/…	4	88	39	6943	1703	8646	63.6	69.3	7	6.5	5	2
689	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	90	39	6939	1902	8841	64.5	70.1	7	5	5	0.5
680	902207x2/LGRU//CHENIERE	5	89	39	6928	1516	8444	66.0	70.6	7	5.5	5.5	1.5
686	CPRS//82CAY21/TBNT/3/EPAGRI106	6	89	40	6922	2852	9774	61.9	68.9	6.5	5.5	2	0.5
687	9502008-A/DREW//9502008/AR1121	6	91	40	6910	1357	8267	63.0	68.6	6.5	6.5	3.5	0.5
690	9502008-A/DREW//CCDR	5	89	39	6843	1915	8758	64.1	71.3	6.5	5.5	4.5	1.5
679	NWBT/KATY//9902207x2/3/9502008-A/DREW	5	89	38	6830	2511	9340	66.6	72.2	7.5	5.5	5	1
688	CPRS/3/CPRS//82CAY21/TBNT	6	89	39	6778	1754	8531	67.2	72.5	7.5	5	4.5	1.5
681	TACAURI/3/CPRS//82CAY21/TBNT/4/CCDR	6	89	37	6773	1954	8727	66.3	71.9	6	5.5	5	3
678	CPRS/3/CPRS//82CAY21/TBNT	6	88	43	6763	1850	8612	63.8	70.0	8	5.5	4	1.5
696	CHENIERE/4/CPRS/3/KBNT//AR1188	6	91	32	6285	2119	8403	70.0	74.2	6.5	7	4.5	3
693	KATY/CPRS//NWBT/…/3/9502008/4/FRANCIS	6	92	39	6188	3237	9425	66.9	71.5	6.5	5	6	1
685	9502008/LGRU/3/CPRS//82CAY21/TBNT	6	91	38	6152	2865	9017	67.3	71.1	6.5	6.5	6	2.5
692	CPRS/SABER	5	89	37	5896	2643	8540	64.3	68.9	7.5	6.5	1.5	0
695	CHENIERE//9502008-A/DREW	6	92	37	5841	1770	7610	65.3	71.8	8	4.5	5.5	1.5
691	./3/CPRS//82CAY21/TBNT/4/9502008-A/DREW	6	91	39	5700	2447	8147	70.6	73.8	6	5.5	5	1.5
698	TACAURI/3/CPRS//82CAY21/TBNT/4/JKSN	6	93	35	5543	1865	7408	62.3	68.6	6.5	5.5	4	2
697	9502008-A/TACAURI//CHENIERE	6	96	31	5479	1402	6881	58.7	69.2	7	6.5	5	1
676	TACAURI/3/CPRS//82CAY21/TBNT/4/CPRS//	6	96	36	5181	1437	6618	.	.	6	7	3.5	2
c.v. %		9.7	2.1	3.7	9.0	16.7	8.6	3.4	2.4	12.4	13.0	31.2	57.3
$LSD_{0.05}$		1.1	3.8	2.9	1235	727	1551	5.7	4.4	1.6	1.5	2.7	1.9

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 9. Grain and milling yield, agronomic performance, and disease ratings[†] of entries in the 2007 Single-Plot Yield Trial, Group 1, Crowley, LA.

Entry	Pedigree	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%)		SB[‡]	BPB[‡]	RNB[‡]	NBLS[‡]
						Whole	Total				
050	CHENIERE	5	93	37	8557	63.6	70.4	6	4.5	5.5	2
022	KATY/CPRS//NWBT/…/3/9502008/4/CCDR	5	88	35	7172	65.5	71.0	6.5	5.5	4.5	2.5
048	CHENIERE//9502008-A/TACAURI	6	90	37	7166	61.4	70.7	6	6	6	0.5
002	DREW/3/KBNT//KATY/CPRS/4/WELLS	4	93	43	7160	53.0	70.6	4	4.5	3	0
047	9502008/LGRU//CCDR	6	93	34	6998	59.8	70.9	5.5	4.5	3.5	3.5
005	CCDR/FRAN	5	89	33	6914	63.3	69.6	6	5.5	5	0
020	KATY/CPRS//NWBT/…/3/9502008/4/CCDR	6	92	37	6870	63.7	69.3	6	6	5	2
021	CPRS//9502008-A/DREW	5	92	35	6806	67.2	71.0	6.5	7	3	0
024	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	94	37	6676	64.3	69.7	5.5	5	5	1
025	CATAHOULA	5	92	37	6549	66.1	72.3	5.5	4.5	2	0
015	AR1121/3/CPRS//82CAY21/TBNT/4/CCDR	5	92	34	6546	60.9	68.8	5	5.5	3	2.5
046	TACAURI/3/CPRS//82CAY21/TBNT/4/CPRS//…	5	92	35	6493	65.3	70.5	4	5.5	6	3
018	TACAURI/3/CPRS//82CAY21/TBNT/4/CCDR	5	90	31	6480	65.3	72.2	6.5	6.5	5	1.5
017	NWBT/KATY//9902207x2/3/9502008-A/DREW	5	89	37	6428	64.1	72.4	7	5	3	1
031	NWBT/KATY//9902207x2/3/CCDR	6	94	36	6357	56.3	64.8	6	6	4.5	2.5
044	9502008-A/DREW/3/NWBT/KATY//9902207x2	5	93	35	6353	65.1	70.1	5.5	6	3.5	1
008	DREW/3/KBNT//KATY/CPRS/4/WELLS	5	94	37	6305	53.4	70.8	4.5	5.5	2	0
013	CCDR/4/CPRS/3/KBNT//AR1188	5	91	39	6186	64.0	69.8	6	6	4.5	4
043	CHENIERE/4/9502008/3/CPRS//82CAY21/TBNT	5	93	36	6170	60.1	67.6	6.5	6	3.5	2.5
003	9302065/CPRS	4	93	35	6125	67.3	71.0	6	6	2	1.5
006	MILL/4/DREW/3/9602103/CPRS//…	5	91	31	6068	61.5	69.6	4.5	6	5	2
004	SABER/LGRU	4	88	33	6027	65.5	71.8	7	6	3.5	0.5
001	JODN/3/NWBT/KATY//LCSN	4	90	36	5991	65.2	71.8	6.5	6	6	3
023	CCDR//9502008-A/TACAURI	5	90	36	5979	64.9	70.4	7	5.5	3	2.5
028	9502008-A/DREW//FRAN	5	95	31	5901	59.6	68.3	6	6	5	2
012	CCDR//9502008-A/TACAURI	6	90	33	5805	64.1	71.2	5	5.5	2	0
049	CPRS/4/RXCL//LABR33/3/RSMT/KATY	5	93	32	5775	62.9	68.5	5	6	4	1.5
011	CPRS9502008-A/TACAURI	5	94	30	5730	63.0	64.1	6	6.5	3	1
033	9502008//KATY/9902207x2/3/9502008/CPRS	6	95	31	5649	62.0	67.9	6.5	6.5	4.5	1.5
032	9502008//KATY/9902207x2/3/CPRS/DREW	6	97	34	5643	60.6	69.3	6	5.5	5	2.5
030	TACAURI/3/CPRS//82CAY21/TBNT/4/CPRS//…	5	96	35	5567	64.4	70.0	4.5	4	3.5	1
016	FRANCIS/4/TACAURI/3/CPRS//82CAY21/TBNT	6	89	36	5455	64.7	71.0	7	5.5	2.5	1
040	9502008/AR1121//CPRS/(KATY//GFMT/PCOS)	6	97	33	5263	66.5	71.5	7	5.5	3.5	3
045	9502008-A/TACAURI//CHENIERE	7	95	31	5261	58.2	68.6	6	5	4	0
014	CPRS9502008-A/TACAURI	5	94	37	5228	66.1	72.4	8	5.5	3.5	0.5
039	NWBT/KATY//9902207x2/3/CCDR	5	97	34	5215	65.7	71.0	7	6.5	4.5	2.5

Continued.

Table 9. Continued.

Entry	Pedigree	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB[‡]	BPB[‡]	RNB[‡]	NBLS[‡]
041	AR1121/3/CPRS//82CAY21/TBNT/4/TACAURI	5	93	31	5168	60.2	68.3	4	5	3.5	2.5
034	CCDR/4/AR1121/3/CPRS//82CAY21/TBNT	5	94	34	5161	65.5	72.0	5	6	4.5	2.5
019	AR1121/3/CPRS//82CAY21/TBNT/4/CPRS//…	6	91	37	5121	64.4	71.7	5.5	6.5	4	4
007	9502008/CPRS//WELLS	5	93	34	5081	61.6	70.7	7	7	3	0
029	CCDR/4/CPRS/3/KBNT//AR1188	7	99	34	5057	62.0	68.0	5.5	6.5	2	1.5
035	FRANCIS/9302065	6	98	30	4988	59.0	69.2	6.5	6	5	2.5
027	9502008//KATY/9902207x2/3/JKSN	6	96	30	4823	64.3	70.3	7	6.5	3.5	2.5
037	TACAURI//CPRS/82CAY21/TBNT/4/…	7	98	35	4780	62.0	68.1	5.5	5.5	1.5	1.5
026	TACAURI/3/CPRS//82CAY21/TBNT/4/CCDR	5	96	31	4598	64.7	71.4	6	5.5	4.5	2.5
038	9502008/KBNT//CPRS/LGRU	6	100	34	4466	61.2	71.7	5	4	4.5	3.5
010	9502008/KBNT//FRAN	7	94	30	4456	60.3	70.0	5.5	6	5.5	3
036	9502008/KBNT//CPRS/LGRU	6	100	35	4365	62.1	70.3	4	4	2	1.5
009	WELLS/EP144	5	92	39	.	57.3	71.5	4.5	6	3.5	1
042	CHENIERE/3/CPRS//82CAY21/TBNT	5	90	38	.	64.8	71.4	7	5.5	5.5	0.5

[†] Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
[‡] Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

DATE OF PLANTING STUDIES

The purpose of these trials is to determine the grain yield, milling quality, and other agronomic characteristics of major rice varieties, experimental lines, and hybrids planted at various times. The choice of planting date can significantly impact rice growth, development, and yield, and the information generated from these trials is important for understanding the impact on important economic and production characteristics associated with rice production.

Experiment: Date of Planting

Location: Rice Research Station, Crowley, Louisiana

Planting Method: Water-seeded

Plot size: 4.66 x 16 ft

Planting Dates: March 1, March 15, March 30, April 13, May 1, May 15, June 1

Entries: Catahoula, Cheniere, CL131, CL151, CL161, CL171, Cocodrie, LA0502022, LA0502177, LA0602109, Neptune, Trenasse, XP723, CLXL729, CLXL730

Experimental Design: Randomized complete block design with three replications

Results: Results can be found in Tables 1 to 5, which are arranged across planting dates.

Table 1. Grain yields† of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	**Mar 1**	**Mar 15**	**Mar 30**	**Apr 13**	**May 1**	**May 15**	**June 1**	**Mean**
CATAHOULA	1902	2597	7597	3924	8282	6710	3346	5059
CHENIERE	4103	3232	7716	2450	7047	6452	3046	4864
CL131	3159	1208	7694	3808	8088	6335	2620	4552
CL151	5183	3100	7696	3851	8914	7592	3493	5690
CL161	5003	1202	6868	4427	8790	7264	3167	5671
CL171	2336	2116	7822	5388	6897	6243	2333	4734
COCODRIE	4387	2999	7715	2851	6046	8421	3913	5190
LA0502022	4490	1812	8058	5103	7199	7239	2990	5384
LA0502177	3842	3095	5628	3097	5629	6142	4267	4542
LA0602109	3766	2046	5777	3385	6999	6675	2720	4481
NEPTUNE	6433	3886	7709	5107	8916	8901	1937	6048
TRENASSE	1307	3261	7891	4343	5855	7194	3868	4817
XP723	5768	3874	9148	4729	8375	8171	3616	6240
XP729	6393	4380	8811	3436	9194	8745	4000	6423
XP730	7191	3009	9027	5212	9006	7949	3135	6361
Mean	4406	2862	7676	4074	7682	7336	3212	5338
c.v. %	22.8	34.9	9.2	31.4	12.4	6.4	32.3	n/a
$LSD_{0.05}$	1712	1788	1225	2138	1587	786	1798	n/a

† Yield is in pounds rough rice per acre at 12% moisture.

Table 2. Seedling vigor† of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	Mar 1	Mar 15	Mar 30	Apr 13	May 1	May 15	June 1	Mean
CATAHOULA	8	4	4	5	6	5	7	6
CHENIERE	6	4	4	6	6	5	8	6
CL131	7	5	5	5	8	5	9	6
CL151	5	4	4	5	5	5	8	5
CL161	5	3	4	4	4	4	7	4
CL171	7	4	4	5	7	4	8	6
COCODRIE	6	4	3	5	7	5	7	5
LA0502022	5	3	5	4	7	4	8	5
LA0502177	5	4	4	5	6	4	7	5
LA0602109	7	4	4	5	6	5	7	5
NEPTUNE	4	3	3	3	4	4	8	4
TRENASSE	8	5	6	6	7	7	8	7
XP723	5	4	6	6	7	7	9	6
XP729	5	5	6	7	6	8	8	6
XP730	4	4	6	6	6	6	8	6
Mean	6	4	4	5	6	5	8	6
c.v. %	12.1	15.3	14.2	21.4	17.9	11.0	10.9	n/a
$LSD_{0.05}$	1.2	1.0	1.1	1.9	1.8	0.98	1.4	n/a

† Subjective rating of 1 to 9 where 1 is the highest seedling vigor and 9 is the lowest seedling vigor.

Table 3. Days to 50% heading of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	Mar 1	Mar 15	Mar 30	Apr 13	May 1	May 15	June 1	Mean
CATAHOULA	103	91	80	87	82	78	74	85
CHENIERE	104	91	82	88	82	78	74	86
CL131	102	95	80	87	81	76	72	85
CL151	102	93	82	89	80	78	74	85
CL161	104	99	88	90	82	79	76	88
CL171	104	92	82	88	85	79	76	86
COCODRIE	101	92	78	89	79	75	71	84
LA0502022	100	95	80	83	80	75	72	83
LA0502177	97	83	77	84	81	76	72	82
LA0602109	99	90	78	85	79	75	71	82
NEPTUNE	99	90	82	90	81	78	74	85
TRENASSE	98	83	75	81	75	71	66	78
XP723	98	88	82	84	77	76	72	83
XP729	99	92	82	85	78	76	74	84
XP730	99	90	84	84	78	78	75	84
Mean	101	91	81	86	80	77	73	84
c.v. %	2.2	2.7	1.3	2.8	2.0	1.4	2.1	n/a
$LSD_{0.05}$	3.7	4.0	1.3	3.7	2.7	1.8	2.5	n/a

Table 4. Plant height† of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	**Mar 1**	**Mar 15**	**Mar 30**	**Apr 13**	**May 1**	**May 15**	**June 1**	**Mean**
CATAHOULA	28	30	37	34	38	37	41	35
CHENIERE	32	32	36	34	36	37	38	35
CL131	30	27	35	31	36	34	34	32
CL151	33	31	39	35	38	38	38	36
CL161	32	31	38	36	40	38	40	36
CL171	33	32	40	37	39	39	40	37
COCODRIE	31	31	36	33	37	37	38	35
LA0502022	31	29	36	33	37	36	36	34
LA0502177	32	31	37	35	41	40	35	36
LA0602109	31	29	36	32	36	34	36	34
NEPTUNE	30	28	35	33	37	36	31	33
TRENASSE	28	31	38	35	37	38	36	35
XP723	37	36	42	39	44	43	42	40
XP729	37	34	43	37	44	42	41	40
XP730	39	35	44	41	45	44	44	42
Mean	32	31	38	35	39	38	38	36
c.v. %	6.1	4.6	3.8	4.5	3.0	3.7	4.6	n/a
$LSD_{0.05}$	3.3	2.4	2.4	2.6	2.0	2.4	2.9	n/a

† Plant height in inches from the soil surface to the tip of the main panicle.

Table 5. Whole milling percentage† of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	**Mar 1**	**Mar 15**	**Mar 30**	**Apr 13**	**May 1**	**May 15**	**June 1**	**Mean**
CATAHOULA	59.6	63.4	68.0	57.2	65.1	58.9	62.9	62.2
CHENIERE	61.8	60.9	65.3	56.3	61.0	66.3	57.1	61.3
CL131	65.1	66.4	65.5	63.9	63.7	63.1	62.4	64.3
CL151	60.6	59.2	62.0	56.6	62.7	60.1	57.1	59.8
CL161	65.5	54.4	69.1	60.4	64.3	63.6	58.1	62.2
CL171	65.3	65.6	68.0	61.9	64.7	64.4	57.1	63.7
COCODRIE	63.4	63.1	64.8	63.5	57.4	61.4	60.0	61.9
LA0502022	67.5	65.6	65.3	60.4	62.7	57.9	61.0	62.9
LA0502177	63.7	60.4	63.0	48.2	59.8	46.9	46.0	55.4
LA0602109	62.6	63.3	65.5	58.0	58.8	60.0	54.9	60.4
NEPTUNE	67.6	67.7	68.2	69.3	66.3	65.0	57.5	65.9
TRENASSE	64.8	63.1	64.0	58.2	57.8	56.9	61.3	60.6
XP723	65.1	62.7	60.7	55.9	63.3	58.9	57.3	60.6
XP729	59.9	62.6	60.7	53.3	61.7	58.8	52.6	58.5
XP730	62.4	59.5	61.1	53.2	62.8	58.9	58.1	59.4
Mean	63.7	62.4	64.8	58.4	62.1	60.1	57.6	61.3
c.v. %	3.4	5.5	2.4	3.6	3.1	4.1	8.7	n/a
$LSD_{0.05}$	4.7	7.7	3.5	4.5	4.1	5.3	10.8	n/a

† The percentage of unbroken grains after removal of the hulls and broken grains.

Table 6. Total milling percentage[†] of 15 rice varieties, experimental lines, and hybrids planted over seven planting dates, 2007, Rice Research Station, Crowley, LA.

	Planting Date							
Entry	**Mar 1**	**Mar 15**	**Mar 30**	**Apr 13**	**May 1**	**May 15**	**June 1**	**Mean**
CATAHOULA	72.0	72.4	74.0	72.1	72.2	70.3	69.1	71.7
CHENIERE	68.6	68.5	71.7	70.4	68.8	71.1	65.6	69.2
CL131	70.9	71.3	71.9	71.2	69.0	70.1	68.0	70.3
CL151	68.2	66.6	70.3	69.2	69.0	68.7	65.1	68.1
CL161	71.1	64.5	73.8	70.1	69.0	67.9	64.9	68.8
CL171	72.5	72.1	73.7	71.8	69.7	70.7	65.7	70.8
COCODRIE	70.1	68.9	72.6	71.7	64.9	68.3	66.5	69.0
LA0502022	72.5	71.3	72.5	71.7	69.3	69.0	67.6	70.6
LA0502177	72.3	70.7	72.9	72.5	68.9	69.6	65.9	70.4
LA0602109	69.7	69.3	71.2	70.0	66.5	69.0	64.3	68.6
NEPTUNE	70.0	70.7	73.3	73.6	69.6	69.7	68.0	70.7
TRENASSE	69.9	69.5	70.4	68.4	65.9	66.5	67.1	68.2
XP723	72.5	71.2	72.1	71.7	71.1	69.5	66.1	70.6
XP729	69.9	71.1	72.5	70.5	69.7	69.0	65.3	69.7
XP730	70.3	68.9	72.2	69.2	70.8	69.6	65.9	69.6
Mean	70.7	69.7	72.3	70.9	69.0	69.3	66.3	69.8
c.v. %	1.5	3.2	1.1	1.6	2.5	1.9	2.4	n/a
$LSD_{0.05}$	2.2	5.0	1.8	2.5	3.7	2.8	3.4	n/a

[†] The cumulative percentage of broken and unbroken grains after removal of the hulls.

MEDIUM-GRAIN RICE BREEDING

S.B. Blanche, S.D. Linscombe, X.Y. Sha, G.A. Anderson, Q.J. Zaunbrecher, K.F. Bearb, C.A. Conner, B.T. Theunissen, S.J. Theunissen, and H.L. Hoffpauir

The objectives of the medium-grain rice breeding project are to develop improved medium-grain rice varieties using traditional and modern breeding techniques. Key goals of the program are to increase yield potential, disease resistance, and milling quality and to select for large, bold grain types with good cooking characteristics. Other traits of interest include short plant stature, lodging resistance, earliness, and stable grain and milling yields.

The medium-grain breeding project made 80 unique cross combinations to accomplish the goals of the program. Other activities in 2007 included 70 transplanted F_1 populations and 65 space-planted F_2 populations. The 2007 medium-grain rice breeding nursery included over 10,000 progeny rows from F_3 (early) to F_8 (advanced) generations.

Eight advanced medium-grain experimental lines (entries 062, 065, 068, 071, 162, 165, 168, and 171) were tested in the 2007 Uniform Regional Rice Nursery (URN). The yield, milling, and agronomic performance of these lines are presented in the URN tables (pages 8 and 11). Five of these lines were tested in the Commercial-Advanced Yield Trial (CA) at five locations throughout the Louisiana rice-growing regions, and these data are presented in the CA tables (pages 14-20).

There were 125 advanced medium-grain lines tested in the preliminary yield testing program in 2007. The preliminary yield trials consist primarily of outstanding breeding nursery material that is ready for testing in replicated (PY) or non-replicated (SP) yield trials. The material in these trials was screened for agronomic and grain characteristics in nurseries prior to this phase of testing. Promising experimental lines were evaluated for seedling vigor, maturity, plant height, lodging resistance, grain yield of main and ratoon crops, whole and total milling percentages, and disease resistance.

Standard agronomic practices were used for the preliminary yield tests except that no fungicide was applied. Tests were conducted at the Rice Research Station at Crowley, LA, and plot size was 4.66 x 16 ft. Plots were seeded at a rate of 100 lb/A. This test was drill seeded on March 19 and harvested on August 9. Milling samples were taken from each plot at harvest maturity (18 to 20% moisture). Tables 1 to 3 presented in this section report only on the medium-grain entries in the replicated and single-plot preliminary yield test. Dr. Don Groth and the Rice Pathology Project provided the disease ratings for sheath blight, rotten neck blast, bacterial panicle blight, and narrow brown leaf spot.

Table 1. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 14, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%) Main	2nd	Total	Milling Yield (%) Whole	Total	SB‡	BPB‡	RNB‡	NBLS‡
834	BNGL/SHORTRICO/4/9502065/3/…	5	81	40	8840	2933	11772	67.8	71.5	6	6	3	1
844	BNGL/SHORTRICO/4/ORIN//…	5	78	41	8447	2838	11285	68.0	71.1	5	3.5	2.5	1
850	JUPITER	4	85	39	8402	2135	10536	62.4	66.9	6.5	5	5	1.5
833	BNGL/SHORTRICO/4/ORIN//…	5	75	36	8372	3107	11479	66.1	70.1	6	5.5	2.5	1
831	BNGL/3/BNGL//MERC/RICO	4	86	38	8371	3201	11572	67.4	71.3	4.5	7	2.5	0.5
826	9902028/3/BNGL//MERC/RICO	4	79	39	8226	1730	9955	64.2	68.8	4.5	7	3	0
837	BNGL/SHORTRICO/4/ORIN//…	6	80	40	8210	2985	11195	66.8	70.2	5	4.5	4	1
848	BNGL/SHORTRICO/4/9502065/3/…	5	82	40	8084	1729	9813	69.9	72.6	5.5	6	2.5	0.5
829	BNGL//MERC/RICO/3/EARL	5	82	37	8054	3038	11092	68.3	70.0	4.5	7	5	0
835	BNGL/SHORTRICO//LFTE	4	77	40	8025	2421	10446	68.8	71.9	6	5	4.5	0.5
828	EARL//BNGL/SHORTRICO	4	84	34	7887	2828	10714	65.8	70.7	5	7.5	5	0.5
849	9502065/3/BNGL//MERC/RICO/5/LFTE/4/…	5	82	42	7745	3067	11300	66.2	69.2	7	6	5	0
843	ORIN//MERC/RICO/3/MARS//M201/…	4	78	38	7744	2013	9757	63.6	68.8	5.5	5	4	0.5
836	9865216DH2//BNGL/SHORTRICO	5	79	40	7594	3008	10601	63.6	67.6	6.5	6.5	5	0.5
845	BNGL/SHORTRICO/4/ORIN//…	4	80	38	7591	2784	10375	69.4	71.8	4.5	5	4.5	1.5
846	9902028/3/BNGL//MERC/RICO	4	84	36	7533	2518	10051	67.8	70.4	5	7	3	0.5
840	BNGL/SHORTRICO/4/ORIN//…	6	78	39	7374	2073	9446	68.0	71.0	5.5	5	5	0.5
832	BNGL//MERC/RICO/3/RICO/…	5	85	37	7357	3011	10368	69.0	72.5	6	6	4	0
830	LFTE/4/KATY/CPRS/3/CPRS/LMNT/5/…	5	77	39	7209	2686	9895	68.6	71.0	6.5	5.5	2.5	0
847	9865216DH2//BNGL/SHORTRICO	4	81	38	7068	2492	9561	66.6	69.9	6	6	5.5	0.5
839	BNGL/SHORTRICO/4/9502065/3/…	6	84	36	7034	1784	9132	65.6	69.2	5.5	6	3	0.5
842	9865216DH2//BNGL/SHORTRICO	4	81	40	6853	2489	9343	63.2	67.8	5	5	6	1.5
827	9902028/3/BNGL//MERC/RICO	4	84	39	6826	2719	9545	69.4	71.2	6.5	7	4.5	1
838	9865216DH2/EARL	5	82	40	6734	1816	8550	62.8	68.1	5.5	6	5	1
841	9502065/3/BNGL//MERC/RICO/5/LFTE/4/…	4	82	37	4825	2151	6976	70.4	72.7	7	6	3.5	1.5
c.v. %		21.4	2.0	3.5	7.7	14.7	7.2	2.0	1.1	14.6	13.0	16.4	67.1
$LSD_{0.05}$		1.9	3.3	2.8	1215	807	1591	2.7	1.6	1.7	1.5	1.5	2.0

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 2. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Preliminary Yield Trial, Group 15, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)			Milling Yield (%)		SB‡	BPB‡	RNB‡	NBLS‡
					Main	2nd	Total	Whole	Total				
865	BNGL//MERC/RICO/3/EARL	4	85	37	7471	2858	10330	69.1	71.3	5	5	4	0
868	9865216DH2/EARL	5	82	40	7312	3215	10527	63.6	66.5	5	5	5	1
867	ORIN/3/MERC/CAM9/MARS/4/BNGL	4	83	40	7218	2562	9780	64.4	68.9	5.5	5	3	1
852	BNGL/SHORTRICO/4/9502065/3/…	4	82	37	7074	2245	9319	68.0	71.9	6.5	5	3.5	1.5
870	ORIN//MERC/RICO/3/MARS//M201/…	5	82	38	6935	2658	9593	63.4	67.7	4	5	4.5	0.5
855	BNGL/SHORTRICO//BNGL	5	83	39	6825	2760	9584	64.9	69.3	5.5	6	4.5	0.5
871	EARL/4/ORIN//MERC/RICO/3/…	5	84	38	6805	2667	9472	67.5	71.0	5	5	5.5	0.5
858	9865216DH2//BNGL/SHORTRICO	5	79	38	6791	2343	9134	69.2	71.4	5.5	6	5	0
874	ORIN/3/MERC/CAM9/MARS/4/BNGL	5	82	38	6785	3043	9828	64.5	70.2	4.5	5	3	0
863	LFTE/BNGL	5	81	38	6714	2549	9263	69.0	73.3	4.5	5	4.5	0
851	ORIN/3/MERC/CAM9/MARS/4/BNGL	4	84	37	6645	2712	9357	66.2	68.5	6.5	6	3.5	1
862	9502065/3/MERC//MERC/4/9902028	5	81	37	6612	2927	9539	64.9	68.0	5	5	4.5	0
853	BNGL/SHORTRICO//BNGL	4	86	39	6610	2020	8630	55.9	70.0	6	6.5	2.5	0
866	9502065/3/MERC//MERC/4/BNGL/4/9902028	5	77	42	6455	2426	8881	64.2	67.6	4.5	4	6	0.5
856	BNGL/SHORTRICO//BNGL	5	82	37	6401	1877	8278	64.3	70.5	4	6	3.5	0
857	BNGL/SHORTRICO/4/ORIN//…	6	81	38	6365	2887	9252	68.5	71.1	5	6	2	0
864	BNGL//MERC/RICO/3/EARL	5	84	38	6276	2847	9792	70.0	72.1	3.5	4	4	0
861	EARL/ABSRM154291	5	81	36	6108	2061	8717	64.3	70.6	4.5	6	6	0.5
854	BNGL/SHORTRICO/4/9502065/3/…	5	82	34	5993	2817	8811	68.7	70.9	6.5	5.5	5.5	0
872	BNGL//MERC/RICO/3/MERC/RICO//BNGL	4	84	36	5888	2291	8179	67.3	70.5	4	5.5	2	0.5
875	BENGAL	4	85	39	5729	2398	8128	66.7	70.1	4.5	5	3	0
860	BNGL//MERC/RICO/3/EARL	5	86	35	5664	2976	9120	70.0	72.3	6.5	5.5	4	1.5
873	BNGL//MERC/RICO/3/MERC/RICO//BNGL	5	82	39	5415	2997	8411	69.9	71.9	4.5	5.5	5	0.5
859	BNGL/SHORTRICO//LFTE	5	73	40	5011	1759	6770	70.0	72.3	4.5	4.5	2	0.5
869	BNGL/SHORTRICO//BNGL	5	81	39	4927	2034	6961	65.4	69.9	4.5	5.5	1.5	1
c.v. %		22.1	2.9	2.4	13.2	15.7	10.8	1.8	1.3	14.6	13.0	16.4	67.1
$LSD_{0.05}$		2.1	4.9	1.8	1739	883	2147	2.6	1.9	1.7	1.5	1.5	2.0

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

Table 3. Grain and milling yield, agronomic performance, and disease ratings† of entries in the 2007 Single-Plot Yield Trial, Group 3, Crowley, LA.

Entry	Pedigree	Vigor†	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Milling Yield (%) Total	SB‡	BPB‡	RNB‡	NBLS‡
284	EARL/9902028	5	88	37	9250	67.7	72.8	3.5	6	4.5	1
303	MARS//M201/MARS/5/STRN//MERC/…	6	80	38	8737	68.2	72.1	4.5	7	3.5	0.5
292	9865216DH2/4/ORIN//…	3	82	44	8519	66.6	71.2	5.5	6	4	1
320	EARL/4/ORIN//MERC/RICO/3/…	3	89	40	8407	67.4	70.2	4.5	5	5	1
305	PY678/MARS	4	84	37	8307	62.7	72.1	4.5	7	2	1
266	ORIN/3/MERC/CAM9/MARS/4/BNGL	4	83	37	8290	68.8	71.6	5.5	4.5	3.5	1
285	BNGL//MERC/RICO/3/EARL	4	84	38	8155	67.5	72.6	4.5	6	5	2
279	ORIN//MERC/RICO//…/3/BNGL/RICO	6	84	40	8090	66.5	70.4	5	6.5	5	1
281	ORIN/3/MERC/CAM9/MARS/4/BNGL	3	84	36	7965	64.4	72.9	5.5	6	2.5	0.5
296	BNGL/SHORTRICO//BNGL	4	85	37	7945	63.2	74.4	6	6	3.5	0.5
316	LFTE/4/KATY/CPRS/3/CPRS/LMNT/6/…	4	79	41	7854	69.2	72.3	7	6	5.5	0.5
277	ORIN/3/MERC/CAM9/MARS/4/BNGL	4	82	38	7801	67.3	73.1	5	5	4	0
315	BNGL/SHORTRICO//MERC	5	85	39	7773	65.9	70.4	5	6.5	4.5	0
312	BNGL//MERC/RICO/4/EARL/3/CPRS/…	6	82	38	7771	67.7	71.4	5	6.5	4	0
276	ORIN/3/MERC/CAM9/MARS/4/BNGL	6	81	37	7719	65.7	69.0	5	6	4	0
254	MARS/4/9502065/3/MERC//MERC	3	82	36	7635	65.1	71.1	5.5	4	4	2
278	ORIN/3/MERC/CAM9/MARS/4/BNGL	6	80	37	7617	70.1	72.5	5	5	4.5	1.5
323	MDRK/EARL	5	86	35	7557	66.6	70.6	5.5	7	6	1
313	BNGL//MERC/RICO/4/EARL/3/CPRS/…	5	86	37	7553	67.5	73.0	4.5	5	4	1
253	PY678/BNGL//MERC/RICO	5	87	40	7550	67.8	70.9	5.5	7	3.5	0
309	9502065/3/BNGL//MERC/RICO/5/LFTE/4/…	3	85	39	7545	64.7	66.9	6	6.5	5.5	0
291	9865216DH2/EARL	5	81	38	7542	58.5	65.8	5	7	6	2.5
274	EARL/9902028	3	86	37	7511	66.2	70.8	5	5	5.5	2.5
256	BNGL//MERC/RICO/3/EARL	5	85	34	7504	68.4	72.4	5.5	8	5.5	1.5
290	9865216DH2/EARL	5	86	39	7470	66.5	70.2	4.5	5	5	0.5
286	BNGL//MERC/RICO/3/EARL	3	86	35	7466	66.1	70.1	5	7	4.5	0.5
295	BNGL/5/LFTE/4/KATY/CPRS/3/…	5	82	38	7460	68.4	71.4	6	7	5	1.5
251	BNGL//MERC/RICO/3/STRN	3	83	36	7456	68.7	72.1	4.5	5.5	3	0.5
319	LFTE/4/KATY/CPRS/3/CPRS/LMNT/5/…	6	83	37	7456	68.8	71.5	6	7	4	2
261	BNGL//MERC/RICO/3/EARL	5	85	34	7450	66.8	70.3	5.5	7.5	4	0.5
301	BNGL/SHORTRICO//LFTE	3	87	40	7447	68.4	71.8	4	5.5	2.5	0.5
252	BNGL/3/BNGL//MERC/RICO	5	86	38	7429	64.2	74.9	4	4.5	3	0.5
283	9502065/3/MERC//MERC/4/BNGL	6	86	41	7295	59.6	72.8	6.5	7	3.5	0
259	MARS/4/9502065/3/MERC//MERC	3	86	39	7288	65.1	70.6	4.5	7	3.5	2
282	ORIN/3/MERC/CAM9/MARS/4/BNGL	5	87	39	7236	60.2	70.2	4	4.5	3	0
308	RICO/BNGL	3	86	34	7210	65.0	69.6	4.5	5.5	4.5	1
299	BNGL/SHORTRICO/4/9502065/3/…	5	84	37	7199	67.4	72.1	5.5	6.5	4.5	0.5
304	MARS//M201/MARS/5/STRN//MERC/…	5	88	37	7184	64.8	69.9	5	4.5	2.5	0

Continued.

Table 3. Continued.

Entry	Pedigree	Vigor[†]	Days to 50% Heading	Plant Height (in)	Grain Yield (lb/A @ 12%)	Milling Yield (%) Whole	Total	SB[‡]	BPB[‡]	RNB[‡]	NBLS[‡]
298	BNGL/SHORTRICO//BNGL	6	87	37	7144	64.2	69.6	5	7	3	0.5
314	BNGL//MERC/RICO/4/EARL/3/CPRS/…	5	87	36	7132	57.3	70.9	4.5	5.5	4	3.5
270	BNGL/3/ORIN//MERC/RICO//…	3	85	38	7129	66.5	70.2	3.5	6	3.5	1.5
318	LFTE/4/KATY/CPRS/3/CPRS/LMNT/5/…	4	86	35	7085	65.4	68.3	7	7.5	4	1
294	BNGL/5/LFTE/4/KATY/CPRS/3/…	4	81	36	7045	71.1	75.0	7	6.5	5	0.5
280	ORIN/3/MERC/CAM9/MARS/4/BNGL	3	90	39	7025	59.9	70.1	4.5	6	3.5	0.5
324	BNGL/3/MEDARK//MERC/SABER	3	87	38	7011	61.5	70.9	4	5	4	0.5
255	9902028/3/BNGL//MERC/RICO	4	85	37	6962	68.0	70.0	6	6.5	3.5	1
310	9502065/3/BNGL//MERC/RICO/5/LFTE/4/…	3	83	39	6928	65.8	70.0	5.5	6	5	1
271	9502065/3/MERC//MERC/4/9902028	3	83	37	6914	62.5	70.7	4	6	4.5	2
321	EARL/4/ORIN//MERC/RICO/3/…	6	86	34	6900	69.6	72.6	5	6	5.5	1
297	BNGL/SHORTRICO//BNGL	4	89	37	6886	66.0	71.1	4	4	4	0.5
300	BENGAL	3	88	38	6881	62.2	70.7	4	6	5	1
273	EARL/9902028	4	86	38	6845	64.3	70.8	4.5	4.5	3	1
265	ORIN/3/MERC/CAM9/MARS/4/BNGL	3	83	37	6745	65.3	71.7	6.5	5.5	5	0.5
288	BNGL/SHORTRICO//MERC	4	87	36	6731	61.8	67.1	5.5	7	5	1
311	9865216DH2//BNGL/SHORTRICO	4	86	37	6704	65.3	69.6	4	6	5.5	1
258	MARS/4/9502065/3/MERC//MERC	4	84	35	6646	61.0	66.3	6.5	7	5	0.5
260	PY678/BNGL	4	84	38	6644	67.0	72.5	3.5	5	2.5	0.5
257	EARL/ABSRM154291	4	86	37	6607	67.7	71.6	5.5	6.5	6	0
307	RICO/BNGL	3	89	35	6568	63.3	69.6	5.5	7	5.5	1
289	PY678/MERC	5	87	40	6476	66.7	72.3	4.5	5.5	2	0.5
267	ORIN/3/MERC/CAM9/MARS/4/BNGL	6	86	36	6458	62.5	71.8	4	4	4.5	2.5
264	BNGL/4/9502065/3/MERC//MERC	4	84	41	6356	63.0	69.0	3.5	4	3	1
306	RICO/BNGL	3	89	40	6323	63.9	70.2	4.5	6.5	5	0.5
302	EARL//BNGL/SHORTRICO	3	89	36	6279	65.9	69.8	5.5	6	2.5	1.5
287	BNGL/FRAN	5	88	36	6275	56.3	67.6	5.5	7.5	5.5	0
275	JUPITER	5	92	37	6210	65.9	72.4	4.5	4	5	1
322	ORIN/BNGL//EARL	5	84	41	6153	65.0	70.0	5	6	4.5	0.5
293	9502065/3/BNGL//MERC/RICO/4/MERC	3	89	38	6145	67.9	73.3	3.5	4.5	5	1
272	9502065/3/MERC//MERC/4/9902028	5	88	38	6131	57.2	69.7	4.5	6	4.5	1.5
317	LFTE/4/KATY/CPRS/3/CPRS/LMNT/5/…	3	88	44	6129	66.7	69.3	5	5.5	5	0.5
263	BNGL//MERC/RICO/3/EARL	5	86	37	6064	55.2	56.9	5	6.5	3.5	2
268	BNGL/3/ORIN//MERC/RICO//…	5	86	37	5677	67.5	70.3	5	6.5	5.5	1
262	BNGL//MERC/RICO/3/EARL	5	86	35	5614	67.6	69.8	4.5	5	4	1
325	ORIN//…/RICO/3/9602135/4/BNGL//GP-2/LFTE	4	92	32	5029	63.4	70.6	5	6	5.5	0.5
269	BNGL/3/ORIN//MERC/RICO//…	4	87	37	4672	50.8	63.2	5	6	6	1

† Subjective rating 0 to 9, where 0 = excellent, 9 = poor.
‡ Abbreviations: SB=sheath blight, BPB=bacterial panicle blight, RNB=rotten neck blast, NBLS=narrow brown leaf spot.

DEVELOPMENT OF IMPROVED LONG-GRAIN AND SPECIAL PURPOSE RICE VARIETIES FOR LOUISIANA

X.Y. Sha, S.D. Linscombe, S.J. Theunissen, and B.J. Henry

This state project is aimed to develop superior conventional long-grain rice varieties with emphasis on yield potential, quality (milling, cooking, and processing), disease resistance, lodging resistance, seedling vigor, and early maturity. The other objective is to develop specialty rice varieties adapted to Louisiana and southern U.S. environmental conditions with superior cooking, agronomic, milling, and specific qualities, such as aroma and kernel elongation. The emphasis is being placed on breeding for Jasmine-, Basmati-, and Della-type long-grain rice.

The 2007 field test included 276 transplanted F_1s (190 long-grain and 86 specialty), 11 transplanted BC_1F_1s, 188 space planted specialty F_2 populations (101 long-grain and 87 specialty), and 24,000 progeny rows (18,000 long-grain and 6,000 specialty) ranging from F_3 to F_8. Out of those rows, 588 rows were bulk-harvested for the further evaluation (463 long-grain and 125 specialty). Of the 426 new crosses made in 2007, 188 are long-grain, 87 specialty, and 151 for Dr. Linscombe's project. A total of 26 backcrosses with up to 100 seeds per cross were made to incorporate the specialty traits of Jasmine rice into elite U.S. long-grain genotypes. Three hundred and thirty breeding lines (220 long-grain and 110 specialty) were included in the preliminary yield test, of those, 148 (124 long-grain and 24 specialty) in replicated test (PY) and 182 (96 long-grain and 86 specialty) in the single plot test (SP). Yield, milling, and agronomic performance of these lines are listed in Tables 1 to 7. Seven advanced long-grain (entries 022, 031, 034, 125, 128, 131, and 134), five specialty (entries 025, 137, 140, 146, and 149), and one medium-grain line (entry 028) were tested in the Uniform Regional Rice Nursery (URN). Test results of these lines are presented in Table 8. Most of these lines were also tested in statewide multi-location Commercial-Advanced (CA) yield trials. CA data are presented in Table 9. The agronomic performance of these advanced lines compared with other conventional lines also can be found in URN Tables 1 to 7 on pages 5 to 11 and in CA Tables 1 to 6 on pages 12 to 20. A separate advanced yield (AY) trial of specialty rice was carried out at the Rice Research Station, as well as at Vermilion and Evangeline parishes. Test results of the AY trial were listed in Tables 10 to 12.

The Puerto Rico winter nursery is critical to this project. In 2007, 5,000 progeny rows of both long-grain and special purpose types were planted and selected. Most of these were F_3s for the generation advancement purpose.

The medium-grain experimental line LA2028 continuously showed superior yield potential, good milling and grain quality and it was officially released by LSU AgCenter as 'Neptune' for seed production in 2008. The Jasmine- type line LA0402125 also showed competitive grain and milling yields with specialty attributes (aroma, flavor, amylose content, alkaline spread value, and cooking quality) similar to the imported Thai Jasmine. Foundation seed of LA0402125 will be produced in 2008 for varietal release purpose.

Table 1. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group 9, long-grain entries. Rice Research Station, Crowley, LA.

Entry	Pedigree	Vigor*	Days to 50% Heading	Plant Height (inch)	Yield (lb/A)			Milling (%)		Visual Score†
					Main	Ratoon	Total	Head	Total	
701	AC627	5	87	35	6862	2326	9188	64.3	69.7	7
702	AC1279	5	92	43	6620	3134	9754	68.0	73.3	3
703	AC1279	5	92	43	6609	2043	8653	59.0	74.6	3
704	AC1398	5	87	37	7466	2355	9821	64.1	70.3	7
705	AC1375	6	90	38	6262	1628	7890	67.5	72.4	7
706	AC899	3	87	36	5775	1436	7212	63.7	70.7	7
707	AC1019	3	91	38	5956	3204	9160	66.0	72.1	5
708	AC638	3	89	39	7018	2041	9059	67.0	72.4	5
709	AC1019	3	90	38	6427	3230	9658	62.2	73.7	5
710	AC1019	3	91	37	6218	3252	9469	66.9	73.3	7
711	AC1019	4	90	40	5790	3706	9496	68.8	73.2	3
712	AC625	5	90	39	6921	1785	8707	60.9	72.7	5
713	AC539	4	89	41	6618	1009	7627	62.4	70.2	5
714	AC625	5	90	39	6664	1816	8480	67.4	73.4	7
715	AC545	4	92	40	7514	3224	10738	63.6	72.8	5
716	AC105	4	90	40	6184	1667	7851	65.4	73.3	5
717	AC105	4	89	40	7097	1095	8192	65.5	72.4	5
718	AC627	6	86	34	6813	1897	8710	62.9	68.5	7
719	AC934	5	93	36	4113	1619	5732	62.4	68.1	7
720	AC358	4	92	39	5299	3036	8335	64.0	71.8	7
721	AC915	4	86	37	6792	2255	9047	66.7	71.4	5
722	AC915	3	90	37	5884	2525	8409	66.4	71.2	5
723	AC917	4	89	37	6311	2305	8616	66.6	72.7	7
724	AC918	3	85	38	5893	1943	7837	63.8	68.6	5
725	RU0502094	3	90	40	6223	1680	7903	63.5	73.2	5
c.v.%		12.3	2.3	3.5	7.9	24.1	8.2	5.7	1.9	
$LSD_{0.05}$		1.0	4.2	2.7	1044	1119	1463	7.8	2.8	

* Subjective rating 1 to 9, where 1 = excellent, 9 = stand.
† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 2. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group 10, long-grain entries. Rice Research Station, Crowley, LA.

			Days to 50%	Plant Height	Yield (lb/A)			Milling (%)		Visual
Entry	Pedigree	Vigor*	Heading	(inch)	Main	Ratoon	Total	Head	Total	Score†
726	AC918	4	81	38	5670	1650	7319	64.8	69.4	5
727	AC918	4	90	40	5618	1640	7257	64.5	70.4	5
728	AC918	4	91	38	5835	2501	8336	64.3	69.9	7
729	AC918	4	93	36	5197	2064	7261	66.0	71.5	7
730	AC918	3	89	38	6206	1247	7453	70.4	73.9	5
731	AC918	4	89	39	6692	2673	9365	66.7	72.2	5
732	AC918	3	88	38	6351	2498	8849	69.8	72.9	7
733	AC918	4	87	38	6516	1890	8406	66.5	70.8	5
734	AC918	3	88	39	5616	2660	8276	65.9	71.6	3
735	AC918	4	86	40	6753	2250	9003	69.9	73.4	3
736	AC918	5	87	40	6657	2214	8871	69.5	73.2	5
737	AC918	3	89	40	6235	2199	8434	61.2	65.1	5
738	AC918	3	90	39	5608	2473	8080	66.6	71.2	5
739	AC918	4	86	39	6278	2462	8740	70.9	74.6	7
740	AC918	3	89	37	6396	2563	8959	65.4	70.0	7
741	AC920	4	89	39	6337	2711	9048	69.0	72.9	7
742	AC858	4	84	40	6405	2592	8997	65.8	69.1	5
743	AC924	5	86	40	6422	2418	8840	62.0	67.4	3
744	AC981	3	90	39	6408	2340	8748	68.3	72.2	7
745	AC981	4	89	37	5980	2424	8404	70.1	74.2	7
746	AC1012	3	90	37	6108	2949	9057	67.1	72.1	7
747	AC638	4	88	38	7223	1918	9140	66.8	72.7	7
748	AC815	4	94	33	5330	2940	8269	63.4	70.3	7
749	AC815	5	93	32	4368	2208	6576	58.5	68.3	7
750	Cocodrie	5	91	40	6187	1689	7876	64.4	72.4	5
c.v.%		12.3	1.8	3.2	10.5	22.0	10.3	5.3	4.0	
$LSD_{0.05}$		0.9	3.3	2.5	1322	1038	1788	7.3	5.9	

* Subjective rating 1 to 9, where 1 = excellent, 9 = stand.

† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 3. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group 11, long-grain entries. Rice Research Station, Crowley, LA.

Entry	Pedigree	Vigor*	Days to 50% Heading	Plant Height (inch)	Yield (lb/A)			Milling (%)		Visual Score†
					Main	Ratoon	Total	Head	Total	
751	AC815	4	95	32	5340	2760	8100	59.4	69.6	5
752	AC815	5	95	32	4865	2772	7636	59.8	69.4	5
753	AC815	4	94	32	5551	3577	9128	65.6	73.1	5
754	AC815	4	92	34	5846	3543	9389	62.4	72.3	5
755	AC924	4	85	39	6277	2784	9061	62.1	67.3	3
756	AC1019	4	87	37	6217	2453	8671	70.3	73.4	7
757	AC1019	3	89	38	6629	3350	9979	67.5	72.9	7
758	AC1019	4	88	39	7172	2608	9781	63.5	69.9	5
759	AC1019	4	86	38	7859	2738	10597	63.1	73.1	5
760	AC1019	3	88	37	6178	3321	9499	66.2	71.7	5
761	AC1021	4	89	35	6872	2778	9651	68.3	73.3	7
762	AC1021	5	90	41	6784	3360	10144	62.0	69.1	3
763	AC1021	5	92	35	6512	3906	10418	50.3	72.4	5
764	AC1073	5	82	40	7710	2391	10101	64.4	72.2	7
765	AC1075	5	81	42	7824	1673	9497	61.5	68.5	3
766	AC1075	5	81	41	7054	2553	9607	59.5	68.0	5
767	AC1075	4	83	40	6991	2624	9615	64.6	70.3	7
768	AC1075	5	85	37	6423	1656	8080	56.0	66.6	7
769	AC1078	4	81	39	7098	1845	8943	60.3	70.5	7
770	AC1109	4	83	39	5007	2481	7488	58.7	65.4	7
771	AC1055	5	83	38	8198	2003	10201	62.4	72.1	3
772	AC1055	4	85	41	8041	1484	9524	60.7	69.5	3
773	AC1072	5	85	36	7591	1636	9227	64.5	70.2	5
774	AC1070	4	80	40	7566	1930	9497	65.5	71.4	7
775	Wells	4	89	43	7515	3253	10768	61.8	73.3	5
c.v.%		11.1	2.0	3.1	14.9	13.1	12.4	7.3	3.0	
$LSD_{0.05}$		0.9	3.5	2.4	2085	708	2401	9.4	4.4	

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 4. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group 12, long-grain entries. Rice Research Station, Crowley, LA.

Entry	Pedigree	Vigor*	Days to 50% Heading	Plant Height (inch)	Yield (lb/A) Main	Yield (lb/A) Ratoon	Yield (lb/A) Total	Milling (%) Head	Milling (%) Total	Visual Score†
776	AC1070	4	91	36	6921	1930	8851	60.4	70.6	5
777	AC1402	5	90	37	6505	1790	8295	62.3	71.4	5
778	AC1403	4	83	40	7174	2361	9536	66.6	69.9	3
779	AC1400	5	84	38	6728	2148	8876	65.5	71.2	5
780	AC1400	4	86	40	6544	2504	9048	61.6	68.7	3
781	AC1070	4	83	41	7590	1846	9436	64.1	68.7	3
782	AC1406	4	81	36	7477	2999	10476	65.6	69.8	5
783	AC1398	5	85	40	8618	2630	11248	63.2	70.0	5
784	AC1330	4	86	36	6328	1797	8125	63.8	70.8	7
785	AC1330	4	87	39	7663	1030	8693	62.4	70.2	7
786	AC1341	4	85	39	5941	2767	8708	66.6	70.3	5
787	AC1349	4	88	39	6625	1545	8170	64.1	70.0	3
788	AC1349	4	84	40	7084	1299	8383	62.8	68.3	3
789	AC1349	4	83	41	7976	1481	9457	62.7	70.1	5
790	AC1350	4	85	35	5829	1443	7272	62.5	71.2	3
791	AC1350	3	85	38	6735	2571	9306	66.2	71.1	7
792	AC1350	4	87	40	5909	2176	8085	63.8	69.8	5
793	AC1370	4	86	38	6839	1046	7885	63.1	70.0	3
794	AC1370	3	85	40	6926	1243	8168	66.2	72.0	3
795	AC1402	7	88	36	7043	1377	8421	67.2	71.5	7
796	A-201//JSMN/DLLA	5	90	36	5264	3029	8293	51.4	71.4	5
797	RU0202051//9202168/DLMT	4	81	41	7215	2555	9770	62.5	68.2	7
798	RU0202051//9202168/DLMT	4	85	41	6883	2738	9621	62.2	69.4	5
799	AC1027	4	81	44	7215	3096	10311	68.2	71.1	3
800	Trenasse	5	83	42	7405	2268	9673	61.1	66.5	3
c.v.%		12.3	1.8	3.2	10.5	22.0	10.3	5.3	4.0	
$LSD_{0.05}$		0.9	3.3	2.5	1322	1038	1788	7.3	5.9	

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.
† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 5. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group 13, specialty entries. Rice Research Station, Crowley, LA.

Entry	Pedigree	Vigor*	Days to 50% Heading	Plant Height (inch)	Yield (lb/A) Main	Yield (lb/A) Ratoon	Yield (lb/A) Total	Milling (%) Head	Milling (%) Total	Visual Score†
801	CPRS//L-205/DLLA	4	92	38	5008	2379	7387	57.7	67.8	7
802	JSMN/DLLA//96SP287/3/DLMT	7	92	37	6072	2439	8511	64.0	71.1	5
803	9502008//KATY/9902207x2/3/JSMN/DLLA//LEAH/DLLA	5	89	38	6073	2111	8183	66.1	72.4	7
804	DLMT 8462…/4/DMSI/5/RSMT	6	86	41	5827	3348	9176	59.8	73.0	7
805	AC1106	4	85	38	7567	3494	11062	66.6	73.0	7
806	CPRS//L-205/DLLA	4	88	40	7151	3317	10468	65.2	70.2	5
807	A-201/SADRI TYPE//DLRS	3	81	38	7188	3372	10560	64.7	70.5	5
808	A-201/SADRI TYPE//DLRS	4	84	38	6751	3302	10053	69.2	72.6	7
809	CPRS/DLRS	4	85	42	7570	1869	9439	65.1	72.8	7
810	CPRS/LGRU//KAYEEMA	5	85	38	5438	2266	7704	66.3	71.3	7
811	JSMN/DLLA//CCDR/LGRU	6	93	35	5010	2408	7418	46.0	70.3	5
812	00HB126/PI 457917//CCDR	5	91	39	5974	3066	9039	57.4	68.5	3
813	CPRS//L-205/DLLA	4	88	38	5669	2788	8457	62.5	70.0	5
814	DLRS//KBNT/JODN	5	92	36	4738	3162	7900	64.7	71.5	5
815	CPRS//L-205/DLLA	5	86	34	6829	2515	9344	67.5	72.6	5
816	LBLE/L201//MBLE/3/BSMT PAK372A/4/…	4	90	37	5411	3510	8921	65.9	72.8	5
817	9502008/KBNT//DREW/KDM 105	4	85	35	4976	2686	7662	65.1	71.9	5
818	CPRS/KBNT/3/KBNT//DLMT/B8462T3-710	4	88	38	5778	3320	9098	63.2	71.4	7
819	LGRU/A-201	4	92	38	5751	3801	9552	54.1	71.0	5
820	SABER /5/DLMT 88462../4/DMSI	5	85	40	6970	1502	8472	61.8	70.2	3
821	NCHS//JSMN/DLLA	4	90	41	5022	2108	7130	54.1	61.3	3
822	NWBT/KATY//9902207x2/3/JSMN/DLLA//LEAH/DLLA	4	83	36	6233	1595	7828	63.7	71.0	5
823	NWBT/KATY//9902207x2/3/JSMN/DLLA//LEAH/DLLA	4	85	42	6555	1661	8216	64.5	72.5	3
824	9502008-A/DREW/3/JSMN/DLLA//LEAH/DLLA	4	90	40	6142	2240	8382	65.2	64.7	5
825	LA2125 (96 INT/Ahrent)	5	91	42	6236	1685	7921	52.7	64.3	5
c.v.%		12.3	1.8	3.2	10.5	22.0	10.3	5.3	4.0	
$LSD_{0.05}$		0.9	3.3	2.5	1322	1038	1788	7.3	5.9	

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 6. Agronomic and milling performance of the 2007 Preliminary Yield Test, Group Puerto Rico, long-grain lines, Rice Research Station, Crowley, LA.

Entry	Pedigree	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A)	Milling (%)	
						Head	Total
07P3063	AC1012/AC110	5	70	35	6674	52.9	65.8
07P3072	AC1012/AC110	4	66	36	6488	51.6	64.2
07P3074	AC1012/AC110	4	65	35	6656	52.3	64.3
07P3090	AC1012/AC110	4	68	35	7130	57.7	69.3
07P3158	AC110/AC919	4	73	35	6945	62.1	69.5
07P3164	AC110/AC919	4	74	38	6981	61.9	69.0
07P3178	AC110/AC919	4	72	38	7504	59.6	68.1
07P3181	AC110/AC919	4	75	34	6692	61.3	69.2
07P3188	AC110/AC919	4	74	39	6913	58.5	66.8
07P3194	AC110/AC919	3	70	35	7161	53.6	68.8
07P3221	AC110/AC638	3	71	34	7392	62.3	70.2
07P3237	AC110/AC638	4	71	35	7420	61.4	69.7
07P3252	AC625/PRESIDO	4	70	35	6816	64.3	72.6
07P3358	CCDR//CCDR/JEFF	4	71	36	7254	62.3	70.8
07P3393	CCDR//CCDR/JEFF	4	71	35	7897	59.1	69.4
07P3437	CCDR//9502008//AR1188/CCDR	3	69	36	7829	62.4	71.5
07P3496	CCDR/0502085	4	72	36	7887	63.4	71.4
07P3506	CCDR/0502094	4	71	36	7784	60.5	70.4
07P3563	CPRS/3/CPRS/KBNT//9502008	4	71	36	7299	60.4	68.4
07P3569	CPRS/3/CPRS/KBNT//9502008	4	72	36	6984	61.0	68.9
07P3621	0402022/0502094	4	69	37	7705	65.4	72.8
07P3661	0402022/3/9502008//AR1142/MBLE	5	71	36	7735	61.6	70.5
07P3694	0402022/3/9502008//AR1142/MBLE	3	69	34	7238	60.2	68.8
07P3915	9502008//KATY/902207x2/3/0402068	4	70	38	7545	61.1	69.7
07P4059	9502008//AR 1142/MBLE/3/0502091	5	72	35	7650	60.3	68.7
07P4077	9502008//AR 1142/MBLE/3/0502091	5	74	35	7200	58.2	66.2
07P4114	9502008//AR 1142/MBLE/3/0502165	5	70	33	7065	60.2	70.3
07P4254	DREW/CCDR//0302005	5	74	36	6428	56.4	66.4
CCDR	Cocodrie	3	71	35	6861	58.3	68.8
TRNS	Trenasse	4	64	38	6734	54.7	66.4
c.v.%		15.3	1.1	2.8	4.8	5.4	2.3
$LSD_{0.05}$		1.2	1.6	2.1	700	6.5	3.2

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

Table 7. Agronomic and milling performance of the 2007 Single Plot Test. Long-grain and specialty lines, Rice Research Station, Crowley, LA.

SP Entry	Pedigree	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	Yield (lb/A) 2^{nd}	Yield (lb/A) Total	Milling (%) Head	Milling (%) Total	Visual Score†
SP051	AC426	4	87	37	6854	1697	8551	59.3	66.1	7
SP052	AC925	4	85	36	6916	2175	9091	67.3	71.6	5
SP053	AC1021	3	88	33	6397	2068	8465	69.8	73.3	5
SP054	AC1075	4	85	35	6913	2040	8953	61.8	69.2	5
SP055	AC899	4	85	32	6079	1955	8034	62.8	69.5	5
SP056	AC1073	3	85	35	8146	1342	9488	61.4	68.8	7
SP057	AC539	4	87	37	6426	1920	8346	62.3	67.3	5
SP058	AC1019	3	88	36	6451	2027	8478	66.4	71.9	5
SP059	AC918	3	88	36	5316	1549	6864	64.4	69.4	5
SP060	AC791	5	87	36	5879	2141	8020	65.1	69.8	3
SP061	AC1055	4	86	37	7868	1608	9476	60.5	68.5	3
SP062	AC625	4	92	36	5740	1457	7197	64.9	70.8	5
SP063	AC1349	5	93	35	5165	1057	6222	60.1	66.5	5
SP064	AC105	5	92	36	5505	869	6374	61.2	69.3	5
SP065	AC105	4	88	37	6683	1632	8315	64.8	69.4	5
SP066	AC1075	4	85	37	6592	1517	8109	68.3	71.7	7
SP067	AC770	4	89	36	5724	2318	8043	59.2	68.5	5
SP068	AC1172	4	87	36	6883	1545	8427	61.4	65.8	5
SP069	AC638	4	89	38	6110	1290	7401	64.2	70.1	5
SP070	AC1025	4	90	39	6326	1802	8128	59.5	64.0	5
SP071	AC1019	4	92	33	5494	2011	7505	66.2	71.8	7
SP072	AC972	4	88	36	7137	1977	9114	68.1	72.6	5
SP073	AC1075	4	85	38	7249	2212	9461	59.0	67.4	3
SP074	AC1359	3	104	37	4551	707	5258	47.2	55.5	5
SP075	LA2082	4	93	36	5487	2018	7505	60.4	69.3	5
SP076	AC1075	4	88	35	5912	1893	7805	63.6	68.5	7
SP077	AC1048	3	84	36	6489	2274	8763	56.9	65.2	7
SP078	AC1194	5	85	39	7594	2079	9673	53.4	67.4	5
SP079	AC1070	4	83	33	7699	1134	8833	64.8	70.4	5
SP080	AC1336	4	86	36	7562	1755	9317	64.1	69.0	7
SP081	AC1119	3	86	37	7561	563	8124	62.7	67.5	7
SP082	AC918	4	84	36	6283	1895	8178	66.3	70.9	5
SP083	AC1081	4	84	34	7697	2013	9710	63.4	67.9	7
SP084	AC1106	4	90	34	5447	1826	7273	60.2	68.0	5
SP085	AC622	4	89	38	7372	744	8116	61.6	67.0	5
SP086	AC1350	3	89	34	5301	1750	7051	66.7	71.3	3
SP087	AC1350	5	93	37	5040	761	5801	59.7	66.8	5
SP088	AC1215	4	89	38	6342	655	6997	61.9	66.6	5
SP089	AC1400	4	88	37	6235	1595	7830	64.5	69.5	5
SP090	AC1013	4	88	35	6374	2191	8564	62.4	67.4	7
SP091	AC1348	4	90	36	6434	1071	7505	61.2	67.6	5
SP092	AC880	5	89	36	5360	1940	7300	62.3	67.2	3
SP093	AC815	4	93	30	5609	2465	8074	62.6	70.5	5
SP094	AC804	5	86	41	7824	2007	9831	57.9	69.0	5
SP095	AC1070	5	84	31	7241	1763	9005	64.2	70.0	5
SP096	AC1406	4	86	34	7585	2489	10073	62.9	71.1	5

Continued.

Table 7. Continued.

SP Entry	Pedigree	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	2nd	Total	Milling (%) Head	Total	Visual Score†
SP097	AC918	3	90	38	5478	2595	8073	58.2	62.5	5
SP098	AC1106	4	89	38	6896	2912	9808	61.5	67.1	5
SP099	AC1349	3	88	38	6318	1157	7474	61.9	68.4	5
SP100	Cypress	4	91	39	7707	2457	10164	60.6	65.6	5
SP101	AC920	4	87	37	6562	2348	8909	69.3	72.3	5
SP102	AC1348	3	87	37	6499	438	6937	62.6	67.1	7
SP103	AC918	3	88	36	6123	2598	8721	68.1	71.3	5
SP104	AC918	3	88	33	5774	2488	8262	69.6	73.0	5
SP105	AC1075	5	81	36	8313	1742	10055	56.5	66.9	7
SP106	AC918	4	90	35	5715	2722	8437	63.9	68.6	5
SP107	AC1073	5	84	37	8142	969	9111	60.8	70.7	7
SP108	AC1268	3	84	40	7810	2086	9896	65.4	71.2	5
SP109	AC1075	6	86	36	7195	2782	9977	58.5	70.7	7
SP110	AC1013	4	89	39	5601	2287	7888	67.0	69.9	5
SP111	AC831	4	86	26	5010	2032	7042	68.9	72.7	5
SP112	AC1055	4	86	38	7769	1522	9292	59.8	68.4	3
SP113	AC1073	4	86	40	7395	808	8202	62.5	67.3	5
SP114	AC918	6	91	36	4258	1573	5831	67.4	71.7	5
SP115	AC105	3	87	39	6812	1949	8761	65.3	70.3	3
SP116	AC924	6	87	38	6145	2222	8367	64.6	68.5	5
SP117	AC924	5	87	38	5929	2190	8119	60.7	66.2	5
SP118	AC918	3	89	39	5454	2067	7521	63.0	69.0	5
SP119	AC1019	4	91	40	6306	1698	8003	64.0	69.5	5
SP120	AC633	5	93	38	4786	2502	7288	59.0	65.6	5
SP121	AC1055	4	86	37	7845	1228	9073	60.3	69.1	5
SP122	AC1330	4	92	35	5330	1064	6394	62.2	68.7	5
SP123	AC1075	5	87	37	7465	2783	10248	65.7	69.9	7
SP124	AC1069	3	87	38	5234	1128	6363	61.6	68.4	5
SP125	Pace	6	93	35	4940	2967	7908	49.1	66.1	5
SP126	AC981	3	89	36	4842	2584	7426	65.1	70.7	5
SP127	AC831	4	84	38	4523	2182	6706	66.0	71.8	5
SP128	AC1081	5	84	35	7483	1877	9361	64.3	69.8	7
SP129	AC915	4	89	37	6079	2413	8492	59.2	68.1	5
SP130	AC1172	4	81	37	7714	1035	8749	65.9	72.6	7
SP131	AC1019	3	84	39	8195	2392	10587	64.7	71.4	5
SP132	AC1218	4	86	35	7934	1468	9402	67.7	72.9	5
SP133	AC1076	4	81	35	8059	1865	9924	64.0	70.2	7
SP134	AC1055	4	86	37	8085	1769	9855	62.7	71.6	3
SP135	AC936	4	88	38	5881	2532	8413	66.4	71.8	3
SP136	AC1365	4	84	37	7777	1556	9333	65.3	70.9	7
SP137	AC1419	7	91	34	5893	1617	7510	60.2	67.6	5
SP138	AC920	3	86	38	6919	1827	8747	63.4	68.6	5
SP139	AC936	4	91	37	5838	2404	8242	63.8	70.4	3
SP140	AC1406	4	87	35	7585	2283	9869	65.3	70.1	5
SP141	AC1415	5	87	32	7416	2305	9720	64.0	69.6	3
SP142	AC1406	7	87	34	7116	2322	9438	65.7	69.5	7
SP143	AC1415	5	86	33	7572	2374	9945	65.7	70.4	5

Continued.

Table 7. Continued.

SP Entry	Pedigree	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	2nd	Total	Milling (%) Head	Total	Visual Score†
SP144	AC1415	6	87	34	7603	2016	9619	61.1	67.1	5
SP145	AC1406	5	87	31	7237	1964	9201	65.4	70.1	7
SP146	AC1406	5	84	30	8102	2029	10131	70.5	75.7	5
SP147	AC1406	6	85	34	6864	2083	8947	69.3	73.4	5
SP148	AC810	5	84	37	7570	2497	10068	60.4	66.9	5
SP149	NCHS//JSMN/DLLA	7	95	33	4917	2841	7758	56.8	62.8	5
SP150	Banks	3	89	45	9633	2629	12262	59.2	68.3	5
SP151	A-201//ADAR/JODN/3/CPRS	4	84	36	7327	3036	10363	51.2	63.2	3
SP152	SABER /5/DLMT 88462../4/DMSI	4	86	38	6577	2453	9030	55.7	68.0	3
SP153	9502008/KBNT/4/DMSI/DLLAX2//…	4	91	32	5194	2727	7921	66.5	70.6	5
SP154	NWBT/KATY//9902207x2/3/JSMN/DLLA//.	3	86	38	6686	2195	8882	59.1	68.9	7
SP155	NCHS//JSMN/DLLA	6	86	35	5569	1848	7417	55.7	63.6	5
SP156	9502008/LGRU/3/JSMN/DLLA//LEAH/.	4	87	35	6636	2228	8864	67.9	72.2	7
SP157	DREW/KDM 105//LGRU	5	86	40	7292	1669	8960	54.2	66.4	5
SP158	DLRS//AR1142/LA2031/3/JSMN/DLLA	6	90	35	6175	2976	9152	58.4	69.2	7
SP159	CPRS/DREW/3/JSMN/DLLA//LEAH/DLLA	5	88	43	6427	2697	9124	64.6	69.0	3
SP160	9502008//KATY/9902207x2/3/JSMN/…	7	88	38	5613	2399	8012	51.5	66.1	5
SP161	9502008/LGRU/3/JSMN/DLLA//LEAH/.	4	88	41	6707	2892	9599	64.1	71.5	5
SP162	LBLE/L201//MBLE/3/BSMT PAK372A/4/…	5	90	34	6987	2383	9370	62.7	70.0	5
SP163	AC107DH1/AC167DH1/4/DMSI/…	4	85	37	7527	2429	9956	60.0	67.3	5
SP164	JSMN/DLLA//CCDR/LGRU	5	92	35	4541	1974	6515	47.3	68.2	5
SP165	CPRS/KBNT/4/DMSI/DLLAX2//…	4	87	35	6983	1737	8721	57.2	65.6	3
SP166	9502008/LGRU/3/JSMN/DLLA//LEAH/.	3	86	39	6075	1615	7689	61.0	68.7	7
SP167	DLRS//AR1142/LA2031/3/JSMN/DLLA	5	89	32	4315	1503	5818	48.6	66.7	5
SP168	9502008/LGRU/3/JSMN/DLLA//LEAH/.	4	84	40	7502	1937	9438	57.9	68.9	5
SP169	9502008/LGRU/3/JSMN/DLLA//LEAH/.	5	85	42	7273	2613	9886	63.7	71.2	3
SP170	LBLE/L201//MBLE/3/BSMT PAK372A/4/…	5	87	37	6786	1928	8714	55.4	69.0	3
SP171	CPRS/KBNT//JSMN/DLLA	4	95	34	4905	2108	7013	61.9	69.8	5
SP172	CPRS/PI 385456//CCDR	5	95	34	5033	1970	7003	54.3	62.3	5
SP173	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	4	87	40	6573	2935	9508	67.7	72.4	5
SP174	CCDR/3/JSMN/DLLA//LEAH/DLLA	4	87	43	6632	1445	8077	59.2	68.4	3
SP175	Dellrose	4	93	40	4782	2628	7410	65.9	72.8	3
SP176	9502008/LGRU/3/JSMN/DLLA//LEAH/.	3	92	37	4766	1915	6682	59.2	67.9	5
SP177	LBLE/L201//MBLE/3/BSMT PAK372A/4/…	4	89	37	6247	3268	9516	60.7	69.1	3
SP178	SABER /5/DLMT 88462../4/DMSI	4	88	42	6118	2438	8556	54.4	69.1	5
SP179	CPRS/KBNT/3/KBNT//DLMT/B8462T3-710	4	88	35	6496	2881	9377	58.8	65.9	5
SP180	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	3	86	40	6025	1112	7137	58.5	72.1	5
SP181	NWBT/KATY/3/82CAY21/LMNT//…	4	88	39	6781	1559	8340	51.4	68.8	7
SP182	NCHS/A-201	5	95	37	5496	2081	7578	63.6	68.1	5
SP183	JSMN/DLLA//96SP287/3/AR 1121/3/CPRS/.	4	86	42	6041	3100	9141	50.1	67.5	3
SP184	DLMT/4/NWBT/KATY/3/82CAY21/…	4	91	39	5590	3088	8678	62.3	69.6	7
SP185	SABER /5/DLMT 88462../4/DMSI	5	89	39	5289	2249	7538	53.7	65.7	7
SP186	LBLE/L201//MBLE/3/BSMT PAK372A/4/…	5	87	36	7379	2374	9753	58.6	68.5	3
SP187	DREW/KDM 105//LGRU	4	89	40	5923	1385	7308	51.9	60.9	5
SP188	SABER /5/DLMT 88462../4/DMSI	4	88	41	6646	3038	9685	48.4	67.9	3
SP189	CPRS/PI 385456//CCDR	6	96	34	4570	2728	7297	53.2	62.3	5
SP190	JSMN/DLLA//96SP287/3/DLMT	5	88	34	5127	2245	7373	55.5	64.0	3

Continued.

Table 7. Continued.

SP Entry	Pedigree	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	2nd	Total	Milling (%) Head	Total	Visual Score†
SP191	CCDR/3/JSMN/DLLA//LEAH/DLLA	4	88	37	6764	1980	8744	46.3	56.8	5
SP192	SABER /5/DLMT 88462../4/DMSI	4	88	43	7226	2958	10184	54.8	67.4	3
SP193	9502008/LGRU/3/JSMN/DLLA//LEAH/.	4	88	36	6328	2117	8444	58.4	64.1	5
SP194	NWBT/KATY//9902207x2/3/JSMN/…	5	81	36	7567	2308	9875	56.2	66.8	5
SP195	CPRS//L-205/DLLA	5	89	37	7104	1680	8784	56.8	62.7	5
SP196	LGRU/A-201	3	88	43	6682	3853	10535	53.1	69.0	5
SP197	NWBT/KATY/3/82CAY21/LMNT//…	5	85	33	6035	1384	7418	56.7	69.2	7
SP198	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	3	87	38	6567	2756	9323	58.4	67.7	7
SP199	A-201/SADRI TYPE//CCDR	5	89	37	6163	2497	8659	57.4	65.9	5
SP200	LA2146	4	89	38	6658	3532	10190	65.1	70.0	3
SP201	CPRS/DREW/3/JSMN/DLLA//LEAH/DLLA	3	88	44	6870	3104	9974	62.1	68.6	3
SP202	DREW/KDM 105//LGRU	4	86	45	7683	1802	9485	47.5	64.4	7
SP203	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	4	81	33	7281	2261	9542	60.8	68.5	7
SP204	CPRS/KBNT/3/KBNT//DLMT/B8462T3-710	4	85	37	6134	2478	8612	58.7	67.0	7
SP205	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	3	84	35	7301	3611	10912	61.8	67.2	5
SP206	AC107DH1/AC167DH1/4/DMSI/…	5	85	32	6217	2493	8709	66.4	70.6	5
SP207	9502008/KBNT/4/DMSI/DLLAX2//…	5	96	34	4612	3137	7750	63.2	69.3	5
SP208	SABER /5/DLMT 88462../4/DMSI	4	90	37	5082	1162	6244	52.6	66.7	7
SP209	DLMT 8462…/4/DMSI/5/PI 385456	5	88	36	3802	946	4748	50.8	68.4	5
SP210	9502008/LGRU/3/JSMN/DLLA//LEAH/.	5	89	41	6479	2494	8974	62.1	68.8	5
SP211	L-205/BSMT 370	4	87	33	5462	3059	8521	56.1	70.0	5
SP212	DLMT 8462…/4/DMSI/5/RSMT/5/WELLS	5	89	36	5421	1373	6794	58.0	69.0	5
SP213	CCDR/3/JSMN/DLLA//LEAH/DLLA	4	84	36	6519	2093	8612	58.0	68.8	5
SP214	CCDR/3/KBNT//DLMT/B8462T3-710	4	85	36	6668	2514	9182	51.5	64.7	5
SP215	DLRS//AR1142/LA2031/3/JSMN/DLLA	5	90	35	5471	2491	7961	51.9	61.4	5
SP216	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	4	88	37	6346	2942	9289	62.7	69.3	7
SP217	SABER /5/DLMT 88462../4/DMSI	5	85	38	5499	1508	7007	49.3	65.4	3
SP218	9502008-A/DREW/3/JSMN/DLLA//LEAH/.	4	84	38	7917	2046	9963	57.9	68.1	5
SP219	NWBT/KATY//9902207x2/3/JSMN/DLLA//.	4	84	38	7788	1754	9542	59.3	67.6	5
SP220	NCHS/A-201	4	87	44	5392	1713	7105	53.9	64.3	3
SP221	97 KDMX2-1/WELLS	5	88	30	4846	1010	5857	63.0	70.2	5
SP222	9502008/KBNT/4/DMSI/DLLAX2//…	5	95	31	4769	2266	7035	59.5	67.9	5
SP223	CCDR/3/JSMN/DLLA//LEAH/DLLA	4	89	39	5940	1339	7279	61.3	66.7	3
SP224	NWBT/KATY//9902207x2/3/JSMN/DLLA//.	4	90	41	6032	1290	7323	61.6	66.8	3
SP225	LA2177	5	89	37	5526	2405	7931	56.1	69.7	5
SP226	AC107DH1/AC167DH1/4/DMSI/…	5	89	33	5614	1462	7075	60.2	66.6	5
SP227	NWBT/KATY//9902207x2/3/JSMN/DLLA//.	4	88	38	6385	1738	8123	63.7	70.9	3
SP228	CPRS/DREW/3/JSMN/DLLA//LEAH/DLLA	6	95	41	4980	2192	7171	49.6	61.0	5
SP229	CPRS/DREW/3/JSMN/DLLA//LEAH/DLLA	6	95	40	5473	2627	8100	56.8	67.2	5
SP230	JSMN/DLLA//96SP287/3/AR 1121/3/...	4	93	36	5281	1022	6303	48.9	62.6	5
SP231	JSMN/DLLA//96SP287/3/DLMT	4	86	37	6814	2447	9260	54.3	66.4	5
SP232	LGRU/A-201	5	89	38	6669	3246	9916	50.2	63.9	5
SP233	A-201/SADRI TYPE	5	84	35	5951	1693	7644	59.2	66.2	5
SP234	NCHS//JSMN/DLLA	4	87	39	6746	1797	8543	57.5	66.4	3
SP235	JSMN/DLLA//96SP287/3/DLMT	4	85	40	6337	2596	8933	64.0	70.6	5
SP236	NWBT/KATY//9902207x2/3/JSMN/DLLA//.	5	89	39	5317	2517	7834	61.7	67.4	5
SP237	JSMN/TORO-2//DLMT/3/A-201	6	95	34	3796	2532	6328	47.6	61.4	5
SP238	JSMN/DLLA//96SP287/3/DLMT	4	85	42	6484	3005	9489	34.5	66.1	3
SP239	SABER /5/DLMT 88462../4/DMSI	4	87	39	6204	2622	8827	55.5	64.7	5

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

† Subjective rating 1 to 9, where 1 = extremely poor, 9 = ideal type.

Table 8. Yield, milling, and agronomic performance of 13 experimental long, medium, and aromatic lines and check varieties in the Uniform Regional Rice Nursery (URN), Crowley, 2007.

Entry	RU#	Grain Type	Vigor*	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	Ratoon	Total	Milling (%) Head	Total
022	RU0502094	Long	4	85	39	6937	1811	8748	64.9	69.7
025	RU0402125	Jasmine	5	87	40	7411	1629	9040	67.2	70.3
028	RU0402028	Medium	4	86	36	8399	2833	11232	70.1	72.4
031	RU0702031	Long	4	80	40	7929	1843	9772	62.9	68.3
034	RU0702034	Long	4	79	41	7309	1877	9187	64.9	70.6
125	RU0702125	Long	5	83	41	7994	2074	10067	58.0	69.5
128	RU0702128	Long	5	86	38	6872	2568	9440	65.0	70.5
131	RU0702131	Long	5	83	41	8412	1683	10095	57.4	70.2
134	RU0702134	Long	5	80	41	7320	1821	9141	64.4	69.3
137	RU0702137	Toro	6	87	35	6734	2281	9015	66.1	71.5
140	RU0502177	Basmati	5	84	39	5984	2779	8762	57.5	69.9
146	RU0602146	Della	5	87	39	5763	2463	8226	67.5	71.4
149	RU0702149	Della	5	87	39	6802	2191	8993	63.3	70.2
018	Trenasse	Long	5	78	41	8469	1992	10461	59.7	64.6
037	Jupiter	Medium	6	86	38	7938	1623	9562	68.1	70.8
038	Bengal	Medium	4	86	38	8373	1785	10157	69.7	72.7
045	Catahoula	Long	5	88	37	7074	2007	9081	66.9	72.7
058	Cheniere	Long	5	88	36	7882	1117	8999	63.3	71.5
059	Cocodrie	Long	4	85	38	7717	1157	8874	63.3	70.8
158	Dellrose	Della	5	87	44	5969	3267	9236	68.2	72.9

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

Table 9. Average yield, milling, and agronomic performance of eight experimental long, medium, and aromatic lines and seven check varieties in Commercial-Advanced (CA) trial at four Louisiana locations, 2007.

Entry	Source	Grain Type†	Vigor‡	Days to 50% heading	Plant Height (inch)	Yield (lb/A)	Milling (%) Head	Total
240	RU0502094	Long	5	80	39	5985	61.9	69.0
241	RU0402125	Jasmine	5	83	38	5876	57.5	66.0
242	RU0402028	Medium	5	83	36	7322	62.9	67.1
243	RU0702031	Long	5	77	38	6626	61.8	69.3
244	RU0702034	Long	4	75	39	6154	61.0	68.7
245	RU0702137	Toro	5	81	36	6218	62.2	68.3
246	RU0502177	Basmati	6	79	39	5567	57.9	70.2
247	RU0602146	Della	5	81	38	5511	61.3	69.2
205	Trenasse	Long	5	74	39	7112	59.7	67.1
207	Cocodrie	Long	4	79	37	6586	59.4	68.2
208	Cheniere	Long	5	82	36	6533	61.2	70.6
213	Jupiter	Medium	6	83	39	7272	61.3	66.2
214	Bengal	Medium	4	83	39	7089	60.8	66.1
217	Dellrose	Della	6	81	40	5264	63.3	70.6
218	Catahoula	Long	5	82	37	6327	63.1	71.4

* Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

Table 10. Yield, milling, and agronomic performance of the specialty Advanced Yield trial (AY) tested at the Rice Research Station, Crowley, 2007.

Entry	Pedigree	Grain† Type	Vigor‡	Days to 50% Heading	Height (inch)	Yield (lb/A) Main	Ratoon	Total	Milling (%) Head	Total
001	96 INT/AHRENT	J	4	90	42	6227	1073	7301	57.1	62.5
002	L202/Leah//Toro/3/IR67016	B	6	86	40	5772	2161	7934	58.0	70.1
003	CPRS/LGRU//97 KDM X2-5	D	4	89	40	5550	2409	7959	64.2	71.1
004	AC1106	T	3	88	36	6192	2229	8421	58.2	64.7
005	Dellrose	D	5	91	42	5299	2277	7576	66.8	71.9
006	Dellmati	B	6	82	46	4337	1698	6035	35.7	63.6
007	Toro-2	T	4	88	45	6482	1292	7774	65.9	72.1
008	Cocodrie	L	4	87	39	7369	1541	8910	63.6	70.7
c.v.%			12.2	0.8	3.5	4.5	10.4	4.6	7.8	4.1
$LSD_{0.05}$			0.9	1.3	2.6	465	335	621	10.8	6.6

† J = Jasmine-type, B = Basmati-type, D = Della-type, T = Toro type, and L = Long-grain.
‡ Subjective rating 1 to 9, where 1 = excellent, 9 = no stand.

Table 11. Yield, milling, and agronomic performance of the specialty Advanced Yield trial (AY) tested at Lake Arthur, Vermilion Parish, 2007.

Entry	Source	Grain Type†	Days to 50% heading	Plant Height (inch)	Yield (lb/A)	Milling (%) Head	Milling (%) Total
001	96 INT/AHRENT	J	84	39	4566	53.1	61.2
002	L202/Leah//Toro/3/IR67016	B	80	37	4179	52.9	67.0
003	CPRS/LGRU//97 KDM X2-5	D	81	37	4830	64.3	70.8
004	AC1106	T	82	37	4718	59.4	65.7
005	Dellrose	D	84	37	4018	62.1	68.9
006	Dellmati	B	74	43	4235	54.7	71.2
007	Toro-2	T	88	43	4197	47.1	60.0
008	Cocodrie	L	81	39	4217	54.6	65.3
c.v.%			1.0	2.4	7.7	6.5	3.4
$LSD_{0.05}$			1.4	1.6	586	8.6	5.3

Table 12. Yield, milling, and agronomic performance of the specialty Advanced Yield trial (AY) tested at Mamou, Evangeline Parish, 2007.

Entry	Source	Grain Type†	Vigor‡	Days to 50% heading	Plant Height (inch)	Yield (lb/A)	Milling (%) Head	Milling (%) Total
001	96 INT/AHRENT	J	5	79	88	4211	57.7	67.2
002	L202/Leah//Toro/3/IR67016	B	6	76	101	4577	37.7	71.3
003	CPRS/LGRU//97 KDM X2-5	D	6	77	96	6258	62.7	72.0
004	AC1106	T	6	77	100	6805	64.3	70.7
005	Dellrose	D	6	79	95	4646	38.4	71.3
006	Dellmati	B	7	73	117	4644	52.6	70.1
007	Toro-2	T	5	80	106	4910	65.0	74.5
008	Cocodrie	L	6	75	93	7012	60.2	68.5
c.v.%			7.2	1.5	3.4	7.4	19.3	2.8
$LSD_{0.05}$			0.7	2.1	2.4	699	25.0	4.7

RICE GENETICS AND GERMPLASM DEVELOPMENT

J.H. Oard, D.E. Groth, S.D. Linscombe, X. Sha, S. Kadaru, S. Ordonez, and W. Zhang

Summary

1) Genetic and agronomic analyses of red rice-Clearfield hybrids and their progeny showed that resistance to NewPath herbicide was dominant in all tested F_1 hybrids and a small proportion of the F_2 progeny exhibited reproductive success equal to or even greater than the Clearfield varieties.

2) We have developed and applied a new DNA-based method to determine if varieties, lines, hybrids, outcrosses, or seed mixtures contain genes for resistance to the NewPath herbicide.

3) Multi-year field trials were completed for sheath blight resistance and head rice yield that will facilitate identification of DNA markers associated with these two important traits in the Rice CAP Project.

4) Use of DNA markers appears promising for rapid and efficient introgression of aroma, disease resistance, and cooking quality traits from exotic germplasm into adapted Louisiana breeding lines.

5) Numerous sheath blight-resistant lines were developed (SB rating ≤ 5) and used as parents for production of 334 hybrid crosses, and 20 new advanced lines were distributed to the Rice Breeding Program at the Rice Research Station, Crowley, LA.

6) More than 100 statistical methods were evaluated for linking DNA markers with economically important traits in rice breeding lines.

Genetic and Agronomic Analyses of Red Rice-Clearfield Hybrids and Their Progeny Produced from Natural and Controlled Crosses

Clearfield rice technology is a popular method for controlling noxious red rice weeds (*Oryza sativa* L.) in commercial rice fields in the southern United States. Previous research has detected red rice-Clearfield variety F_1 hybrids at low rates in Louisiana and Arkansas. The first research objective was to determine genetic control of imazethapyr resistance in F_1 hybrids and F_2 populations derived from natural and controlled hybridizations of red rice and Clearfield rice. The second objective was to characterize and compare agronomic performance of the hybrids and their progeny with Clearfield varieties. Genetic analysis showed that imazethapyr resistance was dominant in all tested F_1 hybrids with single and two-gene inheritance observed across composite F_2 populations. F_1 hybrids exhibited high levels of variation for plant height, heading date, and seven reproductive traits. Heterosis was observed in the hybrids vs. Clearfield varieties for plant height, heading date, seed-bearing tillers, panicle length, and spikelets/panicle. While seed production of the F_1 hybrids was generally inferior to that of the commercial varieties, one red rice/CL121 hybrid produced greater seeds/panicle than the CL121 commercial parent. Extensive variation was observed for all measured traits in the F_2 populations derived from either natural or controlled crosses. Results from this study indicate that red rice/Clearfield F_1 hybrids normally exhibit low reproductive seed capacity, but a small proportion of the subsequent F_2 progeny can produce high fecundity levels. Effective stewardship practices are therefore warranted to reduce the occurrence of such hybrids and their offspring to ensure continued success of the Clearfield technology. Results from this study have been accepted for publication in the journal *Euphytica.*

Development and Application of DNA-Based (PCR) Assays for Genes that Confer Resistance to the Imazethapyr (NewPath) Herbicide in Rice

Outcrossing or cross hybridization is a potential concern in herbicide-resistant crop management strategies such as in the Clearfield™ rice system. Recent studies have shown that the mutated acetolactate synthase (*ALS*) gene that confers resistance to the imazethapyr (NewPath) herbicide can be transferred from Clearfield rice cultivars via cross pollination under field conditions to weedy red rice. Resistance of commercial Clearfield rice cultivars to imazethapyr is due to the presence of two-point mutations in the *ALS* gene that result in amino acid substitutions from serine to asparagine (S to D) and glycine to glutamic acid (G to E). We have developed a DNA-based method that involves application of allele-specific PCR assays to distinguish herbicide-susceptible and resistant *ALS* alleles in either homozygous or heterozygous genotypes produced from natural outcrosses between Clearfield varieties CL121, CL141, CL161, and weedy red rice. PCR assays that can distinguish between the homozygous and heterozygous imazethapyr-resistant S_{653}D and G_{654}E SNP alleles of the rice *ALS* gene were developed and evaluated. A total of 483 individual red rice plants were successfully screened for the presence of S_{653}D SNP and another 145 F_2 individuals from natural red rice x CL121 hybridizations were screened for the presence of the G_{654}E SNP. The PCR-based assays produced during this study are simple, rapid, inexpensive, reproducible, and require only standard PCR and electrophoretic instruments that can be applied toward outcrossing evaluation and effective weed management strategies for the Clearfield crop system. Results from this study have been accepted for publication in the journal *Euphytica*.

Population Development for Sheath Blight Resistance and High Head Rice Yield in the RiceCAP Project

The RiceCAP Project is a USDA-funded cooperative research program consisting of institutions from nine states, including three USDA research centers in Arkansas, Mississippi, and Texas. The primary objective of RiceCAP is to identify DNA markers for sheath blight resistance and milling quality that will facilitate breeding of superior varieties for the U.S. rice industry. RiceCAP also has an important outreach component to transfer and communicate research progress that will impact stakeholders and inform the general public. The LSU AgCenter Rice Station has played a crucial role in the development of germplasm and completion of field trials over the last three years for the RiceCAP project. In 2007, the Rice Station collected agronomic data for sheath blight resistance, height, and maturity from the SB2 mapping population (Cocodrie x MCR10277). This is the third and final year for this trial. A second mapping population, referred to as MY2, was derived from a cross between Cypress and LaGrue and evaluated for the second and final year in Louisiana to identify DNA markers for high milling yield and other agronomic traits. All results obtained from the RiceCAP project will be made publicly available to breeders, stakeholders, and the general public.

Evaluation and Application of DNA Markers for Aroma, Disease Resistance, and Cooking Quality in Rice

The demand for high quality or special purpose aromatic rice in the United States and elsewhere has increased during the past two decades. The objective of this research is to evaluate DNA markers for introgression of aroma, disease resistance, and cooking quality into elite U.S. breeding lines. We have developed new Single Nucleotide Polymorphism (SNP) markers in exon 7 of the BAD2 gene for marker-assisted identification and introgression of the aroma gene into U.S. southern germplasm. Additional SNP markers developed by USDA researchers for rice blight resistance, amylose content, and gelatinization temperature were used to genotype 7 parents, 30 F_2 individuals, and 216 F_1/BC plants. A total of 65 individuals were found to carry the highest percentage of desirable genes for aroma and the other traits. All selected lines were used in crosses to CL161 and other varieties. The F_1 hybrids are currently being advanced in the greenhouse for additional SNP genotyping and crossing. The ultimate utility of these markers for rapid development of aromatic rice has yet to be determined, but results to date are promising.

Development of Sheath Blight-Resistant Germplasm by Conventional Methods

The primary goal of this research is to develop improved genetic material for sheath blight resistance from both domestic and foreign sources by crossing to elite Louisiana varieties. A total of 334 crosses were made using multiple sources of sheath blight resistance that were hybridized with various Louisiana varieties and genetic lines. During the field screening of inoculated material, 88 sheath blight-resistant lines (rating ≤ 5) were identified from more than 1,300 $F_2 – F_6$ families. Twenty panicle selections with good levels of resistance and acceptable agronomic traits were submitted for evaluation to the Rice Breeding Program. One hundred lines with similar height, maturity, and panicle type as the variety Cocodrie will be evaluated and crossed to elite lines in 2008 field trials.

Linking DNA Markers with Agronomic Traits in Rice

The mixed model is a univariate approach for association genetics that has been developed and applied recently to both outcrossed and inbred plant species, but validation of selected markers associated with complex agronomic traits has not been extensively studied. Our research objective was to evaluate the mixed model and a “model selection” approach to identify markers that explain phenotypic variance associated with four agronomic traits in two genetically diverse and narrow germplasm collections of inbred rice. The results showed that kinship estimates incorporated into the mixed model for the narrow germplasm did reduce Type I errors, but this improvement was not sufficient for high phenotypic prediction rates after validation. The model selection approach as implemented in SAS PROC GLMSELECT estimated main and epistatic effects by standard hypothesis testing and Bayesian information criteria in a multivariate format. Evaluation of 172 different selection criteria resulted in selection of models that increased power and enhanced prediction ability of markers evaluated after validation in both diverse and narrow germplasm. The addition of an epistatic component to the procedure improved validation results. We conclude that a model selection approach with epistatic effects coupled with a validation step should be considered for association genetic studies in rice.

MARKER-ASSISTED BREEDING AND GENETIC IMPROVEMENT OF SOUTHERN U.S. RICE

H.S. Utomo, J.L. Nash, and S.D. Linscombe

Marker-assisted breeding (MAB) at the Rice Research Station focuses on important traits such as disease resistance, grain quality, fragrance, and protein content. To produce potential breeding lines, MAB is conducted in conjunction with conventional breeding to include other important traits that currently are beyond the scope of marker-assisted selection (MAS) and anther culture to produce double haploid lines. DNA marker approaches are being used to introgress target genes that are currently not present in the U.S. germplasm. Even though newer cultivars show steady yield increases, a narrow U.S. genetic base has posed concerns in regard to the yield potential in the future. Widening the genetic base through inter-specific crosses, however, can disrupt favorable gene complexes important for maintaining high yield potential and quality advantages of the adapted lines. Although wild or exotic germplasm is likely to contain many genes that interfere with favorable gene complexes, a few genes are beneficial. DNA markers provide a surgical tool to work with these few potential genes from the unadapted materials while maintaining the balance of the favorable gene complexes. With a proper introgression design, the effect of these few foreign genes can be analyzed extensively. Once target alleles have been introgressed into the adapted lines, forward crossing and MAB can be applied during cultivar development.

Blast-Resistant Genes

Durable blast-resistant cultivars will help achieve potential yield by minimizing yield loss due to blast outbreak. The *Pi-ta*^{2} gene provides resistance that is considered adequate in some rice growing areas such as Arkansas. While *Pi-ta*^{2} provides the widest spectrums against rice blast races, it does not provide protection against 10 major U.S. blast races (eight out of 10 major races). *Pi-ta*^{2} blast-resistant gene was obtained from Vietnamese cultivar Tetep and was used in developing cultivar Katy that was released in 1981. Similarly, the *Pi-b* gene was originally not present in the U.S. germplasm. It was obtained from Chinese cultivar TeQing and incorporated into the development of U.S. cultivar Saber. Molecular markers closely associated with *Pi-ta*^{2}, *Pi-b, Pi-z, Pi-k*^{h}, and *Pi-k*^{s} are available to identify these genes in the background of U.S. cultivars.

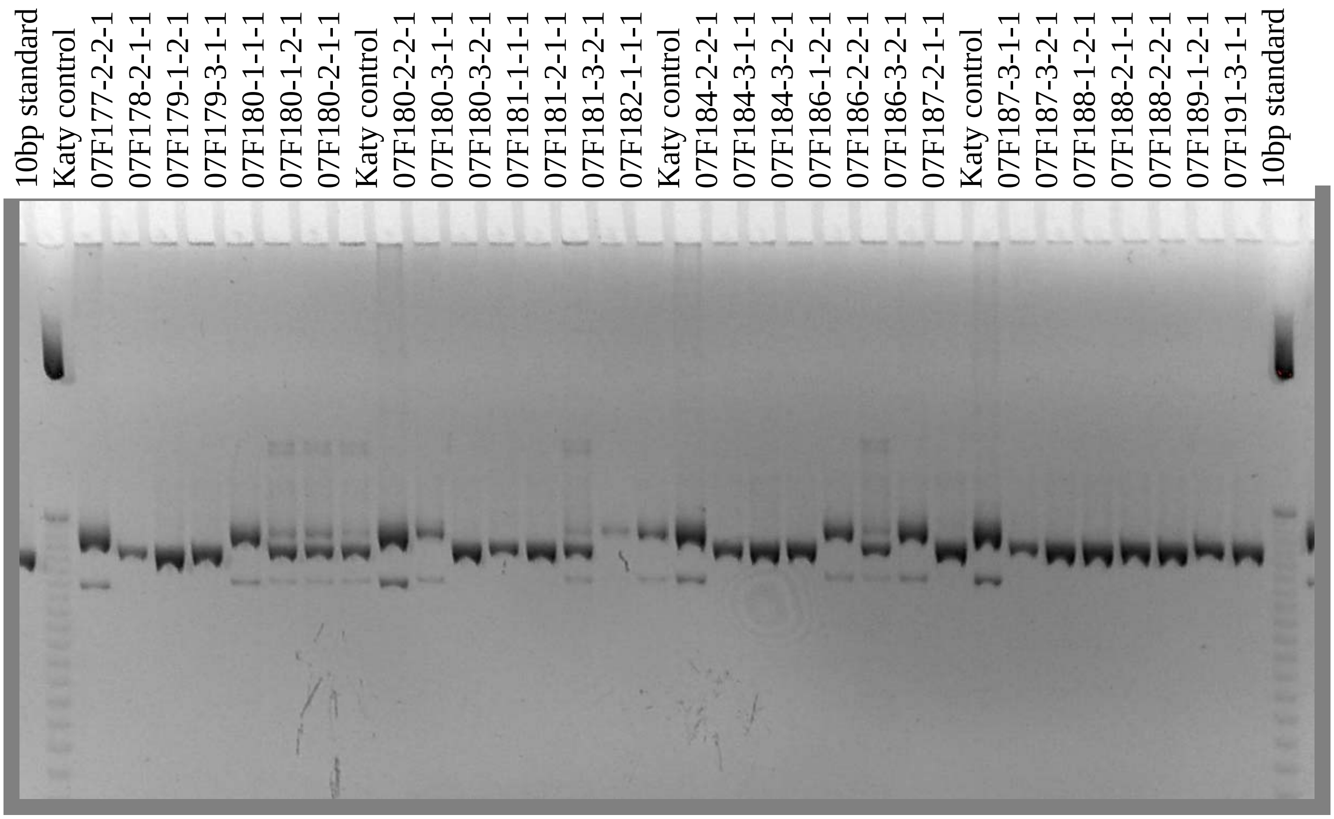
Increasing durability against blast disease among commercial cultivars will help maintain steady yield under various disease pressure. Recently, IRRI has developed a set of parental lines composed of monogenic lines for targeting 24 blast-resistant genes *Pia, Pib, Pii, Pik-s, Pik, Pik-h, Pik-m, Pik-p, Pish, Pit, Pita (Pi4), Pita-2, Piz, Piz-(Pi2), Piz-t, Pi1, Pi-3, Pi5, Pi7 (t), Pi9, Pi11(t), Pi12 (t), Pi19, and Pi20* in rice. Near isogenic lines carrying 14 blast-resistant genes - *Pi-b, Pik-s, Pik, Pik-h, Pik-m, Pik-p, Pish, Pita (Pi4), Pita-2, Piz-5 (Pi2), Piz-t, Pi1, Pi5,* and *Pi7 (t)* has been successfully developed in *Indica* background. Accumulation of known blast genes into the U.S. background similar to the near isogenic lines developed by IRRI will be a valuable source of resistance genes in breeding programs. Lines containing various combinations of pyramided genes can be used for detailed pathological analysis of blast races found in the United States.

Pi-ta^2 gene

> Resistant spectrum: provide protection against IB-1, B-45, IB49, IB-54, IC17, IE-1, IG-1, and IH-1.
> Location: in the chromosome 12 near the centromer region.
> Linked markers: RM 7102, RM 155, and OSM 89.
> Source of *Pi-ta*^{2}gene used in crosses: Katy, Kaybonnet, and Drew.

Table 1 shows agronomic characteristic of F_5 breeding lines carrying a *Pi-ta*^{2} gene. Figure 1 is an example of a gel image to indicate the presence of blast-resistant genes among segregating lines.

Figure 1. Example of a gel image as a basis for carrying out marker-assisted selection for blast-resistant genes. In this marker screening, cultivar Katy was used as a control for the *Pi-ta*^{2} presence.



Microsatellite markers

Typical PCR reactions are as follows: The PCR mix consisted of 3.13 µl of Sigma Jumpstart™ (Sigma, MO, USA; Cat. # P0982), 1.87 µl DNA template, and 0.63 µl (0.1 µM) each of forward and reverse microsatellite primers. PCR amplification was performed on a PTC 100 thermal cycler (MJ Research, Inc., MA, USA) using a 96-well plate, programmed to initial denaturation at 94°C for 4 min followed by 35 cycles of 45 sec at 94°C, 45 sec at 55°C, and 1 min at 72°C, with a final extension step of 1 min at 72°C for amplification. The PCR product was held at 4°C before analysis.

Electrophoresis and band scoring

PCR products were separated on a polyacrylamide gel in a Mega-Gel dual high-throughput vertical electrophoresis unit (C.B.S. Scientific, CA, USA). 100 µl of 10 mg ml^{-1} ethidium bromide was added to the lower buffer reservoir before pre-running the gel. The PCR product of 6.25 µl volume was loaded into the well and run at 300 volts for 2 hours and 30 minutes. The resulting bands were visualized under 254-nm UV light and the band images were captured on the KODAK EDAS 290. The size of bands was determined using the KODAK EDAS 290 companion software and band images were stored as JPEG file.

Table 1. Field performance of progeny lines carrying *Pi-ta*^{2} gene.

	Plant ID	Seedling Vigor[¶]	Panicle Length (cm)	Grain type[‡]	Panicle weight (g)	Plant height (cm)	Row yield (g)	Heading date
1	07F397	3	28.8	L	8.29	70	701	85
2	07F374	3	28.4	L	7.14	74	504	84
3	07F479	3	29.2	L	7	80	670	88
4	07F490	3	26.4	L	6.4	82	1202	84
5	07F513	3	28.2	L	6.4	81	899	82
6	07F540	2	28.9	L	6.3	84	930	83
7	07F475	3	30.1	L	6.14	76	1603	84
8	07F437	2	26.1	L	6.1	71	500	88
9	07F345	2	29.7	L	5.98	76	506	83
10	07F440	2	26.7	L	6	86	435	80
11	07F762	3	26.5	L	5.9	76	436	80
12	07F571	3	26.3	L	5.87	75	367	76
13	07F772	3	29.3	L	5.9	76	509	88
14	07F467	3	27.5	L	5.85	75	806	80
15	07F538	3	27.4	L	5.82	87	344	81
16	07F717	3	24.4	L	5.81	81	435	81
17	07F582	3	27	L	5.8	88	367	82
18	07F124	3	26.6	L	5.76	80	390	84
19	07F775	2	27.6	L	5.72	80	566	85
20	07F719	3	27	L	5.66	82	678	85
21	07F511	3	29.4	L	5.65	81	466	86
22	07F515	3	27.5	L	5.64	83	578	83
23	07F533	3	26.7	L	5.6	84	432	83
24	07F282	3	27	L	5.6	83	343	83
25	07F385	3	24.9	L	5.6	82	356	84
26	07F548	3	28.9	L	5.59	82	564	85
27	07F584	3	27.1	L	5.59	82	454	87
28	07F481	3	27.8	L	5.58	81	345	85
29	07F367	3	30.8	L	5.57	79	340	85
30	07F480	3	25.9	L	5.56	77	504	85
31	07F539	3	25.6	L	5.5	81	205	83
32	07F478	3	28.3	L	5.5	84	246	83

[¶] Subjective rating 1 to 9 (1 = excellent, 9 = poor).
[‡] L = long grain.

Puerto Rico Winter nursery: 20 selected F_5 carrying *Pi-ta*^{2} genes that have promising agronomic traits are being grown in the winter nursery. Seed harvested will be used for preliminary yield trials in the summer of 2008.

Marker-Assisted Backcrossing

Backcross program and development of progeny lines

Four donor lines were used; Cultivar Katy for *Pi-ta*^{2}, Saber for *Pi-b*, Lemont for *Pi-k*^{h}, and Bengal for *Pi-k*^{s} gene (Fig. 1). Microsatellite marker RM 7102 was used to tract *Pi-ta*^{2} (with a distance of 1.2 cM), RM 208 for *Pi-b* (0.0 cM), and RM224 for *Pi-k*^{h} (0.2 cM). Backcrosses were made to introgress an individual target gene into recurrent parent Cocodrie. The second recurrent parent, breeding line MB7006, was used to duplicate the process. Conventional breeding is being conducted among progeny lines derived from pyramided Cocodrie and MB7006 lines.

Pi-b gene

Resistance spectrum: provide protection against IB-1, B-45, IB49 (moderate), IC17, IE-1, IG-1, IG-1K, and IH-1
Location: in chromosome 2
Linked markers: *Pi-b* dom
Source of *Pi-b* gene used in crosses: Saber and Bolivar

Pi-k gene

Resistance spectrum: provide protection against IB-45, IB54, and IG-1 races
Location: in chromosome 11
Linked markers: RM 224 and RM 1233
Source of *Pi-k*^{h} gene used in crosses: Kaybonnet and Lemont

Pi-k^s gene

Resistance spectrum: provide protection against IB54 race
Location: in chromosome 11
Linked markers: RM 224 and RM 1233
Source of *Pi-k*^{s} gene used in crosses: M201 and Bengal

Figure 2 shows the backcross and cross schedule used to pyramid target genes. Genome scanning by placing markers of approximately equal spacing along the 12 rice chromosomes was used to improve the efficiency of backcross transgression. Microsatellite polymorphic parental markers and number of markers per chromosome used in genome scanning are presented in Table 2. An estimate recipient genome recovery (G) was calculated as

$$G = \{(X+0.5Y) \times 100\}/N$$

Where, N= total number of parental polymorphic markers used
X= number of markers showing homozygousity for recurrent parental allele
Y = number of markers showing heterozygosity for parental alleles

Figure 2. Backcross and cross schedule used to pyramid target genes.

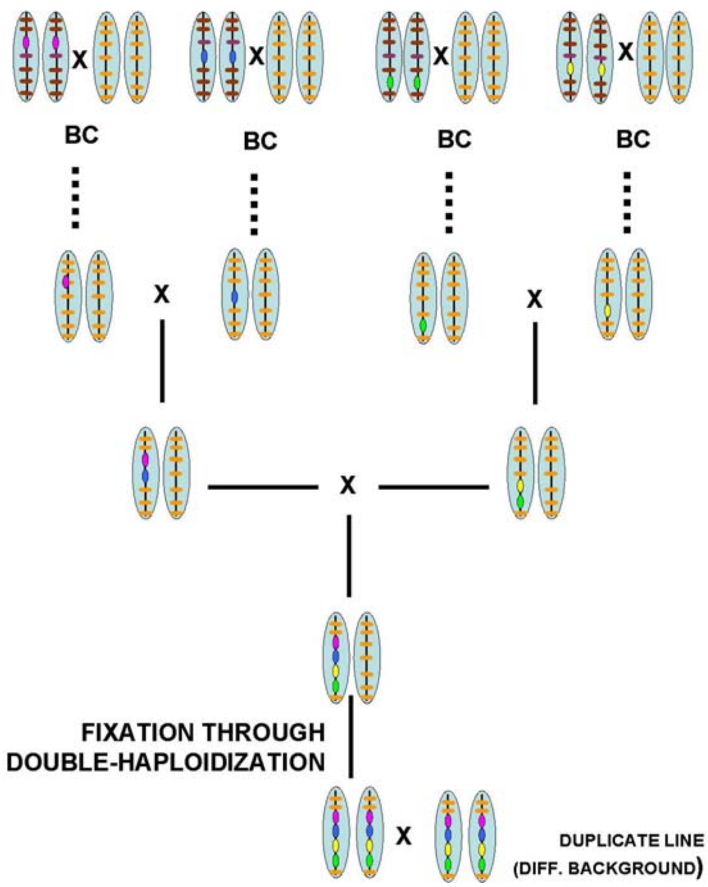


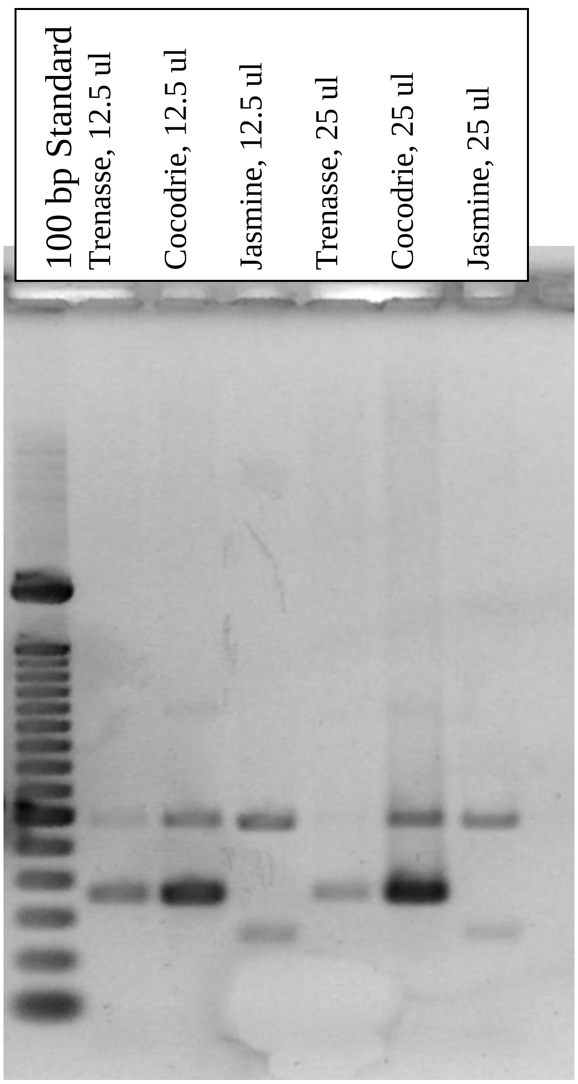
Table 2. Percent of alleles in BC_3F_2 introgression lines revealed by genome scanning.

BC lines	Percent allele	Chromosome 1	2	3	4	5	6	7	8	9	10	11	12	Whole Genome
BC3F2	CCDR	61.2	95.2	70.1	57.4	76.1	100	78.4	90.1	93.3	96	76.2	89.1	82
(75)	Heterozygous	20.6	4.8	22.9	19.6	17.9	0	9.6	7.9	2.7	3	21.8	7.9	11.5
	Pi-ta2 donor	18.2	0	7	23	6	0	12	2	4	1	2	3	6.5
BC3F2	CCDR	82.3	88.3	76	72.3	77.1	88.3	88	79.8	77.5	95	86	89.1	83.3
(75)	Heterozygous	0.7	6.7	16	23.7	8.9	9.7	1.8	16.2	8.5	3	14	8.9	9.8
	Pi-b donor	17	5	8	4	14	2	10.2	4	14	2	0	2	6.9
BC3F2	CCDR	87	89.8	77.8	76.4	88.1	78	74.3	88.4	94	100	91.2	100	87
(75)	Heterozygous	8	4.2	15.2	15.6	6.5	22	13.7	9.6	2	0	6.8	0	8.6
	Pi-kh donor	5	6	7	8	5.4	0	12	2	4	0	2	0	4.4
BC3F2	CCDR	87.2	88.3	89	78.2	77.1	98.2	89.5	92	87.9	87.5	87.4	98	88.3
(75)	Heterozygous	5.7	11.7	0.8	15.4	16.8	1.8	8.5	8	8.9	11.5	10.6	2	8.5
	Pi-z donor	7.1	0	10.2	6.4	6.1	0	2	0	3.2	1	2	0	3.2

Aroma

Aroma in Basmati and Jasmine rice is a recessive trait and has been associated with increased levels of 2-acetyl-1-pyrroline (2AP). An eight-base pair deletion and three SNPs in exon 7 of the gene encoding betaine aldehyde dehydrogenase 2 (BAD2) on chromosome 8 of *Oryza sativa* have caused the production of aroma in Jasmine and Basmati rice. Non-aromatic rice varieties possess a fully functional copy of the gene encoding BAD2 while fragrant varieties possess a copy of the gene encoding BAD2, which contains the deletion and SNPs, resulting in a frame shift that generates a premature stop codon that disables the BAD2 enzyme. Bradbury's group has constructed four Single Nucleotide Polymorphisms (SNPs) primers, two that anneal to sequences common to both fragrant (ESP) and non-fragrant varieties (EAP) and external to the area where the mutation occurs and two that are specific to one of the two possible alleles (IFAP and INSP). Using these four SNP primers (Fig. 3), a variety or individual that is homozygous non-aromatic, homozygous aromatic, and heterozygous non-aromatic can be identified. Currently, the aroma gene is being pyramided into the breeding lines carrying multiple blast genes.

Figure 3. SNP (Single Nucleotide Polymorphism) marker to detect the presence of aroma gene, either in the heterozygouse state (three amplified bands) or homozygous state (two bands). Bands produced by Trenasse and Cocodrie represent non-aroma traits.



Aroma Tests:

Test #2

All DNA was isolated via Qiagen DNEasy kit
from 10 ground seed embryos.

PCR reactions:

6.5 ul Jumpstart
0.8 ul each primer
3.3 ul DNA

Total: 13 ul

12.5 ul Jumpstart
1.25 ul each primer
7.5 ul DNA

Total: 25 ul

Thermocycler program: Aroma-2

Four aroma primers were used:
- ESP
- IFAP
- INSP
- EAP

PCR was run on 11/2/07, Gel run and stained on 11/6/07.

These SNPs markers were used to select among segregating progeny lines.

Drought Tolerance

A drought-tolerant gene has been mapped recently and known to be located in chromosome 12. Gary Atlin's group has identified two SSR markers flanking a major QTL region for drought tolerance that correspond to 60% of total variation . *Indica* rice variety Way Rarem carries the drought-resistant gene. RM28048 and RM511 flank the 10.2 cM QTL region (Fig. 4). The two markers are being used during introgression of *qtl 12.1* from Indica Way Rarem into the U.S. germplasm. This introgression process is reminiscence of transferring $Pi\text{-}ta^2$ or *Pi-b* blast gene of foreign origin. $Pi\text{-}ta^2$is a major blast-resistant gene introduced into Katy from the Vietnamese landrace Tetep, and *Pi-b* is another major gene introduced into Saber from Chinese cultivar TeQing. Crosses have been initiated (Table 3). Introgession of *qtl 12.1* will be carried out through marker-assisted backcrossing.

Figure 4. QTLs associated with drought tolerance based on mapping population from Way Rarem/cross.

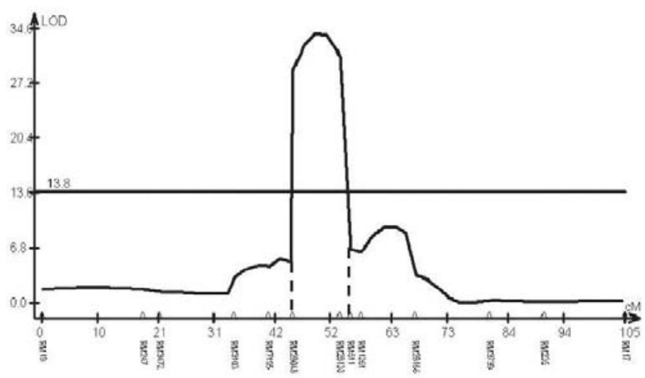


Table 3. List of crosses with *cv* Way Rarem.

	Crosses	*Generation*
1	Cocodrie	F_1
2	Trenasse	F_1
3	Catahoula	F_1
4	Cheniere	F_1
5	Jupiter	F_1
6	Bengal	F_1

High Lysine Trait

Lysine is an essential amino acid. Lysine concentration in major grains, including rice, is the lowest among 11 essential amino acids. It is a major nutritional drawback, therefore, nutritional improvement of rice grain will be associated directly with improved lysine content. Lysine belongs to the aspartate family of amino acids and its biosynthesis is regulated by several feedback loops. Dihydrodipicolinate synthase (DHDPS; EC 4.2.1.52), the first enzyme of the lysine specific branch of the aspartate pathway, is strongly feedback inhibited by lysine in most plant species. Thus, de-regulating the metabolic pathway through modification of the allosteric site of DHDPS plays a crucial role in increasing lysine synthesis. A feedback insensitive version of DHDPS has shown to cause elevated amounts of lysine content. For example, the mutant *dhdps-r1* gene from *Nicotiana sylvestris* demonstrates that the gene encoding a feedback insensitive DHDPS is responsible for the elevated level of lysine. A bacterial DHDPS gene, isolated from *E. coli*, has been shown to be at least 20-fold less sensitive to increases in lysine levels. A portion of this proposed project will be focused on identifying mutation sites in the gene coding for DHDPS in two high lysine rice lines.

Molecular markers to tag the genes controlling this trait will be needed to transfer; this trait into popular cultivars and help establish successful breeding methodology. The gene coding for DHDPS, a key enzyme in the lysine synthesis pathway, will be evaluated using two high lysine lines from high protein lines WE07 and WE97 developed at the Rice Research Station. Four low protein lines from the USDA collection will be used as additional controls. A molecular technique, Ecotilling, will be used to identify nucleotide differences in the gene coding for DHDPS enzyme. Molecular information obtained will be used to develop new markers for high lysine content in the rice grain.

Isolation of the DHDPS gene and PCR amplification

A gene coding for DHDPS from high lysine lines and the cultivar check Wells has been isolated. Specific primers, forward primer D-Probe-1 and reversed primer D-Probe-2, were used to amplify the gene. Figure 5 is the example of amplified DHDPS genes from Cocodrie, Wells, and Cypress. Amplified products of 1141 bp long from two high lysine lines and cultivar Wells were purified from the excised gels. Purified amplified products are currently being sequenced. Sequence information will be used to develop SNPs markers for used in marker-assisted breeding.

Induced Mutation Breeding and Marker for Herbicide Resistance

Induced mutation: Approximately 50 lb of Cypress seed were treated with mutagen ethyl methanesulfonate (EMS). EMS is expected to produce random mutations in genetic material by nucleotide substitution, specifically by guanine alkylation.

Date of treatment: April 30, 2007

EMS treatement: 0.125% EMS for 18 hours.

Date of planting: May 3, 2007, on a 0.4-A plot, hand broadcasted followed by mulching.

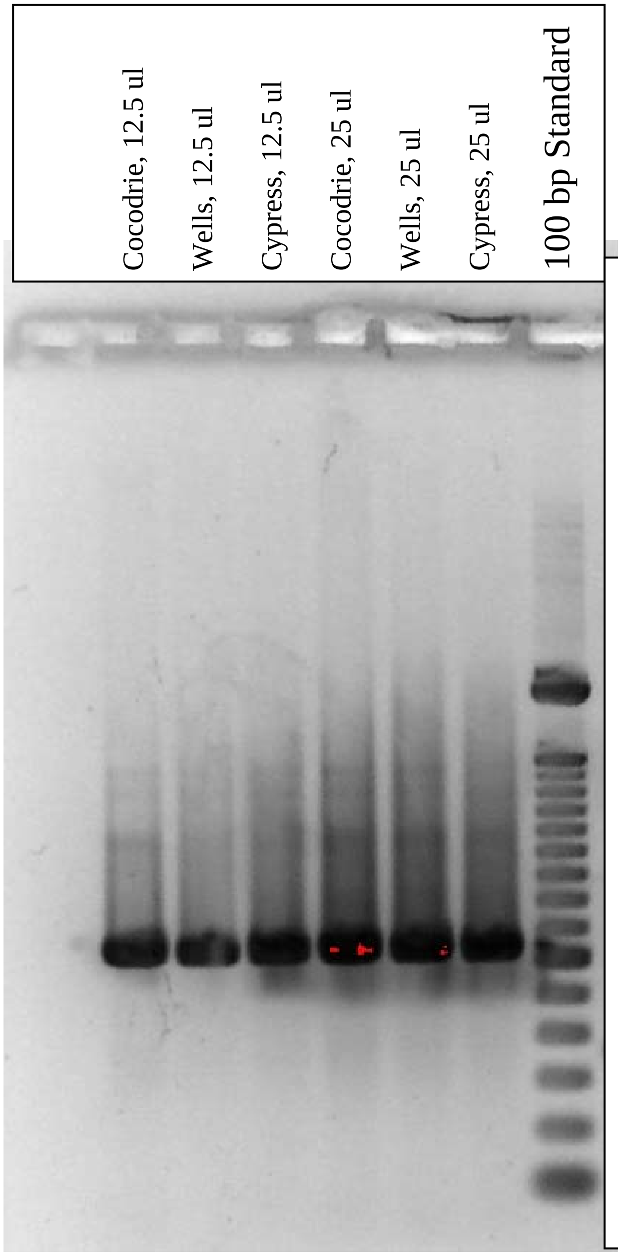
Seeding rate: 4 to 5 seedling/square inch.

Mutated M_2 seed was harvested last summer and will be planted in the field. Sethoxydim herbicide will be applied at a recommended rate when the M_2 plants reach the 2- to 5-leaf stage to identify mutant(s) resistant to the herbicide.

RiceCap Activities

DNA marker analysis for the SB2 mapping population was conducted using an ABI capillary system (Brian Scheffler's USDA laboratory in Stoneville, MS). DNA marker data from the ABI outputs were analyzed using the GeneMapper ver. 3.7. Examples of ABI outputs analyzed using the GeneMapper ver. 3.7. to determine allelic status of each SB2 line following the amplification of DNA targets using specific primers that generate polymorphic SSR markers (Fig. 6). An example of DNA fingerprints of SB2 lines based on 11 SSR markers is given in Table 4.

Figure 5. PCR amplification of dihydrodipicolinate synthase (DHDPS) (EC 4.2.1.52), a major catalytic enzyme in the production of lysine. DHDPS genes from cultivars Cocodrie, Wells, and Cypress were used as a standard DNA sequence.



Probe Tests:

Test #1

PCR reactions:

6.5 ul Jumpstart
1.25ul each primer
3.75ul DNA

Total: 12.5ul

12.5 ul Jumpstart
2.5ul each primer
7.5ul DNA

Total: 25ul

Thermocycler program: DHDPSCP

Primers used:
D-Probe-1
D-Probe-2

PCR was run on 11/2/07, Gel run and stained on 11/6/07.

Figure 6. Allelic determination of SB2 lines using GeneMapper ver. 3.7.

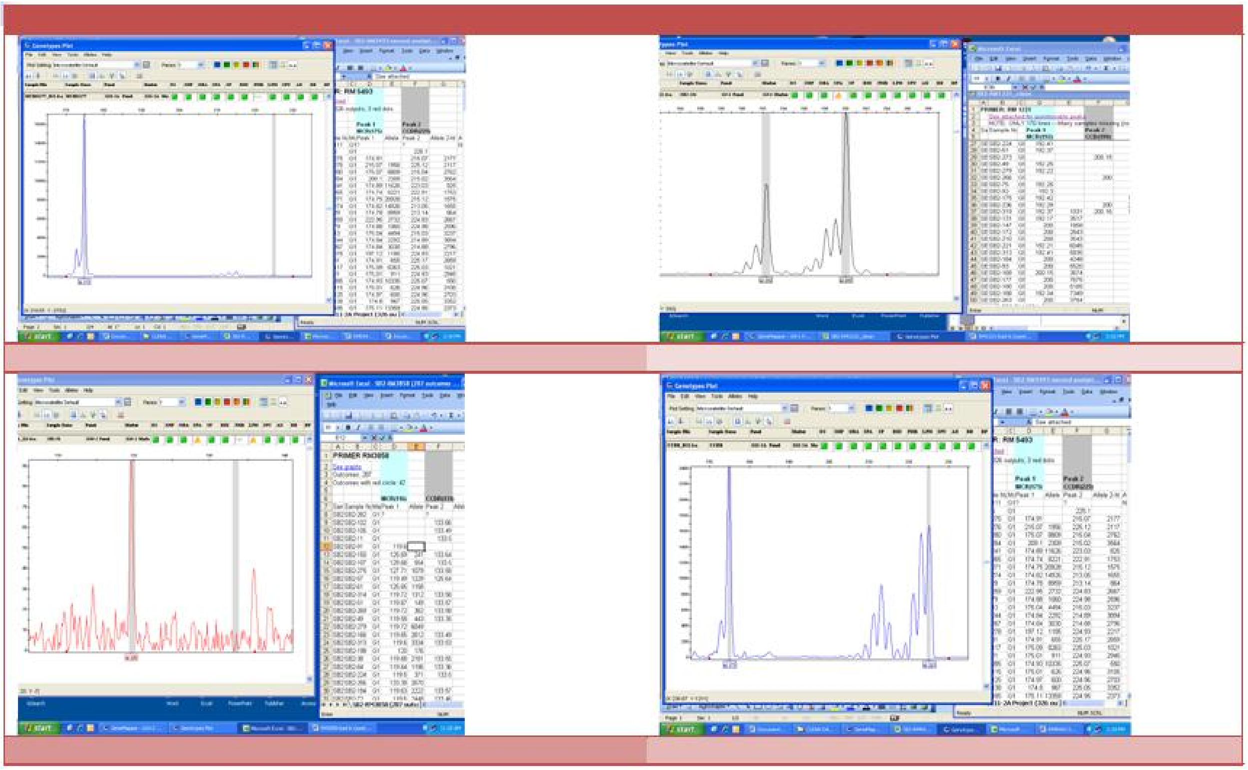


Table 4. Allelic status of 325 sheath blight lines from SB2 mapping population based.

	RM 3288	RM3912	RM1108	RM1287	RM5575	RM6844	RM3828	RM1352	RM1335	RM233A	RM3585
SB2-1											?
SB2-2											?
SB2-3											
SB2-4									165.1&170.9		
SB2-5											
SB2-6		192.2&194.3									
SB2-7											
SB2-8											
SB2-9										?	?
SB2-10											
SB2-11											
SB2-12											
SB2-13	224.53 ?				136.7&167.7						
SB2-14											
SB2-15											
SB2-16											
SB2-17											?
SB2-18					136.7&167.7						
SB2-19											
SB2-20		192.2&194.3				154.9&168.3					
SB2-21											
SB2-22				211.9&209.9							
SB2-23											
SB2-24			121&129						165.1&170.9		
SB2-25											
SB2-26		192.2&194.3									
SB2-27	22.6&212.6				136.7&167.7						
SB2-28											
SB2-29						154.9&168.3					
SB2-30					136.7&167.7						187.5&195.3
SB2-31											
SB2-32					136.7&167.7						
SB2-33				?	136.7&167.7						?
SB2-34											
SB2-35											
SB2-36											
SB2-37											
SB2-38									165.1&170.9		
SB2-39											?
SB2-40											
SB2-41											
SB2-42											
SB2-43					136.7&167.7						
SB2-44		192.2&194.3			136.7&167.7						
SB2-45											
SB2-46											
SB2-47											
SB2-48					136.7&167.7						
SB2-49											
SB2-50											
SB2-51						154.9&168.3					
SB2-52											
SB2-53											
SB2-54											
SB2-55											
SB2-56		192.2&194.3									
SB2-57				211.9&209.9						357.47 (?)	
SB2-58											
SB2-59	22.6&212.6	192.2&194.3	121&129	211.9&209.9						355.6&361.6	
SB2-60											
SB2-61		196.33 (?)				158.27(?)					
SB2-62											
SB2-63											
SB2-64		192.2&194.3									
SB2-65											

Continued.

Table 4. Continued.

	RM 3288	RM3912	RM1108	RM1287	RM5575	RM6844	RM3828	RM1352	RM1335	RM233A	RM3585
SB2-66											
SB2-67											
SB2-68		192.2&194.3									187.5&195.3
SB2-69											
SB2-70											
SB2-71											
SB2-72											
SB2-73											
SB2-74					136.7&167.7						
SB2-75											
SB2-76											
SB2-77											
SB2-78					136.7&167.7						
SB2-79										?	?
SB2-80										355.6&361.6	
SB2-81											
SB2-82			121&129	211.9&209.9		154.9&168.3					
SB2-83											
SB2-84											
SB2-85											
SB2-86											
SB2-87					136.7&167.7						?
SB2-88											
SB2-89											
SB2-90											
SB2-91											?
SB2-92											
SB2-93					136.7&167.7						
SB2-94					136.7&167.7						
SB2-95									160.16 (?)		?
SB2-96									165.1&170.9		
SB2-97											
SB2-98				211.9&209.9						355.6&361.6	
SB2-99											
SB2-100											187.5&195.3
SB2-101		192.2&194.3			136.7&167.7						186.2(?)
SB2-102											187.5&195.3
SB2-103											?
SB2-104				211.09 (?)							
SB2-105											
SB2-106											
SB2-107		192.2&194.3	121&129							355.6&361.6	
SB2-108											
SB2-109											
SB2-110											
SB2-111	225.8?				136.7&167.7						
SB2-112		192.2&194.3									
SB2-113											
SB2-114											
SB2-115											
SB2-116											
SB2-117		192.2&194.3									
SB2-118								237.1&250.7			
SB2-119								237.1&250.7			
SB2-120					136.7&167.7						
SB2-121					136.7&167.7						187.5&195.3
SB2-122											187.5&195.3
SB2-123					136.7&167.7						
SB2-124											
SB2-125											
SB2-126	22.6&212.6						185.7&191.5		165.1&170.9		
SB2-127											?
SB2-128											
SB2-129											187.5&195.3
SB2-130					136.7&167.7						
SB2-131											

Continued.

Table 4. Continued.

	RM 3288	RM3912	RM1108	RM1287	RM5575	RM6844	RM3828	RM1352	RM1335	RM233A	RM3585
SB2-132											
SB2-133					136.7&167.7						
SB2-134											
SB2-135											
SB2-136			121&129	211.9&209.9	136.7&167.7	154.9&168.3	185.7&191.5		165.1&170.9		
SB2-137	22.6&212.6			211.9&209.9				237.1&250.7			
SB2-138										355.6&361.6	187.5&195.3
SB2-139											
SB2-140											
SB2-141					136.7&167.7						
SB2-142					136.7&167.7						
SB2-143								?			?
SB2-144	22.6&212.6										187.5&195.3
SB2-145					136.7&167.7						
SB2-146					136.7&167.7						
SB2-147											
SB2-148		192.2&194.3									
SB2-149									165.1&170.9		
SB2-150				211.9&209.9	136.7&167.7					357.6 (?)	
SB2-151											
SB2-152											
SB2-153											
SB2-154			121&129							355.6&361.6	
SB2-155											
SB2-156											
SB2-157											
SB2-158				211.9&209.9							
SB2-159											
SB2-160											
SB2-161									165.1&170.9		
SB2-162									165.1&170.9		
SB2-163					136.7&167.7	161.25					
SB2-164		192.2&194.3			136.7&167.7						
SB2-165		192.2&194.3				154.9&168.3			165.1&170.9		
SB2-166	22.6&212.6										
SB2-167								251(?)			
SB2-168											
SB2-169											
SB2-170											
SB2-171					136.7&167.7						
SB2-172											
SB2-173											187.5&195.3
SB2-174											
SB2-175										?	?
SB2-176											
SB2-177											
SB2-178											
SB2-179											
SB2-180		192.2&194.3									
SB2-181											
SB2-182										?	
SB2-183								?		?	?
SB2-184									165.1&170.9		?
SB2-185											
SB2-186											187.5&195.3
SB2-187	22.6&212.6										
SB2-188		192.2&194.3									187.5&195.3
SB2-189		192.2&194.3		211.9&209.9		154.9&168.3	185.7&191.5			355.6&361.6	
SB2-190				?				?	167.37(?)		
SB2-191					136.7&167.7						?
SB2-192		192.2&194.3									
SB2-193	22.6&212.6	192.2&194.3									
SB2-194											
SB2-195											
SB2-196		192.2&194.3									
SB2-197		192.2&194.3			136.7&167.7						
SB2-198											

Continued.

Table 4. Continued.

	RM 3288	RM3912	RM1108	RM1287	RM5575	RM6844	RM3828	RM1352	RM1335	RM233A	RM3585
SB2-199											
SB2-200											
SB2-201											
SB2-202			121&129							?	187.5&195.3
SB2-203											
SB2-204		192.2&194.3									
SB2-205			121&129	211.9&209.9		154.9&168.3				355.6&361.6	
SB2-206											
SB2-207		192.2&194.3									
SB2-208											
SB2-209											
SB2-210				211.89							
SB2-211											
SB2-212		192.2&194.3						237.1&250.7			
SB2-213	22.6&212.6	192.2&194.3									
SB2-214	22.6&212.6									355.6&361.6	
SB2-215		192.2&194.3									
SB2-216			121&129								
SB2-217											
SB2-218	22.6&212.6							237.1&250.7		355.6&361.6	
SB2-219											
SB2-220											
SB2-221											
SB2-222					136.7&167.7						187.5&195.3
SB2-223											
SB2-224						154.9&168.3			165.1&170.9		187.5&195.3
SB2-225				211.9&209.9		154.9&168.3					
SB2-226											
SB2-227											
SB2-228					136.7&167.7						187.5&195.3
SB2-229		192.2&194.3			136.7&167.7						187.5&195.3
SB2-230											
SB2-231											
SB2-232		192.2&194.3							165.1&170.9		
SB2-233											
SB2-234											
SB2-235	22.6&212.6										
SB2-236		?		211.9&209.9							
SB2-237		192.2&194.3									
SB2-238					136.7&167.7						
SB2-239											
SB2-240		192.2&194.3									
SB2-241		192.2&194.3									
SB2-242			121&129							355.6&361.6	
SB2-243					136.7&167.7						
SB2-244				208.11 (?)	136.7&167.7						
SB2-245											
SB2-246											
SB2-247											
SB2-248											
SB2-249		192.2&194.3						237.1&250.7			
SB2-250											
SB2-251											
SB2-252											
SB2-253				?							189.28 (?)
SB2-254											
SB2-255		192.2&194.3									
SB2-256					136.7&167.7				165.1&170.9		
SB2-257		192.2&194.3									
SB2-258			121&129								
SB2-259										355.6&361.6	
SB2-260											
SB2-261		192.2&194.3									
SB2-262											
SB2-263				?		?					
SB2-264					136.7&167.7				165.1&170.9	355.6&361.6	
SB2-265								237.1&250.7			

Continued.

Table 4. Continued.

	RM 3288	RM3912	RM1108	RM1287	RM5575	RM6844	RM3828	RM1352	RM1335	RM233A	RM3585
SB2-266											
SB2-267											
SB2-268	223.43?										
SB2-269			121&129								
SB2-270		192.2&194.3				158.04(?)					
SB2-271											
SB2-272											
SB2-273										355.6&361.6	
SB2-274		192.2&194.3									
SB2-275	222.45?		124.96(?)		136.7&167.7	157.95(?)			165.1&170.9		187.5&195.3
SB2-276			124.92(?)	208.01(?)				242.59 (?)			
SB2-277										?	?
SB2-278											
SB2-279										355.6&361.6	
SB2-280					139 (?)						
SB2-281										355.6&361.6	
SB2-282				211.9&209.9					165.1&170.9		
SB2-283											
SB2-284							185.7&191.5			355.6&361.6	
SB2-285					136.7&167.7					?	?
SB2-286		192.2&194.3		210.79 (?)							
SB2-287		192.2&194.3									
SB2-288											
SB2-289											187.5&195.3
SB2-290								237.1&250.7			
SB2-291											
SB2-292											
SB2-293		192.2&194.3			136.7&167.7					355.6&361.6	
SB2-294				208.12 (?)					167.16 (?)		
SB2-295			121&129		136.7&167.7	154.9&168.3					
SB2-296											187.5&195.3
SB2-297					136.7&167.7						
SB2-298		192.2&194.3									
SB2-299										355.6&361.6	
SB2-300											
SB2-301					136.7&167.7						
SB2-302		192.2&194.3									
SB2-303		192.2&194.3			136.7&167.7						
SB2-304					136.7&167.7						
SB2-305				211.9&209.9							
SB2-306											
SB2-307		192.2&194.3			136.7&167.7						
SB2-308											
SB2-309											
SB2-310			121&129						165.1&170.9		
SB2-311		192.2&194.3	128.53(?)								
SB2-312					136.7&167.7						
SB2-313								237.1&250.7			187.5&195.3
SB2-314		192.2&194.3						246.52 (?)			
SB2-315											
SB2-316											
SB2-317										?	187.5&195.3
SB2-318		192.2&194.3									
SB2-319				207.93(?)					165.1&170.9		
SB2-320											
SB2-321											
SB2-322		192.2&194.3									
SB2-323		192.2&194.3									
SB2-324											
SB2-325					136.7&167.7						
CCDR	226.6	192.2	192.27		159.52 (?)						
CCDR				211.9	136.7&167.7						
MCR01277	212.6	194.3	194.41	209.9	136.7						
MCR01277											

Note:

? = Too much noise
Blank = Missing data
Red = Heterozygous

Purple = MCR allele
Yellow = Cocodrie allele
Grey = Non parental allele

INDUCED MUTATIONAL BREEDING AND ENHANCEMENT OF NUTRITIONAL QUALITY IN RICE

I. Wenefrida, S.D. Linscombe, and H.S. Utomo

Enhancing specific grain properties that will give outstanding health benefits will provide more marketable products and expand rice grain markets into processing industries. In the recent years, rice protein-based supplements are emerging products in the health-enhancement industry. Delivering high nutritional characteristics into new cultivars will accelerate the development of new markets for rice.

1. Protein content and field performance

Last year, new additional lines (612 lines) were successfully recovered from *in vitro* screening and other methods that were designed to increase the level of grain protein and/or lysine content in rice. The newly identified lines were evaluated in the field through replicated tests consisting of three replicated rows per entry. The first year of data indicated that 218 lines showed an increase in their total crude protein content, ranging from 5 to 96% of the parental protein content. Further tests will be conducted in the second growing season.

Replicated field trials have been conducted among 56 promising lines that were developed three years ago. Tables 1 and 2 show the average protein content and field performance of the 56 promising lines, respectively, based on two years of data.

Protein quantification: Total crude protein content was measured using brown and milled rice based on the dry combustion method using a Leco N Analyzer. In addition, Bradford's method and SDS-PAGE were used to reconfirm protein content in a sample of lines.

2. Preliminary yield trials

Replicated field tests were conducted on 635 new lines derived from Cypress, Cocodrie, and Trenasse. Preliminary yield trials were conducted among six promising lines (Table 3). Fertilizers were applied at 280 kg/ha (8-24-24) at preplant and 168 kg/ha (46-0-0) at the 3- to 4-leaf stage (before flooding). Seed samples were collected at maturity, dried in a dryer at 37°C for 3 days, and stored in a walk-in cooler at 2°C. Grain amino acid compositions were determined using amino acid analyzers with post-column, ninhydrin derivatization. N-tests were carried out among 30 lines. Four nitrogen fertilization regimes (112, 140, 168, and 196 kg/ha) were used to evaluate the effects of fertilization regimes on total protein contents in a randomized complete block design in a factorial treatment arrangement with four replications. A total of 30 protein lines were included in this test. Fertilizer was applied at the early stage of vegetative growth before permanent flood.

3. Amino acid quantification

Amino acid analyses were conducted on six selected high protein lines (Table 4) using Zhu and Galili's method. Briefly, 100 mg of seeds were ground to a powder in liquid nitrogen followed by hydrolysis in 6 M HCl for 22 h at 115°C. Amino acid analyses were performed by reversed-phase HPLC on a C-18 column (Waters, Milford, MA) using pre-column phenylisothiocyanate derivatization. Some samples were sent to a commercial laboratory for confirmation. The Beckman 6300 Amino Acid Analyzer with post-column, ninhydrin derivatization was used to analyze the 16 amino acids plus hydroxyproline and hydroxylysine, cyst(e)ine as cysteic acid, and tryptophan.

Table 1. Average protein content of 56 high protein lines.

No .	Plant ID	Total protein content	No.	Plant ID	Total protein content	No.	Plant ID	Total protein content
1	33493	13.74	21	298436	11.23	41	296627	10.74
2	296195	13.65	22	936454	11.23	42	32615	10.68
3	24505	13.54	23	32154	11.21	43	31249	10.60
4	31495	13.17	24	29835	11.15	44	296433	10.54
5	298437	13.11	25	296594	11.11	45	936192	10.51
6	296504	12.87	26	33408	10.97	46	264499	10.51
7	26503	12.50	27	02629	10.97	47	937188	10.46
8	32494	12.47	28	32572	10.93	48	016547	10.43
9	32566	12.25	29	31406	10.93	49	937590	10.39
10	33247	12.19	30	023506	10.93	50	020023	10.38
11	298253	12.18	31	32480	10.92	51	022541	10.36
12	296432	12.14	32	935593	10.92	52	020142	10.35
13	935456	12.03	33	296141	10.90	53	29834	10.35
14	937461	11.93	34	020509	10.85	54	Francis	8.67
15	296453	11.82	35	298502	10.80	55	Wells	8.76
16	298126	11.60	36	296597	10.79	56	Cypress	7.95
17	32170	11.55	37	021262	10.78			
18	02932	11.44	38	32407	10.77			
19	296201	11.43	39	298147	10.75			
20	3033	11.24	40	296234	10.75			

Table 2. Field performance of 56 high protein lines.

	Plant ID	Grain type and maternal line	Plant height (cm)	Heading date	Panicle weight (g)	Panicle Length (cm)	Row yield (g)
1	33493	L, WLLS	101	81	4.06	19.5	277.5
2	296195	L, CPRS	97	80	3.77	18.9	306.3
3	24505	L, CPRS	92	81	3.94	19.0	303.2
4	31495	L. WLLS	101	81	6.10	19.6	374.9
5	298437	L, WLLS	101	82	4.40	17.0	396.3
6	296504	L, CPRS	96	82	4.57	22.3	368.7
7	26503	L, CPRS	98	84	4.68	20.3	370.9
8	32494	L, WLLS	101	80	3.67	18.2	478.4
9	32566	L, WLLS	97	80	3.95	22.7	455.6
10	33247	L, WLLS	100	80	3.90	19.2	468.4
11	298253	L, WLLS	98	80	4.03	18.9.2	448.6
12	296432	L, CPRS	97	84	5.27	19.9.3	388.7
13	935456	L, FRNS	96	79	4.46	22.3	440.4
14	937461	L, FRNS	96	80	4.62	21.8	460.3
15	296453	L, CPRS	98	84	4.48	20.3	360.9
16	298126	L, WLLS	97	80	3.95	24.7	465.6
17	32170	L, WLLS	99	80	4.60	19.5	413.5
18	32029	L, WLLS	98	81	4.41	20.1	414.6
19	296201	L, CPRS	95	83	4.09	18.6	385.7
20	3033	L, WLLS	99	81	3.80	17.6	417.1
21	298436	L, WLLS	100	80	4.00	19.4	413.5
22	936454	L, FRNS	99	79	4.10	23.3	394.1
23	32154	L, WLLS	98	81	4.00	20.0	400.2
24	29835	L, WLLS	97	81	6.18	28.0	443.5
25	296594	L, CPRS	92	83	6.10	20.6	386.8
26	33408	L, WLLS	100	80	3.98	19.4	389.2
27	02629	L, CPRS	94	83	3.68	19.3	376.8
28	32572	L, WLLS	98	81	3.40	22.2	446.7
29	31406	L, WLLS	101	80	3.86	19.8	419.6
30	023506	L, CPRS	95	83	6.83	21.2	400.7
31	32480	L, WLLS	100	80	4.34	20.1	402.4
32	935593	L, FRNS	96	79	4.42	19.9	440.4
33	296141	L, CPRS	94	84	5.96	21.0	356.4
34	020509	L, CPRS	94	84	5.16	20.7	406.7
35	298502	L, WLLS	100	80	4.41	20.4	422.2
36	296597	L, CPRS	93	82	4.29	18.2	404.0

Continued.

Table 2. Continued.

	Plant ID	Grain type and maternal line	Plant height (cm)	Heading date	Panicle weight (g)	Panicle Length (cm)	Row yield (g)
37	021262	L, CPRS	90	82	3.60	19.5	400.9
38	32407	L, WLLS	101	80	3.56	19.0	449.3
39	298147	L, WLLS	98	80	3.93	23.4	402.2
40	296234	L, CPRS	90	83	3.68	21.0	405.5
41	023506	L, CPRS	94	83	3.68	19.7	389.8
42	296627	L, CPRS	94	83	4.48	20.1	377.6
43	32615	L, WLLS	98	80	4.23	18.5	446.9
44	31249	L, WLLS	99	79	3.55	18.4	412.4
45	296433	L, CPRS	92	83	6.83	29.0	386.9
46	936192	L, FRNS	99	81	4.02	20.3	439.6
47	264499	L, CPRS	96	79	4.24	19.0	420.4
48	937188	L, FRNS	97	81	3.92	19.3	429.8
49	016547	L, CPRS	90	82	4.32	20.4	336.7
50	937590	L, FRNS	101	79	4.40	19.9	421.2
51	020023	L, CPRS	94	84	3.71	24.0	401.2
52	022541	L, CPRS	95	83	5.32	21.4	346.7
53	020142	L, CPRS	94	83	7.20	16.1	396.4
54	29834	L, CPRS	93	82	4.90	19.3	413.5
55	Francis	L, FRNS	101	80	4.50	22.0	423.1
56	Wells	L, WLLS	100	79	4.31	20.0	432.2
57	Cypress	L, CPRS	93	83	3.58	19.3	381.4

Table 3. Preliminary yield trials of six high protein lines.

	Plant ID	Vigor	Days	Height (cm)	Yield (lb/A)	Milling Whole	Milling Total
1	Wells	3	78	109	5876	59.9	70.2
2	Cocodrie	3	75	96	5847	56.7	64.7
3	Cypress	6	80	99	5562	65.8	70.8
4	58072967	5	80	99	5429	62.4	69.5
5	58072969	5	81	96	4942	64.3	71.1
6	Cheniere	4	77	94	4656	64.2	71.7
7	580729610	6	79	96	3808	62.4	70.0
8	58072961	6	80	94	3613	63.2	69.8
9	58072963	6	80	91	3492	62.9	70.6
10	58072968	7	79	96	3217	59.8	67.6

Table 4. Amino acid composition of eight high protein rice lines.

	High protein lines							
Amino Acid	33493	296195	24505	31495	298437	32494	935456	936192
Threonine	0.44	0.45	0.41	0.40	0.44	0.46	0.39	0.37
Serine	0.63	0.66	0.60	0.74	0.63	0.66	0.57	0.51
Glutamine	2.36	2.39	2.28	2.44	2.32	2.42	1.96	1.98
Proline	0.58	0.30	0.79	0.90	0.31	0.33	0.53	0.45
Glycine	0.57	0.62	0.57	0.62	0.61	0.60	0.51	0.51
Alanine	0.74	0.77	0.80	0.87	0.76	0.79	0.64	0.63
Valine	0.75	0.75	0.75	0.79	0.72	0.76	0.57	0.65
Isoleucine	0.53	0.52	0.52	0.54	0.48	0.52	0.38	0.42
Leucine	1.09	1.09	1.09	1.16	1.06	1.10	0.86	0.87
Tyrosine	0.32	0.30	0.21	0.31	0.34	0.36	0.24	0.29
Phenylalanine	0.66	0.67	0.71	0.76	0.66	0.68	0.54	0.58
Lysine	0.51	0.46	0.42	0.52	0.46	0.48	0.38	0.39
Histidine	0.31	0.31	0.30	0.30	0.30	0.32	0.27	0.26
Arginine	1.05	1.03	0.91	1.03	0.98	1.10	0.83	0.87
Cystine	0.25	0.25	0.24	0.26	0.24	0.25	0.20	0.23
Methionine	0.33	0.35	0.33	0.35	0.33	0.35	0.28	0.30
Tryptophane	0.20	0.23	0.18	0.20	0.20	0.21	0.15	0.17

4. Sequence analysis of dihydropicolinate synthase (DHDPS) gene

Dihydrodipicolinate synthase (DHDPS, E.C. 4.2.1.52) catalyzes the first reaction of (S)-lysine biosynthesis in plants by condensing (S)-aspartate-β-semialdehyde ((S)-ASA) and pyruvate (Figure 1). DHDPS is strongly feedback inhibited by lysine in most plant species. Thus, deregulating the metabolic pathway through modification of the allosteric site of DHDPS plays a crucial role in increasing lysine synthesis. Rice lines that have elevated levels of lysine from this study are being used to examine if deregulating the pathway is associated with sequence changes in the gene coding for DHDP leading to less sensitivity to the lysine build-up. Efforts are underway to sequence the DHDPS gene from several high lysine lines. In other plants, a feedback insensitive version of DHDPS has shown to cause elevated amounts of lysine content. For example, the mutant *dhdps-r1* gene from *Nicotiana sylvestris* demonstrates that the gene encoding a feedback insensitive DHDPS is responsible for the elevated level of lysine. A bacterial DHDPS gene, isolated from *E. coli*, has been shown to be at least 20-fold less sensitive to increases in lysine levels. The gene coding for DHDPS in rice is composed of 1411 bps. A portion of this proposed project was focused on identifying mutational sites in the gene coding for DHDPS in two high lysine rice lines. A portion of DHDPS genes from two sister lines of Cypress-derived lines (Figures 2 and 3), a Francis-derived line (Figure 4), and a Wells-derived line (Figure 5) was sequenced.

5. Development of mapping population

A mapping population is being developed in cooperation with the marker-assisted selection project. The mapping population will be used to identify QTL regions associated with high grain protein content. To obtain high accuracy in QTL mapping, parental lines that demonstrated a wide range of measurable differences possible for protein content were selected and used in the cross. Two most extreme parental lines that have the highest and the lowest protein content were chosen, i.e. CIor 3773-Pulutan that has 2.8% grain protein content and CY504, 12.5%. With this level of differences, progeny lines in the mapping population from a cross between these two lines are expected to exhibit a wide array of grain protein contents. Such a wide difference might provide an opportunity to reduce phenotyping error and subsequently can increase QTL mapping accuracy. Currently, a mapping population derived from a CIor 3773-Pulutan/CY504 cross that is composed of 398 F_3 lines has been obtained through a single seed decent. This mapping population will be further advanced to achieve F_7 generation before used in gene mapping analyses.

Figure 1. Dihydrodipicolinate synthase (DHDPS) and lysine synthesis pathway [Galili et al. (2006)].

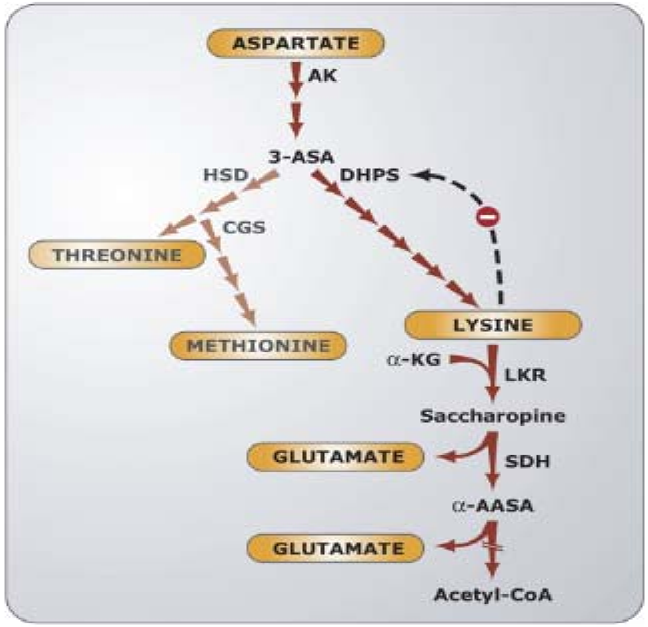


Figure 2. Partial sequence DHDPS gene from 506-PR-1-1-G8 (Cypress-derived line).

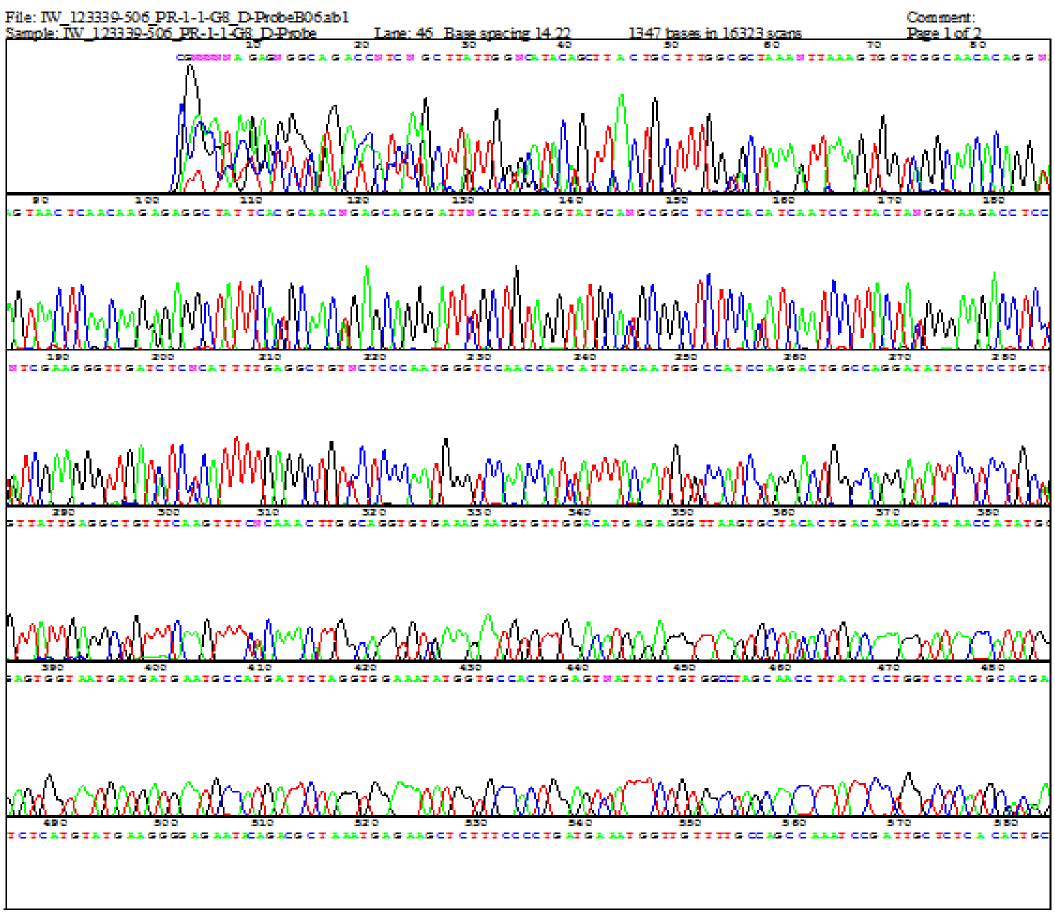


Figure 3. Partial sequence DHDPS gene from 505-PR-1-1-E8 (Cypress-derived line).

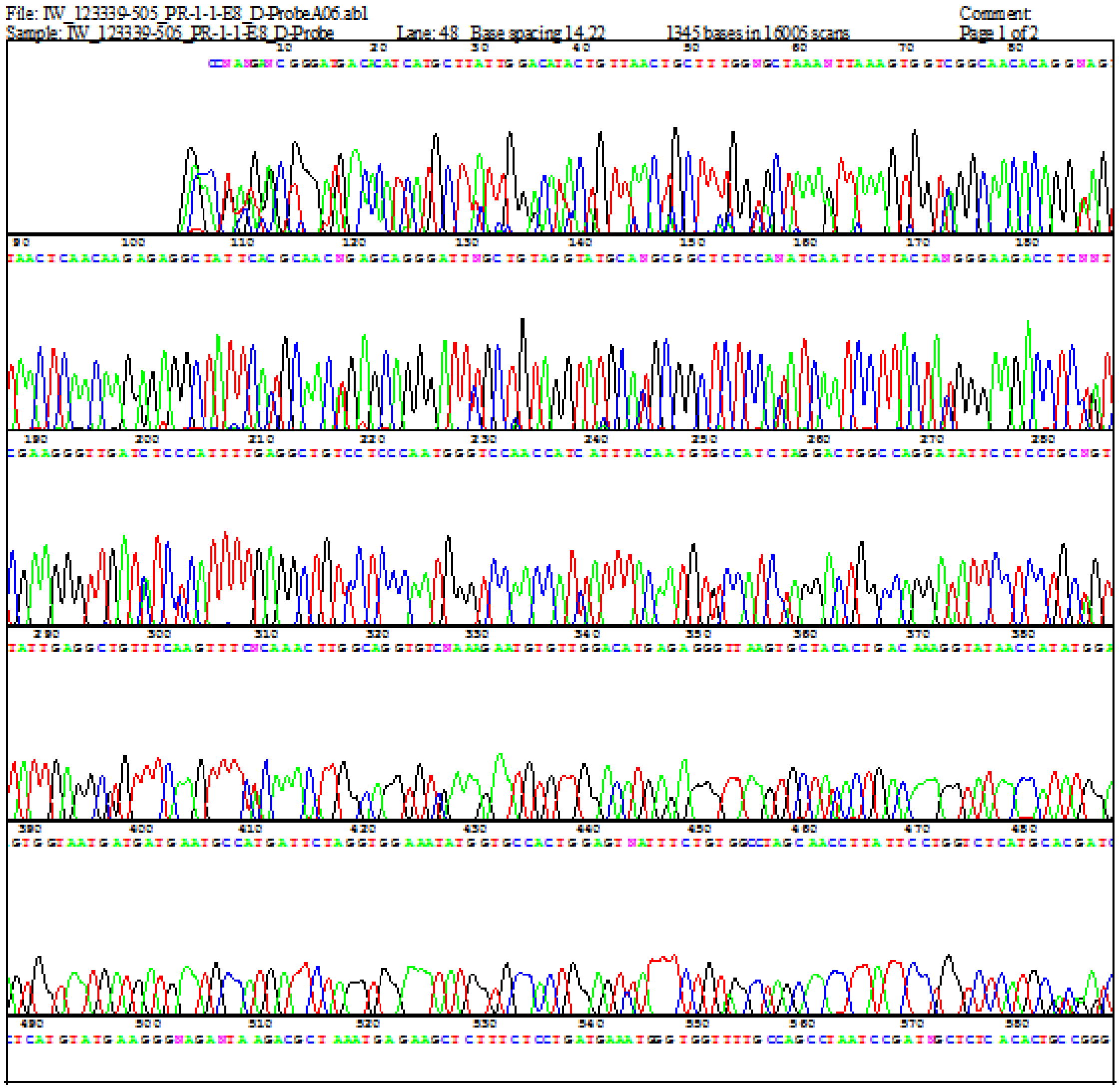


Figure 4. Partial sequence DHDPS gene from 502-939-506 (Francis-derived line).

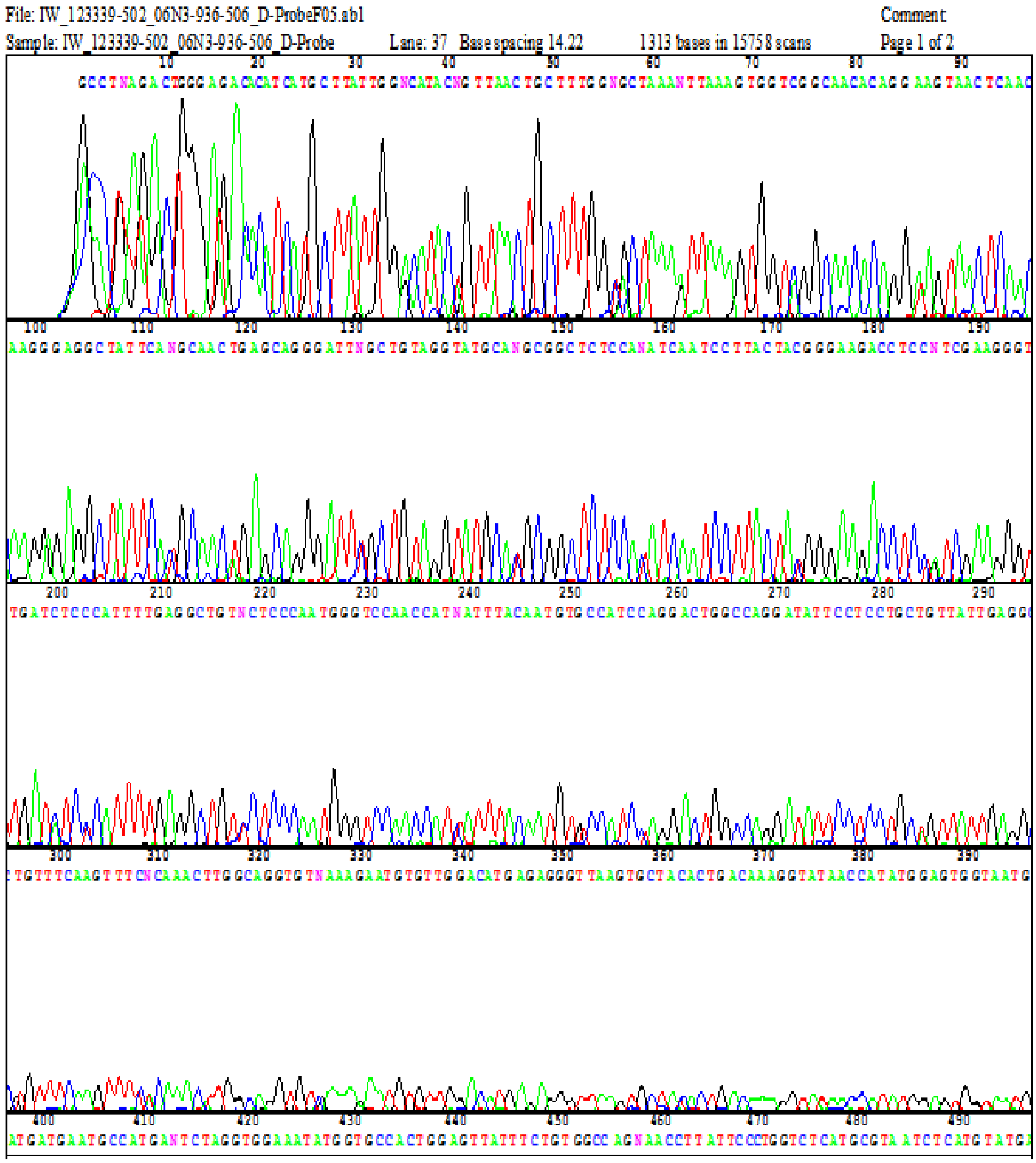
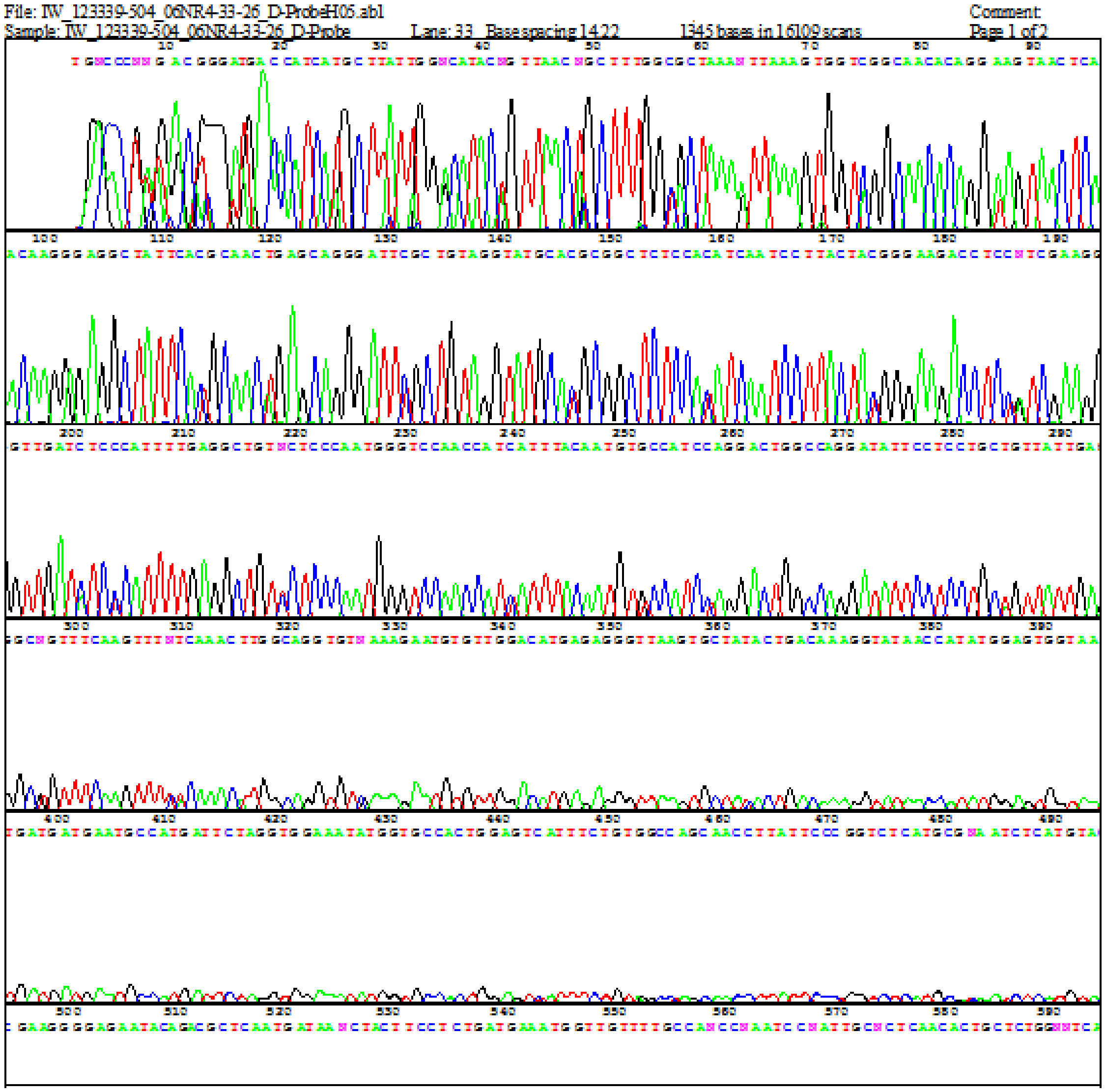


Figure 5. Partial sequence DHDPS gene from 504-33-26 (Wells-derived line).



RICE AGRONOMY[1]

D.L. Harrell, J.P. Leonards, R.P. Regan, and D.M. Walker

INRODUCTION

The following two sections of the report document research conducted in rice plant nutrition and cultural management. Rice plant nutrition and cultural management studies were conducted at the LSU AgCenter Rice Research Station and multiple off-station locations in an effort to generate agronomic production information representative of all Louisiana rice production areas. Rice nutrition studies were conducted in Acadia Parish at the Rice Research Station and on cooperator farms located in Vermilion, Richland, and Morehouse parishes. Cultural management studies were conducted at the Rice Research Station and on on-farm locations in Evangeline, Morehouse, Richland, and Vermilion parishes.

We would like to express our sincere appreciation to the following off-station cooperators for their assistance in conducting this research. Our efforts would not be successful without their support:

Lounsberry Farms – Vermilion Parish
Christian Richard – Vermilion Parish
Roland Crymes and Zaunbrecher Farms – Morehouse Parish
Woodlands Plantation – Richland Parish
Larry and Kody Bieber – Evangeline Parish

Throughout the following sections, multiple abbreviations are used to represent common units of measure and agricultural chemicals. These abbreviations are explained below in Tables 1 and 2, respectively.

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

Table 1. Common abbreviations used in agronomic research at the Rice Research Station.

Abbreviation	Explanation
A	Acre
Ca	Calcium
COC	Crop oil concentrate
Cu	Copper
cwt	Hundredweight
DAT	Days after treatment
DPP	Days prior to planting
Fe	Iron
ft	Feet
ft^2	Square feet
gal/A	Gallons product per acre
Head Rice	Percent unbroken kernels left after milling
in	Inches
lb	Pounds
lb/A	Pounds product per acre
LB A/A	Pounds active ingredient per acre
Ldg-Rate	Lodging rate in percent
Ldg-Type	Lodging type on a scale from 0 to 5 where 0 = no lodging, 1 = slightly lodged (approximately 1 - 23^o angle) and 5 = lodged to ground (90^o angle)
K	Potassium
Main	First rice crop; crop growth stage prior to first harvest
Mg	Magnesium
N	Nitrogen
Na	Sodium
NA	Information not avaliable/applicable
oz/A	Ounces product per acre
P	Phosphorus
PD	Panicle differentiation
PI	Panicle initiation
pl/m^2	Plant densities measures 14 days after seeding emergence by counting the main-stem numbers in a randomly selected area of 1 m^2 in each plot
Postharvest	Application applied immediately following main crop harvest
ppm	parts per million
PRE	Application prior to crop emergence
PF	Preflood application applied 1 to 2 days prior to permanent flood establishment
Preplant	Preplanting application prior to flooding and seeding
pt/A	Pints product per acre
Ratoon	Second rice crop growth after harvest of first (main) crop
RRS	Rice Research Station, Crowley, LA
S	Sulfur
SB Severity	Sheath blight investation on a scale from 1 to 9; Where 1 = no sheath blight and 9 = severe sheath blight infestation
Total Mill	Percent of rice kernels left after milling
Zn	Zinc
5% Heading	Crop growth stage where 5% of plants within a plot have visiable panicles
50% Heading	Number of days from effective seeding date to 50% panicle exertion

Table 2. Common crop protection chemicals and formulations used in agronomic research at the Rice Research Station.

Trade Name	Common Name	Formulation	Company
Herbicides			
Aim	Carfentrazone-ethyl	21.3%	FMC Corp.
Arrosolo	Propanil + molinate	3 lb + 3 lb	RiceCo
Basagran	Bentazon	4 lb	BASF
Clincher	Cyhalofop	2.38 lb	Dow Agro Science LLC
Command	Clomazone	3ME	FMC Corp.
Duet	Propanil + bensulfuron	4 lb + 0.48 oz	RiceCo
Facet	3,7-dichloro-8-quinolinecarboxylic acid	75%	BASF
Grandstand R	Triclopyr	3 lb	Dow AgroSciences
Grasp	Penozsulam	2 lb	Dow AgroSciences
Honcho	Glyphosate	5 lb	Monsanto
Liberty	Glufosinate ammonium	18.19%	Bayer CropScience
Londax	Bensulfuron	60% DF	DuPont
Newpath	Imazethapyr	2 lb	BASF
Permit	Halosulfuron	75% WSG	Monsanto
Regiment	Bispyribac-sodium	80% DF	Valent USA
Roundup Weatherman	Glyphosate	4 lb	Monsanto
Stam M4	Propanil	4 lb	Dow Agro Science LLC
Stelth	Pendimethalin	3.3 lb	Loveland Products
Weedar 64	2,4-D	3.8 lb	Aventis
Insecticides			
Icon	Fipronil	6.2 FS	Aventis
Karate Z	Cyhalothrin	2.08 lb	Syngenta
Mustang Max	Zeta-cypermethrin	0.8	FMC Corp.
Steward	Indoxacarb	1.25 lb	DuPont
Trebon 3G	Etofenprox		Mitsui Chemicals America
Fungicides			
Dithane DF	Mancozeb	75% DF	Dow Agro Science LLC
Quadris	Azoxystrobin	2.08 lb	Syngenta
Quilt	Azoxystrobin + Propiconazole	1.04 + 0.62 lb, respectively	Syngenta
Stratego	Propiconazole + Trifloxystrobin	1.04 + 1.04 lb	Bayer CropScience
Uppercut	Tebuconazole	38.7%	DuPont

RICE NUTRITION RESEARCH

D.L. Harrell, J.P. Leonards, R.P. Regan, and D.M. Walker

Variety/Hybrid by Nitrogen Rate and Application Timing Experiments

Variety and hybrid by nitrogen (N) experiments are conducted yearly throughout Louisiana to establish N requirements for new commercial varieties, advanced experimental lines, and hybrids. Rice varieties and hybrids vary in their response to N rate and timing of application. These varietal N response differences can be attributed to several factors, including such traits as lodging, disease susceptibility, and N uptake efficiency. Environmental influences also impact the N rate needed to produce optimum yields. These include such factors as soil type, weather, disease, and insect pressure. For this reason, trials are conducted not only at the Rice Research Station in Crowley but also at cooperator sites in Vermilion and Richland parishes. Rates of N range from 0 to 210 lb/A utilizing both the single preflood and split applications. The N requirement, days to 50% heading, lodging susceptibility, and plant height are all determined. Ratoon data is also determined for trials in southwest Louisiana. A minimum of three years for each variety are needed before final recommendations are established. These recommendations can be found in Rice Varieties and Management Tips 2008, LAES publication number 2270. Electronic copies of this publication can be accessed from the LSU AgCenter Web site: (http://www.lsuagcenter.com).

Three rice varieties (CL171, Spring, and Trenasse), two advanced experimental lines (LA2082 and LA2028), and four commercial hybrids (XP744, CLXL729, CLXL730, and CLXL745) were evaluated in both conventional and no-till drill-seeded systems. Yields at the Rice Research Station were greater than those at both Vermilion Parish and Richland Parish sites. The four commercial hybrids generally outyielded all non-hybrid cultivars. All Clearfield hybrid by N trials at all locations received NewPath herbicide prior to permanent flood establishment.

At the Rice Research Station, all variety by N trials were drill seeded into a conventionally tilled seedbed. Optimum N rates for CL171, Spring, Trenasse, LA2082, CLXL730, and XP744 were 150 lb/A. Hybrids CLXL745 and CLXL729 were optimized at a rate of 120 lb/A. LA2028, the only medium grain tested in the trials, was optimized at the 180 lb N/A rate.

At the Vermilion Parish site, all variety by N trials were drill seeded into a conventionally tilled seedbed. The site had strong disease pressure throughout the season. This pressure may have contributed to the modest grain yield response from the various N fertilization rates of all cultivar and hybrid by N trials at the location. Determination of an optimum N rate from these trials may be unreliable. Nonetheless, the highest yielding N rate for CL171, Spring, Trenasse, and LA2082 was 90 lb/A. Grain yield for LA2028 was maximized at 120 lb/A.

At the Richland Parish site, all variety by N trials were no-till drill seeded into soybean stubble. When the rice was at or near the 2- to 3-leaf stage, the field was slightly damaged by glyphosate drift. The Spring trial was affected the most by the drift resulting in a high CV for the trial. The optimum N rate for Trenasse, LA2028, XP744, CLXL729, and CLXL730 was 90 lb/A. LA2082 and CLXL745 were both optimized at 150 lb/A.

Nitrogen Source and/or Application Timing Experiments

A study was conducted to evaluate the effectiveness of a slow release granular N fertilizer and urea coated with a urease inhibitor for use in rice production. The slow-release granular fertilizer is marked as Nitamin® 43G and is modified urea coated with a formaldehyde resin. The urease inhibitor is marked as Agrotain®, and is sold as a liquid to be applied onto urea. The active ingredient in Agrotain® is NBPT. Three N sources (Agrotain-treated urea, 43G, and urea) and two application timings [7 days preflood (7DPF) and 1 day preflood (1DPF)] were used in the study. At the 1DPF timing, the rice fertilized with urea had significantly higher grain yields as compared with those fertilized with both Agrotain® and Nitamin 43G®. The plots fertilized with the Agrotain®-treated urea significantly outyielded both the urea and Nitamin 43G® fertilized plots at the 7 DPF application timing.

A study was conducted to evaluate liquid N sources as a potential midseason N source. Two liquid N sources were used in the study, a 30 and 25% N solution. Urea fertilizer was used as the control for the experiment. Initial preflood N was applied at 105 lb/A. Midseason N applications were made at an equivalent rate of 45 lb/A. Rice fertilized with urea significantly out yielded the 25 and 30% N solutions by 819 and 533 lb/A, respectively.

Other Fertility Experiments

Two phosphorus (P) fertilizer rate trials were conducted to help in the calibration of the Mehlich3 soil test extraction. One trial was located at the Rice Research Station near Crowley, LA, and the other was located in Morehouse Parish near Jones, LA. The soil at the Jones location is classified as a Perry clay while the soil at the Station is classified as a Crowley silt loam. Triple superphosphate was used as the P fertilizer source and was broadcast on the surface at planting. Rates of P were applied in 20-lb increments, ranging from 0 to 100 lb P_2O_5/A. Cocodrie was drill seeded to a conventionally tilled seedbed at both locations. Initial soil test P was 30 and 21 ppm at the Rice Research Station and the Jones location, respectively. A significant grain yield response was not observed at either location confirming that the Mehlich3 critical soil test level is below 21 ppm. Future test locations need to be located with lower soil test P levels to continue this research.

Three zinc (Zn) fertilization trials were conducted in 2007. The objective of the trials was to help in the calibration of the Melich-3 soil test for Zn. Locations included the Rice Research Station, Morehouse Parish, and Vermilion Parish site near Abbeville, LA. The soils for the Rice Research Station and the Morehouse Parish site are as described above. The soil at the Vermilion Parish site is classified as a Kaplan silt loam series. Initial soil test Zn levels were 6.8, 4, and 0.5 ppm at the Rice Station, Morehouse Parish, and Vermilion Parish sites, respectively. Zn was applied in furrow at planting as Zn sulfate at the Rice Station and Jones Parish sites. Rates of Zn ranged from 0 to 20 lb Zn/A in 5-lb increments. Elemental sulfur (S) was also applied to balance the S contained in the Zn sulfate fertilizer. Zinc sulfate fertilizer was surface broadcast at the Vermilion Parish site prior to permanent flood establishment. A Zn response was not observed at any of the locations in 2007. This was easily explained at the Rice Station and Morehouse Parish sites because initial soil test Zn levels were above the current soil test Zn critical level of 1 ppm. However, a Zn response was expected at the Vermilion Parish site. The lack of response at the Vermilion Parish site may be explained by the P fertilizer source used by the cooperator, which was found to be treated with Zn. Fertilizer Zn levels from the P fertilizer were calculated to be approximately 5 lb Zn/A using this application rate. This study will be repeated in 2008 using untreated P fertilizer. A Zn fertilizer response is expected.

A trial was conducted to evaluate the effectiveness of the humic acid product HydraHume in rice production. The trial was located at the Morehouse Parish site near Jones, LA. The study had three rates of HydraHume (0, 10, and 40 lb/A) and two rates of 0-24-24 fertilizer (0 and 250 lb/A). A yield response was not observed for any of the treatments.

Two trials were conducted to evaluate the effectiveness of granular and liquid starter fertilizers in a Clearfield system. The first trial evaluated a conventional long-grain variety, CL171, and the second trial evaluated the hybrid CLXL730. Treatments included two granular fertilizer sources, ammonium sulfate (AS) and diammonium phosphate (DAP), and two liquid fertilizer sources, ammonium thiosulfate (ATS) and ammonium polyphosphate (APP), and one untreated control (UTC). Two N rates were used, 10 and 20 lb/A. Both liquid N sources were tank-mixed with NewPath herbicide at 9 oz/A. A statistical plant height difference was observed at the 2- to 3-leaf stage for CL171 when AS was applied at the 20 lb/A N rate over the UTC. DAP applied at both N rates was statistically taller at the 2- to 3-leaf stage compared with the UTC in the CL171 trial. A yield response was not observed for any starter fertilizer in both the CL171 and CLXL730 trials.

Ratoon Rice Fertility Experiments

Two trials evaluated the ratoon response to main crop stubble manipulation. Stubble manipulation treatments included cutting at standard harvest height, flail mowing, rolling, and harvesting at 12 in. The first trial evaluated the hybrids CLXL729 and XP723. In this trial, days to 50% heading was delayed when flail mowing or rolling as compared with standard cutting height for both hybrids. A ratoon yield response was not observed for either hybrid. The second trial evaluated the varieties Cocodrie and Trenasse. In this trial, days to 50% heading was delayed when flail mowing and rolling as compared with standard cutting heights. A statistical yield advantage was seen for the standard cutting height as compared with rolling for the Trenasse variety. No other significant yield differences were observed.

A trial was conducted to evaluate the response of Cocodrie and Trenasse ratoon yields to various N sources and rates. N sources included urea, AS, and a 1:1 N based blend of urea and AS. Rates of N were 45, 90, and 135 lb/A. Both Cocodrie and Trenasse grain yields were optimized at an N rate of 90 lb/A when urea or the AS/urea blend was used. Ratoon grain yields were optimized at an N rate of 135 lb/A when AS was used as the N source.

Two rice hybrids, XP723 and CLXL729, were evaluated for their ratoon yield response to four postharvest N rates. Rates were 60, 90, 120, and 150 lb N/A applied as urea immediately after harvest. Ratoon grain yields for XL723 were significantly increased by approximately 590 lb/A between the 60 and 90 lb N/A rates. Higher N rates above 90 lb N/A did not increase ratoon rice yields. Ratoon grain yields for CLXL729 were optimized at 60 lb N/A.

Cocodrie and Trenasse ratoon rice yields were evaluated for their response to various N application rates applied immediately after main crop harvest. Nitrogen rates of 60, 90, 120, and 150 lb/A, applied as urea, were used in the study. The optimum ratoon N rate for both varieties was 60 lb N/A.

Nitrogen application timing for ratoon rice production was evaluated for two rice varieties, Cocodrie and Trenasse. Nitrogen was applied at 90 lb/A at one of six different application timings: 1) main crop heading, 2) 7 days prior to draining, 3) main crop harvest, 4) a 60/30 split between heading and harvest, 5) a 60/30 split between 7 days prior to draining and harvest, or 6) 60/30 split between harvest and 21 days after harvest. Nitrogen applied at main crop harvest provided the highest grain yield for Trenasse, while N applied with a 60/30 split between harvest and 21 days after harvest provided the highest grain yield for Cocodrie.

A trial was conducted to evaluate the ratoon yield response to P and K applications after main crop harvest. A factorial arrangement of three K rates (0, 30, and 60 lb/A) and three P rates (0, 30, and 60 lb/A) were used in the experiment. A significant ratoon yield increase was not seen for any of the treatment combinations.

Zn fertilization after main crop harvest was evaluated for its responsiveness to ratoon rice yields. Rates of Zn were 0, 5, 10, 15, and 20 lb/A applied as Zn sulfate. Sulfur (S) was applied as elemental S to balance the units of S received by each plot. This was done in an effort to ensure that if a yield response was observed, that it was due to Zn and not S. Nonetheless, a Zn ratoon yield response was not observed in 2007.

Rice Variety by Nitrogen Experiments at the Rice Research Station

Experiment number ....: 07-CM-08 – 07-CM-12

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 6.9
- **Extractable nutrients** ....: Ca-1,171; Cu-1.6; Mg-210; P-13.5; K-71.9; Na-65.2; S-6.3; Zn-6.6

Crop/Variety ....: Rice / CL171AR
- **Planting method/date** ....: Drill seeded / March 20
- **Seeding rate/depth** ....: 40 seeds/ft^2 / 1 in
- **Emergence date** ....: March 28
- **Harvest date** ....: August 7; Ratoon harvest, October 24

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 20
1 qt/A Zinc Plus, May 1
90 lb N/A 46-0-0, August 7

Water management ....:
- **Flush** ....: March 28, April 20
- **Flood** ....: May 3; Ratoon flood, August 8
- **Drain** ....: July 17; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** ....: 4 oz/A Karate, May10
4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 3. CL171AR Nitrogen Rate Validation 1.1 (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/7/2007		10/24/2007	10/24/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield	Yield
Rating Unit				days	in	lb/A	days	lb/A	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon	Total
Trt No.	Rate Rate Unit	Growth Stage	Appl Description						
1	0 LB A/A	4-5 leaf	Preflood	97 b	25 g	1850 e	30 g	1983 a	1990 a
2	30 LB A/A	4-5 leaf	Preflood	97 b	31 f	3708 d	37 f	2162 a	2175 a
3	60 LB A/A	4-5 leaf	Preflood	97 b	34 e	5632 c	39 ef	2275 a	2294 a
4	90 LB A/A	4-5 leaf	Preflood	97 b	36 cde	6927 b	42 cd	2539 a	2563 a
5	120 LB A/A	4-5 leaf	Preflood	98 b	37 bcd	7716 b	45 bc	1921 a	1948 a
6	150 LB A/A	4-5 leaf	Preflood	100 a	39 ab	8820 a	46 ab	2427 a	2458 a
7	180 LB A/A	4-5 leaf	Preflood	101 a	41 a	8703 a	49 a	2347 a	2377 a
8	210 LB A/A	4-5 leaf	Preflood	102 a	40 a	9243 a	49 a	2282 a	2314 a
9	45 LB A/A	4-5 leaf	Preflood	97 b	35 de	5768 c	39 def	2090 a	2109 a
	45 LB A/A	PD	Midseason						
10	75 LB A/A	4-5 leaf	Preflood	97 b	37 bcd	7245 b	41 de	2584 a	2609 a
	45 LB A/A	PD	Midseason						
11	105 LB A/A	4-5 leaf	Preflood	98 b	38 abc	8551 a	42 cd	2294 a	2323 a
	45 LB A/A	PD	Midseason						
12	135 LB A/A	4-5 leaf	Preflood	100 a	39 ab	8997 a	46 ab	2206 a	2237 a
	45 LB A/A	PD	Midseason						
LSD (P=.05)				1.6	1.8	690.4	2.3	509.7	510
Standard Deviation				1	1.1	478.1	1.3	353	353.2
CV				0.98	2.96	6.9	3.16	15.62	15.47
Replicate F				13.033	4.287	1.865	13.563	1.181	1.175
Replicate Prob(F)				0.0002	0.0268	0.1548	0.0001	0.3319	0.334
Treatment F				11.37	48.452	93.703	50.67	1.322	1.367
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.2561	0.234

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 4. Spring Nitrogen Rate Validation 3.1 (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/7/2007		10/24/2007	10/24/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield	Yield
Rating Unit				days	in	lb/A	days	lb/A	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon	Total
Trt No.	Rate Rate Unit	Growth Stage	Appl Description						
1	0 LB A/A	4-5 leaf	Preflood	93 a	25 f	1401 f	28 b	1114 b	2350 e
2	30 LB A/A	4-5 leaf	Preflood	92 a	31 e	2612 e	28 b	1604 ab	4216 d
3	60 LB A/A	4-5 leaf	Preflood	92 a	33 e	4627 d	34 a	1851 ab	6478 c
4	90 LB A/A	4-5 leaf	Preflood	93 a	37 cd	6136 c	37 a	1895 ab	8031 b
5	120 LB A/A	4-5 leaf	Preflood	93 a	40 ab	7093 b	37 a	2154 a	9247 ab
6	150 LB A/A	4-5 leaf	Preflood	93 a	39 abc	7845 ab	37 a	2313 a	10158 a
7	180 LB A/A	4-5 leaf	Preflood	94 a	41 a	7549 ab	37 a	1491 ab	9041 ab
8	210 LB A/A	4-5 leaf	Preflood	94 a	41 a	8281 a	37 a	2166 a	10447 a
9	45 LB A/A	4-5 leaf	Preflood	92 a	35 d	4838 d	37 a	1936 ab	6774 c
	45 LB A/A	PD	Midseason						
10	75 LB A/A	4-5 leaf	Preflood	92 a	37 bcd	6309 c	37 a	2116 a	8425 b
	45 LB A/A	PD	Midseason						
11	105 LB A/A	4-5 leaf	Preflood	93 a	39 abc	7268 b	37 a	2008 a	9275 ab
	45 LB A/A	PD	Midseason						
12	135 LB A/A	4-5 leaf	Preflood	93 a	40 a	7523 ab	37 a	1923 ab	9446 ab
	45 LB A/A	PD	Midseason						
LSD (P=.05)				1.3	2	673.6	2.6	537.8	967.3
Standard Deviation				0.8	1.2	466.5	1.5	372.5	669.9
CV				0.86	3.23	7.83	4.31	19.8	8.56
Replicate F				2.147	0.06	1.23	0.881	0.51	1.189
Replicate Prob(F)				0.1406	0.9418	0.3142	0.4283	0.6781	0.3294
Treatment F				2.817	47.497	87.023	15.789	3.239	54.171
Treatment Prob(F)				0.0186	0.0001	0.0001	0.0001	0.0046	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 5. Trenasse Nitrogen Rate Validation 4.1 (Rice Research Station).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/6/2007	8/7/2007		10/24/2007	10/24/2007
Rating Data Type					50% Head	Height	Yield	50% Head	Yield	Yield
Rating Unit					days	in	lb/A	days	lb/A	lb/A
Sample Size Unit										
Crop Stage					Main	Main	Main	Ratoon	Ratoon	Total
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description						
1	0	LB A/A	4-5 leaf	Preflood	93 c	27 e	1994 f	20 d	1333 e	3328 g
2	30	LB A/A	4-5 leaf	Preflood	93 c	30 d	3262 e	20 d	1756 d	5018 f
3	60	LB A/A	4-5 leaf	Preflood	94 bc	33 c	5406 d	29 c	2028 cd	7434 e
4	90	LB A/A	4-5 leaf	Preflood	95 abc	35 bc	7396 c	34 ab	2158 bcd	9554 d
5	120	LB A/A	4-5 leaf	Preflood	96 ab	37 ab	8141 bc	35 ab	2272 bc	10412 cd
6	150	LB A/A	4-5 leaf	Preflood	96 ab	37 ab	9259 a	36 a	2660 ab	11919 ab
7	180	LB A/A	4-5 leaf	Preflood	96 abc	38 a	9624 a	35 ab	2337 bc	11962 ab
8	210	LB A/A	4-5 leaf	Preflood	97 a	39 a	9981 a	35 ab	2824 a	12806 a
9	45	LB A/A	4-5 leaf	Preflood	94 c	33 c	5780 d	31 bc	2087 cd	7867 e
	45	LB A/A	PD	Midseason						
10	75	LB A/A	4-5 leaf	Preflood	94 bc	35 bc	7503 c	33 ab	2236 bcd	9739 d
	45	LB A/A	PD	Midseason						
11	105	LB A/A	4-5 leaf	Preflood	95 abc	36 ab	8835 ab	35 ab	2362 bc	11196 bc
	45	LB A/A	PD	Midseason						
12	135	LB A/A	4-5 leaf	Preflood	96 abc	36 ab	9720 a	35 ab	2516 abc	12236 ab
	45	LB A/A	PD	Midseason						
LSD (P=.05)					1.4	1.9	840.5	2.7	343.3	997.7
Standard Deviation					0.8	1.1	582.1	1.6	237.8	691
CV					0.89	3.3	8.04	4.95	10.74	7.31
Replicate F					19.534	3.188	9.598	6.265	17.243	15.793
Replicate Prob(F)					0.0001	0.0608	0.0001	0.007	0.0001	0.0001
Treatment F					6.477	28.875	81.245	40.918	11.207	75.54
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 6. Advanced Experimental Line LA2082 Nitrogen Rate Validation 2 (Rice Research Station).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/6/2007	8/7/2007		10/24/2007	10/24/2007
Rating Data Type					50% Head	Height	Yield	50% Head	Yield	Yield
Rating Unit					days	in	lb/A	days	lb/A	lb/A
Crop Stage					Main	Main	Main	Ratoon	Ratoon	Total
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description						
1	0	LB A/A	4-5 leaf	Preflood	95 d	27 f	1850 f	24 c	1669 c	3571 f
2	30	LB A/A	4-5 leaf	Preflood	96 cd	29 ef	3089 e	30 b	2117 b	5206 e
3	60	LB A/A	4-5 leaf	Preflood	96 cd	31 de	5011 d	36 a	2181 ab	7192 d
4	90	LB A/A	4-5 leaf	Preflood	97 bcd	34 cd	6339 c	37 a	2445 ab	8784 c
5	120	LB A/A	4-5 leaf	Preflood	98 bc	36 abc	7460 b	37 a	2437 ab	9898 b
6	150	LB A/A	4-5 leaf	Preflood	99 b	39 ab	8170 ab	37 a	2521 ab	10691 ab
7	180	LB A/A	4-5 leaf	Preflood	101 a	39 a	8325 ab	37 a	2626 a	10951 ab
8	210	LB A/A	4-5 leaf	Preflood	102 a	39 a	8867 a	37 a	2556 ab	11423 a
9	45	LB A/A	4-5 leaf	Preflood	96 cd	33 cd	5360 d	35 a	2231 ab	7589 d
	45	LB A/A	PD	Midseason						
10	75	LB A/A	4-5 leaf	Preflood	97 bcd	35 bcd	6502 c	37 a	2417 ab	8919 c
	45	LB A/A	PD	Midseason						
11	105	LB A/A	4-5 leaf	Preflood	97 bcd	35 bcd	7534 b	37 a	2519 ab	10053 b
	45	LB A/A	PD	Midseason						
12	135	LB A/A	4-5 leaf	Preflood	99 b	36 abc	8327 ab	37 a	2431 ab	10758 ab
	45	LB A/A	PD	Midseason						
LSD (P=.05)					1.6	2.9	683.7	2	299	814.2
Standard Deviation					0.9	1.7	473.5	1.2	207.1	563.9
CV					0.97	4.91	7.39	3.3	8.83	6.44
Replicate F					4.705	0.937	6.513	2.424	1.043	5.349
Replicate Prob(F)					0.0199	0.407	0.0015	0.1119	0.3874	0.0044
Treatment F					14.912	14.802	87.169	36.39	6.491	75.465
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 7. Advanced Experimental Line LA2028 Nitrogen Rate Validation 2.1 (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/7/2007	8/7/2007		10/24/2007	10/24/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield	Yield
Rating Unit				Days	IN	lb/A	Days	lb/A	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon	Total
Trt No. Rate	Rate Unit	Growth Stage	Appl Description						
1 90	LB A/A	4-5 leaf	Preflood	101 a	33 b	6611 c	40 a	2494 a	9105 c
2 120	LB A/A	4-5 leaf	Preflood	101 a	34 b	7858 b	41 a	2618 a	10476 b
3 150	LB A/A	4-5 leaf	Preflood	101 a	34 b	8211 b	41 a	2688 a	10899 ab
4 180	LB A/A	4-5 leaf	Preflood	101 a	37 a	9257 a	44 a	2766 a	12023 a
LSD (P=.05)				0.6	1.1	899.2	3	493.6	1156.8
Standard Deviation				0.3	0.6	562.2	1.5	308.6	723.2
CV				0.29	1.61	7.04	3.67	11.68	6.81
Replicate F				1	13.364	2.888	0.036	1.157	2.238
Replicate Prob(F)				0.4219	0.0062	0.0948	0.9647	0.3783	0.1531
Treatment F				1	25	15.074	3.602	0.559	11.116
Treatment Prob(F)				0.4547	0.0009	0.0007	0.0851	0.6555	0.0022

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Variety by Nitrogen Experiments at Vermilion Parish

Experiment number ....: 07-VP-03 – 07-VP-07

Site and design ....:
- **Location/Cooperator** ....: Vermilion Parish / Lounsberry Farm
- **Tillage type**.................................: Conventional
- **Experimental design**...................: Randomized complete block
- **Number of reps**...........................: 4
- **Plot size**..: 7 x 20 ft
- **Row width/rows per plot**............: 7 in / 12

Soil type ....: Kaplan silt loam
- **% organic matter**........................: NA
- **pH**...: 4.9
- **Extractable nutrients**.................: Ca-678; Cu-0.7; Mg-103; P-22.4; K-95.2; Na-33.7; S-7.4; Zn-2.2

Crop/Variety ....: Rice / CL171AR
- **Planting method/date** ....: Drill seeded / March 21
- **Seeding rate/depth**......................: 40 seeds/ft^2 / .75 in
- **Emergence date**...........................: March 27
- **Harvest date** ....: August 2

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization..: 195 lb/A 0-24-24-2.5, March 21

Water management ....:
- **Flush** ....: By rain
- **Flood** ....: April 21
- **Drain**..: July 13

Pest management...............................:
- **Herbicides**....................................: 3 qt Arrosolo, April 6
3 qt Arrosolo + 2.8 oz Grasp + 1 oz Permit, April 19
- **Insecticides** ....: None
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 18

Table 8. CL171AR Nitrogen Rate Validation 1.2 (Vermilion Parish).

Crop Name				Rice	Rice	Rice
Rating Date					7/31/2007	8/2/2007
Rating Data Type				50% Head	Height	Yield
Rating Unit				Days	IN	lb/A
Crop Stage				Main	Main	Main
Trt No.	Treatment Name	Rate	Rate Unit			
1	UREA	0	LB A/A	90 c	38 b	5432 ab
2	UREA	30	LB A/A	91 bc	38 b	5443 ab
3	UREA	60	LB A/A	92 abc	39 ab	5398 ab
4	UREA	90	LB A/A	92 abc	40 ab	5715 ab
5	UREA	120	LB A/A	93 ab	41 ab	5653 ab
6	UREA	150	LB A/A	94 a	40 ab	5193 ab
7	UREA	180	LB A/A	95 a	41 ab	5065 b
8	UREA	210	LB A/A	95 a	41 ab	5254 ab
9	UREA	45	LB A/A	92 abc	40 ab	6169 a
	UREA	45	LB A/A			
10	UREA	75	LB A/A	93 abc	39 ab	5636 ab
	UREA	45	LB A/A			
11	UREA	105	LB A/A	94 a	40 ab	5693 ab
	UREA	45	LB A/A			
12	UREA	135	LB A/A	94 a	41 a	5481 ab
	UREA	45	LB A/A			
LSD (P=.05)				1.8	1.9	581
Standard Deviation				1.1	1.1	402.4
CV				1.14	2.84	7.3
Replicate F				7.604	1.072	5.61
Replicate Prob(F)				0.0031	0.3597	0.0032
Treatment F				6.523	2.932	2.098
Treatment Prob(F)				0.0001	0.0153	0.0495

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 9. Spring Nitrogen Rate Validation 3.2 (Vermilion Parish).

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					7/31/2007	8/2/2007	8/2/2007	8/2/2007
Rating Data Type				50% Head	Height	Ldg-Rate	Ldg-Type	Yield
Rating Unit				days	in	%	1-5	lb/A
Crop Stage				Main	Main	Main	Main	Main
Trt	Treatment		Rate					
No.	Name	Rate	Unit					
1	UREA	0	LB A/A	82 a	37 a			4972 b
2	UREA	30	LB A/A	81 a	39 a			6107 a
3	UREA	60	LB A/A	82 a	40 a			6404 a
4	UREA	90	LB A/A	82 a	39 a			7018 a
5	UREA	120	LB A/A	82 a	39 a	80	2	6899 a
6	UREA	150	LB A/A	82 a	40 a	60	4	6671 a
7	UREA	180	LB A/A	82 a	40 a	10	3	6712 a
8	UREA	210	LB A/A	83 a	41 a			6623 a
9	UREA	45	LB A/A	82 a	40 a			6190 a
	UREA	45	LB A/A					
10	UREA	75	LB A/A	83 a	39 a			6693 a
	UREA	45	LB A/A					
11	UREA	105	LB A/A	83 a	40 a			6579 a
	UREA	45	LB A/A					
12	UREA	135	LB A/A	82 a	40 a			7020 a
	UREA	45	LB A/A					
LSD (P=.05)				1.1	2	.	.	733.2
Standard Deviation				0.7	1.2	.	.	507.8
CV				0.79	3.05	.	.	7.82
Replicate F				49.5	1.167			1.88
Replicate Prob(F)				0.0001	0.3299			0.1522
Treatment F				2.071	2.226			4.831
Treatment Prob(F)				0.0703	0.053			0.0002

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL

Table 10. Trenasse Nitrogen Rate Validation 4.2 (Vermilion Parish).

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					7/31/2007	8/2/2007	8/2/2007	8/2/2007
Rating Data Type				50% Head	Height	Ldg-Rate	Ldg-Type	Yield
Rating Unit				days	in	%	1-5	lb/A
Crop Stage				Main	Main	Main	Main	Main
Trt No.	Treatment Name	Rate	Rate Unit					
1	UREA	0	LB A/A	84 ab	35 a	.	.	5922 b
2	UREA	30	LB A/A	84 b	36 a	.	.	6874 a
3	UREA	60	LB A/A	85 ab	37 a	.	.	7137 a
4	UREA	90	LB A/A	84 ab	37 a	70	3	7569 a
5	UREA	120	LB A/A	84 ab	37 a	30	3	7350 a
6	UREA	150	LB A/A	86 ab	37 a	60	3	7464 a
7	UREA	180	LB A/A	85 ab	37 a	.	.	7271 a
8	UREA	210	LB A/A	87 a	38 a	.	.	7106 a
9	UREA	45	LB A/A	84 ab	36 a	.	.	7488 a
	UREA	45	LB A/A					
10	UREA	75	LB A/A	85 ab	37 a	.	.	7425 a
	UREA	45	LB A/A					
11	UREA	105	LB A/A	85 ab	36 a	10	3	7509 a
	UREA	45	LB A/A					
12	UREA	135	LB A/A	86 ab	38 a	20	4	7307 a
	UREA	45	LB A/A					
LSD (P=.05)				1.8	1.6	.	.	711.2
Standard Deviation				1.1	1	.	.	492.5
CV				1.27	2.61	.	.	6.84
Replicate F				66.497	5.274			0.136
Replicate Prob(F)				0.0001	0.0135			0.9379
Treatment F				2.632	1.6			3.338
Treatment Prob(F)				0.0256	0.1675			0.0035

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 11. Advanced Experimental Line LA2082 Nitrogen Rate Validation 2.2 (Vermilion Parish).

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					7/31/2007	8/2/2007	8/2/2007	8/2/2007
Rating Data Type				50% Head	Height	Ldg-Rate	Ldg-Type	Yield
Rating Unit				days	in	%	1-5	lb/A
Crop Stage				Main	Main	Main	Main	Main
Trt No.	Rate Rate Unit	Growth Stage	Appl Description					
1	0 LB A/A	4-5 leaf	Preflood	86 d	36 b	.	.	5028 c
2	30 LB A/A	4-5 leaf	Preflood	88 c	37 ab	.	.	6269 b
3	60 LB A/A	4-5 leaf	Preflood	89 bc	37 ab	.	.	6857 ab
4	90 LB A/A	4-5 leaf	Preflood	90 ab	39 ab	5	2	7324 a
5	120 LB A/A	4-5 leaf	Preflood	91 ab	40 a	10	4	7311 a
6	150 LB A/A	4-5 leaf	Preflood	91 a	41 a	10	4	7187 a
7	180 LB A/A	4-5 leaf	Preflood	92 a	39 ab	10	3	7268 a
8	210 LB A/A	4-5 leaf	Preflood	92 a	40 ab	20	3	7150 a
9	45 LB A/A	4-5 leaf	Preflood	89 bc	39 ab	10	3	6823 ab
	45 LB A/A	PD	Midseason					
10	75 LB A/A	4-5 leaf	Preflood	90 ab	39 ab	10	2	7261 a
	45 LB A/A	PD	Midseason					
11	105 LB A/A	4-5 leaf	Preflood	91 ab	39 ab	10	3	7270 a
	45 LB A/A	PD	Midseason					
12	135 LB A/A	4-5 leaf	Preflood	92 a	41 a	10	3	7620 a
	45 LB A/A	PD	Midseason					
LSD (P=.05)				1.3	2.3	.	.	589.4
Standard Deviation				0.8	1.4	.	.	408.2
CV				0.87	3.54	.	.	5.88
Replicate F				48.804	1.336			2.562
Replicate Prob(F)				0.0001	0.2833			0.0716
Treatment F				14.739	3.636			11.564
Treatment Prob(F)				0.0001	0.0048			0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 12. Advanced Experimental Line LA2028 Nitrogen Rate Validation 2.2 (Vermilion Parish).

Crop Name					Rice	Rice	Rice
Rating Date						7/31/2007	8/2/2007
Rating Data Type					50% Head	Height	Yield
Rating Unit					days	in	lb/A
Crop Stage					Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description			
1	90	LB A/A	4-5 leaf	Preflood	97 a	35 a	6349 a
2	120	LB A/A	4-5 leaf	Preflood	97 a	35 a	6925 a
3	150	LB A/A	4-5 leaf	Preflood	97 a	36 a	6556 a
4	180	LB A/A	4-5 leaf	Preflood	97 a	36 a	6732 a
LSD (P=.05)					0.7	1.9	585
Standard Deviation					0.3	0.9	365.7
CV					0.34	2.66	5.51
Replicate F					21	1.125	1.498
Replicate Prob(F)					0.002	0.3847	0.2803
Treatment F					1	1.375	1.807
Treatment Prob(F)					0.4547	0.3376	0.2159

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Variety by Nitrogen Experiments at Richland Parish

Experiment number ....: 07-RP-03

Site and design ....:
Location/Cooperator ....: Richland Parish / Marley Oldham
Tillage type ....: No Till into soybean stubble
Experimental design ....: Randomized complete block
Number of reps ....: 4
Plot size ....: 7 x 20 ft
Row width/rows per plot ....: 7 in / 12

Soil type ....: Hebert silty clay
% organic matter ....: NA
pH ....: 6.1
Extractable nutrients ppm ....: Ca-2,121; Cu-2.0; Mg-480; P-28.5; K-166.7; Na-91.8; S-25.0; Zn-2.4

Crop/Variety ....: Rice / CL171AR
Planting method/date ....: Drill seeded / March 28
Seeding rate/depth ....: 40 seeds/ft^2 / .75 in
Emergence date ....: April 9
Harvest date ....: August 21

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: None

Water management ....:
Flush ....: Rain March 31
Flood ....: May 14
Drain ....: August 3

Pest management ....:
Herbicides ....: 1 gal/A Arrosolo + 1 oz/A Permit, April 21
1 gal/A Arrosolo + 1 pt/A Grandstand, May 10
13 oz/A Clincher, May 31
15 oz/A Clincher, June 28
Insecticides ....: 2 oz/A Karate, June 28
4 oz/A Mustang Max, July 18
Fungicides ....: 12 oz/A Quadris, July 18

Table 13. CL171AR Nitrogen Rate Validation 1.3 (Richland Parish).

Crop Name				Rice	Rice	Rice
Rating Date					8/21/2007	8/21/2007
Rating Data Type				50% Head	Height	Yield
Rating Unit				days	in	lb/A
Crop Stage				Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description		
1	0	LB A/A	4-5 leaf	Preflood	99 e	35 d	5179 b
2	30	LB A/A	4-5 leaf	Preflood	101 d	37 c	5703 b
3	60	LB A/A	4-5 leaf	Preflood	103 bc	38 bc	6828 a
4	90	LB A/A	4-5 leaf	Preflood	104 bc	40 ab	7012 a
5	120	LB A/A	4-5 leaf	Preflood	104 bc	41 ab	7112 a
6	150	LB A/A	4-5 leaf	Preflood	106 a	43 a	7262 a
7	180	LB A/A	4-5 leaf	Preflood	106 a	42 a	7419 a
8	210	LB A/A	4-5 leaf	Preflood	106 a	43 a	6969 a
9	45	LB A/A	4-5 leaf	Preflood	101 d	40 ab	6482 a
	45	LB A/A	PD	Midseason			
10	75	LB A/A	4-5 leaf	Preflood	103 c	40 ab	7236 a
	45	LB A/A	PD	Midseason			
11	105	LB A/A	4-5 leaf	Preflood	104 bc	42 a	7128 a
	45	LB A/A	PD	Midseason			
12	135	LB A/A	4-5 leaf	Preflood	105 ab	42 a	7233 a
	45	LB A/A	PD	Midseason			
LSD (P=.05)					1.2	1.8	712
Standard Deviation					0.8	1.1	493.1
CV					0.78	2.67	7.25
Replicate F					20.721	6.542	6.047
Replicate Prob(F)					0.0001	0.0059	0.0021
Treatment F					32.744	14.124	7.758
Treatment Prob(F)					0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 14. Spring Nitrogen Rate Validation 3.3 (Richland Parish).

Crop Name					Rice	Rice	Rice
Rating Date						8/21/2007	8/21/2007
Rating Data Type					50% Head	Height	Yield
Rating Unit					days	in	lb/A
Crop Stage					Main	Main	Main
Trt		Rate	Growth	Appl			
No.	Rate	Unit	Stage	Description			
1	0	LB A/A	4-5 leaf	Preflood	95 cd	34 c	2847 b
2	30	LB A/A	4-5 leaf	Preflood	96 bcd	37 b	3283 ab
3	60	LB A/A	4-5 leaf	Preflood	96 bcd	40 ab	4006 ab
4	90	LB A/A	4-5 leaf	Preflood	98 abc	41 ab	4791 ab
5	120	LB A/A	4-5 leaf	Preflood	98 abc	41 ab	5015 ab
6	150	LB A/A	4-5 leaf	Preflood	98 ab	42 a	5245 ab
7	180	LB A/A	4-5 leaf	Preflood	99 a	43 a	5127 ab
8	210	LB A/A	4-5 leaf	Preflood	98 ab	43 a	5270 ab
9	45	LB A/A	4-5 leaf	Preflood	94 d	39 ab	3321 ab
	45	LB A/A	PD	Midseason			
10	75	LB A/A	4-5 leaf	Preflood	96 bcd	40 ab	4162 ab
	45	LB A/A	PD	Midseason			
11	105	LB A/A	4-5 leaf	Preflood	96 bcd	41 ab	4780 ab
	45	LB A/A	PD	Midseason			
12	135	LB A/A	4-5 leaf	Preflood	97 a-d	40 ab	6140 a
	45	LB A/A	PD	Midseason			
LSD (P=.05)					1.9	2.9	1716.5
Standard Deviation					1.3	1.7	1188.8
CV					1.33	4.21	26.42
Replicate F					73.685	6.085	7.902
Replicate Prob(F)					0.0001	0.0079	0.0004
Treatment F					5.393	6.556	2.733
Treatment Prob(F)					0.0001	0.0001	0.0131

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 15. Trenasse Nitrogen Rate Validation 4.3 (Richland Parish).

Pest Type						
Crop Name				Rice	Rice	Rice
Rating Date					8/21/2007	8/21/2007
Rating Data Type				50% Head	Height	Yield
Rating Unit				days	in	lb/A
Trt No. Rate	Rate Unit	Growth Stage	Appl Description			
1 0	LB A/A	4-5 leaf	Preflood	94 b	31 d	3865 c
2 30	LB A/A	4-5 leaf	Preflood	95 ab	33 c	4707 c
3 60	LB A/A	4-5 leaf	Preflood	96 ab	36 ab	6007 b
4 90	LB A/A	4-5 leaf	Preflood	97 ab	38 ab	7183 ab
5 120	LB A/A	4-5 leaf	Preflood	98 ab	37 ab	7077 ab
6 150	LB A/A	4-5 leaf	Preflood	98 ab	38 ab	7561 a
7 180	LB A/A	4-5 leaf	Preflood	99 a	39 a	7629 a
8 210	LB A/A	4-5 leaf	Preflood	98 ab	39 ab	7511 a
9 45	LB A/A	4-5 leaf	Preflood	95 ab	35 bc	6054 b
45	LB A/A	PD	Midseason			
10 75	LB A/A	4-5 leaf	Preflood	97 ab	37 ab	6411 ab
45	LB A/A	PD	Midseason			
11 105	LB A/A	4-5 leaf	Preflood	98 ab	37 ab	6747 ab
45	LB A/A	PD	Midseason			
12 135	LB A/A	4-5 leaf	Preflood	98 ab	39 ab	7807 a
45	LB A/A	PD	Midseason			
LSD (P=.05)				2.5	2.3	925.2
Standard Deviation				1.8	1.3	640.7
CV				1.81	3.65	9.79
Replicate F				40.957	0.325	3.109
Replicate Prob(F)				0.0001	0.726	0.0396
Treatment F				2.877	10.333	14.68
Treatment Prob(F)				0.0092	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 16. Advanced Experimental Line LA2082 Nitrogen Rate Validation 2.3 (Richland Parish).

Crop Name				Rice	Rice	Rice
Rating Date					8/21/2007	8/21/2007
Rating Data Type				50% Head	Height	Yield
Rating Unit				days	in	lb/A
Crop Stage				Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description		
1	0	LB A/A	4-5 leaf	Preflood	102 e	32 d	3459 e
2	30	LB A/A	4-5 leaf	Preflood	103 de	33 cd	4088 e
3	60	LB A/A	4-5 leaf	Preflood	106 bc	35 bc	4975 d
4	90	LB A/A	4-5 leaf	Preflood	106 abc	36 ab	6314 bc
5	120	LB A/A	4-5 leaf	Preflood	108 ab	37 ab	6155 c
6	150	LB A/A	4-5 leaf	Preflood	108 ab	37 ab	6648 abc
7	180	LB A/A	4-5 leaf	Preflood	108 a	38 ab	7502 a
8	210	LB A/A	4-5 leaf	Preflood	108 ab	39 a	7462 a
9	45	LB A/A	4-5 leaf	Preflood	104 de	36 ab	6083 c
	45	LB A/A	PD	Midseason			
10	75	LB A/A	4-5 leaf	Preflood	105 cd	36 ab	6661 abc
	45	LB A/A	PD	Midseason			
11	105	LB A/A	4-5 leaf	Preflood	106 abc	37 ab	7204 ab
	45	LB A/A	PD	Midseason			
12	135	LB A/A	4-5 leaf	Preflood	107 ab	38 ab	7349 a
	45	LB A/A	PD	Midseason			
LSD (P=.05)					1.3	2.2	684.8
Standard Deviation					0.9	1.3	474.3
CV					0.88	3.53	7.7
Replicate F					53.322	2.507	76.876
Replicate Prob(F)					0.0001	0.1045	0.0001
Treatment F					19.196	8.428	31.546
Treatment Prob(F)					0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 17. Advanced Experimental Line LA2028 Nitrogen Rate Validation 2.3 (Richland Parish).

Crop Name					Rice	Rice	Rice
Rating Date						8/21/2007	8/21/2007
Rating Data Type					50% Head	Height	Yield
Rating Unit					days	in	lb/A
Crop Stage					Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description			
1	90	LB A/A	4-5 leaf	Preflood	105 a	35 a	7020 a
2	120	LB A/A	4-5 leaf	Preflood	105 a	36 a	7729 a
3	150	LB A/A	4-5 leaf	Preflood	105 a	35 a	7660 a
4	180	LB A/A	4-5 leaf	Preflood	106 a	36 a	8087 a
LSD (P=.05)					1	1.1	1216.7
Standard Deviation					0.6	0.6	760.7
CV					0.6	1.55	9.98
Replicate F					15.737	0.273	11.965
Replicate Prob(F)					0.0006	0.7703	0.0017
Treatment F					3.526	3.182	1.363
Treatment Prob(F)					0.0618	0.1059	0.315

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

RiceTec Hybrid by Nitrogen Experiments (Rice Research Station)

Experiment number ....: 07-CM-16 – 07-CM-19

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.0
- **Extractable nutrients** ....: Ca-1,238; Cu-1.6; Mg-222; P-19.3; K-88.0; Na-91.0; S-6.6; Zn-6.3

Crop/Variety ....: Rice / CLXL730, CL161
- **Planting method/date** ....: Drill seeded / March 20
- **Seeding rate/depth** ....: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / 1 in
- **Emergence date** ....: March 28
- **Harvest date** ....: August 6; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 20
1 qt /A Zinc Plus, May 1
90 lb N/A 46-0-0, August 7

Water management ....:
- **Flush** ....: March 28, April 20
- **Flood** ....: May 3; Ratoon flood, August 8
- **Drain** ....: July 17; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 4 oz/A NewPath, April 16 and May 1
15 oz/A Clincher, April 23
1 gal Arrosolo + .75 oz Londax + .5 oz Permit, May 1
1 oz Londax, May 17
- **Insecticides** ....: 4 oz/A Karate, May10
4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 18. RiceTec Hybrid CLXL730 Nitrogen Rate Validation (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/1/2007	8/6/2007			10/16/2007	10/16/2007
Rating Data Type				50% Head	Height	Yield	Total Mill	Whole Mill	Yield	Yield
Rating Unit				days	in	lb/A	%	%	lb/A	lb/A
Crop Stage				Main	Main	Main	Main	Main	Ratoon	Total
Trt No.	Rate Rate Unit	Growth Stage	Appl Description							
1	0 LB A/A	3-4 leaf	Preflood	93 d	33 d	2042 e	66 a	47 b	3047 b	5089 e
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
2	90 LB A/A	3-4 leaf	Preflood	96 bc	44 bc	9708 cd	70 a	55 a	3540 a	13248 c
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
3	90 LB A/A	3-4 leaf	Preflood	97 bc	45 abc	10930 ab	69 a	55 a	3475 a	14405 b
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
4	90 LB A/A	3-4 leaf	Preflood	97 bc	42 c	10011 c	70 a	57 a	4116 a	14127 bc
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
5	120 LB A/A	3-4 leaf	Preflood	97 bc	44 bc	10866 ab	69 a	54 a	3650 a	14516 b
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
6	150 LB A/A	3-4 leaf	Preflood	98 b	48 a	11561 a	67 a	54 a	3851 a	15413 a
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
7	90 LB A/A	3-4 leaf	Preflood	96 c	48 ab	11059 ab	70 a	56 a	3900 a	14959 ab
	30 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
8	90 LB A/A	3-4 leaf	Preflood	96 c	44 bc	9317 cd	70 a	58 a	3930 a	13246 c
	0 LB A/A	PD	Midseason							
	60 LB A/A	5% heading	Late Season							
9	120 LB A/A	3-4 leaf	Preflood	97 bc	45 abc	11693 a	68 a	56 a	3851 a	15544 a
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
10	120 LB A/A	3-4 leaf	Preflood	97 bc	45 abc	10643 b	70 a	57 a	3704 a	14347 b
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
11				102 a	41 c	9029 d	68 a	59 a	2663 b	11692 d
	120 LB A/A	3-4 leaf	Preflood							
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
LSD (P=.05)				1.3	2.8	600.6	2.1	3.9	402.8	734.7
Standard Deviation				0.8	1.7	416	1	1.7	279	508.8
CV				0.79	3.79	4.28	1.4	3.15	7.72	3.82
Replicate F				2.539	2.697	0.784	0.303	0.806	6.621	0.831
Replicate Prob(F)				0.1041	0.0918	0.512	0.594	0.3904	0.0014	0.4873
Treatment F				22.435	19.443	167.341	2.878	6.357	9.28	134.003
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0553	0.0036	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 19. RiceTec Hybrid CLXL745 Nitrogen Rate Validation (Rice Research Station).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/1/2007	8/6/2007			10/16/2007	10/16/2007
Rating Data Type					50% Head	Height	Yield	Total Mill	Whole Mill	Yield	Yield
Rating Unit					days	in	lb/A	%	%	lb/A	lb/A
Crop Stage					Main	Main	Main	Main	Main	Ratoon	Total
Trt No	Rate	Rate Unit	Growth Stage	Appl Description							
1	0	LB A/A	3-4 leaf	Preflood	92 c	31 c	2446 d	71 ab	54 bc	2643 bc	5089 d
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
2	90	LB A/A	3-4 leaf	Preflood	95 b	42 ab	9932 bc	70 ab	49 c	2866 abc	12798 bc
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
3	90	LB A/A	3-4 leaf	Preflood	94 b	44 ab	11086 ab	70 ab	54 bc	2728 bc	13814 ab
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
4	90	LB A/A	3-4 leaf	Preflood	95 b	43 ab	9819 bc	71 ab	54 bc	2923 abc	12742 bc
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
5	120	LB A/A	3-4 leaf	Preflood	95 b	43 ab	10799 ab	71 ab	54 bc	2959 abc	13758 ab
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
6	150	LB A/A	3-4 leaf	Preflood	96 b	45 ab	11733 a	69 b	53 bc	3347 a	15080 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
7	90	LB A/A	3-4 leaf	Preflood	95 b	43 ab	10804 ab	71 ab	57 abc	2786 abc	13590 ab
	30	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
8	90	LB A/A	3-4 leaf	Preflood	95 b	42 ab	9783 bc	72 a	63 a	2874 abc	12657 bc
	0	LB A/A	PD	Midseason							
	60	LB A/A	5% heading	Late Season							
9	120	LB A/A	3-4 leaf	Preflood	95 b	45 a	10843 ab	71 ab	56 abc	2936 abc	13780 ab
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
10	120	LB A/A	3-4 leaf	Preflood	95 b	45 a	10934 ab	71 ab	57 abc	3182 ab	14116 ab
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
11					101 a	41 b	9237 c	69 b	59 ab	2441 c	11678 c
	120	LB A/A	3-4 leaf	Preflood							
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
LSD (P=.05)					1	2.4	963.7	1.5	5	374.9	1166.7
Standard Deviation					0.6	1.4	667.4	0.7	2.3	259.7	808
CV					0.63	3.34	6.83	0.96	4.08	9.01	6.39
Replicate F					0.254	1.201	0.496	0	0.004	3.469	1.328
Replicate Prob(F)					0.778	0.3218	0.6878	1	0.9486	0.0283	0.2838
Treatment F					36.695	22.802	57.627	3.942	4.495	3.572	43.463
Treatment Prob(F)					0.0001	0.0001	0.0001	0.0206	0.0131	0.0033	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 20. RiceTec Hybrid CLXL729 Nitrogen Rate Validation (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/6/2007			10/16/2007	10/16/2007
Rating Data Type				50% Head	Height	Yield	Total Mill	Whole Mill	Yield	Yield
Rating Unit				Days	IN	lb/A	%	%	lb/A	lb/A
Crop Stage				Main	Main	Main	Main	Main	Ratoon	Total
Trt No.	Rate Rate Unit	Growth Stage	Appl Description							
1	0 LB A/A	3-4 leaf	Preflood	93 d	31 d	2575 d	69 a	55 a	3266 b	5841 e
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
2	90 LB A/A	3-4 leaf	Preflood	95 c	41 abc	9539 bc	69 a	53 a	4082 a	13622 bcd
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
3	90 LB A/A	3-4 leaf	Preflood	96 bc	41 abc	11143 ab	69 a	56 a	4164 a	15307 ab
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
4	90 LB A/A	3-4 leaf	Preflood	95 c	40 bc	9516 bc	70 a	57 a	3819 a	13334 bcd
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
5	120 LB A/A	3-4 leaf	Preflood	96 bc	42 abc	10483 abc	70 a	57 a	4083 a	14566 a-d
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
6	150 LB A/A	3-4 leaf	Preflood	97 b	43 ab	11556 a	69 a	56 a	4461 a	16017 a
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
7	90 LB A/A	3-4 leaf	Preflood	95 c	42 abc	10463 abc	69 a	55 a	4005 a	14469 a-d
	30 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
8	90 LB A/A	3-4 leaf	Preflood	96 bc	40 c	9181 c	70 a	58 a	3798 a	12979 cd
	0 LB A/A	PD	Midseason							
	60 LB A/A	5% heading	Late Season							
9	120 LB A/A	3-4 leaf	Preflood	96 bc	44 a	10822 abc	69 a	54 a	4043 a	14865 abc
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
10	120 LB A/A	3-4 leaf	Preflood	96 bc	42 abc	10678 abc	70 a	58 a	3911 a	14588 a-d
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
11				100 a	41 abc	9887 abc	68 a	58 a	2721 c	12608 d
	120 LB A/A	3-4 leaf	Preflood							
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
LSD (P=.05)				1.2	1.9	1191.7	1.5	3.8	422.4	1411
Standard Deviation				0.7	1.1	824.1	0.7	1.7	292.1	975.8
CV				0.73	2.78	8.57	1	3.02	7.59	7.24
Replicate F				7.654	1.814	1.393	0.142	7.709	11.293	3.83
Replicate Prob(F)				0.0034	0.1888	0.2646	0.7139	0.0196	0.0001	0.02
Treatment F				18.037	26.64	35.34	1.69	1.9	10.615	31.289
Treatment Prob(F)				0.0001	0.0001	0.0001	0.2105	0.1631	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 21. RiceTec Hybrid XP744 Nitrogen Rate Validation (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/6/2007			10/16/2007	10/16/2007
Rating Data Type				50% Head	Height	Yield	Total Mill	Whole Mill	Yield	Yield
Rating Unit				days	in	lb/A	%	%	lb/A	lb/A
Crop Stage				Main	Main	Main	Main	Main	Ratoon	Total
Trt No. Rate	Rate Unit	Growth Stage	Appl Description							
1 0	LB A/A	3-4 leaf	Preflood	90 c	32 c	3158 d	71 a	56 a	2327 b	5485 e
0	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
2 90	LB A/A	3-4 leaf	Preflood	94 b	43 a	9535 bc	71 a	47 b	2734 ab	12268 bc
0	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
3 90	LB A/A	3-4 leaf	Preflood	94 b	43 a	9606 bc	71 a	51 ab	2412 ab	12018 bc
30	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
4 90	LB A/A	3-4 leaf	Preflood	94 b	44 a	9297 bc	71 a	50 ab	2939 ab	12235 bc
0	LB A/A	PD	Midseason							
30	LB A/A	5% heading	Late Season							
5 120	LB A/A	3-4 leaf	Preflood	95 b	44 a	9966 bc	71 a	53 ab	2499 ab	12465 bc
0	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
6 150	LB A/A	3-4 leaf	Preflood	95 ab	45 a	11656 a	71 a	51 ab	3016 a	14672 a
0	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
7 90	LB A/A	3-4 leaf	Preflood	94 b	45 a	10167 b	71 a	51 ab	2817 ab	12984 bc
30	LB A/A	PD	Midseason							
30	LB A/A	5% heading	Late Season							
8 90	LB A/A	3-4 leaf	Preflood	94 b	42 a	8651 c	71 a	53 ab	2616 ab	11267 cd
0	LB A/A	PD	Midseason							
60	LB A/A	5% heading	Late Season							
9 120	LB A/A	3-4 leaf	Preflood	94 b	46 a	10397 b	71 a	53 ab	2929 ab	13326 b
30	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
10 120	LB A/A	3-4 leaf	Preflood	95 ab	45 a	10216 b	71 a	55 a	2766 ab	12982 bc
0	LB A/A	PD	Midseason							
30	LB A/A	5% heading	Late Season							
11				96 a	39 b	8722 c	70 b	56 a	1793 c	10515 d
120	LB A/A	3-4 leaf	Preflood							
30	LB A/A	PD	Midseason							
0	LB A/A	5% heading	Late Season							
LSD (P=.05)				1	2.2	932.1	0.8	4.4	392	1141.3
Standard Deviation				0.6	1.3	645.6	0.3	2	271.5	790.4
CV				0.6	3.07	7.01	0.48	3.8	10.35	6.68
Replicate F				3.75	0.922	7.12	0.331	1.74	13.697	11.661
Replicate Prob(F)				0.0414	0.414	0.0009	0.5777	0.2165	0.0001	0.0001
Treatment F				24.192	27.415	45.434	3.103	3.872	6.808	35.904
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0442	0.0218	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

RiceTec Hybrid by Nitrogen Experiments (Richland Parish)

Experiment number ....: 07-RP-08 – 07-RP-11

Site and design ....:
- **Location/Cooperator** ....: Richland Parish / Marley Oldham
- **Tillage type**..................................: No Till into soybean stubble
- **Experimental design**...................: Randomized complete block
- **Number of reps** ....: 4
- **Plot size**..: 7 x 20 ft
- **Row width/rows per plot**............: 7 in / 12

Soil type ....: Hebert silty clay
- **% organic matter**........................: NA
- **pH**...: 7.3
- **Extractable nutrients ppm**.........: Ca-2,402; Cu-2.1; Mg-559; P-17.7; K-164.8; Na-146; S-37.2; Zn-1.4

Crop/Variety ....: Rice / XP744, Wells
- **Planting method/date** ....: Drill seeded / March 28
- **Seeding rate/depth**......................: Hybrid- 14 seeds/ft^2, Commercial- 40 seeds/ft^2 / .75 in
- **Emergence date**...........................: April 10
- **Harvest date** ....: August 21

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization..: None

Water management ....:
- **Flush** ....: Rain, March 31
- **Flood** ....: May 14
- **Drain**..: August 3

Pest management...............................:
- **Herbicides**....................................: 1 gal/A Arrosolo + 1 oz/A Permit, April 21
  1 gal/A Arrosolo + 1 pt/A Grandstand, May 10
  13 oz/A Clincher, May 31
  15 oz/A Clincher, June 28
- **Insecticides** ....: 2 oz/A Karate, June 28
  4 oz/A Mustang Max, July 18
- **Fungicides** ....: 12 oz/A Quadris, July 18

Table 22. RiceTec Hybrid XP744 Nitrogen Rate Validation (Richland Parish).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/21/2007	8/21/2007	8/21/2007	8/21/2007		
Rating Data Type					50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit					days	in	%	1-5	lb/A	%	%
Crop Stage					Main	Main	Main	Main	Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description							
1	0	LB A/A	3-4 leaf	Preflood	98 c	37 c	25 a	3 a	4456 b	70 a	54 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
2	90	LB A/A	3-4 leaf	Preflood	100 bc	44 a	27 a	2 a	8409 a	71 a	53 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
3	90	LB A/A	3-4 leaf	Preflood	100 bc	45 a	15 a	2 a	8912 a	71 a	55 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
4	90	LB A/A	3-4 leaf	Preflood	101 b	44 a	13 a	2 a	7486 a	70 a	54 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
5	120	LB A/A	3-4 leaf	Preflood	102 b	45 a	18 a	2 a	8014 a	69 a	53 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
6	150	LB A/A	3-4 leaf	Preflood	101 b	46 a	12 a	2 a	8933 a	71 a	55 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
7	90	LB A/A	3-4 leaf	Preflood	100 bc	45 a	15 a	2 a	8567 a	70 a	55 a
	30	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
8	90	LB A/A	3-4 leaf	Preflood	100 bc	45 a	13 a	2 a	8609 a	70 a	55 a
	0	LB A/A	PD	Midseason							
	60	LB A/A	5% heading	Late Season							
9	120	LB A/A	3-4 leaf	Preflood	101 b	46 a	13 a	1 a	9221 a	70 a	55 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
10	120	LB A/A	3-4 leaf	Preflood	100 bc	44 a	17 a	1 a	8872 a	70 a	55 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
11					111 a	40 b			4727 b	71 a	52 a
	120	LB A/A	3-4 leaf	Preflood							
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
LSD (P=.05)					1.9	2.3	16.4	1.4	1083.4	1.8	4
Standard Deviation					1.3	1.4	9.5	0.8	749.2	1	2.2
CV					1.3	3.14	56.63	43.09	9.56	1.36	3.98
Replicate F					32.582	1.624	3.145	6.387	39.047	2.989	0.278
Replicate Prob(F)					0.0001	0.2234	0.0688	0.0085	0.0001	0.101	0.7634
Treatment F					29.428	12.8	0.865	1.153	19.99	1.006	0.959
Treatment Prob(F)					0.0001	0.0001	0.572	0.3818	0.0001	0.5008	0.5293

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 23. RiceTec Hybrid CLXL745 Nitrogen Rate Validation (Richland Parish).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date					8/21/2007	8/21/2007	8/21/2007	8/21/2007		
Rating Data Type				50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit				Days	IN	%	1-5	lb/A	%	%
Crop Stage				Main	Main	Main	Main	Main	Main	Main
Trt No.	Rate Rate Unit	Growth Stage	Appl Description							
1	0 LB A/A	3-4 leaf	Preflood	99 c	38 b	40 a	4 a	5750 d	70 a	53 b
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
2	90 LB A/A	3-4 leaf	Preflood	101 b	44 a	20 b	1 b	8972 b	70 a	52 b
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
3	90 LB A/A	3-4 leaf	Preflood	101 b	46 a	8 b	1 b	9835 ab	70 a	55 ab
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
4	90 LB A/A	3-4 leaf	Preflood	101 b	45 a			8917 b	70 a	54 ab
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
5	120 LB A/A	3-4 leaf	Preflood	101 b	45 a	10 b	1 b	9763 ab	70 a	55 ab
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
6	150 LB A/A	3-4 leaf	Preflood	101 b	46 a	5 b	1 b	10660 a	70 a	56 ab
	0 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
7	90 LB A/A	3-4 leaf	Preflood	101 b	44 a	20 b	2 b	9738 ab	70 a	56 ab
	30 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
8	90 LB A/A	3-4 leaf	Preflood	101 b	44 a	10 b	1 b	8918 b	71 a	58 ab
	0 LB A/A	PD	Midseason							
	60 LB A/A	5% heading	Late Season							
9	120 LB A/A	3-4 leaf	Preflood	101 b	45 a	10 b	1 b	10031 ab	70 a	54 ab
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
10	120 LB A/A	3-4 leaf	Preflood	101 b	43 a	10 b	1 b	9347 b	70 a	54 ab
	0 LB A/A	PD	Midseason							
	30 LB A/A	5% heading	Late Season							
11				108 a	40 b			7305 c	71 a	61 a
	120 LB A/A	3-4 leaf	Preflood							
	30 LB A/A	PD	Midseason							
	0 LB A/A	5% heading	Late Season							
LSD (P=.05)				1.2	2	11.7	0.8	746	1.7	4.3
Standard Deviation				0.8	1.2	6.1	0.4	516.7	0.7	1.9
CV				0.82	2.72	41.26	27.55	5.73	1.07	3.46
Replicate F				47.148	2.328	0.056	0.78	51.463	0.098	0.16
Replicate Prob(F)				0.0001	0.1234	0.9455	0.4999	0.0001	0.7608	0.6976
Treatment F				31.022	11.487	9.456	18.78	28.777	0.379	3.178
Treatment Prob(F)				0.0001	0.0001	0.0039	0.001	0.0001	0.9292	0.0411

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 24. RiceTec Hybrid CLXL729 Nitrogen Rate Validation (Richland Parish).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/21/2007	8/21/2007	8/21/2007	8/21/2007		
Rating Data Type					50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit					Days	IN	%	1-5	lb/A	%	%
Crop Stage					Main	Main	Main	Main	Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description							
1	0	LB A/A	3-4 leaf	Preflood	101 d	37 c	30	2	5196 c	67 b	49 b
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
2	90	LB A/A	3-4 leaf	Preflood	104 b	43 a	10	3	8452 ab	70 a	58 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
3	90	LB A/A	3-4 leaf	Preflood	104 bc	44 a			9969 a	70 ab	57 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
4	90	LB A/A	3-4 leaf	Preflood	103 bc	43 a			9032 a	70 ab	57 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
5	120	LB A/A	3-4 leaf	Preflood	103 bc	43 a			9417 a	70 a	58 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
6	150	LB A/A	3-4 leaf	Preflood	104 b	45 a			9866 a	70 a	59 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
7	90	LB A/A	3-4 leaf	Preflood	104 bc	43 a	10	4	8941 a	71 a	59 a
	30	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
8	90	LB A/A	3-4 leaf	Preflood	102 c	44 a	10	4	8830 a	70 a	59 a
	0	LB A/A	PD	Midseason							
	60	LB A/A	5% heading	Late Season							
9	120	LB A/A	3-4 leaf	Preflood	103 bc	44 a	20	3	9867 a	70 ab	57 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
10	120	LB A/A	3-4 leaf	Preflood	104 b	43 a			8491 ab	69 ab	56 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
11					108 a	39 b			7473 b	70 a	59 a
	120	LB A/A	3-4 leaf	Preflood							
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
LSD (P=.05)					1.3	2	.	.	976.4	1.6	2.5
Standard Deviation					0.9	1.2	.	.	676.2	0.7	1.1
CV					0.88	2.72	.	.	7.79	1	1.96
Replicate F					37.473	9.661			24.008	0.616	1.224
Replicate Prob(F)					0.0001	0.0012			0.0001	0.4506	0.2945
Treatment F					15.241	11.303			16.544	3.708	12.014
Treatment Prob(F)					0.0001	0.0001			0.0001	0.0252	0.0003

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 25. RiceTec Hybrid CLXL730 Nitrogen Rate Validation (Richland Parish).

Crop Name					Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						8/21/2007	8/21/2007	8/21/2007	8/21/2007		
Rating Data Type					50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit					days	in	%	1-5	lb/A	%	%
Crop Stage					Main	Main	Main	Main	Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description							
1	0	LB A/A	3-4 leaf	Preflood	100 d	40 b	17 a	1 a	5293 c	67 a	53 b
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
2	90	LB A/A	3-4 leaf	Preflood	103 c	48 a	45 a	3 a	9166 a	70 a	58 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
3	90	LB A/A	3-4 leaf	Preflood	104 bc	48 a	45 a	2 a	10453 a	69 a	57 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
4	90	LB A/A	3-4 leaf	Preflood	104 bc	47 a	30 a	3 a	9275 a	70 a	59 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
5	120	LB A/A	3-4 leaf	Preflood	104 bc	48 a	20 a	3 a	9906 a	70 a	60 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
6	150	LB A/A	3-4 leaf	Preflood	105 bc	49 a	30 a	4 a	10111 a	70 a	58 a
	0	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
7	90	LB A/A	3-4 leaf	Preflood	104 bc	48 a	55 a	4 a	9937 a	70 a	57 a
	30	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
8	90	LB A/A	3-4 leaf	Preflood	104 bc	47 a	15 a	3 a	9040 a	70 a	58 a
	0	LB A/A	PD	Midseason							
	60	LB A/A	5% heading	Late Season							
9	120	LB A/A	3-4 leaf	Preflood	105 bc	48 a	35 a	4 a	10009 a	70 a	57 a
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
10	120	LB A/A	3-4 leaf	Preflood	105 b	49 a	10 a	1 a	9738 a	71 a	58 a
	0	LB A/A	PD	Midseason							
	30	LB A/A	5% heading	Late Season							
11					108 a	40 b			7529 b	70 a	61 a
	120	LB A/A	3-4 leaf	Preflood							
	30	LB A/A	PD	Midseason							
	0	LB A/A	5% heading	Late Season							
LSD (P=.05)					1	2.1	40.3	2.2	938	2.2	2.8
Standard Deviation					0.7	1.2	21.4	1.2	649.6	1	1.2
CV					0.67	2.59	70.95	43.19	7.11	1.39	2.16
Replicate F					76.331	2.146	0.275	0.185	14.17	2.688	0.433
Replicate Prob(F)					0.0001	0.1431	0.7667	0.8343	0.0001	0.1321	0.5256
Treatment F					30.288	22.725	1.457	2.288	21.26	1.6	5.351
Treatment Prob(F)					0.0001	0.0001	0.3033	0.1289	0.0001	0.2353	0.007

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to P Fertilization (Rice Research Station)

Experiment number ....: 07-CM-13

Site and design ....:
Location/Cooperator ....: Rice Research Station (Crowley Main)
Tillage type ....: Conventional
Experimental design ....: Randomized complete block
Number of reps ....: 4
Plot size ....: 7 x 20 ft
Row width/rows per plot ....: 7 in / 12

Soil type ....: Crowley silt loam
% organic matter ....: NA
pH ....: 7.7
Extractable nutrients ....: Ca-1,470; Cu-1.7; Mg-227; P-30.6; K-79.8; Na-113; S-9.4; Zn-6.8

Crop/Variety ....: Rice / Cocodrie
Planting method/date ....: Drill seeded / March 20
Seeding rate/depth ....: 33 seeds/ft^2 / 1 in
Emergence date ....: March 28
Harvest date ....: August 7; Ratoon harvest, October 24

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g

Fertilization ....: 5 lb/A $ZnSO_4$, March 20
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2
90 lb N/A 46-0-0, August 7

Water management ....:
Flush ....: March 28, April 20
Flood ....: May 3; Ratoon flood, August 8
Drain ....: July 17; Ratoon drain, October 4

Pest management ....:
Herbicides ....: 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
Insecticides ....: 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
Fungicides ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 26. Rice Response to P Fertilization (Rice Research Station).

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice
Description									
Rating Date					8/6/2007	8/7/2007		10/24/2007	
Rating Data Type				50% Head	Height	Yield	Tissue P	Yield	Yield
Rating Unit				days	in	lb/A	%	lb/A	lb/A
Crop Stage				Main	Main	Main	2-3 leaf	Ratoon	Total
Trt No. Treatment Name	Rate	Rate Unit	Growth Stage						
1 Triple Superphosphate	0	LB A/A	ATPLAN	98 a	35 a	8197 a	0.23	2279 a	10476 a
2 Triple Superphosphate	20	LB A/A	ATPLAN	98 a	34 a	8358 a	0.26	2378 a	10735 a
3 Triple Superphosphate	40	LB A/A	ATPLAN	98 a	36 a	8323 a	0.23	2315 a	10638 a
4 Triple Superphosphate	60	LB A/A	ATPLAN	98 a	35 a	8301 a	0.25	2402 a	10703 a
5 Triple Superphosphate	80	LB A/A	ATPLAN	98 a	35 a	8699 a	0.25	2294 a	10993 a
6 Triple Superphosphate	100	LB A/A	ATPLAN	98 a	35 a	8365 a	0.29	2303 a	10668 a
LSD (P=.05)				.	1.3	843.1	.	461.5	1085.5
Standard Deviation				.	0.7	559.5	.	306.3	720.4
CV				.	1.99	6.68	.	13.15	6.73
Replicate F					3.182	1.482		3.812	2.994
Replicate Prob(F)					0.0852	0.2595		0.0326	0.0641
Treatment F					1.545	0.371		0.105	0.219
Treatment Prob(F)					0.2606	0.8605		0.9896	0.949

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to P Fertilization (Morehouse Parish)

Experiment number .... : 07-MP-02

Site and design .... :
- **Location/Cooperator** .... : Morehouse Parish / Don Andrews and Roland Crymes
- **Tillage type** .... : Spring stale
- **Experimental design** .... : Randomized complete block
- **Number of reps** .... : 4
- **Plot size** .... : 7 x 20 ft
- **Row width/rows per plot** .... : 7 in / 12

Soil type .... : Perry clay
- **% organic matter** .... : NA
- **pH** .... : 6.8
- **Extractable nutrients** .... : Ca-2,662; Cu-2.8; Mg-821; P-21.3; K-311.9; Na-243; S-19.0; Zn-4.0

Crop/Variety .... : Rice / Cocodrie
- **Planting method/date** .... : Drill seeded / May 2
- **Seeding rate/depth** .... : 33 seeds/ft^2 / .75 in
- **Emergence date** .... : May 10
- **Harvest date** .... : September 5

Seed treatment/cwt .... : Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization .... : 5 lb Zn/A $ZnSO_4$, May 2
165 lb N/A 46-0-0, May 31

Water management .... :
- **Flush** .... : May 4, May 24
- **Flood** .... : June 1
- **Drain** .... : August 24

Pest management .... :
- **Herbicides** .... : 1 qt/A Honcho Plus, May 8
4 qt/A Arrosolo + .67 lb/A Facet, May 30
15 oz/A Clincher + 1 qt/A Oil, June 8
- **Insecticides** .... : 2 oz/A Karate, June 8
4 oz/A Mustang Max, July 30
- **Fungicides** .... : 12 oz/A Quadris, July 30

Table 27. Rice Response to P Fertilization (Morehouse Parish).

Crop Name			Rice	Rice	Rice	Rice
Rating Date				9/5/2007	9/5/2007	
Rating Data Type			50% Head	Height	Yield	Tissue-P
Rating Unit			days	in	lb/A	%
Sample Size Unit						Y-leaf
Crop Stage			Main	Main	Main	2-3 leaf
Trt No.	Treatment Name	Rate Rate Unit	Growth Stage				
1	Triple Superphosphate	0 LB A/A	ATPLAN	91 a	36 a	7665 a	0.32
	0-0-60 Poash	45 LB A/A	ATPLAN				
2	Triple Superphosphate	20 LB A/A	ATPLAN	91 a	37 a	7859 a	0.31
	0-0-60 Poash	45 LB A/A	ATPLAN				
3	Triple Superphosphate	40 LB A/A	ATPLAN	91 a	36 a	8170 a	0.34
	0-0-60 Poash	45 LB A/A	ATPLAN				
4	Triple Superphosphate	60 LB A/A	ATPLAN	90 a	37 a	8380 a	0.33
	0-0-60 Poash	45 LB A/A	ATPLAN				
5	Triple Superphosphate	80 LB A/A	ATPLAN	91 a	36 a	8217 a	0.34
	0-0-60 Poash	45 LB A/A	ATPLAN				
6	Triple Superphosphate	100 LB A/A	ATPLAN	91 a	37 a	8041 a	0.33
	0-0-60 Poash	45 LB A/A	ATPLAN				
LSD (P=.05)				0.7	1.3	733.3	.
Standard Deviation				0.5	0.7	486.6	.
CV				0.5	1.97	6.04	.
Replicate F				1.8	6.489	0.739	
Replicate Prob(F)				0.1904	0.0156	0.5453	
Treatment F				1.32	0.872	1.135	
Treatment Prob(F)				0.3081	0.5324	0.3846	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to Zn Fertilization (Rice Research Station)

Experiment number ....: 07-CM-14

Site and design ....:
  Location/Cooperator ....: Rice Research Station (Crowley Main)
  Tillage type ....: Conventional
  Experimental design ....: Randomized complete block
  Number of reps ....: 4
  Plot size ....: 7 x 20 ft
  Row width/rows per plot ....: 7 in / 12

Soil type ....: Crowley silt loam
  % organic matter ....: NA
  pH ....: 7.7
  Extractable nutrients ....: Ca-1,470; Cu-1.7; Mg-227; P-30.6; K-79.8; Na-113; S-9.4; Zn-6.8

Crop/Variety ....: Rice / Cocodrie
  Planting method/date ....: Drill seeded / March 20
  Seeding rate/depth ....: 33 seeds/ft^2 / 1 in
  Emergence date ....: March 28
  Harvest date ....: August 7; Ratoon harvest, October 24

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g

Fertilization ....: 100 lb/A triple super phosphate, March 20
75 lb/A 0-0-60, March 20
150 lb N/A 46-0-0, May 2
90 lb N/A 46-0-0, August 7

Water management ....:
  Flush ....: March 28, April 20
  Flood ....: May 3; Ratoon flood, August 8
  Drain ....: July 17; Ratoon drain, October 4

Pest management ....:
  Herbicides ....: 15 oz/A Clincher, April 23
1g al/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
  Insecticides ....: 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
  Fungicides ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 28. Rice Response to Zn Fertilization (Rice Research Station).

Crop Name						Rice	Rice	Rice	Rice	Rice	Rice	Rice
Description												
Rating Date									8/6/2007	8/7/2007	10/24/2007	
Rating Data Type						Sulfur	Zinc	50% Head	Height	Yield	Yield	Yield
Rating Unit						%	mg/kg	days	in	lb/A	lb/A	lb/A
Sample Size Unit						Y-leaf	Y-leaf					
Crop Stage						2-3 leaf	2-3 leaf	Main	Main	Main	Ratoon	Total
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description							
1	Zn Sulfate	0	LB A/A	ATPLAN	Zinc	0.28	35	100 a	36 a	8058 a	2473 a	10530 a
	Sulfur	10	LB A/A	ATPLAN	Sulfur							
2	Zn Sulfate	5	LB A/A	ATPLAN	Zinc	0.31	52	100 a	36 a	8445 a	2610 a	11054 a
	Sulfur	7.6	LB A/A	ATPLAN	Sulfur							
3	Zn Sulfate	10	LB A/A	ATPLAN	Zinc	0.28	66	100 a	37 a	8394 a	2511 a	10905 a
	Sulfur	5.2	LB A/A	ATPLAN	Sulfur							
4	Zn Sulfate	15	LB A/A	ATPLAN	Zinc	0.14	44	101 a	36 a	8740 a	2635 a	11375 a
	Sulfur	2.8	LB A/A	ATPLAN	Sulfur							
5	Zn Sulfate	20	LB A/A	ATPLAN	Zinc	0.32	115	101 a	36 a	8089 a	2673 a	10762 a
	Sulfur	0.4	LB A/A	ATPLAN	Sulfur							
6	Zn Sulfate	0	LB A/A	ATPLAN	Zinc	0.3	36	100 a	37 a	8484 a	2689 a	11173 a
	Sulfur	0	LB A/A	ATPLAN	Sulfur							
LSD (P=.05)						.	.	1.1	1.9	607.3	317.2	635.1
Standard Deviation						.	.	0.6	1	403	210.5	421.5
CV						.	.	0.62	2.82	4.82	8.1	3.84
Replicate F								23.286	0.684	12.677	7.204	20.047
Replicate Prob(F)								0.0002	0.527	0.0002	0.0032	0.0001
Treatment F								2.886	0.084	1.638	0.699	2.042
Treatment Prob(F)								0.0723	0.993	0.2102	0.6325	0.1305

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to Zn Fertilization (Morehouse Parish)

Experiment number ....: 07-MP-03

Site and design ....:
  Location/Cooperator ....: Morehouse Parish / Don Andrews and Roland Crymes
  Tillage type.................................: Spring stale
  Experimental design...................: Randomized complete block
  Number of reps...........................: 4
  Plot size..: 7 x 20 ft
  Row width/rows per plot............: 7 in / 12

Soil type ....: Perry clay
  % organic matter........................: NA
  pH...: 6.8
  Extractable nutrients..................: Ca-2,662; Cu-2.8; Mg-821; P-21.3; K-311.9; Na-243; S-19.0; Zn-4.0

Crop/Variety ....: Rice / Cocodrie
  Planting method/date ....: Drill seeded / May 2
  Seeding rate/depth......................: 33 seeds/ft^2 / .75 in
  Emergence date...........................: May 10
  Harvest date ....: September 6

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization..: 100 lb/A triple super phosphate, May 2
75 lb/A 0-0-60, May 2
165 lb N/A 46-0-0, May 31

Water management ....:
  Flush ....: May 4, May 24
  Flood ....: June 1
  Drain..: August 24

Pest management...............................:
  Herbicides....................................: 1 qt/A Honcho Plus, May 8
4 qt/A Arrosolo + .67 lb/A Facet, May 30
15 oz/A Clincher + 1 qt/A Oil, June 8
  Insecticides ....: 2 oz/A Karate, June 8
4 oz/A Mustang Max, July 30
  Fungicides ....: 12 oz/A Quadris, July 30

Table 29. Rice Response to Zn Fertilization (Morehouse Parish).

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date						5/30/2007	9/5/2007	9/5/2007	
Rating Data Type					50% Head	Height	Height	Yield	Tissue-Zn
Rating Unit					days	in	in	lb/A	ppm
Sample Size Unit									Y-Leaf
Crop Stage					Main	2-3 leaf	Main	Main	2-3 leaf
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description				
1	Zn Sulfate	0	LB A/A	ATPLAN	Zinc	91 a	6 c	37 a	8163 a	53
	Sulfur	10	LB A/A	ATPLAN	Sulfur					
2	Zn Sulfate	5	LB A/A	ATPLAN	Zinc	90 a	7 b	38 a	8008 a	55
	Sulfur	7.6	LB A/A	ATPLAN	Sulfur					
3	Zn Sulfate	10	LB A/A	ATPLAN	Zinc	90 a	7 a	38 a	8127 a	61
	Sulfur	5.2	LB A/A	ATPLAN	Sulfur					
4	Zn Sulfate	15	LB A/A	ATPLAN	Zinc	91 a	7 a	38 a	8346 a	124
	Sulfur	2.8	LB A/A	ATPLAN	Sulfur					
5	Zn Sulfate	20	LB A/A	ATPLAN	Zinc	90 a	7 a	38 a	8184 a	63
	Sulfur	0.4	LB A/A	ATPLAN	Sulfur					
6	Zn Sulfate	0	LB A/A	ATPLAN	Zinc	90 a	6 c	38 a	8327 a	64
	Sulfur	0	LB A/A	ATPLAN	Sulfur					
LSD (P=.05)						0.7	0.4	0.9	566.6	.
Standard Deviation						0.5	0.2	0.5	376	.
CV						0.52	3.2	1.34	4.59	.
Replicate F						2.215	1.044	4.13	0.55	
Replicate Prob(F)						0.1286	0.3875	0.0492	0.6556	
Treatment F						2.013	22.298	0.739	0.46	
Treatment Prob(F)						0.135	0.0001	0.6113	0.7997	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to Zn Fertilization Rate and Source (Vermilion Parish)

Experiment number ....: C Richard Zn Study 2007

Site and design ....:
- **Location/Cooperator** ....: Vermilion Parish / C. Richard
- **Tillage type** ....: Stale seedbed
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 10 x 20 ft
- **Row width/rows per plot** ....: 7 in

Soil type ....:
- **% organic matter** ....: NA
- **pH** ....: 7.6
- **Extractable nutrients-ppm** ....: Ca-2,047; Cu-1.2; Mg-790; P-4.7; K-146.5; Na-174; S-6.4; Zn-0.5

Crop/Variety ....: Rice / RiceTec Clearfield Hybrid Blend
- **Planting method/date** ....: Drill
- **Seeding rate/depth** ....: approx ¾ in
- **Emergence date** ....:
- **Harvest date** ....: August 15

Fertilization ....: 225 lb/A 0-18-36
20 lb/A sulfur
5 lb/A Zn

Table 30. Rice Response to Zn Fertilization Rate and Source (Vermilion Parish).

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date				5/14/2007	8/15/2007	8/15/2007	8/15/2007	8/15/2007
Rating Data Type				height	Height	Ldg-Rate	Ldg-Type	Yield
Rating Unit				cm	in	%	1-5	lb/A
Crop Stage				2-tiller	Main	Main	Main	Main
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage				
1	Zn Sulfate	0	LB A/A	2-leaf	20.31 a	47 a	23 a	1 a	7679 a
	Sulfur	15	LB A/A	2-leaf					
2	Zn Sulfate	5	LB A/A	2-leaf	18.44 a	45 a	26 a	3 a	8021 a
	Sulfur	12.6	LB A/A	2-leaf					
3	Zn Sulfate	10	LB A/A	2-leaf	19 a	46 a	35 a	3 a	7674 a
	Sulfur	10.2	LB A/A	2-leaf					
4	Zn Sulfate	15	LB A/A	2-leaf	19.06 a	46 a	33 a	2 a	8263 a
	Sulfur	7.8	LB A/A	2-leaf					
5	Zn Sulfate	20	LB A/A	2-leaf	20.88 a	46 a	9 a	2 a	8234 a
	Sulfur	5.4	LB A/A	2-leaf					
6	Zn Sulfate	0	LB A/A	2-leaf	19.69 a	46 a	38 a	3 a	7835 a
	Sulfur	0	LB A/A	2-leaf					
7	Lignosulfonate (Ruffin-Tuff)	5	LB A/A	2-leaf	19.69 a	47 a	23 a	2 a	8435 a
	Sulfur	11.5	LB A/A	2-leaf					
8	Lignosulfonate (Ruffin-Tuff)	10	LB A/A	2-leaf	19.5 a	47 a	43 a	2 a	8548 a
	Sulfur	8	LB A/A	2-leaf					
9	Lignosulfonate (Ruffin-Tuff)	15	LB A/A	2-leaf	19.31 a	47 a	28 a	3 a	7847 a
	Sulfur	4.5	LB A/A	2-leaf					
10	Lignosulfonate (Ruffin-Tuff)	20	LB A/A	2-leaf	19.88 a	46 a	28 a	3 a	7611 a
	Sulfur	1	LB A/A	2-leaf					
11	Zinc Plus ($ZnSO_4$ Foliar)	0.266	LB A/A	2-leaf	19.63 a	46 a	10 a	1 a	7483 a
LSD (P=.05)					2.136	2.6	28	1.5	799.3
Standard Deviation					1.479	1.8	19.4	1	549.8
CV					7.56	3.92	72.86	47.6	6.9
Replicate F					3.705	7.141	6.707	5.449	2.495
Replicate Prob(F)					0.0222	0.0009	0.0013	0.0041	0.0821
Treatment F					0.788	0.511	1.179	2.275	1.693
Treatment Prob(F)					0.6398	0.8685	0.3425	0.04	0.1359

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Urea, Agrotain-Treated Urea, and 43G at Two Application Timings

Experiment number : 07-CM-25

Site and design :
- **Location/Cooperator** : Rice Research Station (Crowley Main)
- **Tillage type** : Conventional
- **Experimental design** : Randomized complete block
- **Number of reps** : 4
- **Plot size** : 7 x 20 ft
- **Row width/rows per plot** : 7 in / 12

Soil type : Crowley silt loam
- **% organic matter** : NA
- **pH** : 7.7
- **Extractable nutrients** : Ca-1,470; Cu-1.7; Mg-227; P-30.6; K-79.8; Na-113; S-9.4; Zn-6.8

Crop/Variety : Rice / Cocodrie
- **Planting method/date** : Drill seeded / March 20
- **Seeding rate/depth** : 75 lb/A / 1 in
- **Emergence date** : March 28
- **Harvest date** : August 7; Ratoon harvest, October 24

Seed treatment/cwt : Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization : 195 lb/A 0-24-24-2.5, March 20
1 qt/A Zinc Plus, May 1
90 lb N/A 46-0-0, August 7

Water management :
- **Flush** : March 28, April 20
- **Flood** : May 3; Ratoon flood, August 8
- **Drain** : July 17; Ratoon drain, October 4

Pest management :
- **Herbicides** : 15 oz/A Clincher, April 23
  1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
  1 oz/A Londax, May 17
  3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** : 4 oz/A Karate, May 10
  4 oz/A Mustang Max, July 2
- **Fungicides** : 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 31. Evaluation of Urea, Agrotain-Treated Urea, and 43G at Two Application Timings.

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date						8/1/2007	8/6/2007	10/24/2007	
Rating Data Type					50% Head	Height	Yield	Yield	Yield
Rating Unit					days	in	lb/A	lb/A	lb/A
Crop Stage					Main	Main	Main	Ratoon	Total
Trt No. Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description					
1 Urea 1 day preflood	150	LB A/A	1 day PF	Urea	101 a	35 a	7428 a	2270 a	9698 a
2 Urea 7 days preflood	150	LB A/A	7 dayPF	Urea	96 b	28 b	2648 c	2061 a	4709 c
3 Agrotain-Urea 1 day preflood	150	LB A/A	1 day PF	Agrotain	101 a	35 a	6907 a	1912 a	8818 b
4 Agrotain-Urea 7 days preflood	150	LB A/A	7 dayPF	Agrotain	99 a	34 a	6181 b	2222 a	8403 b
5 Nitamin (43G) 1 day preflood	150	LB A/A	1 day PF	43G	101 a	35 a	6375 b	2259 a	8634 b
6 Nitamin (43G) 7 days preflood	150	LB A/A	7 dayPF	43G	96 b	29 b	2865 c	2013 a	4878 c
LSD (P=.05)					1.7	2.3	529.9	403.7	718.5
Standard Deviation					1	1.3	351.7	267.9	476.8
CV					0.97	3.85	6.51	12.62	6.34
Replicate F					2.952	1.713	5.075	1.357	5.237
Replicate Prob(F)					0.0983	0.2292	0.0127	0.2938	0.0113
Treatment F					19.578	21.119	141.957	1.232	82.086
Treatment Prob(F)					0.0001	0.0001	0.0001	0.3425	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Two Liquid N Fertilizers for Midseason Application

Experiment number	: 07-CM-26
Site and design	:
Location/Cooperator	: Rice Research Station (Crowley Main)
Tillage type	: Conventional
Experimental design	: Randomized complete block
Number of reps	: 4
Plot size	: 7 x 20 ft
Row width/rows per plot	: 7 in / 12
Soil type	: Crowley silt loam
% organic matter	: NA
pH	: 7.7
Extractable nutrients	: Ca-1,470; Cu-1.7; Mg-227; P-30.6; K-79.8; Na-113; S-9.4; Zn-6.8
Crop/Variety	: Rice / Cocodrie
Planting method/date	: Drill seeded / March 20
Seeding rate/depth	: 75 lb/A / 1 in
Emergence date	: March 28
Harvest date	: August 7; Ratoon harvest, October 24
Seed treatment/cwt	: Dithane (fungicide)-114 g Release (gibberellic acid)-10 g Zinche (40.5% Zn)-236 ml
Fertilization	: 195 lb/A 0-24-24-2.5, March 20 1 qt /A Zinc Plus, May 1 90 lb N/A 46-0-0, August 7
Water management	:
Flush	: March 28, April 20
Flood	: May 3; Ratoon flood, August 8
Drain	: July 17; Ratoon drain, October 4
Pest management	:
Herbicides	: 15oz/A Clincher, April 23 1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1 1 oz/A Londax, May 17 3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
Insecticides	: 4 oz/A Karate, May 10 4 oz/A Mustang Max, July 2
Fungicides	: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 32. Evaluation of Two Liquid N Fertilizers for Midseason Application.

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date						8/1/2007	8/6/2007	10/24/2007	
Rating Data Type					50% Head	Height	Yield	Yield	Yield
Rating Unit					Days	IN	lb/A	lb/A	lb/A
Crop Stage					Main	Main	Main	Ratoon	Total
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description				
1	25-0-0	45	LB A/A	PD	Midseason	99 a	33 a	6410 b	2913 a	9323 b
	UREA	105	LB A/A	2- to 3-leaf	Preflood					
2	30-0-0	45	LB A/A	PD	Midseason	98 a	33 a	6768 b	2841 a	9609 b
	UREA	105	LB A/A	2- to 3-leaf	Preflood					
3	Urea	45	LB A/A	PD	Midseason	98 a	34 a	7523 a	2620 a	10142 a
	UREA	105	LB A/A	2- to 3-leaf	Preflood					
LSD (P=.05)						0.8	3.2	387.7	274.6	440.2
Standard Deviation						0.3	1.4	224.1	158.7	254.4
CV						0.34	4.2	3.25	5.69	2.63
Replicate F						16	1.5	13.347	0.902	10.731
Replicate Prob(F)						0.0123	0.3265	0.0046	0.4934	0.008
Treatment F						1	0.5	25.705	3.722	10.68
Treatment Prob(F)						0.4444	0.64	0.0011	0.0889	0.0105

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Rice Response to the Humic Acid Product HydraHume

Experiment number	: 07-MP-04
Site and design	:
Location/Cooperator	: Morehouse Parish / Don Andrews and Roland Crymes
Tillage type	: Spring stale
Experimental design	: Randomized complete block
Number of reps	: 4
Plot size	: 7 x 20 ft
Row width/rows per plot	: 7 in / 12
Soil type	: Perry clay
% organic matter	: NA
pH	: 6.8
Extractable nutrients	: Ca-2,662; Cu-2.8; Mg-821; P-21.3; K-311.9; Na-243; S-19.0; Zn-4.0
Crop/Variety	: Rice / Cocodrie
Planting method/date	: Drill seeded / May 2
Seeding rate/depth	: 33 seeds/ft^2 / .75 in
Emergence date	: May 10
Harvest date	: September 6
Seed treatment/cwt	: Dithane (fungicide)-114 g Release (gibberellic acid)-10 g Zinche (40.5% Zn)-236 ml
Fertilization	: 165 lb N/A 46-0-0, May 31
Water management	:
Flush	: May 4, May 24
Flood	: June 1
Drain	: August 24
Pest management	:
Herbicides	: 1 qt/A Honcho Plus, May 8 4 qt/A Arrosolo + .67 lb/A Facet, May 30 15 oz/A Clincher + 1 qt/A Oil, June 8
Insecticides	: 2 oz/A Karate, June 8 4 oz/A Mustang Max, July 30
Fungicides	: 12 oz/A Quadris, July 30

Table 33. Rice Response to the Humic Acid Product HydraHume.

Crop Name				Rice	Rice	Rice	Rice
Rating Date					5/30/2007	9/6/2007	9/6/2007
Rating Data Type				50% Head	Height	Height	Yield
Rating Unit				days	mm	in	lb/A
Crop Stage				Main	2-3 leaf	Main	Main
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage			
1	0 lb/A HudraHume	0	LB/A	ATPLAN	92 a	90 a	37 a	8174 a
	0 lb/A 0-24-24	0	LB/A	ATPLAN				
2	0 lb/A HudraHume	0	LB/A	ATPLAN	92 a	89 a	38 a	8231 a
	250 lb/A 0-24-24	250	LB/A	ATPLAN				
3	10 lb/A HydraHume	10	LB/A	ATPLAN	91 a	98 a	38 a	8274 a
	0 lb/A 0-24-24	0	LB/A	ATPLAN				
4	10 lb/A HydraHume	10	LB/A	ATPLAN	92 a	94 a	38 a	7857 a
	250 lb/A 0-24-24	250	LB/A	ATPLAN				
5	40 lb/A HydraHume	40	LB/A	ATPLAN	92 a	94 a	37 a	8463 a
	0 lb/A 0-24-24	0	LB/A	ATPLAN				
6	40 lb/A HydraHume	40	LB/A	ATPLAN	92 a	98 a	38 a	8179 a
	250 lb/A 0-24-24	250	LB/A	ATPLAN				
LSD (P=.05)					0.7	15.2	1	437.5
Standard Deviation					0.5	5.9	0.6	290.4
CV					0.54	6.33	1.5	3.54
Replicate F					1.552	0.686	10.517	5.354
Replicate Prob(F)					0.2424	0.4451	0.0035	0.0104
Treatment F					0.724	0.738	1	1.844
Treatment Prob(F)					0.6158	0.6266	0.4651	0.1645

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Liquid Starter N Fertilizers in a Clearfield System

Experiment number ....: 07-MP-05 and 07-MP-06

Site and design ....:
- **Location/Cooperator** ....: Morehouse Parish / Don Andrews and Roland Crymes
- **Tillage type** ....: Spring stale
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Perry clay
- **% organic matter** ....: NA
- **pH** ....: 6.8
- **Extractable nutrients** ....: Ca-2,662; Cu-2.8; Mg-821; P-21.3; K-311.9; Na-243; S-19.0; Zn-4.0

Crop/Variety ....: Rice / CL171AR
- **Planting method/date** ....: Drill seeded / May 2
- **Seeding rate/depth** ....: 14 seeds/ft^2 / .75 in
- **Emergence date** ....: May 11
- **Harvest date** ....: September 6

Seed treatment/cwt ....: NA

Fertilization ....: NA

Water management ....:
- **Flush** ....: May 4, May 24
- **Flood** ....: June 1
- **Drain** ....: August 24

Pest management ....:
- **Herbicides** ....: 1 qt/A Honcho Plus, May 8
  4 qt/A Arrosolo + .67 lb/A Facet, May 30
  15 oz/A Clincher + 1 qt/A Oil, June 8
- **Insecticides** ....: 2 oz/A Karate, June 8
  4 oz/A Mustang Max, July 30
- **Fungicides** ....: 12 oz/A Quadris, July 30

Table 34. Evaluation of Liquid Starter N Fertilizers in a Clearfield System – CL171.

Crop Variety				CL171	CL171	CL171	CL171
Rating Data Type				Height	50% Head	Height	Yield
Rating Unit				mm	days	in	lb/A
Rating Date				5/30/2007		9/6/2007	9/6/2007
Crop Stage				2-3 leaf		Main	Main
Trt No.	Treatment Name	Rate	Rate Unit	Grow Stg			
1	Amm. Sulfate-Gr	10	LB A/A	planting	177 a	93 a	40 a	6641 a
	UREA	150	LB A/A	PF				
2	Amm. Thiosulfate-L	10	LB A/A	1-2 leaf	172 ab	93 a	40 a	6782 a
	UREA	150	LB A/A	PF				
3	Amm. Sulfate-Gr	20	LB A/A	planting	163 ab	93 a	40 a	6652 a
	UREA	150	LB A/A	PF				
4	Amm. Thiosulfate-L	20	LB A/A	1-2 leaf	178 a	93 a	39 a	6883 a
	UREA	150	LB A/A	PF				
5	DAP	10	LB A/A	planting	180 a	93 a	40 a	6611 a
	UREA	150	LB A/A	PF				
6	APS	10	LB A/A	1-2 leaf	150 b	93 a	39 a	6447 a
	UREA	150	LB A/A	PF				
7	DAP	20	LB A/A	planting	179 a	92 a	39 a	6818 a
	UREA	150	LB A/A	PF				
8	APS	20	LB A/A	1-2 leaf	163 ab	93 a	39 a	6617 a
	UREA	150	LB A/A	PF				
9	UTC				148 b	93 a	39 a	6463 a
	UREA	150	LB A/A	PF				
LSD (P=.05)					17.7	1	0.9	514.8
Standard Deviation					10.2	0.7	0.5	351.9
CV					6.07	0.75	1.27	5.29
Replicate F					1.057	2.946	4	1.546
Replicate Prob(F)					0.3722	0.0542	0.039	0.2296
Treatment F					4.496	0.712	1.333	0.722
Treatment Prob(F)					0.006	0.679	0.2963	0.6709

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Table 35. Evaluation of Liquid Starter N Fertilizers in a Clearfield System-CLXL730.

Crop Variety				CLXL730	CLXL730	CLXL730	CLXL730
Rating Data Type				Height	50% Head	Height	Yield
Rating Unit				mm	days	in	lb/A
Rating Date				5/30/2007		9/6/2007	9/6/2007
Crop Stage				2-3 leaf		Main	Main
Trt No.	Treatment Name	Rate	Rate Unit	Grow Stg			
1	Amm. Sulfate-Gr	10	LB A/A	planting	170 a	93 a	50 a	10484 a
	UREA	150	LB A/A	PF				
2	Amm. Thiosulfate-L	10	LB A/A	1-2 leaf	171 a	92 a	49 a	10591 a
	UREA	150	LB A/A	PF				
3	Amm. Sulfate-Gr	20	LB A/A	planting	164 a	92 a	49 a	10630 a
	UREA	150	LB A/A	PF				
4	Amm. Thiosulfate-L	20	LB A/A	1-2 leaf	169 a	92 a	50 a	10470 a
	UREA	150	LB A/A	PF				
5	DAP	10	LB A/A	planting	170 a	93 a	50 a	10721 a
	UREA	150	LB A/A	PF				
6	APS	10	LB A/A	1-2 leaf	157 a	92 a	49 a	10532 a
	UREA	150	LB A/A	PF				
7	DAP	20	LB A/A	planting	161 a	92 a	50 a	10595 a
	UREA	150	LB A/A	PF				
8	APS	20	LB A/A	1-2 leaf	164 a	92 a	49 a	10788 a
	UREA	150	LB A/A	PF				
9	UTC				160 a	92 a	50 a	10544 a
	UREA	150	LB A/A	PF				
LSD (P=.05)					18.5	0.7	1.5	430.8
Standard Deviation					10.7	0.5	0.9	295.2
CV					6.49	0.53	1.78	2.79
Replicate F					7.182	5.765	0.571	13.005
Replicate Prob(F)					0.0059	0.0041	0.5758	0.0001
Treatment F					0.687	1.353	0.75	0.513
Treatment Prob(F)					0.6973	0.2663	0.6491	0.8346

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluating Nondestructive Measurements to Predict Midseason N Needs for Cocodrie Rice

Experiment number ....: 07-CM-27

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ....: Ca-1,243; Cu-1.7; Mg-230; P-16.8; K-80.4; Na-89.6; S-6.7; Zn-7.3

Crop/Variety ....: Rice / Cocodrie
- **Planting method/date** ....: Drill seeded / March 20
- **Seeding rate/depth** ....: 40 seeds/ft^2 / 1 in
- **Emergence date** ....: March 28
- **Harvest date** ....: August 6

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 20
1 qt /A Zinc Plus, May 1

Water management ....:
- **Flush** ....: March 28, April 20
- **Flood** ....: May 3
- **Drain** ....: July 17

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
  1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
  1 oz/A Londax, May 17
- **Insecticides** ....: 4 oz/A Karate, May 10
  4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 36. Evaluating nondestructive measurements to predict midseason N needs for Cocodrie rice. (Only agronomic response data shown.)

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date					6/7/2007			8/1/2007	8/6/2007
Rating Data Type					Tissue-N	Tissue-N	50% Head	Height	Yield
Rating Unit					%	%	days	in	lb/A
Crop Stage					PD	50% Head	Main	Main	Main
Trt No.	Rate	Rate Unit	Growth Stage	Appl Description					
1	0	LB A/A	3- to 4-leaf	Preflood N	0.95 e	0.94 b	95 de	28 gh	2129 f
	0	LB A/A	PD	Midseason N					
2	0	LB A/A	3- to 4-leaf	Preflood N		0.98 b	94 ef	27 h	3375 e
	60	LB A/A	PD	Midseason N					
3	30	LB A/A	3- to 4-leaf	Preflood N	1.08 de	0.88 b	94 f	30 g	3765 e
	0	LB A/A	PD	Midseason N					
4	30	LB A/A	3- to 4-leaf	Preflood N		0.86 b	94 ef	32 f	5169 d
	60	LB A/A	PD	Midseason N					
5	60	LB A/A	3- to 4-leaf	Preflood N	1.4 cd	0.89 b	95 de	32 ef	6447 c
	0	LB A/A	PD	Midseason N					
6	60	LB A/A	3- to 4-leaf	Preflood N		0.98 b	96 d	33 def	7099 bc
	60	LB A/A	PD	Midseason N					
7	90	LB A/A	3- to 4-leaf	Preflood N	1.68 bc	0.95 b	96 bcd	33 def	7251 bc
	0	LB A/A	PD	Midseason N					
8	90	LB A/A	3- to 4-leaf	Preflood N		0.96 b	96 cd	35 cd	8026 ab
	60	LB A/A	PD	Midseason N					
9	120	LB A/A	3- to 4-leaf	Preflood N	1.94 ab	1.05 b	97 bcd	34 cde	8191 ab
	0	LB A/A	PD	Midseason N					
10	120	LB A/A	3- to 4-leaf	Preflood N		1.02 b	97 bc	38 ab	9022 a
	60	LB A/A	PD	Midseason N					
11	150	LB A/A	3- to 4-leaf	Preflood N	2.08 a	1.06 b	97 b	36 bc	9031 a
	0	LB A/A	PD	Midseason N					
12	150	LB A/A	3- to 4-leaf	Preflood N		1.27 a	98 a	39 a	8996 a
	60	LB A/A	PD	Midseason N					
LSD (P=.05)					0.317	0.158	0.9	1.8	837.5
Standard Deviation					0.211	0.109	0.5	1.1	580
CV					13.85	11.08	0.56	3.29	8.87
Replicate F					0.252	1.691	3.018	2.85	1.631
Replicate Prob(F)					0.8584	0.1879	0.0695	0.0793	0.201
Treatment F					18.915	3.997	18.336	33.396	68.328
Treatment Prob(F)					0.0001	0.001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response of Rice Hybrids to Main-Crop Stubble Manipulation 3.1

Experiment number	: 07-CM-21
Site and design	:
Location/Cooperator	: Rice Research Station (Crowley Main)
Tillage type	: Conventional
Experimental design	: Randomized complete block
Number of reps	: 4
Plot size	: 7 x 25 ft
Row width/rows per plot	: 7 in / 12
Soil type	: Crowley silt loam
% organic matter	: NA
pH	: 7.1
Extractable nutrients	: Ca-1,102; Cu-1.7; Mg-231; P-11.6; K-82.2; Na-97.8; S-7.4; Zn-7.2
Crop/Variety	: Rice / CLXL729, XP723
Planting method/date	: Drill seeded / March 19
Seeding rate/depth	: 14 seeds/ft^2 / 1 in
Emergence date	: March 27
Harvest date	: July 26; Ratoon harvest, October 16
Seed treatment/cwt	:
Fertilization	: 195 lb/A 0-24-24-2.5, March 19
	1 qt/A Zinc Plus, May 1
	150 lb N/A 46-0-0, May 2
	90 lb N/A 46-0-0, July 26
Water management	:
Flush	: March 29, April 20
Flood	: May 3; Ratoon flood, July 27
Drain	: July 12; Ratoon drain, October 4
Pest management	:
Herbicides	: 15 oz/A Clincher, April 23
	1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
	1 oz/A Londax, May 17
	3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, July 26
Insecticides	: 4 oz/A Karate, May10
	4 oz/A Mustang Max, July 2
Fungicides	: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 37. Ratoon Response of Rice Hybrids to Main-Crop Stubble Manipulation 3.1.

Crop Name	Rice	Rice	Rice	Rice
Rating Date		7/23/2007		10/16/2007
Rating Data Type	50% Head	Height	50% Head	Yield
Rating Unit	days	in	days	lb/A
Crop Stage	Main	Main	Ratoon	Ratoon
Trt No. Treatment Name				
1 Standard Height CLXL729	97 a	37 a	31 d	4295 a
2 12-inch cutting height CLXL729	97 ab	37 a	32 cd	3753 ab
3 flail-mowed CLXL729	96 ab	36 a	36 b	4157 a
4 rolled CLXL729	96 ab	36 a	50 a	3453 ab
5 Standard Height XP723	96 ab	40 a	31 d	2761 b
6 12-inch cutting height XP723	96 ab	40 a	33 c	3555 ab
7 flail-mowed XP723	95 ab	37 a	36 b	3778 ab
8 rolled XP723	94 b	36 a	49 a	2845 b
LSD (P=.05)	2	2.7	1.4	849.5
Standard Deviation	1.1	1.5	0.8	575.9
CV	1.18	4.08	2.22	16.11
Replicate F	1.595	0.505	1.278	0.967
Replicate Prob(F)	0.2376	0.614	0.3091	0.4276
Treatment F	2.786	3.482	260.696	3.688
Treatment Prob(F)	0.0487	0.0224	0.0001	0.0101

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response of Rice Varieties to Main-Crop Stubble Manipulation 3.1

Experiment number ....: 07-CM-22

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 25 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ....: Ca-1,102; Cu-1.7; Mg-231; P-11.6; K-82.2; Na-97.8; S-7.4; Zn-7.2

Crop/Variety ....: Rice / Cocodrie, Trenasse
- **Planting method/date** ....: Drill seeded / March 19
- **Seeding rate/depth** ....: 33 seeds/ft^2 / 1 in
- **Emergence date** ....: Cocodrie, March 26; Trenasse, March 28
- **Harvest date** ....: July 26; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2
90 lb N/A 46-0-0, July 26

Water management ....:
- **Flush** ....: March 29, April 20
- **Flood** ....: May 3; Ratoon flood, July 27
- **Drain** ....: July 12; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
  1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
  1 oz/A Londax, May 17
  3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, July 26
- **Insecticides** ....: 4 oz/A Karate, May 10
  4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 38. Ratoon Response of Rice Varieties to Main-Crop Stubble Manipulation 3.1.

Crop Name	Rice	Rice	Rice	Rice
Rating Date		7/23/2007		10/16/2007
Rating Data Type	50% Head	Height	50% Head	Yield
Rating Unit	days	in	days	lb/A
Crop Stage	Main	Main	Ratoon	Ratoon
Trt No. Treatment Name				
1 Standard Height Cocodrie	95 ab	29 a	36 f	2324 ab
2 12-inch cutting height Cocodrie	95 a	30 a	40 e	2331 ab
3 flail-mowed Cocodrie	94 ab	29 a	42 c	2182 ab
4 rolled Cocodrie	94 ab	27 a	50 a	2052 ab
5 Standard Height Trenasse	93 b	29 a	36 f	2708 a
6 12-inch cutting height Trenasse	93 b	30 a	36 f	2251 ab
7 flail-mowed Trenasse	93 b	29 a	41 d	2328 ab
8 rolled Trenasse	94 ab	30 a	46 b	1710 b
LSD (P=.05)	1.4	3.1	0.0	445.8
Standard Deviation	0.8	1.8	0.0	303.1
CV	0.83	6.07	0.0	13.56
Replicate F	0.068	0.36	0.0	3.058
Replicate Prob(F)	0.9346	0.7039	1.0	0.0507
Treatment F	4.262	0.851	0.0	3.494
Treatment Prob(F)	0.0102	0.565	1.0	0.0121

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparable.

Influence of Main-Crop Straw on Ratoon-Crop Nitrogen Efficiency 1.1

Experiment number	: 07-CM-23
Site and design	:
Location/Cooperator	: Rice Research Station (Crowley Main)
Tillage type	: Conventional
Experimental design	: Randomized complete block
Number of reps	: 4
Plot size	: 7 x 25 ft
Row width/rows per plot	: 7 in / 12
Soil type	: Crowley silt loam
% organic matter	: NA
pH	: 7.1
Extractable nutrients	: Ca-1,102; Cu-1.7; Mg-231; P-11.6; K-82.2; Na-97.8; S-7.4; Zn-7.2
Crop/Variety	: Rice / Cocodrie
Planting method/date	: Drill seeded / March 19
Seeding rate/depth	: 33 seeds/ft^2 / 1 in
Emergence date	: March 26
Harvest date	: July 26; Ratoon harvest, October 16
Seed treatment/cwt	: Dithane (fungicide)-114 g Release (gibberellic acid)-10 g Zinche (40.5% Zn)-236 ml
Fertilization	: 195 lb/A 0-24-24-2.5, March 19 1 qt/A Zinc Plus, May 1 150 lb N/A 46-0-0, May 2
Water management	:
Flush	: March 29, April 20
Flood	: May 3; Ratoon flood, July 27
Drain	: July 12; Ratoon drain, October 4
Pest management	:
Herbicides	: 15 oz/A Clincher, April 23 1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1 1 oz/A Londax, May 17 3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, July 26
Insecticides	: 4 oz/A Karate, May 10 4 oz/A Mustang Max, July 2
Fungicides	: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 39. Influence of Main-Crop Straw on Ratoon-Crop Nitrogen Efficiency 1.1.

Crop Name				Rice	Rice
Rating Date					10/16/2007
Rating Data Type				50% Head	Yield
Rating Unit				Days	lb/A
SE Description				Ratoon	Ratoon
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage		
1	Urea above straw				40 a	2041 a
	Urea	45	LB A/A	Postharvest		
2	Urea above straw				41 a	2364 a
	Urea	90	LB A/A	Postharvest		
3	Urea above straw				42 a	2659 a
	Urea	135	LB A/A	Postharvest		
4	Urea under straw				42 a	2293 a
	Urea	45	LB A/A	Postharvest		
5	Urea under straw				41 a	2281 a
	Urea	90	LB A/A	Postharvest		
6	Urea under straw				42 a	2622 a
	Urea	135	LB A/A	Postharvest		
7	Urea on bare soil				42 a	2863 a
	Urea	45	LB A/A	Postharvest		
8	Urea on bare soil				42 a	2375 a
	Urea	90	LB A/A	Postharvest		
9	Urea on bare soil				41 a	2412 a
	Urea	135	LB A/A	Postharvest		
LSD (P=.05)					1.2	677.8
Standard Deviation					0.7	464.4
CV					1.67	19.08
Replicate F					5.154	0.899
Replicate Prob(F)					0.0187	0.4562
Treatment F					2.038	1.105
Treatment Prob(F)					0.1073	0.3941

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of N source, Rate, and Variety on Ratoon Yield

Experiment number ....: 07-CM-24

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 25 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ....: Ca-1,102; Cu-1.7; Mg-231; P-11.6; K-82.2; Na-97.8; S-7.4; Zn-7.2

Crop/Variety ....: Rice / Cocodrie, Trenasse
- **Planting method/date** ....: Drill seeded / March 19
- **Seeding rate/depth** ....: 33 seeds/ft^2 / 1 in
- **Emergence date** ....: Cocodrie, March 26; Trenasse, March 28
- **Harvest date** ....: July 26; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2

Water management ....:
- **Flush** ....: March 29, April 20
- **Flood** ....: May 3; Ratoon flood, July 27
- **Drain** ....: July 12; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
  1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
  1 oz/A Londax, May 17
  3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, July 26
- **Insecticides** ....: 4 oz/A Karate, May 10
  4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 40. Evaluation of N Source, Rate, and Variety on Ratoon Yield.

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date						7/23/2007	7/26/2007		10/16/2007
Rating Data Type					50% Head	Height	Yield	50% Head	Yield
Rating Unit					days	in	lb/A	days	lb/A
Crop Stage					Main	Main	Main		Ratoon
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description				
1	Rate	45	LB A/A			94 a	29 ab	6126 a	38 a	1582 f
	Source			Harvest	Urea					
	Cocodrie									
2	Rate	90	LB A/A			95 a	32 ab	7233 a	39 a	2206 a-d
	Source			Harvest	Urea					
	Cocodrie									
3	Rate	135	LB A/A			94 a	30 ab	5932 a	38 a	2027 b-f
	Source			Harvest	Urea					
	Cocodrie									
4	Rate	45	LB A/A			93 a	28 b	6225 a	37 a	1608 ef
	Source			Harvest	Amm Sulfate					
	Cocodrie									
5	Rate	90	LB A/A			94 a	29 ab	6088 a	37 a	1934 c-f
	Source			Harvest	Amm Sulfate					
	Cocodrie									
6	Rate	135	LB A/A			94 a	31 ab	6675 a	37 a	2203 a-d
	Source			Harvest	Amm Sulfate					
	Cocodrie									
7	Rate	45	LB A/A			95 a	31 ab	6766 a	39 a	1650 def
	Source			Harvest	Blend					
	Cocodrie									
8	Rate	90	LB A/A			94 a	32 ab	6902 a	38 a	2180 a-e
	Source			Harvest	Blend					
	Cocodrie									
9	Rate	135	LB A/A			96 a	31 ab	6885 a	39 a	2163 a-e
	Source			Harvest	Blend					
	Cocodrie									
10	Rate	45	LB A/A			94 a	32 ab	7061 a	35 a	1812 def
	Source			Harvest	Urea					
	Trenasse									
11	Rate	90	LB A/A			95 a	34 a	7439 a	35 a	2561 ab
	Source			Harvest	Urea					
	Trenasse									
12	Rate	135	LB A/A			93 a	32 ab	7670 a	33 a	2655 a
	Source			Harvest	Urea					
	Trenasse									

Continued.

Table 40. Continued.

Crop Name					Rice	Rice	Rice	Rice	Rice
Rating Date						7/23/2007	7/26/2007		10/16/2007
Rating Data Type					50% Head	Height	Yield	50% Head	Yield
Rating Unit					days	in	lb/A	days	lb/A
Crop Stage					Main	Main	Main		Ratoon
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage	Appl Description				
13	Rate	45	LB A/A			92 a	32 ab	7373 a	32 a	1748 def
	Source			Harvest	Amm Sulfate					
	Trenasse									
14	Rate	90	LB A/A			92 a	31 ab	7786 a	33 a	2056 b-f
	Source			Harvest	Amm Sulfate					
	Trenasse									
15	Rate	135	LB A/A			94 a	33 ab	7807 a	33 a	2624 a
	Source			Harvest	Amm Sulfate					
	Trenasse									
16	Rate	45	LB A/A			93 a	32 ab	7442 a	32 a	1833 def
	Source			Harvest	Blend					
	Trenasse									
17	Rate	90	LB A/A			93 a	34 a	8220 a	32 a	2414 abc
	Source			Harvest	Blend					
	Trenasse									
18	Rate	135	LB A/A			93 a	32 ab	7402 a	32 a	2540 ab
	Source			Harvest	Blend					
	Trenasse									
LSD (P=.05)						2.6	2.8	1496.7	4.6	347.8
Standard Deviation						1.6	1.7	1058.4	2.8	245.9
CV						1.68	5.3	15	7.77	11.71
Replicate F						2.418	8.058	2.029	4.094	13.751
Replicate Prob(F)						0.1043	0.0014	0.1214	0.0255	0.0001
Treatment F						1.358	2.337	1.558	2.967	8.349
Treatment Prob(F)						0.2178	0.0172	0.1123	0.0034	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response of Rice Hybrids to Nitrogen Fertilizer Rates 3.1

Experiment number ....: 07-CM-01

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 25 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ppm..........: Ca-1,212; Cu-1.7; Mg-232; P-11.5; K-80; Na-81; S-6.8; Zn-5.8

Crop/Variety ....: Rice / XP723, CLXL729
- **Planting method/date** ....: Drill seeded / March 19
- **Seeding rate/depth** ....: 14 seeds/ft^2 / 1 in
- **Emergence date** ....: March 27
- **Harvest date** ....: August 6; Ratoon harvest, October 16

Fertilization ....: 195 lb/A 0-24-24-2.5, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2

Water management ....:
- **Flush** ....: March 29, April 20
- **Flood** ....: May 3; Ratoon flood, August 8
- **Drain** ....: July 17; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
  1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
  1 oz/A Londax, May 17
  3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** ....: 4 oz/A Karate, May 10
  4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 41. Ratoon Response of Rice Hybrids to Nitrogen Fertilizer Rates 3.1.

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/6/2007		10/16/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield
Rating Unit				days	in	lb/A	days	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage				
1	XP723			97 a	45 a	11308 a	35 a	3700 b
	Urea	60	LB A/A	Postharvest				
2	XP723			96 a	46 a	12093 a	35 a	4290 ab
	Urea	90	LB A/A	Postharvest				
3	XP723			97 a	45 a	11540 a	35 a	4061 ab
	Urea	120	LB A/A	Postharvest				
4	XP723			97 a	45 a	11899 a	35 a	4498 a
	Urea	150	LB A/A	Postharvest				
5	CLXL729			97 a	46 a	12054 a	35 a	4061 ab
	Urea	60	LB A/A	Postharvest				
6	CLXL729			98 a	45 a	11899 a	35 a	4379 ab
	Urea	90	LB A/A	Postharvest				
7	CLXL729			98 a	45 a	11799 a	35 a	4354 ab
	Urea	120	LB A/A	Postharvest				
8	CLXL729			97 a	45 a	11920 a	35 a	4316 ab
	Urea	150	LB A/A	Postharvest				
LSD (P=.05)				1	3.5	593.7	0	467.9
Standard Deviation				0.6	2	402.5	0	318.1
CV				0.6	4.39	3.41	0	7.56
Replicate F				3.807	0.602	2.952	0	4.15
Replicate Prob(F)				0.0478	0.5614	0.0574	1	0.0186
Treatment F				2.737	0.09	1.737	0	2.563
Treatment Prob(F)				0.0516	0.9981	0.1569	1	0.0448

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response of Rice Varieties to Nitrogen Fertilizer Rates 3.1

Experiment number ....: 07-CM-02

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 25 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ppm..........: Ca-1,212; Cu-1.7; Mg-232; P-11.5; K-80; Na-81; S-6.8; Zn-5.8

Crop/Variety ....: Rice / Cocodrie, Trenasse
- **Planting method/date** ....: Drill seeded / March 19
- **Seeding rate/depth** ....: 33 seeds/ft^2 / 1 in
- **Emergence date** ....: Cocodrie, March 26; Trenasse, March 28
- **Harvest date** ....: August 6; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2

Water management ....:
- **Flush** ....: March 29, April 20
- **Flood** ....: May 3; Ratoon flood, August 8
- **Drain** ....: July 17; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** ....: 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 42. Ratoon Response of Rice Varieties to Nitrogen Fertilizer Rates 3.1.

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/6/2007		10/16/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield
Rating Unit				days	in	lb/A	days	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon
Trt No.	Treatment Name	Rate	Rate Unit	Growth Stage				
1	Cocodrie				99 a	35 a	7680 a	37 a	2019 a
	Urea	60	LB A/A	Postharvest					
2	Cocodrie				98 a	36 a	7700 a	36 a	2385 a
	Urea	90	LB A/A	Postharvest					
3	Cocodrie				99 a	35 a	8287 a	37 a	2370 a
	Urea	120	LB A/A	Postharvest					
4	Cocodrie				97 a	34 a	8117 a	34 a	2552 a
	Urea	150	LB A/A	Postharvest					
5	Trenasse				97 a	37 a	8034 a	37 a	2349 a
	Urea	60	LB A/A	Postharvest					
6	Trenasse				97 a	37 a	8044 a	32 a	2573 a
	Urea	90	LB A/A	Postharvest					
7	Trenasse				97 a	36 a	8026 a	36 a	2573 a
	Urea	120	LB A/A	Postharvest					
8	Trenasse				96 a	38 a	8334 a	34 a	2841 a
	Urea	150	LB A/A	Postharvest					
LSD (P=.05)					2.8	5.3	1751.1	7.7	457.3
Standard Deviation					1.6	3	1173.6	4.4	310.9
CV					1.66	8.41	14.62	12.53	12.65
Replicate F					0.016	1.322	1.166	1.256	4.385
Replicate Prob(F)					0.9842	0.2979	0.3518	0.3149	0.0152
Treatment F					1.267	0.706	0.165	0.619	2.361
Treatment Prob(F)					0.3336	0.6679	0.9891	0.7323	0.0603

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response to Nitrogen Fertilizer Application Timings 2.1

Experiment number ....: 07-CM-03

Site and design ....:
Location/Cooperator ....: Rice Research Station (Crowley Main)
Tillage type ....: Conventional
Experimental design ....: Randomized complete block
Number of reps ....: 4
Plot size ....: 7 x 25 ft
Row width/rows per plot ....: 7 in / 12

Soil type ....: Crowley silt loam
% organic matter ....: NA
pH ....: 7.1
Extractable nutrients ppm...........: Ca-1,212; Cu-1.7; Mg-232; P-11.5; K-80; Na-81; S-6.8; Zn-5.8

Crop/Variety ....: Rice / Cocodrie, Trenasse
Planting method/date ....: Drill seeded / March 19
Seeding rate/depth ....: 33 seeds/ft^2 / 1 in
Emergence date ....: Cocodrie, March 26; Trenasse, March 28
Harvest date ....: August 6; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2

Water management ....:
Flush ....: March 29, April 20
Flood ....: May 3, Ratoon flood, August 8
Drain ....: July 17, Ratoon drain, October 4

Pest management ....:
Herbicides ....: 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
Insecticides ....: 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
Fungicides ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 43. Ratoon Response to Nitrogen Fertilizer Application Timings 2.1.

Rating Date					10/16/2007
Rating Data Type				50% Head	Yield
Rating Unit				days	lb/A
Trt	Treatment	Rate	Growth Stage		
1	Cocodrie			31 ab	1959 c
	Urea	90 LB A/A	MC Head		
2	Cocodrie			33 ab	1578 c
	Urea	90 LB A/A	7 d Predrain		
3	Cocodrie			33 ab	2214 abc
	Urea	90 LB A/A	MC Harvest		
4	Cocodrie			32 ab	2139 abc
	Urea	60 LB A/A	MC Head		
	Urea	30 LB A/A	MC Harvest		
5	Cocodrie			35 ab	2138 abc
	Urea	60 LB A/A	7 d Predrain		
	Urea	30 LB A/A	MC Harvest		
6	Cocodrie			38 a	2238 abc
	Urea	60 LB A/A	MC Harvest		
	Urea	30 LB A/A	Harv. + 21 d		
7	Trenasse			32 ab	2085 bc
	Urea	90 LB A/A	MC Head		
8	Trenasse			24 b	1781 c
	Urea	90 LB A/A	7 d Predrain		
9	Trenasse			35 ab	2847 a
	Urea	90 LB A/A	MC Harvest		
10	Trenasse			28 ab	2149 abc
	Urea	60 LB A/A	MC Head		
	Urea	30 LB A/A	MC Harvest		
11	Trenasse			35 ab	2751 ab
	Urea	60 LB A/A	7 d Predrain		
	Urea	30 LB A/A	MC Harvest		
12	Trenasse			35 ab	2707 ab
	Urea	60 LB A/A	MC Harvest		
	Urea	30 LB A/A	Harv. + 21 d		
LSD (P=.05)				7.1	464.4
Standard Deviation				4.2	321.6
CV				12.95	14.52
Replicate F				1.838	10.278
Replicate Prob(F)				0.1828	0.0001
Treatment F				2.428	5.702
Treatment Prob(F)				0.0369	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Ratoon Response to Phosphorus and Potassium 2.1

Experiment number .... : 07-CM-04

Site and design .... :
- **Location/Cooperator** .... : Rice Research Station (Crowley Main)
- **Tillage type** .... : Conventional
- **Experimental design** .... : Randomized complete block
- **Number of reps** .... : 4
- **Plot size** .... : 7 x 25 ft
- **Row width/rows per plot** .... : 7 in / 12

Soil type .... : Crowley silt loam
- **% organic matter** .... : NA
- **pH** .... : 7.1
- **Extractable nutrients** ppm .... : Ca-1,212; Cu-1.7; Mg-232; P-11.5; K-80; Na-81; S-6.8; Zn-5.8

Crop/Variety .... : Rice / Cocodrie
- **Planting method/date** .... : Drill seeded / March 19
- **Seeding rate/depth** .... : 33 seeds/ft^2 / 1 in
- **Emergence date** .... : March 26
- **Harvest date** .... : August 6; Ratoon harvest, October 16

Seed treatment/cwt .... : Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g

Fertilization .... : 5 lb/A $ZnSO_4$, March 19
1 qt/A Zinc Plus, May 1
150 lb N/A 46-0-0, May 2
90 lb N/A 46-0-0, August 7

Water management .... :
- **Flush** .... : March 29, April 20
- **Flood** .... : May 3; Ratoon flood, August 8
- **Drain** .... : July 17; Ratoon drain, October 4

Pest management .... :
- **Herbicides** .... : 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** .... : 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
- **Fungicides** .... : 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 44. Ratoon Response to Phosphorus and Potassium 2.1.

Crop Name				Rice	Rice	Rice	Rice	Rice
Rating Date					8/6/2007	8/6/2007		10/16/2007
Rating Data Type				50% Head	Height	Yield	50% Head	Yield
Rating Unit				days	in	lb/A	days	lb/A
Crop Stage				Main	Main	Main	Ratoon	Ratoon
Trt No	Treatment Name	Rate	Rate Unit	Growth Stage					
1	Triple superphosphate	0	LB A/A	Postharvest	104 a	37 a	7798 a	38 a	2132 a
	Potassium chloride	0	LB A/A	Postharvest					
2	Triple superphosphate	0	LB A/A	Postharvest	103 a	37 a	7700 a	38 a	2595 a
	Potassium chloride	30	LB A/A	Postharvest					
3	Triple superphosphate	0	LB A/A	Postharvest	103 a	37 a	7549 a	38 a	2079 a
	Potassium chloride	60	LB A/A	Postharvest					
4	Triple superphosphate	30	LB A/A	Postharvest	103 a	37 a	7540 a	38 a	2257 a
	Potassium chloride	0	LB A/A	Postharvest					
5	Triple superphosphate	30	LB A/A	Postharvest	102 a	36 a	7887 a	38 a	2332 a
	Potassium chloride	30	LB A/A	Postharvest					
6	Triple superphosphate	30	LB A/A	Postharvest	102 a	36 a	7927 a	38 a	2366 a
	Potassium chloride	60	LB A/A	Postharvest					
7	Triple superphosphate	60	LB A/A	Postharvest	102 a	37 a	7585 a	38 a	2247 a
	Potassium chloride	0	LB A/A	Postharvest					
8	Triple superphosphate	60	LB A/A	Postharvest	103 a	37 a	7963 a	38 a	2221 a
	Potassium chloride	30	LB A/A	Postharvest					
9	Triple superphosphate	60	LB A/A	Postharvest	103 a	37 a	7730 a	38 a	2355 a
	Potassium chloride	60	LB A/A	Postharvest					
LSD (P=.05)					1.8	2.2	669.2	.	495.3
Standard Deviation					1.1	1.3	458.5	.	339.4
CV					1.02	3.5	5.92	.	14.84
Replicate F					7.063	8.382	3.733		2.307
Replicate Prob(F)					0.0063	0.0032	0.0247		0.1022
Treatment F					1.439	0.579	0.504		0.79
Treatment Prob(F)					0.2543	0.781	0.8416		0.616

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluate the Influence of Zinc Fertilization on Ratoon Crop

Experiment number ....: 07-CM-05

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (Crowley Main)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 25 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: 7.1
- **Extractable nutrients** ppm..........: Ca-1,212; Cu-1.7; Mg-232; P-11.5; K-80; Na-81; S-6.8; Zn-5.8

Crop/Variety ....: Rice / Cocodrie
- **Planting method/date** ....: Drill seeded / March 19
- **Seeding rate/depth** ....: 33 seeds/ft^2 / 1 in
- **Emergence date** ....: March 26
- **Harvest date** ....: August 6; Ratoon harvest, October 16

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g

Fertilization ....: 100 lb/A triple super phosphate, March 19
75 lb/A 0-0-60, March 19
150 lb N/A 46-0-0, May 2
90 lb N/A 46-0-0, August 7

Water management ....:
- **Flush** ....: March 29, April 20
- **Flood** ....: May 3; Ratoon flood, August 8
- **Drain** ....: July 17; Ratoon drain, October 4

Pest management ....:
- **Herbicides** ....: 15 oz/A Clincher, April 23
1 gal/A Arrosolo + .75 oz/A Londax + .5 oz/A Permit, May 1
1 oz/A Londax, May 17
3 pt/A Basagran + 1 pt/A Crop oil + 4 oz/A Interlock, August 7
- **Insecticides** ....: 4 oz/A Karate, May 10
4 oz/A Mustang Max, July 2
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 16

Table 45. Evaluate the Influence of Zinc Fertilization on Ratoon Crop.

Crop Name					Rice	Rice
Rating Date						10/16/2007
Rating Data Type					50% Head	Yield
Rating Unit					days	lb/A
Crop Stage						Ratoon
Trt No.	Treatment Name	Rate Rate Unit	Growth Stage	Appl Description		
1	Zinc Sulfate	0 LB A/A	Harvest	Zinc	36 a	1964 a
	Sulfur	10 LB A/A	Harvest	Sulfur		
2	Zinc Sulfate	5 LB A/A	Harvest	Zinc	35 a	2288 a
	Sulfur	7.6 LB A/A	Harvest	Sulfur		
3	Zinc Sulfate	10 LB A/A	Harvest	Zinc	36 a	2182 a
	Sulfur	5.2 LB A/A	Harvest	Sulfur		
4	Zinc Sulfate	15 LB A/A	Harvest	Zinc	37 a	2320 a
	Sulfur	2.8 LB A/A	Harvest	Sulfur		
5	Zinc Sulfate	20 LB A/A	Harvest	Zinc	36 a	2206 a
	Sulfur	0.4 LB A/A	Harvest	Sulfur		
6	Check	0 LB A/A	Harvest	Zinc	36 a	2274 a
		0 LB A/A	Harvest	Sulfur		
LSD (P=.05)					3.2	294.8
Standard Deviation					1.7	195.7
CV					4.81	8.87
Replicate F					0	4.551
Replicate Prob(F)					1	0.0185
Treatment F					0.4	1.745
Treatment Prob(F)					0.8382	0.1851

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

CULTURAL MANAGEMENT RESEARCH

D.L. Harrell, J.P. Leonards, R.P. Regan, and D.M. Walker

Cultural Management Research

Experiments were conducted at the Rice Research Station and at on-farm sites in Vermilion, Evangeline, Morehouse, and Richland parishes to compare grain yields of Clearfield rice varieties and Clearfield hybrids. Each trial included three Clearfield hybrids (CLXL72, CLXL730, and CLXL745) and two Clearfield varieties (CL171 and CL161). The hybrid CLXL730 was the highest yielding entry at three of the locations, and CLXL745 was the highest yielding Clearfield at the other two locations. Clearfield hybrids grain yields were significantly higher than both CL171 and CL161 at all locations with the exception of CL161 at the Rice Research Station location. Ratoon grain yields were taken at the Rice Station location. Rice hybrids CLXL730 and CLXL729 had significantly higher ratoon grain yields than non-hybrid entries.

A crop rotation study was established in 2005 at the Rice Research Station South Unit. Rice rotations included in the study were: rice-rice, rice-soybean, rice-grain sorghum, and rice-fallow. Two tillage systems, no-till and conventional till, were also included in the study. Rice grain yields during the initial year of the study were not significantly different for tillage or rotation systems (data not shown). However, by the third year of the study (2007), significant tillage effects were detected. Rice grain yields were 509 kg ha^{-1} higher under no-till compared with conventional tillage across all rotations. Rice plants were taller and reached 50% heading later in the conventional as compared with the no-till plots across rotations. Lodging occurred in many of the conventional tilled plots while none was observed in the no-till plots. The main effect of rotation did not alter maturity. Tillage by rotation interactions were not detected for any agronomic parameter in 2007. Regardless of tillage or rotation system, total soil N was higher in soil samples collected prior to rice planting compared with postharvest samples collected in the fall. Soil N in the upper 15 cm was higher in no-till compared with conventional till plots at both samplings. Total soil N was not affected by rotation. Both total C and OM were higher under no-till than conventional tillage at both samplings in 2007. A rotation effect was also detected in 2007. Generally, C and OM were increased under the rice-grain sorghum rotation compared with the rice-fallow rotation. Soil bulk density (P_d) was higher in the no-till system than the conventional at both the spring and fall 2007 samplings. Changes in P_d values from the spring to the fall were observed in the conventional tillage system while P_d remained relatively constant between samplings. Root penetration was not a problem in no-till rice plots prior to permanent flood establishment because P_d values were below 1.6 cm m^{-3}, a value many believe to be where root penetration problems begin.

Two studies were conducted to evaluate the interaction between tillage, seeding rate, and N rate on rice grain yields and agronomic properties. Separate trials evaluated Jupiter, a high yielding semidwarf medium-grain variety, and Cheniere, an early maturing and high yielding semidwarf long-grain variety. Two tillage treatments (stale seedbed and conventional), four N rates (90, 120, 150, and 180 lb/A), and four seeding rates (15, 30, 45, and 60 seed/ft^2) were used in the study. The trial was set up as a randomized complete block design. Jupiter grain yields were 284 lb/A higher when planted in a stale seedbed as compared with a conventionally tilled seedbed. The optimum seeding rate for Jupiter was 45 seed/ft^2. Optimum N rate for Jupiter was 150 lb/A. A tillage response was not seen for the Cheniere trial. Optimum seeding rate and N rate for the Cheniere trial were 30 seed/ft^2 and 90 lb/A, respectively.

Ratoon Cultural Management Research

Two trials evaluated the ratoon response to main crop stubble manipulation. Stubble manipulation treatments included cutting at standard harvest height, flail mowing, rolling, and harvesting at 12 in. The first trial evaluated the hybrids CLXL729 and XP723. In this trial, days to 50% heading was delayed when flail mowing or rolling compared with standard cutting height for both hybrids. A ratoon yield response was not observed for either hybrid. The second trial evaluated the varieties Cocodrie and Trenasse. In this trial, days to 50% heading was delayed when flail mowing and rolling compared with standard cutting heights. A statistical yield advantage was seen for the standard cutting height compared with rolling for the Trenasse variety. No other significant yield differences were observed.

Rotational Crop Research

A trial was conducted to evaluate the agronomic effects of seedbed selection in soybean production in southwest Louisiana. Two seedbed treatments, raised and flat, were evaluated. One Group IV and four Group V Roundup ready soybean varieties were included in the trial. Actual varieties were 95M30, DG5555RR, DK4753, DPL5634, and TV55R15. Yields were numerically higher in four of the five varieties. When all data were pooled, raised and flat seedbed yields were 59 and 56.5 bu/A, respectively. Plants in raised seedbeds were also generally taller at maturity. Stand counts at maturity indicated that raised seedbeds had at least one more plant per row-foot than those planted to a flat seedbed in four of the five included varieties.

A trial was conducted to evaluate four sweet sorghum varieties for their potential as a biofuel source for southwest Louisiana. Sweet sorghum varieties included Mississippi State University releases Dale, M81-E, Theis, and Topper76-6. Dale was the fastest variety to reach 50% heading (88 days), followed by Theis (105 days), M8-E (111 days), and Topper76-6 (115 days). A rough estimate of fermentable soluble solids indicated that Dale provided the greatest potential for ethanol production in the 2007 trial. Results of the fermentable solids estimate are as follows: Dale (3 ton/A), Topper76-6 (2.5 ton/A), Theis (2.3 ton/A), and M81-E (2.2 ton/A).

Clearfield Hybrid Yield Comparison 1 (Rice Research Station)

Experiment number	: 07-CM-15
Site and design	:
Location/Cooperator	: Rice Research Station (Crowley Main)
Tillage type	: Conventional
Experimental design	: Randomized complete block
Number of reps	: 4
Plot size	: 7 x 20 ft
Row width/rows per plot	: 7 in / 12
Soil type	: Crowley silt loam
% organic matter	: NA
pH	: 7.0
Extractable nutrients	: Ca-1,238; Cu-1.6; Mg-222; P-19.3; K-88.0; Na-91.0; S-6.6; Zn-6.3
Crop/Variety	: Rice / See data sheet
Planting method/date	: Drill seeded / March 20
Seeding rate/depth	: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / 1 in
Emergence date	: March 28
Harvest date	: August 6; Ratoon harvest, October 16
Seed treatment/cwt	: Dithane (fungicide)-114 g Release (gibberellic acid)-10 g Zinche (40.5% Zn)-236 ml
Fertilization	: 195 lb/A 0-24-24-2.5, March 20 1 qt/A Zinc Plus, May 1 120 lb N/A 46-0-0, May 2 45 lb N/A 46-0-0, June 5 (Commercial variety midseason) 30 lb N/A 46-0-0, June 25 (Hybrid 5% heading) 90 lb N/A 46-0-0, August 8 (ratoon)
Water management	:
Flush	: March 28, April 20
Flood	: May 3; Ratoon flood, August 8
Drain	: July 17; Ratoon drain, October 4
Pest management	:
Herbicides	: 4 oz/A NewPath, April 16 and May 1 15 oz/A Clincher, April 23 1 gal Arrosolo + .75 oz Londax + .5 oz Permit, May 1 1 oz Londax, May 17
Insecticides	: 4 oz Karate, May 10 4 oz Mustang Max, July 2
Fungicides	: 21 oz Quilt + 6 oz Quadris, June 16

Table 46. Clearfield Hybrid Yield Comparison 1 (Rice Research Station).

Crop Name			Rice	Rice	Rice	Rice	Rice	Rice
Rating Date				8/1/2007	8/6/2007			
Rating Data Type			50% Head	Height	Yield	Total Mill	Whole Mill	Yield
Rating Unit			days	in	lb/A	%	%	lb/A
Crop Stage			Main	Main	Main	Main	Main	Ratoon
Trt		Treatment						
No.	Type	Name						
1	VAR	CLXL730	96 b	45 a	10942 a	70 a	59 a	3385 ab
2	VAR	CLXL729	96 b	41 b	10922 a	70 a	60 a	3715 a
3	VAR	CLXP745	96 b	42 b	10846 a	72 a	55 a	2930 bc
4	VAR	CL161	99 a	42 b	10405 a	68 a	59 a	2385 c
5	VAR	CL171AR	99 a	39 b	8675 b	70 a	62 a	2639 c
LSD (P=.05)			1	2.6	1001	2	4.4	537.2
Standard Deviation			0.5	1.4	649.7	0.7	1.6	348.6
CV			0.56	3.28	6.27	1.01	2.68	11.58
Replicate F			1.556	0.425	1.405	0.008	0.31	2.67
Replicate Prob(F)			0.2687	0.6678	0.2893	0.9328	0.6074	0.0948
Treatment F			23.333	8.726	8.844	6.361	4.503	9.651
Treatment Prob(F)			0.0002	0.0051	0.0014	0.0504	0.0871	0.001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Clearfield Hybrid Yield Comparison 2 (Evangeline Parish)

Experiment number ....: 07-EP-01

Site and design ....:
- **Location/Cooperator** ....: Evangeline Parish / Dr. Steve Linscombe
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 5 x 16 ft
- **Row width/rows per plot** ....: 7.5 in / 7

Soil type ....: Crowley -Vidrine silt loam complex
- **% organic matter** ....: NA
- **pH** ....: NA
- **Extractable nutrients** ....: NA

Crop/Variety ....: Rice / Multiple
- **Planting method/date** ....: Drill seeded / April 23
- **Seeding rate/depth** ....: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / .75 in
- **Emergence date** ....:
- **Harvest date** ....: August 15

Seed treatment/cwt ....: NA

Fertilization ....: 120 lb N/A 46-0-0, May 22
45 lb N/A 46-0-0, June 26 (commercial varieties)
30 lb N/A 46-0-0, July 12 (hybrid varieties)

Pest management ....:
- **Herbicides** ....: 13 oz/A Clincher + 1 qt Crop oil, May 23
8 oz/A NewPath, May 23

Table 47. Clearfield Hybrid Yield Comparison 2 (Evangeline Parish).

Crop Name			Rice	Rice	Rice	Rice	Rice
Description							
Rating Data Type			50% Head	Height	Yield	Total Mill	Whole Mill
Rating Unit			days	in	lb/A	%	%
Crop Stage			Main	Main	Main	Main	Main
Trt No.	Type	Treatment Name					
1	VAR	CLXL730	82 b	46 a	9314 a	69 ab	53 a
2	VAR	CLXL729	81 b	43 ab	8635 a	70 ab	54 a
3	VAR	CLXP745	79 c	44 ab	9216 a	71 a	52 a
4	VAR	CL161	84 a	39 c	6006 b	69 ab	48 a
5	VAR	CL171AR	84 a	41 b	5792 b	68 b	44 a
LSD (P=.05)			1.4	2.6	1150.4	1.7	25.9
Standard Deviation			0.9	1.4	746.6	0.6	9.3
CV			1.13	3.28	9.58	0.87	18.68
Replicate F			0.216	0.444	0.88	2.621	2.498
Replicate Prob(F)			0.8836	0.6561	0.4787	0.1808	0.1891
Treatment F			17.588	10.821	21.961	9.547	0.331
Treatment Prob(F)			0.0001	0.0026	0.0001	0.0253	0.8453

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Clearfield Hybrid Yield Comparison 3 (Richland Parish)

Experiment number ....: 07-RP-12

Site and design ....:
- **Location/Cooperator** ....: Richland Parish / Marley Oldham
- **Tillage type** ....: No Till into soybean stubble
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Hebert silty clay
- **% organic matter** ....: NA
- **pH** ....: 6.8
- **Extractable nutrients ppm** ....: Ca-2,356; Cu-2.2; Mg-550; P-18.7; K-158.9; Na-139.7; S-40.2; Zn-1.4

Crop/Variety ....: Rice / Multiple
- **Planting method/date** ....: Drill seeded / March 29
- **Seeding rate/depth** ....: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / .75 in
- **Emergence date** ....: See data sheet
- **Harvest date** ....: August 21

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 120 lb N/A 46-0-0, May 10
45 lb N/A 46-0-0, June 19 (CL171); June 21 (CL161)
30 lb N/A 46-0-0, July 9 (Hybrids)

Water management ....:
- **Flush** ....: Rain, March 31
- **Flood** ....: May 14
- **Drain** ....: August 3

Pest management ....:
- **Herbicides** ....: 1 gal/A Arrosolo + 1 oz/A Permit, April 21
1 gal/A Arrosolo + 1 pt/A Grandstand, May 10
13 oz/A Clincher, May 31
15 oz/A Clincher, June 28
4 oz/A NewPath, May 1 and May 10
- **Insecticides** ....: 2 oz/A Karate, June 28
4 oz/A Mustang Max, July 18
- **Fungicides** ....: 12 oz/A Quadris, July 18

Table 48. Clearfield Hybrid Yield Comparison 3 (Richland Parish).

Crop Name			Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date				8/21/2007	8/21/2007	8/21/2007	8/22/2007		
Rating Data Type			50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit			days	in	%	1-5	lb/A	%	%
Crop Stage			Main	Main	Main	Main	Main	Main	Main
Trt		Treatment							
No.	Type	Name							
1	VAR	CLXL730	105 b	47 a	23	3	10603 a	71 a	59 a
2	VAR	CLXL729	105 b	45 ab			9297 a	71 a	58 a
3	VAR	CLXP745	102 c	44 ab			10333 a	71 a	56 a
4	VAR	CL161	109 a	40 b	10	1	7439 b	71 a	62 a
5	VAR	CL171AR	109 a	43 ab	10	1	7045 b	71 a	63 a
LSD (P=.05)			2.1	4.2	.	.	1354	2.5	6.7
Standard Deviation			1.3	2.2	.	.	878.8	0.9	2.4
CV			1.26	5.07	.	.	9.83	1.25	4.03
Replicate F			14.31	1			7.604	0.165	0.1
Replicate Prob(F)			0.0003	0.4096			0.0041	0.7053	0.7681
Treatment F			21.789	4.473			13.825	0.164	2.679
Treatment Prob(F)			0.0001	0.0343			0.0002	0.9458	0.1815

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Clearfield Hybrid Yield Comparison 4 (Morehouse Parish)

Experiment number ....: 07-MP-01

Site and design ....:
- **Location/Cooperator** ....: Morehouse Parish / Don Andrews and Roland Crymes
- **Tillage type**..................................: Spring stale
- **Experimental design**...................: Randomized complete block
- **Number of reps**...........................: 4
- **Plot size**..: 7 x 20 ft
- **Row width/rows per plot**...........: 7 in / 12

Soil type ....: Perry clay
- **% organic matter**........................: NA
- **pH**..: 6.4
- **Extractable nutrients**..................: Ca-2,561; Cu-2.6; Mg-880; P-18.6; K-333.4; Na-291.7; S-21.0; Zn-4.2

Crop/Variety ....: Rice / Multiple
- **Planting method/date** ....: Drill seeded / May 2
- **Seeding rate/depth**......................: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / .75 in
- **Emergence date**...........................: May 12
- **Harvest date** ....: September 5

Seed treatment/cwt ....: NA

Fertilization.......................................: 165 lb N/A 46-0-0, May 31

Water management ....:
- **Flush** ....: May 4, May 24
- **Flood** ....: June 1
- **Drain**..: August 24

Pest management...............................:
- **Herbicides**....................................: 1 qt/A Honcho Plus, May 8
  9 oz/A NewPath, May 22
  4 qt/A Arrosolo + .67 lb/A Facet, May 30
  15 oz/A Clincher + 1 qt/A Oil, June 8
- **Insecticides** ....: 2 oz/A Karate, June 8
  4 oz/A Mustang Max, July 30
- **Fungicides** ....: 12 oz/A Quadris, July 30

Table 49. Clearfield Hybrid Yield Comparison 4 (Morehouse Parish).

Crop Name			Rice	Rice	Rice	Rice	Rice
Rating Date				9/6/2007	9/6/2007		
Rating Data Type			50% Head	Height	Yield	Total Mill	Whole Mill
Rating Unit			Days	in	lb/A	%	%
Crop Stage			Main	Main	Main	Main	Main
Trt No.	Type	Treatment Name					
1	VAR	CLXL730	92 bc	47 a	9587 a	67 b	48 c
2	VAR	CLXL729	92 c	44 c	9969 a	68 ab	52 b
3	VAR	CLXP745	89 d	46 b	10315 a	69 ab	53 b
4	VAR	CL161	95 a	38 d	6215 b	70 a	61 a
5	VAR	CL171AR	93 b	38 d	6601 b	69 ab	59 a
LSD (P=.05)			0.7	1.1	596.4	1.6	3.3
Standard Deviation			0.5	0.6	387.1	0.6	1.2
CV			0.5	1.42	4.53	0.82	2.16
Replicate F			2.8	7.818	0.741	0.329	0.287
Replicate Prob(F)			0.0853	0.0131	0.548	0.5971	0.6207
Treatment F			89.16	151.546	103.168	6.519	40.839
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0484	0.0017

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Clearfield Hybrid Yield Comparison 5 (Vermilion Parish)

Experiment number ....: 07-VP-08

Site and design ....:
- **Location/Cooperator** ....: Vermilion Parish / Lounsberry Farm
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Kaplan silt loam
- **% organic matter** ....: NA
- **pH** ....: 5.1
- **Extractable nutrients** ....: Ca-586; Cu-0.9; Mg-106; P-22.7; K-74.1; Na-39.1; S-7.4; Zn-2.2

Crop/Variety ....: Rice / See data sheet
- **Planting method/date** ....: Drill seeded / March 21
- **Seeding rate/depth** ....: Hybrid- 14 seeds/ft^2, Commercial- 33 seeds/ft^2 / .75 in
- **Emergence date** ....: March 27
- **Harvest date** ....: August 2

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, March 21
45 lb N/A 46-0-0 (Commercial midseason), June 1
30 lb N/A 46-0-0 (Hybrid 5% heading), June 19

Water management ....:
- **Flush** ....: By rain
- **Flood** ....: April 21
- **Drain** ....: July 13

Pest management ....:
- **Herbicides** ....: 3 qt Arrosolo, April 6
  3 qt Arrosolo + 2.8 oz Grasp + 1 oz Permit, April 19
  4 oz NewPath, April 19
- **Insecticides** ....: None
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, June 18

Table 50. Clearfield Hybrid Yield Comparison 5 (Vermilion Parish).

Crop Name			Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date				7/31/2007	8/2/2007	8/2/2007	8/2/2007		
Rating Data Type			50% Head	Height	Ldg-Rate	Ldg-Type	Yield	Total Mill	Whole Mill
Rating Unit			days	in	%	1-5	lb/A	%	%
Crop Stage			Main	Main	Main	Main	Main	Main	Main
Trt No.	Type	Treatment Name							
1	VAR	CLXL730	93 c	46 a	30	2	9109 b	69 a	57 a
2	VAR	CLXL729	92 c	44 a	.	.	9052 b	70 a	60 a
3	VAR	CLXP745	90 d	45 a	.	.	9470 a	70 a	56 a
4	VAR	CL161	95 a	40 b	.	.	5264 c	65 b	47 b
5	VAR	CL171AR	94 b	40 b	.	.	5284 c	69 a	59 a
LSD (P=.05)			1.1	2.2	.	.	337.6	1.9	2.8
Standard Deviation			0.6	1.2	.	.	219.1	0.7	1
CV			0.61	2.69	.	.	2.87	0.98	1.83
Replicate F			16	0.938			1.664	4.264	2.038
Replicate Prob(F)			0.0016	0.4305			0.2273	0.1078	0.2266
Treatment F			33.368	17.852			389.367	16.396	50.291
Treatment Prob(F)			0.0001	0.0005			0.0001	0.0095	0.0011

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Tillage, Seeding Rate, and N Rate on Jupiter Rice Agronomic Traits

Experiment number ....: 07-CS-01-P2

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (South Unit)
- **Tillage type** ....: Conventional and Fall stale
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....:
- **Extractable nutrients** ....:

Crop/Variety ....: Rice / Jupiter
- **Planting method/date** ....: Drill seeded / May 16
- **Seeding rate/depth** ....: Variable / .75-1 in
- **Emergence date** ....: May 31
- **Harvest date** ....: September 20

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, May 16

Water management ....:
- **Flush** ....: May 22
- **Flood** ....: July 3
- **Drain** ....: September 10

Pest management ....:
- **Herbicides** ....: 1.5 qt Glyphosate, May 18
4 qt/A Arrosolo + 2.4 pt/A Stelth + 1 oz/A Permit, June 8
5 qt/A Arrosolo + 2.4 pt/A Stelth + 1 oz/A Permit + .75 oz/A Londax, July 2
- **Insecticides** ....: 9 lb/A Trebon 3G (preflood), July 3
4 oz/A Mustang Max, August 16
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, August 3

Table 51. Evaluation of Tillage, Seeding Rate, and N Rate on Jupiter Rice Agronomic Traits.

Crop Name				Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date						9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007
Rating Data Type				Stand Count	50% Head	Height	WP dry wt.	Panicle	Grain wt.	10 P wt.	10 P seed	TOTGWT	Yield	Milling	Milling
				plt/sq. ft	days	in	g	number	g	g	number	g	lb/A	% Head	% Total
Trt No.	Treatment Name	Rate	Rate Unit												
1	Stale Seedbed 15 seed/sq ft UREA	90	LB A/A	12 ghi	91 abc	34 a	500.1 a	85 b	223.4 a	32.3 a	1372 ab	256 a	6188 c	60 a	69 a
2	Stale Seedbed 15 seed/sq ft UREA	120	LB A/A	12 ghi	91 abc	36 a	626.7 a	114 ab	283.3 a	29.2 a	1204 ab	312 a	7623 abc	65 a	71 a
3	Stale Seedbed 15 seed/sq ft UREA	150	LB A/A	14 f-i	91 abc	35 a	585.1 a	98 ab	251.5 a	36.3 a	1501 a	288 a	7973 abc	65 a	71 a
4	Stale Seedbed 15 seed/sq ft UREA	180	LB A/A	13 ghi	92 ab	36 a	621.7 a	99 ab	284.8 a	29 a	1210 ab	314 a	7838 abc	65 a	70 a
5	Stale Seedbed 30 seed/sq ft UREA	90	LB A/A	21 d-g	91 abc	35 a	469.4 a	95 ab	205.6 a	28.3 a	1166 ab	234 a	6972 abc	62 a	70 a
6	Stale Seedbed 30 seed/sq ft UREA	120	LB A/A	17 f-i	91 abc	36 a	575.7 a	96 ab	256 a	32.3 a	1318 ab	288 a	7144 abc	63 a	71 a
7	Stale Seedbed 30 seed/sq ft UREA	150	LB A/A	22 c-f	91 abc	36 a	598.4 a	99 ab	261.5 a	32.4 a	1307 ab	294 a	7626 abc	65 a	71 a
8	Stale Seedbed 30 seed/sq ft UREA	180	LB A/A	19 e-h	91 abc	37 a	596.1 a	129 ab	250.2 a	32.9 a	1369 ab	283 a	8656 a	67 a	71 a
9	Stale Seedbed 45 seed/sq ft. UREA	90	LB A/A	30 bcd	90 c	35 a	570 a	123 ab	246 a	29.1 a	1182 ab	275 a	7744 abc	66 a	70 a
10	Stale Seedbed 45 seed/sq ft. UREA	120	LB A/A	29 bcd	90 c	36 a	558.6 a	109 ab	260.5 a	26.2 a	1063 ab	287 a	7818 abc	66 a	71 a
11	Stale Seedbed 45 seed/sq ft. UREA	150	LB A/A	32 bc	91 abc	36 a	553.5 a	106 ab	242 a	31.4 a	1338 ab	273 a	7714 abc	63 a	70 a
12	Stale Seedbed 45 seed/sq ft. UREA	180	LB A/A	29 bcd	91 abc	37 a	600.6 a	124 ab	259.4 a	27.6 a	1163 ab	287 a	8521 a	65 a	70 a
13	Stale Seedbed 60 seed/sq ft. UREA	90	LB A/A	35 ab	90 bc	36 a	592.3 a	143 a	261.6 a	20.3 a	820 b	282 a	7529 abc	64 a	69 a
14	Stale Seedbed 60 seed/sq ft. UREA	120	LB A/A	32 b	91 abc	35 a	660.3 a	134 ab	299.9 a	29.1 a	1155 ab	329 a	8433 ab	66 a	71 a
15	Stale Seedbed 60 seed/sq ft. UREA	150	LB A/A	41 a	91 abc	36 a	617.3 a	135 ab	270.3 a	31.8 a	1289 ab	302 a	8275 ab	66 a	71 a
16	Stale Seedbed 60 seed/sq ft. UREA	180	LB A/A	35 ab	91 abc	36 a	609.8 a	122 ab	260.7 a	26.8 a	1117 ab	287 a	8673 a	65 a	70 a
17	Conventional Till 15 seed/sq ft UREA	90	LB A/A	10 hi	91 abc	34 a	509.7 a	87 ab	224.9 a	34.9 a	1383 ab	260 a	6050 c	63 a	70 a
18	Conventional Till 15 seed/sq ft UREA	120	LB A/A	8 i	92 a	34 a	535.4 a	97 ab	225.8 a	38.4 a	1572 a	264 a	6433 bc	64 a	70 a
19	Conventional Till 15 seed/sq ft UREA	150	LB A/A	12 ghi	92 a	35 a	682.5 a	120 ab	301.3 a	34.2 a	1393 ab	335 a	6627 abc	65 a	71 a

Continued.

Table 51. Continued.

Crop Name	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date			9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007
Rating Data Type	Stand Count	50% Head	Height	WP dry wt.	Panicle	Grain wt.	10 P wt.	10 P seed	TOTGWT	Yield	Milling	Milling
	plt/sq. ft	days	in	g	number	g	g	number	g	lb/A	% Head	% Total
Trt No. Treatment Name Rate Rate Unit												
20 Conventional Till 15 seed/sq ft UREA 180 LB A/A	9 i	92 ab	36 a	551 a	101 ab	234.2 a	34.1 a	1451 a	268 a	6957 abc	64 a	70 a
21 Conventional Till 30 seed/sq ft UREA 90 LB A/A	17 f-i	91 abc	35 a	613.7 a	110 ab	276.3 a	30.2 a	1176 ab	306 a	7544 abc	62 a	70 a
22 Conventional Till 30 seed/sq ft UREA 120 LB A/A	18 f-i	91 abc	36 a	525.8 a	93 ab	230.4 a	28.2 a	1193 ab	259 a	7783 abc	65 a	71 a
23 Conventional Till 30 seed/sq ft UREA 150 LB A/A	18 f-i	92 ab	36 a	667.2 a	124 ab	269.8 a	33.6 a	1412 a	303 a	7387 abc	64 a	69 a
24 Conventional Till 30 seed/sq ft UREA 180 LB A/A	16 f-i	91 abc	36 a	595.8 a	124 ab	252.1 a	32.1 a	1265 ab	284 a	7596 abc	67 a	71 a
25 Conventional Till 45 seed/sq ft. UREA 90 LB A/A	28 bcd	91 abc	36 a	591.1 a	116 ab	252.8 a	32.9 a	1327 ab	286 a	7955 abc	60 a	70 a
26 Conventional Till 45 seed/sq ft. UREA 120 LB A/A	27 b-e	91 abc	36 a	583 a	113 ab	267.1 a	28.8 a	1143 ab	296 a	8020 abc	63 a	71 a
27 Conventional Till 45 seed/sq ft. UREA 150 LB A/A	29 bcd	91 abc	36 a	617.7 a	110 ab	264 a	31.2 a	1267 ab	295 a	7922 abc	65 a	69 a
28 Conventional Till 45 seed/sq ft. UREA 180 LB A/A	26 b-e	92 ab	37 a	574.2 a	124 ab	238.1 a	28.5 a	1251 ab	267 a	7978 abc	63 a	69 a
29 Conventional Till 60 seed/sq ft. UREA 90 LB A/A	29 bcd	91 abc	37 a	640 a	121 ab	288.2 a	28.4 a	1110 ab	317 a	8511 a	65 a	71 a
30 Conventional Till 60 seed/sq ft. UREA 120 LB A/A	27 b-e	91 abc	36 a	632 a	122 ab	279.3 a	32.1 a	1312 ab	311 a	7644 abc	64 a	71 a
31 Conventional Till 60 seed/sq ft. UREA 150 LB A/A	33 b	91 abc	36 a	553.8 a	113 ab	241 a	27.7 a	1121 ab	269 a	7719 abc	65 a	71 a
32 Conventional Till 60 seed/sq ft. UREA 180 LB A/A	32 bc	91 abc	36 a	577.3 a	142 a	239.1 a	24.4 a	1049 ab	263 a	8046 abc	63 a	70 a
LSD (P=.05)	5.5	0.8	1.9	146.92	29.8	77.35	8.15	309.2	78.1	1111.8	4	1.8
Standard Deviation	3.4	0.5	1.1	71.95	14.6	37.88	3.99	151.4	38.2	794.1	2	0.9
CV	14.85	0.51	3.22	12.26	12.9	14.78	13.11	12.12	13.33	10.38	3.07	1.22
Replicate F	1.585	13.602	1.049	6.305	0.635	5.044	4.978	4.65	6.044	6.098	6.902	5.249
Replicate Prob(F)	0.2131	0.0001	0.3565	0.0175	0.4317	0.032	0.033	0.0389	0.0197	0.0008	0.0133	0.0289
Treatment F	21.326	3.665	1.412	0.884	2.235	0.722	1.622	1.953	0.703	2.835	1.465	1.311
Treatment Prob(F)	0.0001	0.0001	0.1237	0.6327	0.0142	0.8153	0.0918	0.0335	0.8343	0.0001	0.1466	0.2275

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Tillage, Seeding Rate, and N Rate on Cheniere Rice Agronomic Traits

Experiment number ....: 07-CS-02-P2

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (South unit)
- **Tillage type** ....: Conventional & Fall stale
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 7 x 20 ft
- **Row width/rows per plot** ....: 7 in / 12

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....:
- **Extractable nutrients** ....:

Crop/Variety ....: Rice / Cheniere
- **Planting method/date** ....: Drill seeded / May 16
- **Seeding rate/depth** ....: Variable / .75-1 in
- **Emergence date** ....: May 31
- **Harvest date** ....: September 19

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 195 lb/A 0-24-24-2.5, May 16

Water management ....:
- **Flush** ....: May 22
- **Flood** ....: July 3
- **Drain** ....: September 10

Pest management ....:
- **Herbicides** ....: 1.5 qt Glyphosate, May 18
4 qt/A Arrosolo + 2.4 pt/A Stelth + 1 oz/A Permit, June 8
5 qt/A Arrosolo + 2.4 pt/A Stelth + 1 oz/A Permit + .75 oz/A Londax, July 2
- **Insecticides** ....: 9 lb/A Trebon 3G (preflood), July 3
4 oz/A Mustang Max, August 16
- **Fungicides** ....: 21 oz/A Quilt + 6 oz/A Quadris, August 3

Table 52. Evaluation of Tillage, Seeding Rate, and N Rate on Cheniere Rice Agronomic Traits.

Crop Name			Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date			6/12/2007		9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007
Rating Data Type			Stand count	50% Head	Height	Ldg-rate	Ldg-Type	WP dry wt.	Panicle #	Grain wt.	10 P wt.	10 P seed	TOTGWT	Yield	Milling Head	Milling Total
Rating Unit			plt/sq. ft	days	in	%	1-5	g	number	g	g	number	g	lb/A	Head	Total
Trt No.	Treatment Name	Rate Rate Unit														
1	Stale Seedbed		10 ghi	92 a-d	36 a			510.5 a	87 b	214.9 a	33.3 a	1536 a	248 a	6101 a	65 ab	71 ab
	15 seed/sq ft															
	UREA	90 LB A/A														
2	Stale Seedbed		12 f-i	92 a-d	37 a			573.6 a	105 ab	246 a	31.3 a	1468 a	277 a	6355 a	64 ab	71 ab
	15 seed/sq ft															
	UREA	120 LB A/A														
3	Stale Seedbed		12 ghi	92 a-d	37 a			606.8 a	112 ab	262 a	30.8 a	1470 a	293 a	6387 a	62 ab	69 ab
	15 seed/sq ft															
	UREA	150 LB A/A														
4	Stale Seedbed		13 f-i	92 a-d	37 a			680.8 a	126 ab	299.4 a	33.1 a	1599 a	332 a	6709 a	63 ab	70 ab
	15 seed/sq ft															
	UREA	180 LB A/A														
5	Stale Seedbed		22 a-i	90 d	36 a			649.8 a	129 ab	282 a	27.9 a	1225 a	310 a	6989 a	65 ab	71 ab
	30 seed/sq ft															
	UREA	90 LB A/A														
6	Stale Seedbed		24 a-h	91 cd	37 a			549.6 a	111 ab	232.2 a	27.4 a	1237 a	260 a	6897 a	65 ab	72 a
	30 seed/sq ft															
	UREA	120 LB A/A														
7	Stale Seedbed		21 b-i	91 a-d	37 a			620.2 a	129 ab	262.2 a	30.9 a	1447 a	293 a	7347 a	63 ab	70 ab
	30 seed/sq ft															
	UREA	150 LB A/A														
8	Stale Seedbed		27 a-e	92 a-d	38 a			633.1 a	133 ab	263 a	29 a	1381 a	292 a	7252 a	65 ab	71 ab
	30 seed/sq ft															
	UREA	180 LB A/A														
9	Stale Seedbed		28 a-e	90 d	36 a			606.2 a	143 a	248 a	27.7 a	1266 a	276 a	5658 a	65 ab	72 ab
	45 seed/sq ft.															
	UREA	90 LB A/A														
10	Stale Seedbed		28 a-e	91 bcd	37 a			588.1 a	130 ab	251.9 a	27.5 a	1287 a	279 a	7085 a	65 ab	71 ab
	45 seed/sq ft.															
	UREA	120 LB A/A														
11	Stale Seedbed		24 a-g	91 bcd	36 a			616.8 a	137 ab	249.9 a	26.5 a	1288 a	276 a	6775 a	64 ab	71 ab
	45 seed/sq ft.															
	UREA	150 LB A/A														
12	Stale Seedbed		29 a-e	91 cd	36 a	65	3	613.2 a	145 a	238.1 a	24.1 a	1136 a	262 a	6876 a	66 a	72 ab
	45 seed/sq ft.															
	UREA	180 LB A/A														
13	Stale Seedbed		36 ab	90 d	36 a	70	3	565.6 a	127 ab	214.7 a	26.5 a	1213 a	241 a	6527 a	66 a	72 a
	60 seed/sq ft.															
	UREA	90 LB A/A														
14	Stale Seedbed		37 a	90 d	36 a			615.4 a	143 a	230.7 a	28.8 a	1239 a	259 a	6958 a	65 ab	72 a
	60 seed/sq ft.															
	UREA	120 LB A/A														
15	Stale Seedbed		31 a-e	91 cd	37 a			600.7 a	122 ab	233.8 a	27.9 a	1335 a	262 a	6943 a	64 ab	71 ab
	60 seed/sq ft.															
	UREA	150 LB A/A														
16	Stale Seedbed		35 abc	91 a-d	36 a	70	2	597.8 a	140 ab	227.3 a	24.9 a	1185 a	252 a	7319 a	65 ab	71 ab
	60 seed/sq ft.															
	UREA	180 LB A/A														
17	Conventional Till		9 hi	92 a-d	37 a			464.8 a	89 b	194.7 a	32.6 a	1389 a	227 a	5682 a	65 ab	71 ab
	15 seed/sq ft															
	UREA	90 LB A/A														
18	Conventional Till		10 ghi	92 a-d	37 a			537.8 a	99 ab	236.8 a	31.2 a	1427 a	268 a	5544 a	66 a	72 a
	15 seed/sq ft															
	UREA	120 LB A/A														
19	Conventional Till		11 ghi	94 ab	38 a			580.4 a	98 ab	239.3 a	31.6 a	1538 a	271 a	5972 a	64 ab	71 ab
	15 seed/sq ft															
	UREA	150 LB A/A														

Continued.

Table 52. Continued.

Crop Name	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice	Rice
Rating Date	6/12/2007		9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007	9/18/2007
Rating Data Type	Stand count	50% Head	Height	Ldg-rate	Ldg-Type	WP dry wt.	Panicle #	Grain wt.	10 P wt.	10 P seed	TOTGWT	Yield	Milling	Milling
Rating Unit	plt/sq. ft	days	in	%	1-5	g	number	g	g	number	g	lb/A	Head	Total
Trt Treatment Rate No. Name Rate Unit														
20 Conventional Till 15 seed/sq ft UREA 180 LB A/A	9 i	94 a	36 a			578.1 a	110 ab	228.9 a	31.9 a	1496 a	261 a	5893 a	64 ab	71 ab
21 Conventional Till 30 seed/sq ft UREA 90 LB A/A	18 d-i	92 a-d	38 a			532.1 a	116 ab	248.1 a	27.6 a	1281 a	276 a	6522 a	63 ab	70 ab
22 Conventional Till 30 seed/sq ft UREA 120 LB A/A	22 a-i	92 a-d	37 a			633.6 a	126 ab	268.5 a	29.6 a	1378 a	298 a	6769 a	65 ab	71 ab
23 Conventional Till 30 seed/sq ft UREA 150 LB A/A	21 c-i	92 a-d	38 a			630.4 a	137 ab	256.5 a	30.6 a	1401 a	287 a	6417 a	64 ab	70 ab
24 Conventional Till 30 seed/sq ft UREA 180 LB A/A	16 e-i	94 abc	38 a	40	1	600.8 a	116 ab	243 a	30.4 a	1510 a	273 a	6880 a	63 ab	70 ab
25 Conventional Till 45 seed/sq ft. UREA 90 LB A/A	28 a-e	91 a-d	36 a			554.2 a	123 ab	211.5 a	31 a	1409 a	242 a	7697 a	65 ab	72 ab
26 Conventional Till 45 seed/sq ft. UREA 120 LB A/A	27 a-e	91 a-d	37 a			516.9 a	109 ab	202.8 a	28.3 a	1245 a	231 a	6838 a	64 ab	71 ab
27 Conventional Till 45 seed/sq ft. UREA 150 LB A/A	28 a-e	91 bcd	36 a			564.3 a	136 ab	218.2 a	26.1 a	1213 a	244 a	6848 a	66 a	72 ab
28 Conventional Till 45 seed/sq ft. UREA 180 LB A/A	26 a-f	92 a-d	37 a			540.4 a	110 ab	208.2 a	28.6 a	1369 a	237 a	6874 a	63 ab	69 ab
29 Conventional Till 60 seed/sq ft. UREA 90 LB A/A	30 a-e	91 a-d	36 a			494.7 a	107 ab	195.7 a	26.3 a	1182 a	222 a	6637 a	63 ab	70 ab
30 Conventional Till 60 seed/sq ft. UREA 120 LB A/A	34 abc	91 a-d	36 a			618.3 a	131 ab	254.3 a	24 a	1097 a	278 a	6721 a	61 b	69 b
31 Conventional Till 60 seed/sq ft. UREA 150 LB A/A	30 a-e	92 a-d	37 a			544.6 a	113 ab	218.2 a	29.9 a	1466 a	248 a	6725 a	63 ab	69 ab
32 Conventional Till 60 seed/sq ft. UREA 180 LB A/A	31 a-d	92 a-d	36 a			601 a	124 ab	232.4 a	27.9 a	1361 a	260 a	6493 a	64 ab	70 ab
LSD (P=.05)	8.3	1.7	1.8	.	.	105.89	28.5	56.03	7.87	383.9	58.2	1230	2.3	1.8
Standard Deviation	5.1	1	1.1	.	.	51.86	14	27.44	3.85	188	28.5	878.5	1.1	0.9
CV	21.97	1.11	3.03	.	.	8.91	11.59	11.53	13.34	13.97	10.68	13.22	1.78	1.21
Replicate F	3.309	7.991	3.207			8.636	6.597	3.552	1.487	0.207	3.918	4.364	8.734	7.695
Replicate Prob(F)	0.0431	0.0008	0.0473			0.0062	0.0153	0.0689	0.2318	0.652	0.0567	0.0064	0.0059	0.0093
Treatment F	8.943	2.9	1.146			1.712	2.478	1.572	0.861	0.949	1.503	1.329	1.921	2.385
Treatment Prob(F)	0.0001	0.0002	0.3181			0.0699	0.0069	0.1068	0.6603	0.5576	0.1312	0.1497	0.037	0.009

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Crop Rotation and Tillage Systems in Rice Production – Year 3

Experiment number ....: 07-CS-20 and 07-CS-21

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (South Unit)
- **Tillage type** ....: No-till
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 20 x 50 ft
- **Row width/rows per plot** ....: 7 in / 34

Soil type ....: Crowley silt loam
- **% organic matter** ....: NA
- **pH** ....: See data sheet
- **Extractable nutrients** ....: See data sheet

Crop/Variety ....: Rice / Cheniere
- **Planting method/date** ....: Drill seeded / April 24
- **Seeding rate/depth** ....: 75 lb/A / .75 in
- **Emergence date** ....: April 30
- **Harvest date** ....: August 30

Seed treatment/cwt ....: Dithane (fungicide)-114 g
Release (gibberellic acid)-10 g
Zinche (40.5% Zn)-236 ml

Fertilization ....: 250 lb/A 8-24-24, May 10

Water management ....:
- **Flush** ....: Rain
- **Flood** ....: June 12
- **Drain** ....: August 14

Pest management ....:
- **Herbicides** ....: 1 qt/A Glyphosate + 1 qt/A 2, 4-D, February 9
1.5 qt/A Glyphosate, April 9
1 qt/A Glyphosate, April 27
1 gal/A Arrosolo + 2.4 pt/A Prowl + 1 oz/A Permit + .75 oz/A Londax, May 15
5 qt/A Arrosolo + 2.4 pt/A Stelth + 1 oz/A Permit, June 8
- **Insecticides** ....: None
- **Fungicides** ....: 19 oz/A Stratego, July 18

Table 53. Agronomic results for the main effects of tillage and rotation for 2007.

	Plant Ht.	50% Heading	Yield
	cm	days	kg ha^{-1}
Tillage			
Conventional	99 a†	89 a	7427 b
No-Till	96 b	87 b	7936 a
Rotation			
Rice-Rice	99 ab	88 a	7884 a
Rice-Fallow	96 b	88 a	7605 ab
Rice-Soybean	96 b	88 a	7313 b
Rice-Sorghum	100 a	88 a	7953 a

†Means within each column followed by a different letter are significantly different at the P = 0.05 level of confidence as determined by the Duncan post hoc test.

Table 54. Selected physical and chemical property results for the main effects of tillage and rotation in 2007.

	Total N		Total C		OM		P_d	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	---g kg^{-1}---		-------------------g kg^{-1}-------------------				---g cm^{-3}---	
Tillage								
Conventional	1.50 b†	1.26 b	9.3 b	11.8 b	19.0 b	20.5 b	1.21 b	1.31 b
No-Till	1.60 a	1.43 a	10.0 a	13.3 a	20.5 a	24.2 a	1.42 a	1.41 a
Rotation								
Rice-Rice	1.50 a	1.35 a	9.5 b	12.3 ab	19.7 ab	21.9 ab	1.37 a	1.41 a
Rice-Fallow	1.53 a	1.29 a	9.3 b	11.9 b	18.9 b	20.9 b	1.36 a	1.34 a
Rice-Soybean	1.59 a	1.36 a	9.8 ab	12.5 ab	19.9 ab	22.4 ab	1.30 a	1.35 a
Rice-Sorghum	1.58 a	1.38 a	10.1 a	13.5 a	20.5 a	24.2 a	1.37 a	1.34 a

†Means within each column followed by a different letter are significantly different at the P = 0.05 level of confidence as determined by the Duncan post hoc test.

Table 55. Main effect results for Mehlich-3 extractable nutrients from a depth of 0 to 6 inches taken during the spring and fall of 2007.

	P[†]		K		S		Ca		Mg		Na		Cu		Zn	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
	mg kg^{-1}															
Tillage																
Conventional	52 a	60 b	108 a	111 a	8.5 a	6.8 a	1698 b	1821 a	269 a	285 a	118 a	111 a	1.8 a	0.9 b	6.8 a	10 a
No-Till	60 a	73 a	102 a	106 a	8.6 a	6.4 a	1834 a	1919 a	216 b	245 b	90 b	81 b	1.6 b	1.1 a	6.6 a	15 a
Rotation																
Rice-Rice	54 a	65 a	104 a	107 a	10.2 a	6.5 a	1792 a	1912 a	243 a	280 a	125 a	108 a	1.6 b	1.1 a	6.2 a	12 a
Rice-Fallow	53 a	65 a	105 a	107 a	8.4 a	6.9 a	1743 a	1891 a	243 a	263 ab	101 b	96 a	1.8 ab	1.0 a	6.0 a	13 a
Rice-Soybean	62 a	67 a	101 a	104 a	7.4 a	6.3 a	1745 a	1798 a	233 a	250 b	97 b	91 a	1.6 ab	0.9 a	7.1 a	11 a
Rice-Sorghum	54 a	68 a	111 a	115 a	8.2 a	6.5 a	1786 a	1878 a	250 a	268 ab	92 b	88 a	1.8 a	1.0 a	7.4 a	14 a

[†]Means within each column followed by a different letter are significantly different at the P = 0.05 level of confidence as determined by the Duncan post hoc test.

Evaluation of Flat vs. Raised Seedbeds for Group IV and Group V Soybeans

Experiment number ....: 07-CS-03

Site and design ....:
- **Location/Cooperator**..................: Rice Research Station (South Unit)
- **Tillage type**.................................: Spring stale
- **Experimental design**...................: Randomized complete block
- **Number of reps**...........................: 4
- **Plot size**..: 10 x 30 ft
- **Row width/rows per plot**............: 30 in / 4

Soil type ....: Crowley silt loam
- **% organic matter**........................: NA
- **pH**..: NA
- **Extractable nutrients** ppm..........: NA

Crop/Variety ....: Soybean / Multiple
- **Planting method/date** ....: Drill seeded / May 25
- **Seeding rate/depth**......................: NA / 1.5 inches
- **Emergence date**...........................: Variable
- **Harvest date** ....: October 26

Seed treatment/cwt ....: None

Fertilization..: 250 lb/A 8-24-24, May 10

Water management ....:
- **Flush** ....: NA
- **Flood** ....: NA
- **Drain**..: NA

Pest management...............................:
- **Herbicides**...................................: 1.5 qt/A Glyphosate, May 21, July 12, August 20
  1.25 qt/A Glyphosate, June 13, September 21
- **Insecticides** ....: 4 oz/A Mustang Max, August 3, September 19
  4 oz/A Mustang Max + 8.5 oz/A Steward, August 16
- **Fungicides** ....: 10 oz/A Stratego + 2 oz/A Uppercut + 2 oz/A Interlock, July 19

Table 56. Evaluation of Flat vs. Raised Seedbeds for Group IV and Group V Soybeans.

Crop Name			Soybeans	Soybeans	Soybeans	Soybeans	Soybeans
Rating Date				10/25/2007	10/25/2007	10/25/2007	10/25/2007
Rating Data Type			Maturity	Height	Ldg-Type	Stand Cnt.	Yield
Rating Unit			days	in	1-5	plants	bu/A
Sample Size Unit						row ft	
Crop Stage			R8	R8	R8	R8	R8
Trt No.	Type	Treatment Name					
1	VAR	95M30	124 b	24 d		4.2 bc	49 a
	CULT	Flat Seedbed					
2	VAR	95M30	128 ab	31 abc	2 a	7 a	52 a
	CULT	Raised Seedbed					
3	VAR	DG5555RR	132 a	27 bcd	1 a	4.7 abc	61 a
	CULT	Flat Seedbed					
4	VAR	DG5555RR	132 a	35 a	2 a	6.2 ab	62 a
	CULT	Raised Seedbed					
5	VAR	DK4753	117 c	29 a-d	1 a	5.1 abc	54 a
	CULT	Flat Seedbed					
6	VAR	DK4753	117 c	33 ab	1 a	6.5 ab	59 a
	CULT	Raised Seedbed					
7	VAR	DPL5634	130 a	30 a-d	1 a	5.9 ab	63 a
	CULT	Flat Seedbed					
8	VAR	DPL5634	133 a	35 a	2 a	6.5 ab	61 a
	CULT	Raised Seedbed					
9	VAR	TV55R15	132 a	25 cd		3.2 c	55 a
	CULT	Flat Seedbed					
10	VAR	TV55R15	133 a	32 ab	2 a	4.4 bc	61 a
	CULT	Raised Seedbed					
LSD (P=.05)			4.1	4.3	1.5	1.62	12.3
Standard Deviation			2.4	2.5	0.8	0.94	7.2
CV			1.89	8.37	52.37	17.62	12.41
Replicate F			2.071	0.208	0.5	0.042	4.338
Replicate Prob(F)			0.1551	0.8145	0.6267	0.9593	0.029
Treatment F			20.602	7.617	1.296	5.118	1.254
Treatment Prob(F)			0.0001	0.0001	0.3705	0.0016	0.3248

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Sweet Sorghum Varieties as a Potential Biofuel Source, 2007

Experiment number ....: 2007 Sweet Sorghum Trial

Site and design ....:
- **Location/Cooperator** ....: Rice Research Station (South Unit)
- **Tillage type** ....: Conventional
- **Experimental design** ....: Randomized complete block
- **Number of reps** ....: 4
- **Plot size** ....: 10 x 30 ft
- **Row width/rows per plot** ....: 30 in / 4

Soil type ....: Crowley silt loam
- **% organic matter** ....:
- **pH** ....:
- **Extractable nutrients** ....:

Crop/Variety ....: Sweet Sorghum / Multiple
- **Planting method/date** ....: Drill seeded / April 20
- **Seeding rate/depth** ....: 1.5 lb/A / 1-inch depth
- **Emergence date** ....: April 25
- **Harvest date** ....: August 13

Seed treatment/cwt ....: None

Fertilization ....: 250 lb/A 8-24-24, May 10; 90 lb N/A 46-0-0, May 23

Pest management ....:
- **Herbicides** ....: 1.33 pt Dual Magnum II + 3.5 pt Atrazine, tank mix at 10 GPA, May 9, cultivated May 23
- **Insecticides** ....: 3 oz Mustang Max, May 18
  4 oz Mustang Max, July 23
- **Fungicides** ....: None

Table 57. Agronomic results of sweet sorghum variety trial for potential biofuel source, 2007.

Description	Plant Ht.	Biomass	Biomass	Stand Count	50% Head	Sol. Solids	POL	Sucrose	Purity	TRS	Fermentable†
Part Rated						Stalk	Stalk	Stalk	Stalk	Stalk	Solids
Rating Data Type		total	stalk	plants							Stalk
Rating Unit	in	ton/A	ton/A	10row ft	days	BRIX	POL		%		ton/A
Crop Stage	maturity	maturity	maturity	maturity	maturity	maturity	maturity	maturity	maturity	maturity	maturity
Trt No. Type Treatment Name											
1 VAR Dale	138 b	27 a	21 a	16 a	88 d	18 a	53 a	12 a	67 a	153 a	3.0 a
2 VAR M81-E	155 a	27 a	21 a	18 a	111 b	13 c	30 b	7 b	53 b	72 b	2.2 a
3 VAR Theis	153 a	24 a	18 a	13 a	105 c	16 b	29 b	7 b	42 c	48 c	2.3 a
4 VAR Topper 76-6	130 b	28 a	22 a	17 a	115 a	14 c	27 b	6 b	44 c	49 c	2.5 a
LSD (P=.05)	10.8	9.4	7.7	6.5		0.9	4.1	0.9	4.9	16.6	0.93
Standard Deviation	6.8	5.9	4.8	4.1		0.6	2.6	0.6	3	10.4	0.58
CV	4.72	22.25	23.48	25.13		3.77	7.38	7.17	5.88	12.95	23.42
Replicate F	0.53	1.79	1.54	0.19		6.09	12.95	13.13	9.16	12.81	0.75
Replicate Prob(F)	0.68	0.22	0.27	0.90		0.02	0.00	0.00	0.00	0.00	0.55
Treatment F	12.92	0.30	0.35	1.15		47.70	89.16	89.10	55.32	90.39	1.27
Treatment Prob(F)	0.0013	0.8244	0.7883	0.3800		0.0001	0.0001	0.0001	0.0001	0.0001	0.3413

† This is a rough estimate of fermentable solids determined by: stalk biomass x BRIX x 0.80

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

FOUNDATION SEED RICE PROGRAM

Lawrence M. White III

INTRODUCTION

Foundation seed rice has been produced by the LSU AgCenter's Rice Research Station for distribution to Louisiana farmers since 1949. The Rice Research Station's seed rice program was instituted in response to the critical shortage of pure planting stocks that existed during and after World War II. Since its inception, the program has made available to Louisiana growers more than 155,000 cwt. of pedigreed stock of 37 rice varieties.

Concurrent with the distribution of pure seed by the Rice Research Station, an industry was developed in Louisiana composed 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 farmer's link with the work of the plant breeder. It is the product of hybridization and 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 that will ensure 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 Rice Research Station's breeding program and of established commercial varieties originating either at Crowley or at research centers in neighboring states.

To fulfill the objectives of the seed program, the Rice Research Station uses 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 Rice Research Station's breeding program that 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 is determined by the percentage of the state's 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 and Forestry. 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 the Agronomic Programs Division of the Louisiana Department of Agriculture and Forestry. 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. To eliminate noxious weeds, especially red rice, that 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.

Seedbed preparation of foundation fields are performed in the fall. Burndown herbicides are applied prior to seeding. The foundation fields are planted into a stale seedbed by means of a 24-runner minimum tillage drill. The breeder stock is planted at rates that may vary from 10 to 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, as well as basic fertilizer applications based on soil test recommendations. A midseason application of N in rates from 21 to 55 lb/A is also applied.

Seedling grasses and weeds are controlled by means of commercially available herbicides applied by airplane or ground rig. 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 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 eight 21-foot diameter grain bins, equipped with vented drying floors and centrifugal fans with temperature-controlled heaters. The rice is dried to a moisture level of approximately 12%. During the storage period between drying and cleaning, the rice is treated with an insecticide 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 that removes chaff, straw, and other foreign material and grades the grain according to width and thickness.

It then flows through three length-grading machines that consist of rotating, indented metal cylinders. The first two remove small grains and broken or dehulled kernels of rice. The third one removes stemmy rice, grains that have very long awns that are attached to portions of the panicle. In the next phase of cleaning, the rice moves through a machine that performs precision grading of the grain by means of rotating perforated cylinders. This machine is designed to separate medium-grain and/or red rice from long-grain rice. It is also capable of removing shriveled and other slender kernels from medium-grain rice.

In the final phase of cleaning, the rice moves through a machine that aspirates the grain, removing any chaff, straw, and other foreign material from the conditioned product.

From the cleaning machines, foundation and breeder seed rice are bagged, assigned lot numbers, and placed in storage in the Rice Research Station's seed rice warehouse where they remain until they are 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 to prevent these impurities from contaminating the seed stocks. To that end, it is routine procedure at the Rice Research Station to partially disassemble all planting and harvesting equipment and to clean it thoroughly with water and/or compressed air before using it in the field. The dryer 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 that is in a fallow cycle. These measures, together with the inspection and roguing, which are done during the growing season, help to ensure that foundation seed is genetically pure and free of mechanical mixtures and noxious weed seeds.

2007 ACTIVITIES

Of the 1,552 cwt. of foundation seed rice sold in 2007, the varieties and quantities were as follows: Cocodrie, 494 cwt.; Trenasse, 301 cwt.; Cheniere, 374 cwt.; Jupiter, 191 cwt.; Bengal, 56 cwt.; Dellrose, 43 cwt.; Pirogue, 40 cwt.; Ecrevisse, 24 cwt; Toro-2, 16 cwt.; and Della, 13 cwt.

The Rice Research Station's foundation seed crop in 2007 consisted of 19 acres of Cheniere, 19 acres of Catahoula (a new long-grain variety), 8 acres of Jupiter, 5 acres of Cypress, 4.5 acres of Neptune (a new medium-grain variety), 2 acres of Della, and .5 acre of Ecrevisse.

Headrows of Cypress, Jupiter, Cocodrie, Neptune, Cheniere, Trenasse, Catahoula, Bengal, Della, and Ecrevisse were grown for replenishment of breeder seed stock.

RICE PHYSIOLOGY

INTRODUCTION

Plant growth regulators (PGRs) have a significant effect on crop production because of their ability to alter plant growth and development. Therefore, studies of PGR modifications to plant growth and development that improve rice production were conducted.

In greenhouse and small plot trials, emergence has been improved with PGRs that cause mesocotyl, coleoptile, and leaf elongation. The mesocotyl and coleoptile are short in semidwarf cultivars, and seeding more than 2 inches below the soil surface can result in poor stands. In addition, seedling height of semidwarf rice increases slowly, resulting in poor seedling vigor. Small plot studies were conducted to evaluate the effects of PGRs on seedling vigor of new and existing varieties and experimental lines under different management practices, including early planting, deep planting depth, and conventional drill seeding.

Ratoon or second crop production in rice is directly dependent on growth from buds located at the base and at nodes on first crop stubble remaining after harvest. These buds remain dormant during the first crop. Plant growth regulators and stubble management were evaluated to determine their effects on ratoon crop growth and development.

Some PGRs are reported to increase grain yield directly. Several of these were evaluated.

To address the objectives of emergence and seedling vigor improvement and yield enhancement in rice, PGRs were tested for their effects on rice growth and development.

SEEDLING VIGOR STUDIES – SEED AND FOLIAR TREATMENT

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Gibberellic Acid and Seedling Vigor in Drill-Seeded Rice – March Planting Date

Location: Rice Research Station, Crowley, LA (North Unit, Field N8)

Variety: See Treatments

Planting Method: Drilled on 7-inch rows

Planting Depth: 2-inch

Seeding Rate: 90 lb/A

Fertilizer: None

Plot Size: 11.6 ft^2 – 0.58 (1 row) x 20 ft

Treated Area: 11.6 ft^2 – 0.58 (1 row) x 20 ft

Treatment(s):

Varieties/Experimental Lines

Bengal	CL131	LA2082	LA2125
Cocodrie	Jefferson	LA2097	LA2177

CL – imidazolinone (Clearfield)-resistant lines

Plant Growth Regulators
Seed treatment – N-Large Premier (0.17 oz/cwt) and Release (0.35 oz/cwt)
Foliar treatment – N-Large Premier (0.75 fl oz/A) and Ryzup (1.5 fl oz/A)

Timing
Seed treatment, 14 Mar
Foliar treatment (3- to 4-leaf stage), 19 Apr

Seed Treater: Jar mill tumble mixer

Sprayer: See North Farm General Methodology

Planting Date: 20 Mar

Emergence: See Treatments

Water Management: None

Pertinent Rainfall: 1.0 inch, 31 Mar - 1 Apr; 2.0 inches, 10 Apr; 0.4 inch, 18 Apr; 1.1 inches, 25 Apr

Herbicide(s): Rice Shot (1 gal/A)+Permit (1 oz/A) by airplane, 13 Apr
Rice Shot (1 gal/A) by backpack sprayer, 19 Apr (tank mixed with foliar PGRs)

Insecticide(s): Icon (0.9 fl oz/cwt) seed treatment, 14 Mar

Fungicide(s): Dithane DF (4 oz/cwt) seed treatment, 14 Mar

Plant Growth Regulator(s): See Treatments

Harvest Date: Not applicable

Harvested Area: Not applicable

Experimental Design: Randomized complete block design and four replications. Factorial treatment arrangement was as follows. A given plot contained a different variety or experimental line in each row. The position of a variety or experimental line within a given plot was constant. Each given plot was planted in triplicate in each replicate. Each given plot contained four or five rows in accommodating four varieties and five experimental lines. Of each triplicate, one plot had untreated seed (no gibberellic acid) and the other two plots had seed treated with N-Large Premier or Release according to the randomization of plots.

Comments: **Seedling Vigor – Emergence and Plant Population Density (Stand)**

Germplasm (varieties/experimental lines) and seed treatment with gibberellic acid had a significant effect on emergence of rice (Table 1). Time to stand, an evaluation of emergence, was the number of days from planting to establishment of an adequate stand (10 plants/ft^2). Germplasm, on average, had a moderate emergence rate with a time to stand of 11 to 20 days after planting (DAP). The evaluation period was 28 days. Any germplasm that had not obtained an adequate stand by 28 DAP was assigned a time to stand of 28 DAP. This germplasm was considered unable to reach an adequate stand under the experimental conditions that existed. Germplasm separated into primarily two categories according to time to stand. The earlier emerging category represented by eight entries, Bengal, Cocodrie, CL131, LA2028, LA2082, LA2097, LA2125, and LA2177, had a time to stand of 11 to 14 DAP. The later emerging category had a time to stand of 20 DAP and included only Jefferson. With one exception, the entries had excellent germination (>90%), and Jefferson had 50% germination. Germination was determined by a Petri dish/filter paper process at laboratory temperatures. On average, across all germplasm, time to stand without a gibberellic acid seed treatment occurred 14 DAP, and seed treatment with N-Large Premier and Release resulted in an average time to stand of 12 DAP. CL131 and Jefferson were the most responsive germplasm and had earlier emergence of 6 and 8 days, respectively, with gibberellic acid seed treatments (Table 2). The remainder of the germplasm exhibited little to no response (0 to 2 days earlier emergence).

Germplasm (varieties/experimental lines) and seed treatment with gibberellic acid had significant effects on stand, (Table 1). Final stand was measured as number of viable (green) 1-leaf stage or older plants at 28 DAP. Germplasm, on average, exhibited good to excellent seedling vigor with final stands between 9 and 20 plants/ft^2 and separated into primarily two categories according to final stand. The category with good vigor had stands of 9 to 13 plants/ft^2 and included CL131, Jefferson, LA2097, and LA2125 (10, 9, 12, and 13 plants/ft^2, respectively). The category with excellent vigor had stands of 15 to 20 plants/ft^2 and included Bengal and LA2082 (15 plants/ft^2), Cocodrie (16 plants/ft^2), LA2177 (17 plants/ft^2), and LA2028 (20 plants/ft^2). On average, across germplasm, final stand without gibberellic acid seed treatment was 15 plants/ft^2 compared with 13 and 14 plants/ft^2 for seed treatment with Release and N-Large Premier, respectively (Table 1). Jefferson was the only entry with an inadequate stand (minimum of 10 plants/ft^2) and was only slightly below the cut off with 9 plants/ft^2. There were no interactions between germplasm and seed treatment with gibberellic acid (Table 2).

The good to excellent levels of seedling vigor noted across the board were related in large measure to adequate soil moisture (timely rain; see Pertinent Rainfall) and moderate temperatures. Temperatures were at or above normal for most of the germination and emergence period following planting (20 Mar) and during the evaluation period for emergence and stand (28 Mar - 17 Apr). Daily average soil temperatures averaged 68ºF and ranged between 57 and 74ºF, and daily average air temperatures averaged 66ºF and ranged between 45 and 76ºF. Cool temperatures (daily average air temperatures at or below 60ºF) occurred during a 5-day period (5 Apr – 9 Apr) about 2 weeks after planting. For soil, daily average temperatures were below 60ºF on 7 Apr and 8 Apr.

Seedling Vigor – Seedling Stature

Germplasm (varieties/experimental lines) and foliar treatment with gibberellic acid had a significant effect on seedling height (Table 3). On average, the shortest germplasm was Jefferson (13 cm) and the tallest was Bengal (17 cm). The other germplasm ranged in height from 15 to 16 cm. Overspraying each plot with gibberellic acid at the 3- to 4-leaf stage resulted in a significant increase in seedling height (Table 3), and the effect was relatively constant across germplasm and plant growth regulator (Table 3). The average increase in seedling height (distance from the soil surface to the tip of the longest leaf extended vertically) at 7 days after treatment (DAT) with N-Large Premier and RyzUp was 5 and 6 cm (17 and 18 cm compared with 12 cm for the control), respectively.

Daily average air temperature for the 7-day period (20 Apr - 26 Apr) following foliar application of gibberellic acid averaged 71ºF and ranged between 69 and 75ºF. The recommended rate of foliar gibberellic acid at those temperatures is 1.0 to 1.5 g/A, and the rate of 1.5 g/A (0.75 fl oz N-Large Premier/A and 1.5 fl oz RyzUp/A) was used based on weather forecasts at the time.

Table 1. The main effects of germplasm and plant growth regulator seed treatment on seedling vigor of rice drill seeded in March. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 28 DAP
TABLE OF GERMPLASM MEANS					
Bengal				12bc	15bc
Cocodrie				11c	16b
CL131				14b	10ef
Jefferson				20a	9f
LA2028				11c	20a
LA2082				11c	15bc
LA2097				12bc	12de
LA2125				13bc	13cd
LA2177				11c	17b
TABLE OF PLANT GROWTH REGULATOR MEANS					
Control				14a	15a
N-LargePremier	l	0.15	seed	12b	13b
Release	l	0.30	seed	12b	14ab

Within the same table, means followed by the same letter do not differ significantly (Duncan's multiple range test, P=.05).

Table 2. The simple effects of germplasm and plant growth regulator seed treatment on seedling vigor of rice drill seeded in March. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 28 DAP
Bengal Control				13c	17a-d
Bengal N-LargePremier	l	0.15	seed	12c	15c-f
Bengal Release	l	0.30	seed	12c	14d-g
Cocodrie Control				12c	17a-e
Cocodrie N-LargePremier	l	0.15	seed	10c	16b-f
Cocodrie Release	l	0.30	seed	10c	15c-f
CL131 Control				18b	10hij
CL131 N-LargePremier	l	0.15	seed	12c	10g-j
CL131 Release	l	0.30	seed	12c	11f-j
Jefferson Control				25a	9j
Jefferson N-LargePremier	l	0.15	seed	17b	10g-j
Jefferson Release	l	0.30	seed	17b	9ij
LA2028 Control				12c	20a
LA2028 N-LargePremier	l	0.15	seed	11c	20ab
LA2028 Release	l	0.30	seed	11c	19ab
LA2082 Control				12c	17a-d
LA2082 N-LargePremier	l	0.15	seed	11c	13d-i

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 28 DAP
LA2082 Release	l	0.30	seed	11c	14d-h
LA2097 Control				12c	13d-j
LA2097 N-LargePremier	l	0.15	seed	12c	11f-j
LA2097 Release	l	0.30	seed	12c	12f-j
LA2125 Control				13c	15c-f
LA2125 N-LargePremier	l	0.15	seed	13c	12f-j
LA2125 Release	l	0.30	seed	12c	13e-j
LA2177 Control				12c	19abc
LA2177 N-LargePremier	l	0.15	seed	11c	15c-f
LA2177 Release	l	0.30	seed	10c	17a-d
LSD (.05) =				4	4
Standard Dev. =				2.6897	2.5308
CV =				21.16	17.92

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

Table 3. The main effects of germplasm and plant growth regulator foliar treatment on seedling vigor of rice drill seeded in March. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Pl. Ht. (cm) 7 DAT
TABLE OF GERMPLASM MEANS			
Bengal			17a
Cocodrie			16ab
CL131			15b
Jefferson			13c
LA2028			16ab
LA2082			15b
LA2097			16ab
LA2125			15b
LA2177			16ab
TABLE OF PLANT GROWTH REGULATOR MEANS			
Control			12a
N-Large Premier	0.75	3-4lf	17b
RyzUp	1.5	3-4lf	18b

Within the same table, means followed by the same letter do not differ significantly (Duncan’s multiple range test, P=.05).

Table 4. The simple effects of germplasm and plant growth regulator foliar treatment on seedling vigor of rice drill seeded in March. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Pl. Ht. (cm) 7 DAT
Bengal Control				13gh
Bengal N-Large Premier		0.75	3-4lf	19abc
Bengal RyzUp		1.5	3-4lf	19ab
Cocodrie Control				13gh
Cocodrie N-Large Premier		0.75	3-4lf	18abc
Cocodrie RyzUp		1.5	3-4lf	18abc
CL131 Control				12h
CL131 N-Large Premier		0.75	3-4lf	16ef
CL131 RyzUp		1.5	3-4lf	17cde
Jefferson Control				9i
Jefferson N-Large Premier		0.75	3-4lf	15fg
Jefferson RyzUp		1.5	3-4lf	16def
LA2028 Control				12h
LA2028 N-Large Premier		0.75	3-4lf	18bcd
LA2028 RyzUp		1.5	3-4lf	20a
LA2082 Control				11h
LA2082 N-Large Premier		0.75	3-4lf	16def
LA2082 RyzUp		1.5	3-4lf	18abc

Continued.

Table 4. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Pl. Ht. (cm) 7 DAT
LA2097 Control				11h
LA2097 N-Large Premier		0.75	3-4lf	19abc
LA2097 RyzUp		1.5	3-4lf	19ab
LA2125 Control				11h
LA2125 N-Large Premier		0.75	3-4lf	17b-e
LA2125 RyzUp		1.5	3-4lf	18bcd
LA2177 Control				12h
LA2177 N-Large Premier		0.75	3-4lf	17cde
LA2177 RyzUp		1.5	3-4lf	18abc
LSD (.05) =				2
Standard Dev. =				1.1978
CV =				7.72

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

SEEDLING VIGOR STUDIES – SEED AND FOLIAR TREATMENT

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Gibberellic Acid and Seedling Vigor in Drill-Seeded Rice – April Planting Date

Location: Rice Research Station, Crowley, LA (North Unit, Field N8)

Variety: See Treatments

Planting Method: Drilled on 7-inch rows

Planting Depth: 3-inch

Seeding Rate: 90 lb/A

Fertilizer: None

Plot Size: 11.6 ft^2 – 0.58 (1 row) x 20 ft

Treated Area: 11.6 ft^2 – 0.58 (1 row) x 20 ft

Treatment(s): **Varieties/Experimental Lines**

Bengal	CL171	LA2082	LA2177
Cocodrie	Jefferson	LA2097	MS4191
CL131	LA2028	LA2125	

CL – imidazolinone (Clearfield)-resistant lines

Plant Growth Regulators
Seed treatment – N-Large Premier (0.17 oz/cwt) and Release (0.35 oz/cwt)
Foliar treatment – N-Large Premier (0.5 fl oz/A) and Ryzup (1.0 fl oz/A)

Timing
Seed treatment, 14 Mar
Foliar treatment (3- to 4-leaf stage), 10 May

Seed Treater: Jar mill tumble mixer

Sprayer: See North Farm General Methodology

Planting Date: 16 Apr

Emergence: See Treatments

Water Management: None

Pertinent Rainfall: 0.4 inch, 18 Apr; 1.1 inches, 25 Apr; 1.8 inches, 3 May; 0.4 inch, 7 May; 0.1 inch, 10 May

Herbicide(s): Rice Shot (1 gal/A) by backpack, 7 May
Rice Shot (3 qt/A) by backpack sprayer, 10 May (tank mixed with foliar PGRs)

Insecticide(s): Icon (0.9 fl oz/cwt) seed treatment, 14 Mar

Fungicide(s): Dithane DF (4 oz/cwt) seed treatment, 14 Mar

Plant Growth Regulator(s): See Treatments

Harvest Date: Not applicable

Harvested Area: Not applicable

Experimental Design: Randomized complete block design and four replications. Factorial treatment arrangement was as follows. A given plot contained a different variety or experimental line in each row. The position of a variety or experimental line within a given plot was constant. Each given plot was planted in triplicate in each replicate. Each given plot contained five or six rows in accommodating five varieties and six experimental lines. Of each triplicate, one plot had untreated seed (no gibberellic acid) and the other two plots had seed treated with N-Large Premier or Release according to the randomization of plots.

Comments: **Seedling Vigor – Emergence and Plant Population Density (Stand)**

Germplasm (varieties/experimental lines) and seed treatment with gibberellic acid had a significant effect on emergence of rice (Table 1). Time to stand, an evaluation of emergence, was the number of days from planting to establishment of an adequate stand (10 plants/ft^2). Germplasm, on average, had a moderate emergence rate with a time to stand of 12 to 16 days after planting (DAP). The evaluation period was 24 days. Any germplasm that had not obtained an adequate stand by 24 DAP was assigned a time to stand of 24 DAP. This germplasm was considered unable to reach an adequate stand under the experimental conditions that existed. Germplasm separated into primarily two categories according to time to stand. The earlier emerging category represented by 10 entries, Bengal, Cocodrie, CL131, CL171, LA2028, LA2082, LA2097, LA2125, LA2177 and MS4191, had a time to stand of 12 to 14 DAP. The later emerging category had a time to stand of 16 DAP and included only Jefferson. With one exception, the entries had excellent germination (>90%), and Jefferson had 50% germination. Germination was determined by a Petri dish/filter paper process at laboratory temperatures. On average, across all germplasm, time to stand without a gibberellic acid seed treatment occurred 14 DAP, and seed treatment with N-Large Premier and Release resulted in an average time to stand of 12 DAP.

There was an interaction between germplasm and plant growth regulator on emergence. MS4191 and LA2177 were the most responsive germplasm and had earlier emergence of 5 and 7 days, respectively, with gibberellic acid seed treatments (Table 2). Jefferson and LA2097 had an intermediate response and emerged 3 days early with the gibberellic acid seed treatment. The remainder of the germplasm exhibited no response (0 days earlier emergence).

Germplasm (varieties/experimental lines) and seed treatment with gibberellic acid had significant effects on stand (Table 1). Final stand was measured as number of viable (green) 1-leaf stage or older plants at 24 DAP. Germplasm, on average, exhibited excellent to superior seedling vigor with final stands between 15 and 24 plants/ft^2 and separated into primarily two categories according to final stand. The category with excellent vigor had stands of 15 to 20 plants/ft^2 and included CL131, CL171, Jefferson, LA2097, LA2177, and MS4191 (17, 19, 15, 18, 18, and 20 plants/ft^2, respectively). The category with superior vigor had stands of 21 to 24 plants/ft^2 and included Bengal, Cocodrie, and LA2125 (21 plants/ft^2), LA2082 (23 plants/ft^2), and LA2028 (24 plants/ft^2). On average, across germplasm, final stand without gibberellic acid seed treatment was 17 plants/ft^2 compared with 20 plants/ft^2 for seed treatment with Release and N-Large Premier (Table 1). All entries attained at least an adequate stand (minimum of 10 plants/ft^2), and there were no statistical interactions between germplasm and seed treatment with gibberellic acid (Table 2).

The excellent to superior levels of seedling vigor noted across the board were related in large measure to adequate soil moisture (timely rain; see Pertinent Rainfall) and warm temperatures. Temperatures were at or above normal for most of the germination and emergence period following planting (16 Apr) and during the evaluation period for emergence and stand (24 Apr – 10 May). Daily average soil temperatures averaged 75ºF and ranged between 68 and 80ºF, and daily average air temperatures averaged 74ºF and ranged between 64 and 80ºF.

Seedling Vigor – Seedling Stature

Germplasm (varieties/experimental lines) and foliar treatment with gibberellic acid had a significant effect on seedling height (Table 3). On average, the shortest germplasm was Jefferson (22 cm) and the tallest was Bengal (27 cm). The other germplasm ranged in height from 23 to 26 cm. Overspraying each plot with gibberellic acid at the 3- to 4-leaf stage resulted in a significant increase in seedling height, and the effect was relatively constant across germplasm and plant growth regulator (Table 3). The average increase in seedling height (distance from the soil surface to the tip of the longest leaf extended vertically) at 6 days after treatment (DAT) with N-Large Premier and RyzUp was 6 and 8 cm (26 and 28 cm compared with 20 cm for the control), respectively. Although not statistically different, plant height was increased 4 to 9 cm, depending on formulation and germplasm (Table 4).

Daily average air temperature for the 6-day period (11 May - 16 May) following foliar application of gibberellic acid averaged 78ºF and ranged between 76 and 81ºF. The recommended rate of foliar gibberellic acid at those temperatures is 0.5 to 1.0 g/A, and the rate of 1.0 g/A (0.5 fl oz N-Large Premier/A and 1.0 fl oz RyzUp/A) was used based on weather forecasts at the time.

Table 1. The main effects of germplasm and plant growth regulator seed treatment on seedling vigor of rice drill seeded in April. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm	Ds Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 24 DAP
TABLE OF GERMPLASM MEANS					
Bengal				12	21bc
Cocodrie				12	21bc
CL131				12	17de
CL171				12	19cd
Jefferson				16	15e
LA2028				12	24a
LA2082				12	23ab
LA2097				13	18cd
LA2125				12	21bc
LA2177				13	18cd
MS4191				14	20c
TABLE OF PLANT GROWTH REGULATOR MEANS					
Control				14	17a
N-LargePremier	l	0.15	seed	12	21b
Release	l	0.30	seed	12	20b

Within the same table, means followed by the same letter do not differ significantly (Duncan's multiple range test, P=.05).

Table 2. The simple effects of germplasm and plant growth regulator seed treatment on seedling vigor of rice drill seeded in April. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 24 DAP
Bengal Control				12cd	17efg
Bengal N-LargePremier	l	0.15	seed	12cd	23abc
Bengal Release	l	0.30	seed	12cd	22a-d
Cocodrie Control				13cd	17efg
Cocodrie N-LargePremier	l	0.15	seed	12cd	24ab
Cocodrie Release	l	0.30	seed	12cd	23a-d
CL131 Control				13cd	16g
CL131 N-LargePremier	l	0.15	seed	12cd	18c-g
CL131 Release	l	0.30	seed	12cd	17fg
CL171 Control				13cd	17fg
CL171 N-LargePremier	l	0.15	seed	12cd	21a-f
CL171 Release	l	0.30	seed	12d	20a-g
Jefferson Control				23a	10h
Jefferson N-LargePremier	l	0.15	seed	13cd	18c-g
Jefferson Release	l	0.30	seed	13cd	18d-g
LA2028 Control				12cd	24ab
LA2028 N-LargePremier	l	0.15	seed	11d	25a

Continued.

Table 2. Continued.

Treatment Name	Fm Ds	Rate	Grow Stg	Time to Stand (days)	Final Stand (pl./sq. ft.) 24 DAP
LA2028 Release	l	0.30	seed	11d	25a
LA2082 Control				13cd	22a-e
LA2082 N-LargePremier	l	0.15	seed	12d	23abc
LA2082 Release	l	0.30	seed	12cd	24ab
LA2097 Control				16b	16g
LA2097 N-LargePremier	l	0.15	seed	13cd	19b-g
LA2097 Release	l	0.30	seed	12d	20b-g
LA2125 Control				14c	19b-g
LA2125 N-LargePremier	l	0.15	seed	12cd	23ab
LA2125 Release	l	0.30	seed	12cd	20a-g
LA2177 Control				16b	16fg
LA2177 N-LargePremier	l	0.15	seed	12d	21a-f
LA2177 Release	l	0.30	seed	12cd	17fg
MS4191 Control				17b	16g
MS4191 N-LargePremier	l	0.15	seed	12cd	23abc
MS4191 Release	l	0.30	seed	12cd	22a-e
LSD (.05) =				2	4
Standard Dev. =				1.0828	2.816
CV =				8.49	14.34

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

Table 3. The main effects of germplasm and plant growth regulator foliar treatment on seedling vigor of rice drill seeded in April. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Pl. Ht. (cm) 6 DAT
TABLE OF GERMPLASM MEANS			
Bengal			27a
Cocodrie			26ab
CL131			25bc
CL171			26ab
Jefferson			22e
LA2028			26ab
LA2082			26ab
LA2097			25bc
LA2125			24cd
LA2177			25bc
MS4191			23de
TABLE OF PLANT GROWTH REGULATOR MEANS			
Control			20a
N-Large Premier	0.5	3-4lf	26b
RyzUp	1.0	3-4lf	28b

Within the same table, means followed by the same letter do not differ significantly (Duncan's multiple range test, P=.05).

Table 4. The simple effects of germplasm and plant growth regulator foliar treatment on seedling vigor of rice drill seeded in April. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Pl. Ht. (cm) 6 DAT
Bengal Control				23i-l
Bengal N-Large Premier		0.5	3-4lf	27b-e
Bengal RyzUp		1.0	3-4lf	31a
Cocodrie Control				22j-m
Cocodrie N-Large Premier		0.5	3-4lf	27c-f
Cocodrie RyzUp		1.0	3-4lf	29a-d
CL131 Control				21klm
CL131 N-Large Premier		0.5	3-4lf	27b-f
CL131 RyzUp		1.0	3-4lf	28b-e
CL171 Control				21klm
CL171 N-Large Premier		0.5	3-4lf	26d-g
CL171 RyzUp		1.0	3-4lf	30abc
Jefferson Control				18n
Jefferson N-Large Premier		0.5	3-4lf	24g-j
Jefferson RyzUp		1.0	3-4lf	24f-i
LA2028 Control				22j-m
LA2028 N-Large Premier		0.5	3-4lf	26d-g
LA2028 RyzUp		1.0	3-4lf	30ab

Continued.

Table 4. Continued.

Treatment Name	Fm Ds Rate	Grow Stg	Pl. Ht. (cm) 6 DAT
LA2082 Control			21j-m
LA2082 N-Large Premier	0.5	3-4lf	26d-g
LA2082 RyzUp	1.0	3-4lf	30abc
LA2097 Control			20lmn
LA2097 N-Large Premier	0.5	3-4lf	27b-e
LA2097 RyzUp	1.0	3-4lf	29a-d
LA2125 Control			20lmn
LA2125 N-Large Premier	0.5	3-4lf	25e-h
LA2125 RyzUp	1.0	3-4lf	26d-g
LA2177 Control			20lmn
LA2177 N-Large Premier	0.5	3-4lf	26d-g
LA2177 RyzUp	1.0	3-4lf	28b-e
MS4191 Control			19mn
MS4191 N-Large Premier	0.5	3-4lf	25e-h
MS4191 RyzUp	1.0	3-4lf	23h-k
LSD (.05) =			2
Standard Dev. =			1.6778
CV =			6.78

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

NORTH UNIT GENERAL METHODOLOGY

Location:	Rice Research Station, Crowley, LA (North Unit, Field N9A)
Seeding Method/Depth/Rate:	Drilled on 7-inch rows/2 inches/90 and 120 lb/A
Fertilizer:	8-24-24 with 2.8% Zn at 250 lb/A by John Deere drill, 19 Mar Urea (46% N) at 200 lb/A (24 Apr) and 100 lb/A (16 May) by airplane
Plot Size/Treated Area:	262.5 ft^2 – 8.75 (15 rows) x 30 ft
Seed Treater:	Cement mixer
Sprayer:	CO_2-driven, backpack, 35 psi, 15 GPA, 8001VS tips, 20-inch nozzle spacings
Planting Date:	20 Mar
Emergence:	28 Mar (Cocodrie) and 30 Mar (Trenasse)
Plant Population:	15 to 20 plants/ft^2 at the 3- to 4-leaf stage
Water Management:	Flushed, 18 Apr; permanent flood (3-inch), 27 Apr; preharvest drain, 5 July
Pertinent Rainfall:	1.0 inch, 31 Mar - 1 Apr; 2.0 inches, 10 Apr; 1.1 inches, 25 Apr (collected as a very shallow flood on the south half of the field); see individual experiments
Growth Stage Definitions:	Mid Boot (MB), collar of flag leaf first visible First Heading (1^{st} H), <5% of stems with some degree of panicle exsertion 50% Heading (H+3), ~50% of stems with some degree of panicle exsertion, 3 days after first heading 100% Heading (H+6), ~100% of stems with some degree of panicle exsertion, 6 days after first heading Milk Stage (MS or H+9), endosperm is white liquid in uppermost florets, 9 days after first heading
Pesticide(s):	Dithane DF (4 oz/cwt) seed treatment, 15 Mar Icon (0.9 fl oz/A) seed treatment, 15 Mar Rice Shot (1 gal/A) + Permit (1 oz/A) by airplane, 13 Apr Rice Shot (1 gal/A) + Prowl H_2O (2.5 pt/A) by ATV, 24 Apr Clincher (15 fl oz/A) + COC (1 qt/A) by airplane, 7 June Londax (2 oz/A) by airplane, 1 and 10 May Quadris (12 fl oz/A) by airplane, 13 June
Plant Growth Regulator(s):	Release (0.35 oz/cwt) seed treatment, 15 Mar RyzUp (0.67 fl oz/A) with herbicide, 24 Apr
Harvest Date/Area:	23 July/183.75 ft^2 - 8.75 (15 rows) x 21 ft

YIELD ENHANCEMENT STUDIES – FIRST CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Actagro Plant Nutrients and Crop Production in Drill-Seeded Rice

General Methodology: See North Unit General Methodology (pg. 202)

Variety: Cocodrie

Treatment(s): **Plant Growth Regulator**
Librel (0.25 and 1 qt/A), Liquid Humus (2 and 6 qt/A), and Resist (1.5 and 2 qt/A)

Timing
Early Boot (EB), 8 June

Pertinent Rainfall: No significant rain within 8 hr after foliar applications

Experimental Design: Randomized complete block and four replications

Comments: **Crop Production**

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the applications of Actagro plant nutrients (Table 1). Mature plant height (distance from the soil surface to the tip of the panicle extended vertically) for treatments ranged between 94 and 95 cm (control = 95 cm). Grain moisture (an indicator of crop maturity) for treatments ranged between 18.2 and 18.5% (control = 18.2%). Grain yield (adjusted to 12% moisture) was highest (8,515 lb/A) with the high rate of Librel compared with the control (8,121 lb/A) and other Actagro products that ranged between 8,170 and 8,443 lb/A.

Table 1. The effects of Actagro products on crop growth and production of drill-seeded rice. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Mature Pl. Ht. (cm)	Grain Moisture (%)	Grain Yield (lb/A)
Control				95a	18.2a	8191a
Resist	l	64	EB	94a	18.3a	8443a
Librel	d	32	EB	94a	18.2a	8515a
Resist Librel	l d	48 8	EB EB	95a	18.5a	8259a
Liquid Humus	l	64	EB	94a	18.3a	8170a
Liquid Humus	l	192	EB	95a	18.5a	8254a
LSD (.05) =				1	0.6	490
Standard Dev. =				.83499	.37539	325.02
CV =				0.88	2.05	3.91

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

YIELD ENHANCEMENT STUDIES – FIRST CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Heading Applications of Gibberellic Acid and Crop Production in Drill-Seeded Rice

General Methodology: See North Unit General Methodology (pg. 202)

Variety: Trenasse

Treatment(s): **Plant Growth Regulator**
RyzUp (4 fl oz/A) + Agri-Dex (1 qt/A)

Timing
1st Heading (1stH), 12 June
50% Heading (H+3), 15 June
100% Heading (H+6), 18 June
Milk Stage (H+9), 21 June

Pertinent Rainfall: No significant rain within 8 hr after foliar applications with one exception. The 100% heading application was followed 2 hours later with a light drizzle and no recorded rain until 5 hours after application

Experimental Design: Randomized complete block and three replications

Comments: **Crop Production**

Crop stature, maturity, and production were evaluated at harvest, and plant height was significantly affected by the heading and early grain filling applications of RyzUp (Table 1). Mature plant height (distance from the soil surface to the tip of the panicle extended vertically) for treatments ranged between 108 and 114 cm (control = 102 cm). Of the RyzUp treatments, plant height (114 cm) was tallest in the first heading and first heading plus 3 days times of application and significantly taller than the first heading plus 6 days (111 cm) and first heading plus 9 days (108 cm) times of application. The first heading plus 6 days and first heading plus 9 days treatments were significantly different. Grain moisture (an indicator of crop maturity) for treatments ranged between 20.3 and 20.6% (control = 20.5%). Grain yield (adjusted to 12% moisture) was highest (9,093 lb/A) with the first heading plus 3 days application compared with the control (8,811 lb/A) and other RyzUp treatments that ranged between 8,716 and 9,081 lb/A.

Milling quality was evaluated after harvest, and total and whole milling yields were unaffected by the heading and early grain filling applications of RyzUp (Table 1). Total milling yield (percent of sample remaining after shelling and milling, removal of the hull and bran layers) for treatments ranged between 68 and 70% (control = 70%). Whole milling yield (percent of sample remaining after shelling, milling, and shaking - shaking removes pieces broken during milling) for treatments ranged between 56 and 58% (control = 57%).

Table 1. The effects of application of RyzUp during heading on crop growth and production in drill-seeded rice. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Mature Pl. Ht. (cm)	Grain Moisture (%)	Grain Yield (lb/A)	Total Milling Yield (%)	Whole Milling Yield (%)
Control				102d	20.5a	8811a	70a	57a
RyzUp	l	4	1stH	114a	20.3a	8888a	70a	58a
RyzUp	l	4	H+3	114a	20.6a	9093a	69a	56a
RyzUp	l	4	H+6	111b	20.3a	9081a	70a	57a
RyzUp	l	4	H+9	108c	20.5a	8716a	68a	56a
LSD (.05) =				2	0.4	594	2	3
Standard Dev. =				.93985	.22572	315.7	.87559	1.7701
CV =				0.86	1.10	3.54	1.26	3.11

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

SOUTH UNIT GENERAL METHODOLOGY

First (Main) Crop

Location:	Rice Research Station, Crowley, LA (South Unit, Field 7B)
Seeding Method/Depth/Rate:	Drilled on 7-inch rows/1.5 inches/120 lb/A
Fertilizer:	8-24-24 with 2.8% Zn at 250 lb/A by John Deere drill, 26 Mar Urea (46% N) at 200 lb/A (2 May) and 100 lb/A (23 May) by airplane
Plot Size/Treated Area:	262.5 ft^2 – 8.75 (15 rows) x 33 ft
Seed Treater:	Cement mixer
Sprayer:	CO_2-driven, backpack, 35 psi, 15 GPA, 8001VS tips, 20-inch nozzle spacings
Planting Date:	26 Mar
Emergence:	1 Apr (Cocodrie) and 3 Apr (Trenasse)
Water Management:	Flushed, 18 Apr; permanent flood (3-inch), 3 May; preharvest drain, 13 July
Plant Population:	15 to 20 plants/ft^2 at the 3- to 4-leaf stage
Pertinent Rainfall/Weather:	See individual studies/1.0 inch, 31 Mar - 1 Apr; 1.7 inches, 10 Apr; 0.2 inch, 18 Apr; 1.2 inches, 25 Apr; 0.5 inch, 3 May
Growth Stage Definitions:	3- to 4-Leaf Stage (3/4L), 3 or 4 leaf collars visible Late Boot Stage (LB), 5- to 8-inch panicle inside main stem Dough Stage (DS), endosperm white dough in uppermost florets, ~3 weeks after LB Physiological Maturity (PM), endosperm starting to harden, ~1 week after DS Physiological Maturity plus 1 week (PM+1), 1 week after PM
Pesticide(s):	Dithane DF (4 oz/cwt) seed treatment, 15 Mar Icon (0.9 fl oz/A) seed treatment, 15 Mar Rice Shot (1 gal/A) + Permit (1 oz/A) by airplane, 13 Apr Rice Shot (1 gal/A) + Londax (0.75 oz/A) + Permit (0.5 oz/A) by airplane, 1 May Londax (2 oz/A) by airplane, 10 May Tilt (6 fl oz/A) by airplane, 13 June Quadris (12 fl oz/A) by airplane, 20 June
Plant Growth Regulator(s):	Release (0.35 oz/cwt) seed treatment, 15 Mar
Harvest Date/Area:	25 July/183.75 ft^2 – 8.75 (15 rows) x 21 ft

Second (Ratoon) Crop

Fertilizer:	Urea (46% N) at 200 lb/A by airplane, 3 Aug
Water Management/Weather:	Permanent flood (3-inch), 31 July; preharvest drain, 18 Sept; Hurricane Humberto, 13 Sept
Pertinent Rainfall:	4 inches, 27-31 July; 1.9 inches, 14-17 Aug; 0.9 inch, 24-27 Aug; 3.1 inches, 31 Aug-4 Sept; 2.7 inches, 12-13 Sept
Pesticide(s):	Mustang Max (4 fl oz/A), 19 Sept
Harvest Date/Area:	3 Oct/266.875 ft^2 – 8.75 (15 rows) x 30.5 ft

YIELD ENHANCEMENT STUDIES – FIRST AND SECOND CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Plant Growth Regulators Applied to the First Crop and Crop Production in First and Second Crops in Very Early Season, Semidwarf, Long-Grain, Drill-Seeded Rice

General Methodology: See South Unit General Methodology (pg. 206)

Variety: Cocodrie

Treatment(s): **Plant Growth Regulator(s)**
Embark 2S (1 pt/A)
Royal MH-30 SG (2.5 lb/A)
RyzUp (4 fl oz/A) + Agri-Dex (1 qt/A)

Timing
Dough Stage (DS), 6 July
Physiological Maturity (PM), 13 July
Physiological Maturity plus 1 week (PM+1), 19 July

Pertinent Rainfall: No rainfall within 8 hours after applications

Experimental Design: Randomized complete block and five replications

Comments: **First (Main) Crop Production**

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the pre-drain applications of plant growth regulators (Table 1). For the plant growth regulator treatments, mature plant height (distance from the soil surface to the tip of the panicle extended vertically) ranged between 81 and 85 cm (control = 82 cm). Grain moisture (an indicator of crop maturity) ranged between 17.6 and 17.8% (control = 17.8%). Grain yield (adjusted to 12% moisture) ranged between 5,979 and 7,134 lb/A (control = 6,592 lb/A). Although not significantly different from the control, grain yield from the application of Royal MH 30 at dough stage (5,979 lb/A) was significantly lower compared with grain yield from the application of RyzUp at 1-week after physiological maturity. Growth suppressants (Embark 2S and Royal MH 30) and the growth stimulant (RyzUp) had limited effects on the first crop, allowing a relatively unbiased evaluation of the effects on the second crop.

Second (Ratoon) and Total Crop Production

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the applications of the plant growth regulators (Table 1). In the second crop treatments, mature plant height ranged between 71 and 72 cm (control=72 cm). Grain moisture ranged between 18.0 and 19.9% (control = 18.41%). In general, the mitotic inhibitors (Embark 2S and Royal MH-30 SG), with the exception of Royal MH-30 SG applied at dough stage (2,592 lb/A), had slightly lower yields (ranged from 2,313 to 2,592 lb/A) compared with the control (2,448 lb/A). The gibberellic acid treatments (RyzUp) showed similar results with a slightly higher yield (2,777 lb/A) with the dough stage application compared with the control and later timings. Although similar results were noted in total grain yield (first plus second crop grain yields), total grain yields of the plant growth regulator treatments (ranged from 8,542 to 9,018 lb/A) were lower compared with the control (9,040 lb/A).

Table 1. The effects of pre-drain and post-drain applications of plant growth regulators to the first crop on first and second crop production in very early season, semidwarf, long-grain, drill-seeded rice. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	1st Crop Pl. Ht. (cm)	1st Crop Grain Moisture (%)	1st Crop Grain Yield (lb/A)	2nd Crop Pl. Ht. (cm)	2nd Crop Grain Moisture (%)	2nd Crop Grain Yield (lb/A)	Total Grain Yield (lb/A)
Control				82ab	17.8a	6592ab	72a	18.4bc	2448ab	9040ab
Embark 2S	l	16	DS	83ab	17.6a	6427ab	72ab	18.6bc	2592ab	9018ab
Embark 2S	l	16	PM	83ab	17.8a	6472ab	72ab	18.8bc	2313ab	8785ab
Embark 2S	l	16	PM+1	83ab	17.8a	6465ab	71ab	19.3ab	2387ab	8852ab
Royal MH 30	d	40	DS	81b	17.6a	5979b	71ab	18.3bc	2426ab	8405b
Royal MH 30	d	40	PM	83ab	17.6a	6335ab	71b	19.0abc	2350ab	8685ab
Royal MH 30	d	40	PM+1	84ab	17.8a	6591ab	71ab	18.7bc	2342ab	8933ab
RyzUp	l	4	DS	84ab	17.6a	7071ab	71ab	18.0c	2777a	9848a
RyzUp	l	4	PM	85a	17.6a	6114ab	71b	18.4bc	2428ab	8542ab
RyzUp	l	4	PM+1	85a	17.7a	7134a	72ab	19.9a	2253b	9388ab
LSD (.05) =				3	0.4	965	1	1.0	410	1171
Standard Dev. =				2.0212	.28422	747.43	.82798	.74077	317.33	906.51
CV =				2.43	1.61	11.47	1.16	3.96	13.05	10.13

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

YIELD ENHANCEMENT STUDIES – FIRST AND SECOND CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Plant Growth Regulators Applied to the First Crop and Crop Production in First and Second Crops in Very Early Season, Short Stature, Long-Grain, Drill-Seeded Rice

General Methodology: See South Unit General Methodology (pg. 206)

Variety: Trenasse

Treatment(s): **Plant Growth Regulator(s)**
- Embark 2S (1 pt/A)
- Royal MH-30 SG (2.5 lb/A)
- RyzUp (4 fl oz/A) + Agri-Dex (1 qt/A)

Timing
- Dough Stage (DS), 2 July
- Physiological Maturity (PM), 9 July
- Physiological Maturity plus 1 week (PM+1), 16 July

Pertinent Rainfall: No rainfall within 8 hours after applications with the following exceptions: 0.4 inch at 6 hr after DS treatment and 0.1 inch at 30 min after PM treatment

Experimental Design: Randomized complete block and five replications

Comments: **Crop Production**

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the pre-drain applications of plant growth regulators (Table 1). For the plant growth regulator treatments, mature plant height (distance from the soil surface to the tip of the panicle extended vertically) ranged between 88 and 91 cm (control = 90 cm). Grain moisture (an indicator of crop maturity) ranged between 18.1 and 19.3% (control = 18.9%). Grain yield (adjusted to 12% moisture) ranged between 6,923 and 7,826 lb/A (control = 7,705 lb/A). Growth suppressants (Embark 2S and Royal MH 30) and growth stimulant (RyzUp) had limited effects on the first crop, allowing a relatively unbiased evaluation of the effects on the second crop.

Second (Ratoon) and Total Crop Production

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the applications of the plant growth regulators (Table 1). In the second crop treatments, mature plant height ranged between 73 and 76 cm (control = 75 cm). Grain moisture ranged between 17.9 and 19.0% (control = 19.3%). In general, the mitotic inhibitors (Embark 2S and Royal MH-30 SG) had higher yields (ranged from 1,854 to 2,230 lb/A) compared with the control (1,841 lb/A), and the gibberellic acid treatments (RyzUp) had higher yields (ranged from 1,939 to 2,242 lb/A) compared with the control. Due to slight differences in first crop yields, similar results were not noted in total grain yield (first plus second crop grain yields). Total grain yields of the plant growth regulator treatments (ranged from 9,128 to 9,670 lb/A) were not significantly different from the control (9,546 lb/A).

Table 1. The effects of pre-drain and post-drain applications of plant growth regulators to the first crop on first and second crop production in very early season, short stature, long-grain, drill-seeded rice. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	1st Crop Mature Pl. Ht. (cm)	1st Crop Grain Moisture (%)	1st Crop Grain Yield (lb/A)	2nd Crop Pl. Ht. (cm)	2nd Crop Grain Moisture (%)	2nd Crop Grain Yield (lb/A)	Total Grain Yield (lb/A)
Control				90a	18.9a	7705a	75ab	19.3a	1841a	9546a
Embark 2S	l	16	DS	88a	18.7a	7236a	74ab	18.7a	1854a	9090a
Embark 2S	l	16	PM	91a	19.3a	7623a	76a	17.7a	2047a	9670a
Embark 2S	l	16	PM+1	89a	18.7a	7826a	74ab	19.0a	1991a	9817a
Royal MH 30	d	40	DS	88a	19.2a	7054a	74ab	17.9a	2074a	9128a
Royal MH 30	d	40	PM	90a	18.9a	7577a	75ab	18.2a	2144a	9721a
Royal MH 30	d	40	PM+1	91a	19.0a	7305a	75ab	18.3a	2230a	9535a
RyzUp	l	4	DS	91a	18.3a	7679a	75ab	18.2a	2242a	9921a
RyzUp	l	4	PM	89a	18.1a	6923a	73b	18.3a	2158a	9081a
RyzUp	l	4	PM+1	91a	18.4a	7464a	75ab	18.5a	1939a	9402a
LSD (.05) =				7	1.1	1783	2	1.4	754	2504
Standard Dev. =				5.7109	.87587	1380.5	1.5563	1.1014	583.73	1938.8
CV =				6.35	4.67	18.56	2.09	5.99	28.45	20.43

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

YIELD ENCHANCEMENT STUDIES – SECOND CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: First Crop Cutting Height and Second Crop Production in Drill-Seeded Rice

General Methodology: See South Unit General Methodology (pg. 206)

Variety: See Treatments

Treatment(s): **Variety(s) –** Cocodrie and Trenasse

First Crop Cutting Height (attempted) – 8 and 16 inches

Pertinent Rainfall: Not Applicable

Experimental Design: Randomized complete block and two replications with four subplots per replication. Factorial arrangement of treatments with two varieties and two cutting heights (2x2) for a total of eight treatments.

Comments:

First (Main) Crop Status

Mature plant height (distance from the soil surface to the tip of the panicle extended vertically) was not evaluated in the first crop. Adjacent experiments with Cocodrie and Trenasse showed mature plant heights averaged 82 and 90 cm in the controls, respectively. Stubble height averaged 9 and 16 inches for the two cutting heights (Table 1). Based on these plant heights, the amount of stubble remaining after harvest relative to mature plant height was estimated to average 40% for Cocodrie and 34% for Trenasse. Amount of stubble remaining as affected by cutting height was estimated to average 27% for the lower than normal cutting height and 47% for the normal cutting height. The effects of variety and cutting height were independent of each other (Table 2).

Plots were harvested using a combine with a straw shredder and in one continuous motion without stopping between subplots. This produced an even layer of straw over each subplot and replicate and precluded evaluating grain yield in the first crop. Lodging was absent in all plots.

Second (Ratoon) Crop Growth

The rate of reproductive growth and development, although not significantly different, tended to be affected by variety and first crop cutting height (Table 1). Heading was just beginning at 4 weeks after first crop harvest (WAH), and panicle emergence (panicles completely exserted) was noticeable at 5 WAH. Panicle emergence was slightly earlier and higher for Trenasse compared with Cocodrie. On average, panicle densities were 4, 19, 35, 41, and 42 panicles/ft^2 for Trenasse and 3, 13, 24, 29, and 32 panicles/ft^2 for Cocodrie at 5, 6, 7, 8, and 9 WAH, respectively. Panicle emergence was slightly earlier and number of panicles was higher with the higher cutting height. On average, panicle densities were 2, 11, 26, 32, and 34 panicles/ft^2 with the lower cutting height compared with 5, 21, 33, 39, and 40 panicles/ft^2 with the higher cutting height at 5, 6, 7, 8, and 9 WAH, respectively.

For the most part, the effects of variety and cutting height were independent (Table 2), and panicle emergence was complete at 9 WAH.

Second (Ratoon) Crop Production

Crop stature, maturity, and production were evaluated at harvest, and crop stature and maturity were significantly and independently affected by variety and cutting height (Table 3). Mature plant height (distance from the soil surface to the tip of the panicle extended vertically) averaged 71 and 75 cm for Cocodrie and Trenasse, respectively. On average, mature plant height (73 cm) was not affected when cutting height was reduced from 16 to 9 inches. Grain moisture (an indicator of crop maturity) averaged 19.2 and 19.0% for Cocodrie and Trenasse, respectively.

On average, grain moisture increased significantly (18.2% vs. 20.0%) when cutting height decreased. These results, along with the previously discussed panicle emergence results, indicate a trend toward delaying maturity by lowering cutting height. On average, grain yields (adjusted to 12% moisture) were 2,162 and 2,048 lb/A for Cocodrie and Trenasse, respectively, and grain yields were 2,109 and 2,101 lb/A for the 9- and 16-inch stubble heights, respectively. Trenasse had a lower yield (1,938 lb/A) compared with Cocodrie (2,781 lb/A) at the lower stubble height (Table 4).

Table 1. The main effects of variety and first (main) crop cutting height on first crop stubble production and second (ratoon) crop heading. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Stubble Ht. (in.)	Heading Pan.Den. (pan./sq ft) 04 WAH	Heading Pan.Den. (pan./sq ft) 05 WAH	Heading Pan.Den. (pan./sq ft) 06 WAH	Heading Pan.Den. (pan./sq ft) 07 WAH	Heading Pan.Den. (pan./sq ft) 08 WAH	Heading Pan.Den. (pan./sq ft) 09 WAH
TABLE OF VARIETY MEANS									
Cocodrie			13	0	3	13	24	29	32
Trenasse			12	0	4	19	35	41	42
TABLE OF CUTTING HEIGHT MEANS									
8-inch			9	0	2	11	26	32	34
16-inch			16	0	5	21	33	39	40

Within the same table, means followed by the same letter do not differ significantly (Duncan’s multiple range test, P=.05).

Table 2. The simple effects of variety and first (main) crop cutting height on first crop stubble production and second (ratoon) crop heading. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Stubble Ht. (in.)	Heading Pan.Den. (pan./sq ft) 04 WAH	Heading Pan.Den. (pan./sq ft) 05 WAH	Heading Pan.Den. (pan./sq ft) 06 WAH	Heading Pan.Den. (pan./sq ft) 07 WAH	Heading Pan.Den. (pan./sq ft) 08 WAH	Heading Pan.Den. (pan./sq ft) 09 WAH
Cocodrie 8-inch			9b	0b	2b	10b	20a	27a	30a
Cocodrie 16-inch			16a	0b	3b	17ab	27a	32a	34a
Trenasse 8-inch			8b	0a	2b	12ab	31a	36a	37a
Trenasse 16-inch			16a	0b	6a	25a	39a	46a	47a
LSD (.05) =			1	0	2	15	26	28	27
Standard Dev. =			.36443	0	.50775	4.7726	8.1398	8.9108	8.5639
CV =			2.94	0	14.91	30.01	27.80	25.44	23.24

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

Table 3. The main effects of variety and first (main) crop cutting height on second (ratoon) crop production. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Mature Pl. Ht. (cm)	Grain Moisture (%)	Grain Yield lb/A)
TABLE OF VARIETY MEANS					
Cocodrie			71a	19.2	2162
Trenasse			75b	19.0	2048
TABLE OF STUBBLE HEIGHT MEANS					
8-inch			73	20.0a	2109
16-inch			73	18.2b	2101

Within the same table, means followed by the same letter do not differ significantly (Duncan’s multiple range test, P=.05).

Table 4. The simple effects of variety and first (main) crop cutting height on second (ratoon) crop production. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds Rate	Grow Stg	Mature Pl. Ht. (cm)	Grain Moisture (%)	Grain Yield lb/A)
Cocodrie 8-inch			71b	20.4a	2281a
Cocodrie 16-inch			71b	18.1b	2044ab
Trenasse 8-inch			75a	19.7ab	1938b
Trenasse 16-inch			75a	18.4b	2159ab
LSD (.05) =			3	1.7	253
Standard Dev. =			.85847	.54792	79.621
CV =			1.17	2.86	3.78

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

YIELD ENHANCEMENT STUDIES – FIRST CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: BioForge and Crop Production in Drill-Seeded Rice

General Methodology: See South Unit General Methodology (pg. 206)

Variety: Trenasse

Treatment(s): **Plant Growth Regulator**
BioForge (0.5 and 1.0 pt/A)

Timing
3- to 4-Leaf (3/4 LF), 1 May (2 days before flooding)
Late Boot (LB), 11 June

Pertinent Rainfall: No rainfall within 8 hours after applications

Experimental Design: Randomized complete block and four replications

Comments: **Crop Production**

Crop stature, maturity, and production were evaluated at harvest, and none were significantly affected by the applications of BioForge (Table 1). Mature plant height (distance from the soil surface to the tip of the panicle extended vertically) for treatments ranged between 86 and 88 cm (control = 85 cm). Grain moisture (an indicator of crop maturity) for treatments ranged between 18.6 and 19.2% (control = 18.6%). Grain yield (adjusted to 12% moisture) for treatments ranged between 6,443 and 6,918 lb/A and were generally lower compared with the control (7,357 lb/A).

Table 1. The effects of early and late season applications of BioForge on crop growth and production in drill-seeded rice. Rice Research Station, Crowley, LA. 2007.

Treatment Name	Fm Ds	Rate	Grow Stg	Mature Pl. Ht. (cm)	Grain Moisture (%)	Grain Yield (lb/A)
Control				85a	18.6a	7357a
BioForge	l	8	3/4L	86a	18.9a	6918a
BioForge	l	16	3/4L	86a	19.2a	6833a
BioForge	l	8	LB	88a	18.9a	6918a
BioForge	l	16	LB	86a	18.6a	6443a
LSD (.05) =				3	0.6	1143
Standard Dev. =				1.9472	.41251	742.13
CV =				2.26	2.19	10.77

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

OFF-STATION GENERAL METHODOLOGY

Location:	Dennis Leonards' Farm, Crowley, LA
Seeding Method/Depth/Rate:	Drilled on 7-inch rows/1 inch/90 - 95 lb/A
Fertilizer:	Zinc Plus (10 fl oz/cwt) seed treatment, 15 Apr Urea (46%N) at 200 lb/A by airplane, 15 May Urea/Ammonium sulfate (33% N) at 100 lb/A by airplane, 8 and 15 June
Plot Size/Treated Area:	6000 ft^2 – 30 x 200 ft
Seed Treater:	G&H Seed Company
Sprayer:	John Deere mule, air-driven, 10 GPA
Planting Date:	31 Apr
Emergence:	5 May
Water Management:	Flooded, 16 - 23 May, then drained due to appearance of 'Localized Decline' Flushed, 9 June Flooded, 16 June Preharvest drain, 16 Aug
Pertinent Rainfall:	Frequent rainfall between planting and permanent flood minimized flushing, and rainfall during the later part of August delayed harvest by 3 to 5 days
Growth Stage Definitions:	3/4 Leaf Stage = 3- to 4-leaf collars visible on majority of seedlings
Pesticide(s):	Apron XL (0.32 fl oz/cwt) seed treatment, 15 Apr Maxim (0.04 fl oz/cwt) seed treatment, 15 Apr Roundup (1.5 pt/A) by ground sprayer, 9 and 30 Apr Arrosolo (1 gal/A) + Permit (0.25 oz/A) by airplane, 14 May Stratego (17 fl oz/A) by airplane, 7 July
Plant Growth Regulator(s):	Release LC (1 fl oz/cwt) seed treatment, 15 Apr
Harvest Date/Area:	4 Sept/3916 ft^2 – 22 (cutter width) x 178 ft

YIELD ENHANCEMENT STUDIES – FIRST CROP

R.T. Dunand and R.R. Dilly, Jr.

Experiment: Seedling Applications of Stoller Products, Localized Decline, and Crop Production in Drill-Seeded Rice

General Methodology: See Off-Station General Methodology (pg. 215)

Variety: Jupiter

Treatment(s): **Plant Growth Regulator**
BioForge (8, 16, and 32 fl oz/A)

Timing
3/4 Leaf Stage, 15 May

Pertinent Rainfall: No significant rain within 8 hr after foliar applications

Experimental Design: Strip trial with one strip per treatment

Comments: **Crop Production**

Symptoms of Localized Decline were noted across the test, and crop production was evaluated at harvest. Grain maturity and yield were determined (Table 1). Grain moisture (an indicator of crop maturity) for treatments ranged between 16.8 and 18.2% (control = 17.7%). Grain yield (adjusted to 12% moisture) was highest (8,017 lb/A) with BioForge at the 0.5 pt/A rate and X-tra Power at the 1 qt/A rate. Both strips with these treatments were located on the north end of the field area and may have received a slightly higher rate of nitrogen fertility due to 'dressing' the end of the field by the aerial applicator (a common practice). There was an approximate 50-foot border between the end of the field that was 'dressed' and the strips with the higher yields. Aerial applications of fertilizer by airplane can be as much as 100 feet wide, depending on the situation. The other treatments ranged between 7,389 and 7,626 lb/A compared with the control (7,469 lb/A). Without replication, statistical analysis was not attempted.

Table 1. The effects of a seedling application of Stoller products on rice production of a drill-seeded medium grain in a field exhibiting symptoms of Localized Decline. Single strip trial on the Dennis Leonards' Farm. Crowley, LA. 2007.

Treatment	Rate (fl oz/A)	Timing	Grain Moisture (%)	Grain Yield (lb/A)
Control	0		17.7	7469
Sugar Mover CoMo	32 16	3/4 leaf stage 3/4 leaf stage	17.3	7464
BioPower	32	3/4 leaf stage	17.2	7389
BioForge	32	3/4 leaf stage	16.9	7626
BioForge	16	3/4 leaf stage	16.8	7572
BioForge	8	3/4 leaf stage	17.2	8017
X-tra Power	32	3/4 leaf stage	18.2	8017

AQUACULTURE RESEARCH

ANNUAL SUMMARY OF ENVIRONMENTAL CONDITIONS AND CRAWFISH PRODUCTION

W.R. McClain and J.J. Sonnier

Table 1 contains the average weekly data for environmental conditions and crawfish catch, 2006-2007 season, crawfish research project, Rice Research Station, Crowley, LA. The catch consisted almost exclusively of red swamp crawfish (*Procambarus clarkii*). The production summary is composed of averages across all experimental plots and treatments.

Pond History: Ponds were fallow for a period of 10 months following the previous crawfish season of 2004-2005. Rice crops were planted in Apr and harvested in Sept 2006, and fields were not stocked with brood crawfish. Rather, recruitment was by intentional stocking of hatchlings in the fall of 2006.

Soil Type: Crowley silt loam

Water Source: Groundwater

Pond Area: Twelve 1-acre ponds

Forage Crops: Rice, variety ‘Cocodrie,’ was seeded by air on 17 Apr 2006 at 110 lb/A. Grain was harvested by rice combine on 7 Sept 2006, and a ratoon forage crop was managed from the stubble for crawfish production.

Permanent Flood Date: 2 Oct 2006

Trap Type: 3-funnel pyramid trap; 0.75-inch square mesh wire

Bait Used: Manufactured baits: *Cajun World* and *Early On* (Purina Mills, Inc., St. Louis, MO) and Southern Pride (Country Acres Feed, Inc., Brentwood MO)

Crawfish Harvest: 16 traps/A, 21 Mar - 26 June 2007 (44 total trapping days resulting in 704 total trap-sets/A).

Crawfish Grades: Harvested crawfish were subjected to a grader (passive, water type) and sorted into three size-grade categories as follows: “Large” - <15 count/lb, “Medium” - 15-21 count/lb, and “Small” - > 21 count/lb.

Table 1. Annual environmental conditions and crawfish production (averaged or totaled weekly). Rice Research Station, Crowley, LA. 2006-2007.

Weeks	**Soil Temp.[1] Min.**	**Max.**	**Air Temp. Min.**	**Max.**	**Water Temp. Min.**	**Max.**	**Avg. D.O.[2]**	**Total Rainfall**	**Large Crawfish Count**	**Crawfish Harvest**	**Crawfish Size**	**Total Trapsets**
	-------------------------deg. F-------------------------						**(mg/L)**	**(inches)**	**(#/trap)**	**(lb/A)**	**(cnt/lb)**	**(#/A)**
June 1-3	78.0	84.3	66.3	86.7								
June 4-10	79.0	90.7	68.4	90.4				0.62				
June 11-17	81.6	92.7	72.0	91.9								
June 18-24	79.3	87.7	73.4	89.6				1.30				
June 25-July 1	82.9	94.0	69.1	92.3								
July 2-8	80.6	87.1	74.3	88.0				2.27				
July 9-15	80.0	89.0	74.7	90.7				2.16				
July 16-22	82.6	90.6	74.4	94.4				2.36				
July 23-29	80.4	83.6	74.6	86.9				3.50				
July 30-Aug 5	82.1	89.3	75.1	92.7				0.66				
Aug 6-12	82.0	90.4	74.4	91.7				0.93				
Aug 13-19	83.1	92.4	74.3	94.7				1.92				
Aug 20-26	82.9	91.6	75.1	91.6				2.02				
Aug 27-Sept 2	79.3	88.6	72.4	88.9				3.58				
Sept 3-9	79.6	89.4	68.1	89.9								
Sept 10-16	78.1	85.1	71.1	87.3				1.12				
Sept 17-23	76.0	83.3	70.9	85.1				1.34				
Sept 24-30	71.6	80.6	61.9	83.1				0.64				
Oct 1-7	76.7	86.0	66.7	89.1								
Oct 8-14	70.7	79.3	66.3	83.1				0.10				
Oct 15-21	72.7	78.1	64.0	80.3	68.7	74.7		6.15				
Oct 22-28	60.9	69.4	51.7	71.6	63.1	70.0	1.07	2.10				
Oct 29-Nov 4	60.7	70.0	51.0	73.0	60.8	69.8	0.87					
Nov 5-11	61.7	70.0	55.1	76.0	63.1	70.7	1.20	1.80				
Nov 12-18	57.1	66.1	45.6	66.7	56.3	63.9		0.40				
Nov 19-25	50.9	61.9	37.4	63.4	52.0	59.2						
Nov 26-Dec 2	58.0	66.6	51.6	73.3	58.3	65.5	2.20	0.84				
Dec 3-9	45.1	53.6	30.7	54.7	43.3	50.0	7.54					
Dec 10-16	55.6	59.6	47.9	66.0	55.4	61.0	2.81	0.60				
Dec 17-23	60.9	64.6	56.0	68.9	60.3	64.8	1.19	1.21				

Continued.

Table 1. Continued.

Weeks	Soil Temp.[1] Min.	Soil Temp.[1] Max.	Air Temp. Min.	Air Temp. Max.	Water Temp. Min.	Water Temp. Max.	Avg. D.O.[2]	Total Rainfall	Large Crawfish Count	Crawfish Harvest	Crawfish Size	Total Trapsets
	-------------------------deg. F-------------------------						(mg/L)	(inches)	(#/trap)	(lb/A)	(cnt/lb)	(#/A)
Dec 24-30	51.0	56.6	42.3	59.0	51.1	56.7		5.15				
Dec 31-Jan 6	55.1	59.0	45.9	62.1	53.4	59.5		3.05				
Jan 7-13	55.7	60.6	48.7	66.4	54.9	63.0	3.34	1.05				
Jan 14-20	54.0	57.6	45.4	56.3	47.8	54.0		1.50				
Jan 21-27	52.0	54.4	42.3	55.4	48.2	53.6	6.80	2.90				
Jan 28-Feb 3	49.0	51.3	38.0	49.3	45.5	51.4	7.87	2.10				
Feb 4-10	49.1	54.6	41.0	60.4	50.0	60.1	6.50					
Feb 11-17	49.9	55.7	36.7	56.3	46.8	58.5	3.41	0.24				
Feb 18-24	52.1	59.0	44.3	68.4	56.3	66.7	2.80	0.16				
Feb 25-Mar 3	59.9	65.7	50.7	72.9	60.8	72.7	2.29	0.26				
Mar 4-10	55.7	63.3	41.0	67.1	56.3	70.7	4.53					
Mar 11-17	63.3	68.4	56.4	74.7	64.6	75.7	1.35	1.32				
Mar 18-24	63.1	69.7	58.4	74.9	65.5	77.7	0.63		1.7	3.2	17.2	32
Mar 25-31	69.1	74.9	65.6	81.6	69.6	79.0	0.40		2.4	6.1	15.6	40
Apr 1-7	65.1	71.6	57.4	75.6	62.1	73.6	0.80	1.12	2.0	4.7	14.8	35
Apr 8-14	58.4	66.3	51.4	67.3	60.8	75.2	1.73	1.77	2.9	12.5	12.6	55
Apr 15-21	63.3	73.6	53.6	74.4	64.4	79.9		0.31	3.6	9.4	11.6	31
Apr 22-28	69.1	76.4	63.6	80.1	70.3	82.8		1.20	3.5	14.0	11.5	47
Apr 29-May 5	72.3	82.3	66.7	85.3	75.0	87.4		0.52	4.3	19.3	11.3	51
May 6-12	75.4	83.1	68.7	85.9	76.1	90.9		0.10	4.0	17.1	11.1	48
May 13-19	74.3	84.0	64.4	85.0	73.0	87.4		0.09	3.2	13.7	11.1	48
May 20-26	73.9	81.9	64.0	83.4	72.3	84.4		0.28	2.9	13.0	10.8	48
May 27- June 2	74.0	81.4	66.9	84.7	74.7	85.8		4.60	3.2	14.2	10.7	48
June 3-9	75.9	84.0	73.0	88.6	79.3	91.9		1.50	3.5	20.4	10.6	61
June 10-16	79.6	89.7	73.4	92.9	80.6	90.0		2.84	2.8	17.7	10.6	65
June 17 -23	77.1	86.6	74.3	89.7	80.4	91.2		0.80	2.1	12.4	10.7	64
June 24-30	79.9	90.4	74.3	89.9	79.3	89.8		0.24	1.3	4.0	10.8	32
								65.34		**181.6**		**704**

[1] Soil temperature was measured at a depth of 4 inches.
[2] Dissolved oxygen readings were taken about 8:00 a.m.
[3] Rainfall total is for 1 year only (June 1, 2006 - May 31, 2007) and does not include rainfall occurring in June 2007.

SUMMER BURROW EXCAVATIONS AND EFFECTS OF VARIOUS FACTORS ON REPRODUCTION IN THE LABORATORY

W.R. McClain and J.J. Sonnier

INTRODUCTION

Crawfish survival and reproduction in summer burrows is thought to be highly variable, largely as a result of weather patterns, but also may hinge on the health and condition of animals as they enter the burrow. Because crawfish production as practiced in Louisiana relies on natural reproduction, events that happen prior to and during the burrow occupation may significantly influence subsequent production. For example, anecdotal evidence in recent years, backed by limited research, has linked low production to unusually low and/or infrequent rainfall. Soil type, burrow depth, burrow location, and amount of water inside the burrow at the time of initial burrowing may play a role in how well burrowed crawfish respond to prolonged drought conditions. Because very little research exists regarding the burrow ecology of crawfish, especially as it relates to crawfish aquaculture, research at the LSU AgCenter is being focused in this area. This study examined crawfish in natural burrows following pond draining with normal rainfall patterns and also created simulated drought conditions at various times and of varying lengths in a system of artificial burrows.

Another factor examined in this study was the use of supplemental feeds and/or the crawfish's ability to forage following stocking as a means of building energy reserves prior to burrowing. Because ovarian maturation and spawning occur in the burrow after extended stays, where food resources are severely limited, female broodstock must build sufficient energy reserves for reproduction prior to burrowing. Preliminary investigations have shown lower reproduction potential when females enter the burrow with low energy reserves. Short-term supplemental feeding of ponds prior to peak burrowing activity may improve survival and/or reproductive success within the summer burrow. However, it is unknown if supplemental feeding is beneficial when stocked crawfish have ample opportunity to forage in a food-replete rice crop prior to burrowing.

The effects of burrowing strategy on reproductive performance were also evaluated. Survival and reproductive success of crawfish that burrowed prior to pond draining were compared with that of crawfish burrowing only after pond draining. Crawfish from each burrowing strategy were excavated during the summer dry period and placed in a system of artificial burrows in the lab for further observance. Burrowing crawfish were also compared to trap-harvested animals that were placed in artificial burrows directly from open water or held for varying lengths of time in ponds prior to placement in artificial burrows.

The system of artificial burrows closely mimicked conditions in natural burrows while allowing more precise observations of survival and reproduction. For example, with monthly examinations of each animal, the time of spawning was associated with each treatment factor and time/method of collection.

Ponds: Crawfish from experimental 1-acre ponds receiving no supplemental feed, used in the study "***Effects of Trap Density on Crawfish Yield in a Rice-Crawfish Field Rotational Management System***" in the 97th annual research report, and one experimental pond receiving supplemental feed were used for this study. It is assumed that the experimental trap density treatments in the previous study had no significant effect on the experimental treatments or outcomes of this study.

Permanent Flood Date: 26 Sept 2005

Pond Drain Date: 6 June 2006

Feed: A commercial sinking catfish feed (32% crude protein) was offered twice per week, at 40 lb/A, for 4 weeks prior to crawfish collection in the "fed pond." No supplemental feed was offered in other ponds.

Crawfish Collections from Open Water: Mature crawfish (*Procambarus clarkii*) were collected (via baited traps) from open waters of both fed and non-fed ponds just prior to pond draining. Subsets of the fed and non-fed, trap-harvested crawfish were placed in enclosures within a rice crop for 1, 3, and 5 weeks prior to the transfer of females to artificial burrows. Additional subsets of trap-harvested crawfish were placed in sections of the rice field to roam freely with the intent of subsequent collection by traps. Subsets (n=10) of the trap-harvested crawfish from both fed and non-fed ponds were dissected and assessed for body condition. Other mature females were placed directly in artificial burrows.

Enclosures: Cylindrical wire-mesh enclosures (31 inches in diameter by 18 inches tall) constructed of 1/8-inch plastic-coated wire mesh, with a wire mesh bottom, were placed over young rice plants in a newly planted rice field to serve as a confinement under typical field conditions. The enclosures contained a solid aluminum strip of sheeting (3 inches wide) around the inside top perimeter to prevent escapement from crawfish climbing up the wire mesh. Each enclosure was stocked with five mature females and two mature males.

Burrows Identified: Prior to pond draining and within the first week following pond draining, sealed (capped) crawfish burrows on the levees and in pond bottoms, for both fed and non-fed ponds, were flagged for later excavation.

Crawfish Collections from Burrows: From 10 Aug to 23 Aug 2006, flagged crawfish burrows were hand-excavated and crawfish retrieved. Burrow location, depth, volume of water, and quantity, sex, and maturity of crawfish retrieved from each burrow were noted. Subsets (n=5 to 10) of mature female crawfish retrieved from both pre- and postdrain constructed burrows and for each pond type (fed or non-fed) were dissected for determination of body condition. Remaining mature females were placed directly in artificial burrows for subsequent reproduction under simulated conditions.

Artificial Burrow System: Multiple half-gallon plastic containers (with lids) filled with 0.48 L of soil and a similar volume of aged pond water served to simulate conditions inside naturally constructed crawfish burrows. The containers were each stocked with a single female crawfish and housed in an environmentally controlled laboratory. Temperature in the lab was maintained at about 81°F to provide amenities and conditions approaching that of earthen burrows during the typical burrow occupation (reproductive period) of summer/early autumn.

Survival/Reproduction Assessment: Artificial burrows were inspected monthly, beginning in July, whereby each female crawfish was examined for survival and spawning.

Tissue Analysis: Subsamples of each group where dissected upon collection and non-spawning females of the simulated drought treatments were dissected upon termination (31 Dec 2006) for tissue analysis.

Burrow Parameters: Burrow timing, burrow depth, water volume, and number, sex, maturity and survival status of burrow occupants

Reproductive Parameters: Survival, spawning status, number of offspring, month spawned, month hatched, and body condition indices for select treatments

Experimental Design: With respect to assessment of crawfish survival/reproduction in artificial burrows, a completely randomized design was used for each treatment comparison.

Statistical Analysis: General Linear Model analysis, with means separated by Duncan's multiple range test

Support: USDA Special Grants – Aquaculture

Conclusions: Over 260 attempts were made to excavate crawfish burrows, and though some were too deep, filled with fresh mud, or contained no sign of live or dead crawfish, 194 burrows containing crawfish (74%) were successfully examined (Figure 1). Of those 194, 36% contained only dead crawfish, 34% contained a single live crawfish, and 30% contained two live crawfish. Of the 184 live crawfish excavated, 61% were female and 98% of those were judged to be sexually mature. It was surprising to observe that 36% of the burrows contained no living crawfish after such a short time following pond draining with the modest rainfall patterns.

Based on whether burrows contained live or dead crawfish and whether a burrow was occupied by one or two crawfish, Table 1 contains the average burrow depths, range of water volumes found, and the percentages of burrows per category that contained no measurable free standing water. As with burrow examinations in previous years, dead crawfish were generally associated with shallow burrows and burrows containing no measurable water, and there was a strong positive relationship between the amount of water present and burrow depth.

Burrow morphological data is further broken down in Table 2 by timing of burrow construction (in relationship to pond draining) and by burrow depths. As expected, all predrain burrows were constructed near the top of the levee at the water's edge, while many postdrain burrows were constructed near the confluence of the levee and pond bottom or along boat ruts in the pond bottom. Therefore, it is difficult to separate any influence of timing of burrowing with that of burrow location. There were, however, marked differences due to burrow location/timing in average volume of water present in burrows, the percentages of burrows with no measurable water, and burrows containing live crawfish although the burrow depths were similar. The postdrain burrows contained more water -- often burrows were full of water -- and on average contained about 33% more live crawfish. Though the implication of these findings with regard to burrow location and/or timing is unclear in the Crowley silt loam soil, burrow depth and presence of free water inside the burrow seem to be well correlated to crawfish survival. Water volume was generally greater with increasing burrow depths, as was crawfish survival.

Response variables for crawfish excavated from burrows and held in artificial burrows for spawning are presented in Table 3. Although few significant differences were observed, spawning success appeared slightly greater for the postdrain burrowers, but the predrain burrowers spawned slightly earlier on average. The first comparisons in Table 4 show that the response variables with regard to crawfish extracted from natural burrows and placed in artificial burrows were generally better than crawfish collected from traps, whether they were held for a short time prior to placement in artificial burrows or not. Burrow-extracted crawfish had significantly higher survival, greater spawning rate, and yielded more offspring than trap-collected animals. Spawning success was more than doubled over trap harvested crawfish. The reasons for these differences are not clear. Crawfish stocked into the system of artificial burrows directly after trap harvest spawned and hatched young earlier than those trapped and held or those collected from burrows. The reasons for this too are unclear.

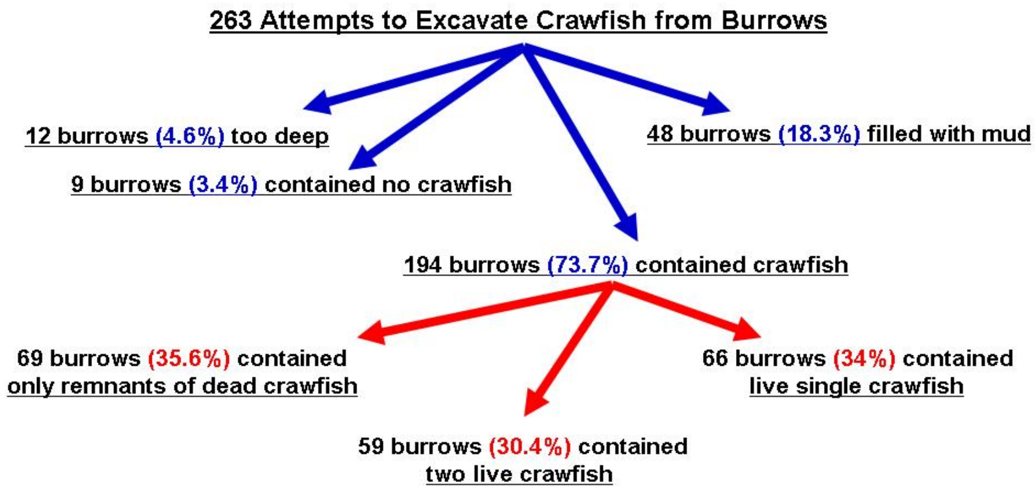
Feeding of crawfish in ponds for a short period prior to collecting was another treatment factor in this study. This was done to compare the survival and reproduction of crawfish during the burrow stay based on the availability of nutrients and presumably their ability to use these abundant nutrients to build reserves prior to entry into the burrow. Spawning success was greater for those crawfish from fed ponds, possibly indicating inadequate nutrition from forage-based ponds. Few other differences were observed between the fed and non-fed groups when comparing animals under the different protocols. Allowing non-fed crawfish to forage in a somewhat more food-rich environment of a rice field prior to the burrow stay seemed to offer little improvement in spawning success in the short run; although after 5 weeks, the spread between fed and non-fed crawfish was reduced. When comparing non-held non-fed crawfish (that is, crawfish placed directly into artificial burrows following trap harvest) and those non-fed crawfish held for 5 weeks in a rice field, survival in the artificial burrows was 73 and 91%, respectively, and spawning success was 27.5 and 54.5%, respectively. Similarly, spawning success of fed crawfish increased from 41% to only 58%. This indicates that given enough time, crawfish may be able to build reserves and gain the needed energy for the long burrow stay without supplemental feed by feeding in the improved environment of a rice field.

The suitable environment of a rice field may also provide an opportunity for stocked broodstock to complete maturation and mate before burrowing. However, the benefits from this perspective may not be separable from those of nutrition, based solely on reproductive success in this study. In previous studies, however, short-term holding seem to positively impact both survival and spawning success.

Table 5 provides the relative timing of spawning in artificial burrows based on various factors. Spawning began as early as July in this study and no spawning occurred after October for this particular group of crawfish. Overall, peak spawning occurred during September. In general, more trap-harvested crawfish spawned earlier than crawfish extracted from burrows. Thirty-nine percent of trap-caught crawfish had spawned before September, while only 17% of burrow crawfish had spawned by then. When examined more closely, however, trap-caught crawfish that were held for only 1 week prior to their introduction into the artificial burrows tended to spawn later. The reason is unclear. About 38% of the crawfish from predrained constructed burrows spawned in August, whereas no crawfish from the postdrain burrows spawned before September. Although it was not possible to determine when crawfish constructed predrain burrows in this study, in general, those crawfish collected from traps earlier during the earlier collection dates had a tendency to spawn earlier. Few differences were observed for fed versus non-fed crawfish with regard to timing of spawning.

Average response variables for those crawfish subjected to aspects of simulated drought during the burrow occupation are presented in Table 6. Simulated drought treatments negatively impacted crawfish survival and spawning success, and those treatments tended to delay the average time of spawning. Survival was impacted most by the constant drought; however, the August drought resulted in low survival as well. This may have just been an artifact of the lower number of replicates because the multi-month drought treatments did not result in this low survival. Spawning success was generally lowest for the September and October and multi-month drought treatments, likely because these months constitute the peak months for spawning. In general, successful reproduction was the lowest and was delayed the longest with the most severe (longest) drought treatments, although differences were not always statistically significant. The date of collection had some minor impact on average date of spawning (in the absence of a drought treatment) – with crawfish collected after May 2 spawning about 1 month later.

The last table (Table 7) provides some comparisons of condition indices for a subsample of crawfish at collection and those non-reproducing crawfish at termination of the simulated drought study. The greatest differences seem to be associated with the hepatopancreas and abdominal or tail muscle of those crawfish at collection compared with those at termination of the study. These differences are typical of changes that occur during the burrow stay. Drought treatments seem to have had little impact on these indices, with the exception of the "all dry" or constant drought treatment. Although there were only two crawfish in this group, these seemed to have on average more advanced ovaries than the initial subset and the condition indices of the hepatopancreas and abdominal muscle fell in between the initial subset and the other treatment groups. Even though these two crawfish experienced the same lengthy burrow stay as those experiencing partial drought environments, it appears they were more "conditioned" to the poor circumstances and were better poised to continue reproduction with improved conditions. This warrants further investigation.



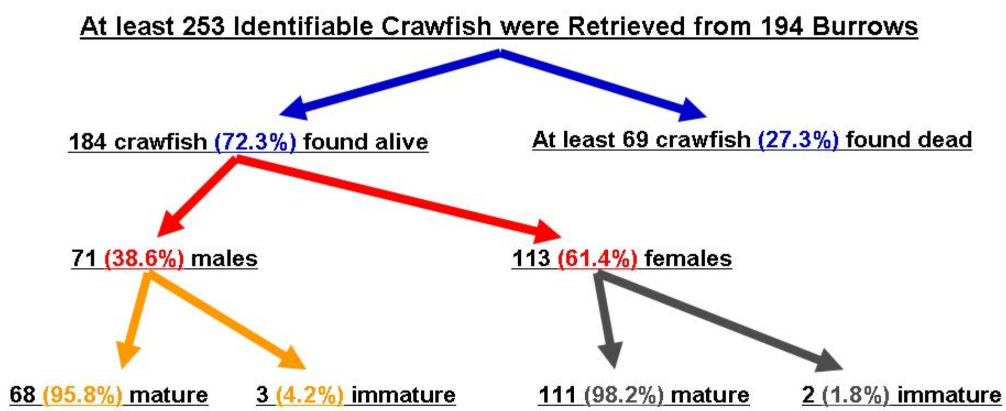


Figure 1. Categorizations from crawfish burrow excavations following draining of experimental crawfish ponds. Upper chart is organized by burrow observations then by occupant status, while lower chart is organized by crawfish survival then by sex and maturity status.

Table 1. Aspects of burrow ecology relating to crawfish extracted from burrows following pond draining in experimental crawfish production ponds. Total rainfall from pond draining until last burrow excavated was 2.64 inches for four occasions (range = 0.30 - 1.10 inches). Rice Research Station, Crowley, LA. 2007.

Burrows	No.	Average Depth (and Range) of Burrows (inches)	Range of Water Volume (ml)	% of Burrows without Water
With Remnants of Dead	69	28.5 (4-57)	0 - 2250	21.7
Single Occupancy[1] - Live	66	33.4 (7-60)	0 - 9000	13.6
Double Occupancy[2] - Both Live	59	37.9 (15-55)	0 - 5300	3.4

[1] Nine of the 66 burrows contained mature males, one contained an immature female, and one contained an immature male.
[2] 58 of the 59 burrows contained one mature male and one mature female and one contained a mature male and immature female.

Table 2. Characteristics of burrows constructed before and after summer pond drawdown. Rice Research Station, Crowley, LA. 2007.

Depth Group (inches)	(N)	(N) as % of Total	Avg. Depth (inches)	% Live Crawfish	Avg. Water Volume[2] (ml)	% of Burrows with No Water
			Pre-Drain-Constructed Burrows			
4 – 10	0	-	-	-	-	-
11 – 20	11	10.6	18.0	36.4	27.3	90.9
21 – 30	30	28.8	26.4	43.3	109.8	20.0
31 – 40	33	31.7	35.0	57.6	603.6	12.1
41 – 50	24	23.1	46.4	70.8	969.6	8.3
51 – 60	6	5.8	55.3	83.3	980.8	0
Average (or Total)	**(104)**		**34.5[1]**	**55.8[1]**		
			Post-Drain-Constructed Burrows			
4 – 10	4	4.4	6.5	25.0	37.5	50.0
11 – 20	18	20.0	15.8	44.4	-	11.1
21 – 30	17	18.9	26.1	82.4	-	0
31 – 40	29	32.2	35.0	79.3	-	0
41 – 50	22	24.5	47.4	95.5	-	0
51 – 60	0	-	-	-	-	-
Average (or Total)	**(90)**		**31.2[1]**	**74.4[1]**		

[1] Averages are weighted averages and not simply grand means from each depth category.
[2] Water volume was not obtainable for burrows filled with water and common with nearby surface water sources.

Table 3. Average response variables for female crawfish extracted from summer burrows and held in artificial burrows for reproduction. Treatment represents those burrows that were constructed prior to pond draining (Pre-Drain) or following pond draining (Post-Drain). Values within columns with different superscripts were significantly different ($P \leq 0.05$), and ***NS*** indicates non-significant differences among the treatments within columns. Rice Research Station, Crowley, LA. 2007.

Treatment	No.[1]	Int. Wt.	% Surv[1]	% Spawned[1]	% Spawned[2]	No. Young	No. Young/ gram	Month Spawned[3]	Month Hatch[3]
Pre-Drain	45	41.1[B]	73.3	71.1	84.2[B]	465	13.6	8.7[B]	9.3[B]
Post-Drain	45	53.5[A]	88.9	86.7	97.5[A]	513	10.7	9.1[A]	9.7[A]
			NS	*NS*		*NS*	*NS*		

[1] Based on initial number of replicates surviving until spawning or termination.
[2] Based only on animals surviving through October (the last month of spawning).
[3] Based on numerical representation of the months, beginning with 1 for January.

Table 4. Average response variables for female crawfish collected with baited traps in open water or extracted from summer burrows and held in artificial burrows for reproduction. Values within columns with the same superscript were not significantly different ($P > 0.05$), and ***NS*** also indicates non-significant differences among treatments within columns, by group. Rice Research Station, Crowley, LA. 2007.

Treatment	No.[1]	Int. Wt.	% Surv[1]	% Spawned[1]	% Spawned[2]	No. Young	No. Young/ gram	Month Spawned[3]	Month Hatch[3]
Overall Averages for Summer-Collected Female Broodstock									
	373	**51.5**	**71.3**	**42.4**	**49.5**	**418**	**9.5**	**8.8**	**9.4**
Comparisons among nonFed Females Collected from Traps (Held or not Held post harvest) and from Burrows									
Traps (not Held)	109	52.2^{A}	73.4^{AB}	27.5^{B}	31.2^{B}	373^{B}	7.9^{B}	8.3^{B}	8.9^{B}
Traps (Held)	174	53.2^{A}	64.9^{B}	32.8^{B}	39.0^{B}	339^{B}	6.9^{B}	9.1^{A}	9.5^{A}
Burrows	90	47.3^{B}	81.1^{A}	78.9^{A}	91.0^{A}	491^{A}	12.1^{A}	8.9^{A}	9.6^{A}
Comparisons between Fed and nonFed Females (All Protocols and All Holding Periods)									
Fed	75	46.8^{B}	69.3	41.3^{A}	82.5^{A}	332	7.3	9.1	9.6
nonFed	99	58.2^{A}	61.6	26.3^{B}	73.5^{B}	347	6.4	9.0	9.4
			NS			*NS*	*NS*	*NS*	*NS*
Comparisons between Fed and nonFed Females by Protocol (All Holding Periods)									
Caged (Fed)	16	42.2^{B}	87.5	68.8^{A}	68.8^{A}	425	10.8	9.0	9.6
Caged (nonFed)	21	56.3^{A}	71.4	28.6^{B}	30.0^{B}	587	10.8	8.7	9.0
			NS			*NS*	*NS*	*NS*	*NS*
Free (Fed)	29	50.6^{B}	69.0	51.7^{A}	71.4^{A}	320	6.3	9.1	9.6
Free (nonFed)	48	60.3^{A}	70.8	27.1^{B}	33.3^{B}	300	5.4	9.0	9.5
			NS			*NS*	*NS*	*NS*	*NS*
In Tanks (Fed)	30	45.5^{B}	60.0	16.7	19.2	220	4.2	9.4	9.4
In Tanks (nonFed)	30	56.0^{A}	40.0	23.3	29.2	59	1.3	9.3	9.5
			NS	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
Comparisons by Week by Feed (Field Held Only)									
Wk1 (Fed)	17	49.5	58.8^{B}	41.2	58.3	286	6.1	9.3	9.6
Wk3 (Fed)	16	45.7	100^{A}	75.0	75.0	426	9.8	8.9	9.5
Wk5 (Fed)	12	47.7	66.7^{B}	58.3	77.8	297	6.3	9.0	9.7
		NS		*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
Wk1 (nonFed)	37	60.0^{A}	67.6	24.3	27.3	376	6.7	9.1	9.4
Wk3 (nonFed)	21	62.1^{A}	66.7	19.0	25.0	366	6.5	8.8	9.5
Wk5 (nonFed)	11	50.1^{B}	90.9	54.5	60.0	442	8.3	8.7	9.2
			NS	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
Comparisons of Field Held Crawfish by Week (Fed and nonFed Combined)									
Wk1	54	56.7^{A}	64.8	29.6	35.6	341	6.5	9.2	9.5
Wk3	37	55.0^{A}	81.1	43.2	50.0	410	8.9	8.9	9.5
Wk5	23	48.8^{B}	78.2	56.5	68.4	364	7.2	8.8	9.5
			NS	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*

[1] Based on initial number of replicates.
[2] Based only on animals surviving through October (the last month of spawning).
[3] Based on numerical representation of the months, beginning with 1 for January.

Table 5. Percentage of spawning crawfish to spawn in artificial burrows by month. Rice Research Station, Crowley, LA. 2007.

Variable	**N**	**July**	**August**	**September**	**October**	**November**
Comparisons between Trap-Caught and Burrow-Excavated Females and Selections within Each Group						
Trap-Caught	**46**	**15.2**	**23.9**	**45.7**	**15.2**	**0**
Trap-Caught (not Held)	30	23.3	30.0	40.0	6.7	0
Trap-Caught (Held 1 wk)	16	0	12.5	56.3	31.3	0
Burrow Excavations	**71**	**0**	**16.9**	**77.5**	**5.6**	**0**
Pre-Drain	32	0	37.5	56.2	6.3	0
Post-Drain	39	0	0	94.9	5.1	0
Comparisons by Collection Dates for Trap-Caught Females						
Collected May 2 (Avg. 7.7)	9	44.4	44.4	11.1	0	0
Collected May 15 (Avg. 8.7)	10	10.0	30.0	40.0	20.0	0
Collected June 1 (Avg. 8.5)	11	18.2	18.2	63.6	0	0
Collected June 7 (Avg. 9.3)	28	0	7.1	60.7	32.1	0
Collected June 21 (Avg. 8.9)	16	6.3	18.7	56.3	18.7	0
Collected July 5 (Avg. 8.8)	13	0	30.8	53.8	15.4	0
Comparisons between Fed and nonFed Trap-Caught Females Harvest the Same Day						
Fed	31	0	16.1	58.1	25.8	0
Non-Feed	26	3.8	15.4	57.5	23.1	0

Table 6. Average response variables for female crawfish collected with baited traps in open water and held in artificial burrows for reproduction under simulated conditions of drought. Values within columns with the same superscript were not significantly different (P > 0.05), and ***NS*** also indicates non-significant differences among treatments within columns, by group. Rice Research Station, Crowley, LA. 2007.

Treatment	No.[1]	Int. Wt.	% Surv[1]	% Spawned[1]	% Spawned[2]	No. Young	No. Young per gram	Month Spawned[3]	Month Hatch[3]
Comparisons among Experimental Treatments (All Collection Dates)									
No Drought	109	52.2[AB]	73.4[A]	27.5[A]	32.6[A]	373	7.9	8.3[C]	8.9
July Dry	60	52.8[AB]	55.0[AB]	15.0[B]	20.0[AB]	284	5.9	8.7[BC]	9.2
Aug Dry	22	48.0[B]	18.2[C]	9.1[BC]	20.0[AB]	120	2.7	9.0[BC]	9.5
Sept Dry	56	55.6[A]	39.3[B]	3.6[BC]	5.7[B]	89	1.6	10.0[AB]	10.0
Oct Dry	54	56.3[A]	51.9[B]	1.9[BC]	2.5[B]	318	9.3	11.0[A]	11.0
Aug-Sept Dry	59	55.4[A]	42.4[B]	8.5[BC]	13.5[AB]	212	5.0	10.0[AB]	10.0
Aug-Oct Dry	60	55.2[A]	55.0[AB]	1.7[BC]	2.4[B]	.	.	11.0[A]	.
All Dry	30	52.7[AB]	6.7[C]	0.0[C]	0[B]	-	-	-	-
						NS	*NS*		*NS*
Comparisons by Length of Time Dry (All Collection Dates)									
No Drought	109	52.2	73.4[A]	27.5[A]	32.7[A]	373	7.9	8.3[C]	8.9
1 Month Dry	192	54.0	45.3[B]	7.3[B]	10.8[B]	226	5.0	9.1[BC]	9.5
2 Month Dry	59	55.4	42.4[B]	8.5[B]	13.5[B]	212	.	10.0[AB]	10.0
3 Month Dry	60	55.2	55.0[B]	1.7[B]	2.4[B]	.	.	11.0[A]	.
All Dry	30	52.7	6.7[C]	0[B]	0[B]	-	-	-	-
		NS				*NS*	*NS*		*NS*
Comparisons among "No Drought" Crawfish by Collection Date									
May 2	25	50.6	68.0	36.0	45.0	368	8.2	7.7[B]	8.3
May 15	44	53.3	79.5	22.7	25.0	409	8.8	8.7[A]	9.3
June 1	40	52.0	70.0	27.5	34.4	337	6.8	8.5[A]	9.0
		NS	*NS*	*NS*	*NS*	*NS*	*NS*		*NS*

[1] Based on initial number of replicates.
[2] Based only on animals surviving through November (the last month of spawning).
[3] Based on numerical representation of the months, beginning with 1 for January.

Table 7. Comparison of condition indices for mature female crawfish at collection and non-reproducing crawfish at termination of the 8-month study. Individuals were grouped by simulated treatments (i.e., no dry period, continuous dry condition, and dry for 1, 2, or 3 months). Values within columns with the same superscript were not significantly different (P > 0.05) and ***NS*** also indicates non-significant differences among treatments within columns. Rice Research Station, Crowley, LA. 2007.

	No.	Ovary Color[1]	% Ovary Moisture	Ovary Index[2]	Hept Color[3]	% Hept Moisture	Hept Index[2]	% Tail Moisture	Tail Index[2]
At Time of Collection	60	2.2[B]	75.4[B]	0.04[B]	4.0[A]	55.6[C]	3.0[A]	79.8[C]	2.29[A]
Termination - No Drought	25	2.8[AB]	83.7[A]	0.10[AB]	1.5[C]	88.6[A]	0.37[C]	91.6[A]	0.25[C]
Termination - 1 Month Dry	71	2.7[AB]	84.2[A]	0.12[AB]	1.4[C]	88.4[A]	0.33[C]	91.5[A]	0.28[C]
Termination - 2 Month Dry	20	2.7[AB]	78.8[AB]	0.14[AB]	1.6[BC]	88.1[A]	0.35[C]	90.3[A]	0.28[C]
Termination - 3 Month Dry	32	2.4[AB]	83.3[A]	0.11[AB]	1.3[C]	88.6[A]	0.34[C]	90.0[A]	0.33[C]
Termination - All Dry	2	3.0[A]	74.7[B]	0.20[A]	2.0[B]	82.8[B]	0.67[B]	84.4[B]	1.94[B]

[1] Numerical scale given to ovary color/development upon dissection: 1=white/small eggs, 2=orange, 3=tan/medium eggs, 4=brown, 5=black/large eggs.
[2] Dry tissue weight as a percentage of wet whole animal weight.
[3] Numerical scale given to hepatopancreas color/condition upon dissection: 1=dark amber/watery, 2=light amber/semi-watery, 3=pale/firm texture, 4=yellow/fatty texture, 5=bright yellow/full and highly fatty texture.

WINTER-BURROW EXCAVATIONS AND SUBSEQUENT REPRODUCTION IN THE LABORATORY

W.R. McClain and J.J. Sonnier

INTRODUCTION

Crawfish burrows provide a moist environment necessary for crawfish to survive periods of dewatering, typically associated with the summer months in Louisiana. However, crawfish also have evolved to reproduce within the protection of the burrow. In crawfish aquaculture, as in much of the natural habitat in Louisiana, dewatering occurs at the beginning of the reproductive cycle for a large percentage of crawfish. Most of the young-of-the-year crawfish in aquaculture ponds reach maturity in late spring or early summer; thus, those females enter the summer burrow during the early stages of their reproductive phase. Mature crawfish first mate in open waters whereby the sperm is deposited in an external receptacle on the female. The sperm is essentially stored there until egg laying where it is used to fertilize the eggs upon egg extrusion from the female. Following mating, the female may retreat to the protection of a burrow to spawn.

For mature females that enter the burrow in late spring or early summer, ovary maturation occurs within the burrow over the course of the summer, and ponds are reflooded to coincide with the more or less synchronized reproductive cycle of August – October spawning. However, because red swamp crawfish are not seasonal spawners and sexual maturity can be reached by some individuals at any time of year, burrowing and spawning can and does take place at other times of the year in the South while ponds are filled. In those situations, the crawfish usually retreat to burrows solely for reproduction. Although spawning can take place in open waters, the burrow provides protection while the eggs and young are attached to the underside of their mother's tail. Females carrying eggs or hatchlings are highly susceptible to predators because they cannot use their normal tail-flipping escape response.

Mature, mated females entering the reproductive phase in the fall/winter/spring, when ponds are flooded, will seek a levee or high ground at or near the water's edge to burrow. Little is known of the burrow ecology of crawfish in general, but far less is known about winter burrowing solely for reproductive purposes. Therefore, this study was initiated to develop some baseline information about winter burrowing in crawfish and to ascertain the potential for those offspring to contribute to the yields within a season.

Ponds: Experimental 1-acre ponds, used for other studies in 2005/2006 (as reported in the 97th annual research report entitled "***Effects of Trap Density on Crawfish Yield in a Rice-Crawfish Field Rotational Management System***") were employed for this study. Ponds were managed for crawfish following a rice crop in 2005, and pond history and conditions are described in detail within that 2006 report. Experimental treatments of that study did not interfere or impede with this project.

Permanent Flood Date: 26 Sept 2005

Pond Drain Date: 6 June 2006

Burrows Identified: Beginning in Dec 2005 and continuing through Mar 2006, pond levees were frequently examined for burrow activity, and when a freshly sealed (capped) burrow was found, it was immediately flagged. Levee examinations occurred soon after significant rainfall events (1-inch or more rainfall) or weekly in the absence of such events. Fresh burrows were not obvious until Jan of that season.

Burrow Excavation: At the beginning of each month, approximately 30 crawfish burrows that were flagged during the previous month were excavated and crawfish were retrieved. Burrow depth, volume of water, and quantity, sex, and maturity of crawfish retrieved from each burrow were noted.

Crawfish Collection: Ten mature female crawfish (*Procambarus clarkii*) retrieved each month from burrows were dissected and initial tissue indices determined, and approximately 20 additional mature female crawfish were placed in artificial burrows in the lab under simulated burrow conditions for subsequent reproduction.

Artificial Burrow System: Multiple half-gallon plastic containers (with lids) filled with 0.48 L of soil and a similar volume of aged pond water served to simulate the conditions typically found inside naturally constructed crawfish burrows. The containers were each stocked with a single female crawfish and housed in an environmentally controlled laboratory. Temperature in the lab was maintained at about 81°F.

Survival/Reproduction Assessment: Artificial burrows were inspected monthly whereby each crawfish was examined for survival and reproduction. Spawned crawfish were dissected (following release of young) for tissue index and moisture content, and young were counted. Non-reproducing crawfish were dissected for tissue analysis at completion of the study (31 Dec 2006).

Parameters: Burrow conditions (month, depth, water volume, occupants, and reproductive status at excavation), subsequent female survival/reproduction, tissue indices, number of young, month spawned and hatched, and weight loss.

Statistical Analysis: General Linear Model analysis and means were separated by Duncan's multiple range test.

Support: USDA Special Grants – Aquaculture

Comments: The results of burrow excavations are summarized in Table 1. Of the 96 burrows successfully excavated, two contained only males, and 56% of the remainder contained a single female, whereas 44% contained a male and female. Depths of burrows ranged from 4 to 32 inches and all burrows contained free-standing water although volumes varied considerably. Of those burrows containing females, there were few differences associated with month of burrowing (Table 2). Average burrow depth (18.2 inches) was nearly identical among the three groups. Average volume of water recorded per burrow was, however, significantly affected by month of spawning, with March burrows containing the most water and February burrows containing the least. The reason is unclear. It should be noted that there were only three females found at the time of excavation that had spawned, and these were all in the March burrowing group.

There were no significant differences among the winter months for average weight of females retrieved, survival and spawning success during the occupation in artificial burrows, number of offspring produced, and average weight loss following spawning (Table 3). There were, however, significant differences associated with month of spawning. Although month of spawning was positively correlated to month of burrowing, only the January females differed significantly in time of spawning from those burrowing in March or April. In general, these observations corroborate similar observations for both winter and summer burrowing – that later burrowing is generally associated with later spawning.

Although there were some expected differences in tissue indices between the subsamples dissected immediately after burrow extraction and those that had spawned during the artificial burrow phase, other differences were few (Table 4). Only the average visual scale assigned to hepatopancreas color/condition at time of collection showed significant differences, and these may be explained by food resource quality and quantity and time of year. Hepatopancreas condition in February may reflect warning conditions and abundance food resources, which may dwindle within 30 days or so.

Perhaps the most perplexing observation from this effort was that such a large percentage (67%) of crawfish extracted from winter burrows did not reproduce. Of those stocked, only 33% spawned. However, the same low percentage was observed in a previous study. Those that spawned, did so, on average, within about 2 months after collection. Mortality was very high at 67% of those stocked. However, many deaths occurred well after the 2 to 3 months expected for spawning. Therefore, the high mortality percentage does not explain the low reproductive rate. Nonetheless, when one looks at the rate of reproduction from those that ultimately survived, it averaged 73%.

The most important finding from this study may be that, based on these results and the assumption that spawning in the lab closely followed spawning in natural burrows, few offspring from winter burrowing crawfish are likely to reach harvest size within the typical season ending in May or early June. Young from January-burrowing females were hatched, on average, in mid-March. Providing adequate food resources remain in the pond until June and overcrowding is not a problem, it may be possible for many of those offspring to reach harvest size by June under favorable conditions. However, for the February- and March-burrowing crawfish, with an average hatchling date of mid-April or later, there is little chance that their offspring will contribute to the annual yield in large numbers unless the season is extended and conditions remain favorable. Though under optimal growing conditions, two months may just be enough time for some percentage of offspring to reach minimal harvest size within the season. It is also possible that spawning dates were advanced somewhat in the lab because of the slightly higher temperatures in the lab when compared with probable temperatures in natural burrows at that time of year. Nonetheless, growing conditions in many commercial ponds during the last two months of the season is typically far from ideal and it seems unreasonable to expect a large percentage of hatchlings spawned during April or later to appear in the harvest.

Table 1. Aspects of burrow ecology relating to crawfish extracted from winter burrows. Rice Research Station, Crowley, LA. 2007.

Burrows	**No.**	**Average Depth of Burrows (**and Range**)**	**Range of Water Volume (ml)**	**% of Burrows without Water**
Single Occupancy – Males	2	23.5 (18-29)	750-800	0
Single Occupancy – Females	53	18.8 (4-32)	60-2240	0
Double Occupancy – One Female	41	17.5 (8-25)	125-3250	0

Table 2. Burrow and reproductive status of female crawfish at time of winter burrow excavation. Values within columns with a different superscript were significantly different ($P < 0.05$) and ***NS*** also indicates non-significant differences ($P > 0.05$) among treatments within columns. Rice Research Station, Crowley, LA. 2007.

Month	**No. Females**	**Avg (and range) of Burrow Depth (in inches)**	**Avg (and range) of Water Volume (in ml)**	**% Spawned**
Jan	31	18.3 (4-32)	713 (60-2200) ^{C}	0
Feb	29	18.3 (10-25)	369 (125-1000) ^{B}	0
Mar	33	17.9 (8-28)	1255 (350-3250) ^{A}	9.09
		NS		*NS (P=0.06)*
Overall	**93**	**18.2 (4-32)**	**800 (60-3250)**	**3.19**

Table 3. Average response variables for female crawfish extracted from burrows during winter and held in artificial burrows for reproduction. Values within columns with the same superscript were not significantly different (P > 0.05) and ***NS*** also indicates non-significant differences among treatments within columns. Rice Research Station, Crowley, LA. 2007.

Month	**No.**	**Intial Wt.**	**% Surv[1]**	**% Spawned[1]**	**% Spawned[2]**	**No. Young**	**No. Young per gram**	**Month Spawned[3]**	**Month Hatch[3]**	**% Wt Loss[4]**
Jan	20	25.99	45.0	45.0	64.3	228	11.5	3.4[B]	3.6[B]	6.3
Feb	20	25.37	30.0	30.0	71.4	244	9.6	4.7[A]	4.7[A]	5.9
Mar	20	28.91	25.0	25.0	83.3	-	-	5.2[A]	5.2[A]	-
		NS	*NS*	*NS*	*NS*	*NS*	*NS*			*NS*
Overall	**60**	**26.76**	**33.3**	**33.3**	**73.0**	**232**	**11.0**	**4.3**	**4.3**	**6.2**

[1] Based on initial number of replicates.
[2] Based only on animals surviving through June (the last month of spawning).
[3] Based on numerical representation of the months, beginning with 1 for January.
[4] For spawning animals only.

Table 4. Comparisons of pre- and post-spawning indices for determining body condition, based on a sub sample of crawfish dissected following burrow extraction and those crawfish dissected after spawning. Values within columns with the same superscript were not significantly different (P > 0.05) and ***NS*** also indicates non-significant differences among treatments within columns. Rice Research Station, Crowley, LA. 2007.

	Pre-Spawning Indices						**Post-Spawning Indices**			
Month	**Ovary Color[1]**	**Hept Color[2]**	**% Hept Moisture**	**Ovary Index[3]**	**Hept Index[3]**	**Tail Index[3]**	**Hept Color[2]**	**% Hept Moisture**	**Hept Index[3]**	**Tail Index[3]**
Jan	3.8	3.7[B]	46.6	0.95	3.8	2.4	2.4	77.8	0.88	13.0
Feb	3.4	4.7[A]	51.7	1.11	3.1	2.2	2.7	74.4	0.91	14.8
Mar	3.7	3.9[B]	46.6	0.63	3.7	2.4	-	-	-	-
	NS		*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
Overall	**3.6**	**4.1**	**48.3**	**0.90**	**3.5**	**2.3**	**2.5**	**76.9**	**0.90**	**13.4**

[1] Numerical scale given to ovary color/development upon dissection: 1=white, 2=orange, 3=tan, 4=brown, 5=black.
[2] Numerical scale given to hepatopancreas color/condition upon dissection: 1=dark amber/watery, 2=light amber/semi-watery, 3=pale/firm texture, 4=yellow/fatty texture, 5=bright yellow/full and highly fatty texture.
[3] Dry tissue weight as a percentage of wet whole animal weight.

ASSESSMENT OF SAMPLING AND HARVEST YIELDS WHEN CRAWFISH PONDS ARE POPULATED ONLY BY STOCKING HATCHLINGS

W.R. McClain, R.P. Romaire, and J.J. Sonnier

INTRODUCTION

Crawfish farming in Louisiana does not rely on a hatchery component for populating grow-out ponds, unlike many aquaculture enterprises around the world. Rather, dependence is upon indigenous and/or supplemented broodstock to reproduce naturally in subsurface burrows as crawfish in the region have evolved to do. Without the reliance on natural reproduction, crawfish farming would probably be nonprofitable. Although the advantages of natural reproduction are many, there are several drawbacks. Reliance on natural reproduction subjects the grower to great variations in yield and harvest size due to large natural variations in adult survival and reproductive success from year to year and pond to pond. Not only are yield and size variations problematic due to variations in recruitment patterns, but these problems are exacerbated by a lack of predictability and a reliable means of assessing pond inventory. Currently, there is no reliable means of accurately determining the success or failure of young-of-the-year recruitment. Without a means of determining population density and structure prior to initiation of harvesting, economic and business planning and implementation of corrective measures are not viable tools for the producer.

Natural, staggered recruitment and heavily vegetated ponds have limited the development of accurate population assessment techniques in crawfish ponds. Previous efforts to establish population sampling in crawfish ponds as a predictor of yield outcomes, though imprecise, were undertaken mainly in crawfish monocropping systems and were accomplished without the knowledge of actual pond densities. Largely unsuccessful, producers do not routinely attempt precise assessments of population density or structure. Therefore, this project attempted, for the first time, to eliminate natural recruitment and instead accomplish the tasks of populating ponds with stocking of hatchlings at known numbers. This was done so that systematic sampling efforts could be employed with the intent of establishing some kind of relationship between sampling (with different gear) and known populations, and furthermore, to determine if harvest results could be relatively associated with sampling outcomes.

Pond History: Ponds were fallow for 10 months following a previous crawfish season. Rice crops were planted in Apr 2006, and fields were not stocked with brood crawfish.

Soil Type: Crowley silt loam

Pond Area: Twelve 1-acre ponds

Forage Crop: Rice (variety ‘Cocodrie’) was aerially seeded at 110 lb/A on 17 Apr 2006. Grain was harvested on 7 Sept 2006, and the ratoon forage crop was managed for crawfish production.

Fertilizer: <u>Main Crop</u>: 8-24-24 at 250 lb/A at planting, 46-0-0 at 200 lb/A (topdress) on 25 May, 46-0-0 100 lb/A (topdress) on 22 June; <u>Ratoon Crop</u>: 46-0-0 at 150 lb/A (topdress) on 12 Sept 2006.

Herbicide: Arrosolo at 1 gal/A and Prowl at 2.4 pt/A on 3 May

Insecticide: None in the main rice crop. A pyrethroid insecticide was subsequently applied to the pond to eliminate any natural recruitment – see below.

Stocking Rate: Adults were not stocked into the main rice crop as usual. Instead, hatchlings were stocked after the permanent flood. See treatments.

Elimination of Natural Recruits: To eliminate or minimize natural recruitment from indigenous crawfish, the ponds were flooded on 2 Oct 2006, Karate at the rate of 4 oz/A was applied 1 day later, and after 1 week, the ponds were completely drained then reflooded with fresh water beginning 3 days after draining.

Permanent Flood Date: 13 - 16 Oct 2006

Stocking of Hatchlings: Stocking rate and timing constituted the treatments of this study. The intent was to stock 0, 3, and 7 crawfish hatchlings/m^2 from hatchlings spawned in the lab from captive broodstock. Spawning success was less than expected; therefore, actual stocking densities were 0, 2.7 (or 3), and 5.9 (or 7) crawfish/m^2 to reflect three treatment densities – 0, high, and low. Stocking timing was accomplished by stocking approximately equal numbers over four dates from 16 Oct to 28 Nov for certain treatments or stocking all at once on the last date for other treatments. Stockings consisted of introducing the hatchlings and adult female (hatchlings clinging to the brood female when possible) to simulate conditions of natural recruitment.

Counting: Hatchlings were counted by temporarily separating them from the female and placing them into a shallow (less than 1 cm deep) pool of water, taking a digital photo of the pool, and counting individuals from an enlarged photo on a computer screen at a later time. Hatchlings were subjected to the shallow pool only long enough for a photo to be taken then were reunited with the adult female in a larger volume of water.

Treatments: Consisted of low stocking rate one time (**Low-1**), low stocking rate four times (**Low-4**), high stocking rate one time (**High-1**), high stocking rate four times (**High-4**), and no stocking of hatchlings (0-Stocking). Crawfish densities of 2.7 or 3 crawfish/m^2 were considered low densities, and densities of 5.9 or 7 crawfish/m^2 were considered high densities for this study. Timing of the multiple stockings occurred every 2 weeks from 16 Oct to 28 Nov 2006.

Samplers: Sampling consisted of employing four sampling gear: large mesh traps, consisting of standard 0.75-inch square mesh pyramid traps, small mesh traps, consisting of common 0.25-inch wire mesh minnow traps with 1.25-inch funnel openings at each end, long handle dip nets (3-mm mesh), and specially constructed drop sampling devices (0.5 m^2 surface area). The drop sampler consisted of a metal cylinder that was rigged to slide up and down on three legs with a trigger that allowed the unit to be "set" in the up position with 50 feet of rope, whereby the unit could be placed in the pond some distance and triggered from the levee to prevent disturbing of crawfish during sampling. When "dropped," the sampler formed an enclosure entrapping any crawfish that were captured within the interior of the cylinder. Water was pumped out and crawfish counted and sized.

Sampling Protocol: Sampling was accomplished during six weekly periods (11-15 Dec, 8-12 Jan, 22-26 Jan, 5-9 Feb, 19-23 Feb, and 5-9 March). The large- and small-mesh traps were employed with and without bait and were placed both around the pond edge and away from the edge within the interior of the pond (with duplicate traps per pond per location per bait regime). Dip net sweeps were accomplished both around the pond edge and within the pond interior (with 10 random sweeps per pond per location). The drop samplers were operated in the morning (approximately 8:30 am) and afternoon (approximately 4:00 pm). Traps and dip net sweeps were accomplished in duplicate ponds of each treatment, while drop samplers were not duplicated by treatment – occurring in only one rep of each treatment. Crawfish catch, total and by size category, were noted for each sampling effort.

Feed: None

Trap Type and Density: 3-funnel pyramid trap constructed of ¾-inch square-mesh wire at 16 traps/A.

Bait Used: Manufactured baits: *Cajun World* and *Early On* (Purina Mills, Inc., St. Louis, MO); Southern Pride (Country Acres Feed, Inc., Brentwood MO).

Crawfish Harvest: 21 Mar - 26 June 2007 for a total of 44 baited trapping days (704 total trap-sets/A)

Crawfish Grades: Harvested crawfish were subjected to a grader (passive, water type) and sorted into three size-grade categories as follows: "Large" - <15 count/lb, "Medium" - 15-21 count/lb, and "Small" - > 21 count/lb

Experimental Design: Completely randomized design (two replicated ponds per treatment except for the 0-stocked treatment, which consisted of four replicated ponds)

Parameters: Crawfish sample catches, crawfish harvest.

Statistical Analysis: Analysis of variance with means separated by Duncan's multiple range test

Support: USDA–Southern Regional Aquaculture Center (SRAC) and the Louisiana Crawfish Promotion and Research Board

Comments: A total of 502 spawns (more than 150,000 hatchlings) were stocked for this study (Table 1). Hatchlings were released with the brood female to more accurately stimulate natural recruitment. Though the number of hatchlings available for this study was limited and stocking density was not in total agreement for one treatment factor, treatments were effectively resolved into a low and high stocking density and into multiple- versus single-stocking occasions. The resulting annual average harvest yields for this study were low, even for typical crawfish production scenarios (Table 2). Overall, annual yields averaged 194 lb/A by weight and 2,216 crawfish/A by number of individuals captured. Highest yielding were those ponds that received multiple introductions of hatchlings at the higher rate, while the lowest yielding ponds consisted of those receiving a single introduction at the low rate, yielding lower even than those ponds that were not intentionally stocked. It is unclear how non-stocked ponds became populated. Perhaps some minimal natural reproduction occurred (even though attempts were made to eliminate that source) and/or some movement of crawfish occurred after stocking. Although rare to see small juveniles traversing across levees between ponds, larger crawfish will sometimes migrate at night, and it is possible that some individuals may have moved between ponds via the water inflow structures by way of a central water supply lateral boarding each pond.

The overall capture rate in this study for ponds where crawfish were introduced represents only 12.8% of the total number of crawfish stocked; however, when non-stocked fields are included, the capture rate increases to 16.5% of crawfish stocked (Table 3). This is lower than expected, but it is unknown if this is typical of commercial ponds since no work regarding known populations exist. Recapture rates were greater for the multi-stocking and low stocking density factors. Assuming the residual of remaining crawfish after cessation of all harvests was similar for all ponds, these low retrieval rates indicate greater mortalities at the higher stocking rates and for the single-stocking scenarios. The reason(s) for this is unclear but could possibly be associated with either fish and/or insect predators. Some small sunfish and dragonfly niads were observed during sampling and subsequent harvests but not in uncommon quantities. Recapture rate was especially low for the single stocking factor. This lends credence to the predation theory because later stocking would allow for an increase in fish and insect numbers and size prior to the introduction of crawfish hatchlings, and the later stocking dates would insure that crawfish size remain small for a longer period (due to lower water temperatures), thus facilitating greater predation opportunity.

Results of the population sampling were generally low for all gear and all sampling periods, most likely due to the low stocking rates and apparent low survival rates. Given the low numbers caught per sampling gear though, the greatest catch per sampling period for both large- and small-mesh traps occurred in March, while the greatest catch with dip nets occurred in February and with drop samplers in January (Figure 1). With regard to wire mesh sampling traps, it should be noted that small-mesh traps dominated the catch per unit effort early on, with large-mesh traps gaining a slight edge during late February and March. This reflects the relative abundance of individuals by size in the population. As crawfish grew, more were retained by the large-mesh traps. Sampling efficacy was generally greater for edge of pond sampling as opposed to the pond interior; therefore, seasonal pond averages for each sample gear (at edge of pond) are presented in Table 4, as are some corresponding correlation coefficients. Sample trap catches for both large- and small-mesh traps mirror the yield data in terms of relationship by treatment from largest to smallest. Although the two highest yielding treatments also had the highest average catches for both dip net and drop sampling gear, the drop sampler was better correlated to yield data.

Correlation coefficient is a measure of how well one group of data corresponds to a second group of data and whether the trend is a positive or negative correspondence. Based on the sampling averages in Table 4, the best predictor of yield (for actual yield data in the table, both for weight and numbers) was the drop sampler. However, this sampling gear did not indicate an exceptional relationship to the number of crawfish stocked. Both small- and large-mesh traps also seemed to show a respectable positive correlation to yield. Interestingly, dip net sweep counts, one of the recommended methods for assessing population early on, did not exhibit an especially strong correlation with yields.

Figures 2 through 9 provide additional depictions of the sampling results, by size as well as total counts, for the various gear and sample location or bait where applicable. As previously stated, edge-of-pond sampling was more effective for both test traps and dip net sweeps. Surprisingly, there was little difference between baited and non-baited catches. Likewise, there was not a lot of difference between 24- and 48-hr trap sets, but the 48-hr sets generally caught more crawfish. Regarding the drop samplers, afternoon sampling proved slightly more effective.

Due to low numbers and lack of pond replications by treatment, the morning and afternoon data were combined and averaged for Figure 9.

In conclusion, although stocking density in this study generally reflected the resulting harvest yields, actual percentage of crawfish retrieved by typical harvesting routines was unexpectedly low. Confounding those results were the single-stocking factor as opposed to multiple-stocking that presumably reflects more natural recruitment conditions. However, additional research is necessary to determine whether relatively low capture rates in comparison to initial population density are the norm in crawfish aquaculture. In addition, the sampling data gathered from late December to early March seemed to more accurately reflect trends in actual yield rather than reflect initial population density at recruitment. Thus, it is apparent that much more work of this nature is necessary before any conclusions can be drawn for the utility of population sampling in crawfish aquaculture.

Table 1. Average number of crawfish stocked into each 1-acre pond for each treatment (two replicated ponds were stocked per treatment). Multiple stockings occurred every 2 weeks from 16 October through 28 November 2006. Single stockings occurred on 28 November. Harvesting commenced on 21 March 2007. Rice Research Station, Crowley, LA. 2007.

Treatment	**No. Hatchlings**	**No. Adults**	**Total Crawfish**	**Density Stocked ($No./m^2$)**	**Times Stocked**
0-Stocked	0	0	0	0	-
Low – 4	10,987	46	11,033	2.7	4
Low – 1	12,159	34	12,193	3.0	1
High - 4	23,761	86	23,847	5.9	4
High - 1	28,416	85	28,501	7.0	1
Total Stocked	***150,646***	***502***	***151,148***		

Table 2. Average annual yield of harvested crawfish. Values within columns with the same superscript were not significantly different ($P > 0.05$). Rice Research Station, Crowley, LA. 2007.

Treatment[1]	**Yield by Wt. (lb/A)**	**Yield by No. (No./A)**	**Avg. Individual Weight (g)**	**Avg. Count (No./lb)**
0-Stocked	112.3^{BC}	$1{,}379^{C}$	36.9	12.3
Low - 4	220.9^{B}	$2{,}567^{B}$	39.1	11.6
Low - 1	98.7^{C}	$1{,}110^{C}$	40.3	11.2
High - 4	397.2^{A}	$4{,}354^{A}$	41.4	11.0
High - 1	148.1^{BC}	$1{,}670^{BC}$	40.3	11.3
	Avg.=195.4	***Avg.=2,216***		

[1] Stocking treatments consisted of two replicated ponds, while four ponds received no crawfish.

Table 3. Average percent recovery of crawfish per treatment (two replicated ponds per treatment) and individual treatment factors. Rice Research Station, Crowley, LA. 2007.

Treatment	**No. Crawfish Stocked**	**No. Recaptured**	**% Recaptured**	**Treatment Avg. for 1 time**	**Treatment Avg. for 4 times**	**Treatment Avg. for Low**	**Treatment Avg. for High**
Low - 4	11,033	2,567	23.3%	7.5%	20.8%	16.2%	12.1%
Low - 1	12,193	1,110	9.1%				
High - 4	23,847	4,354	18.3%				
High - 1	28,501	1,670	5.86%				
Overall	***151,148***	***19,402***	***12.8[1]%***				

[1] When harvests from 0-stocked ponds are included, the average percent recovery based on total stocked individuals was 16.5%.

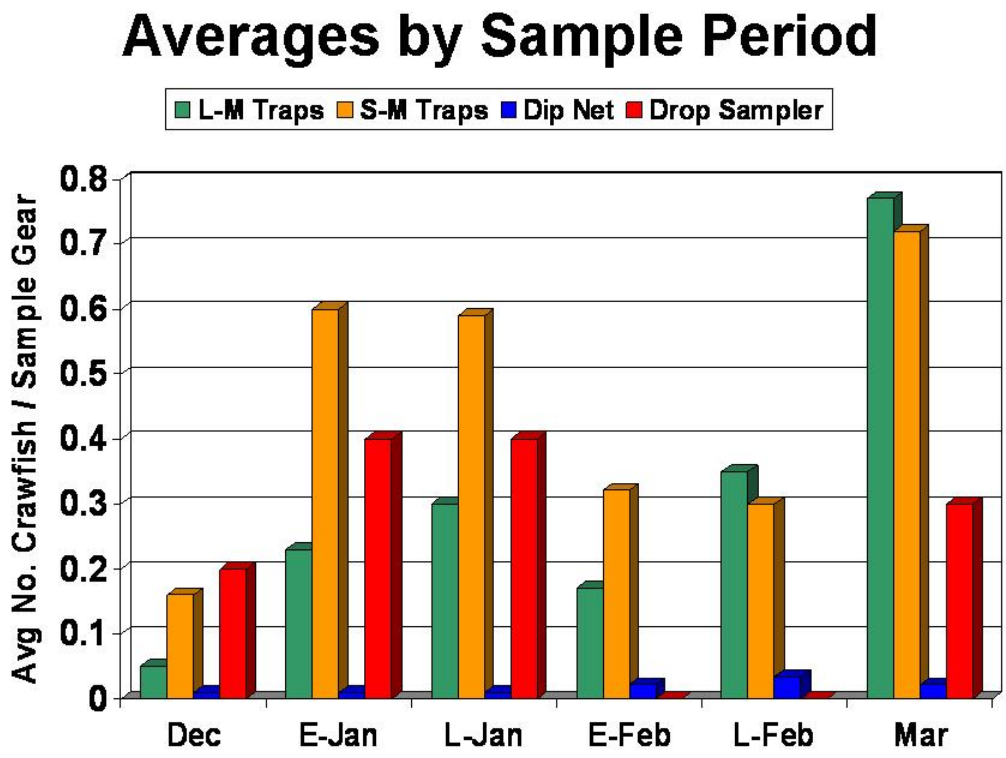


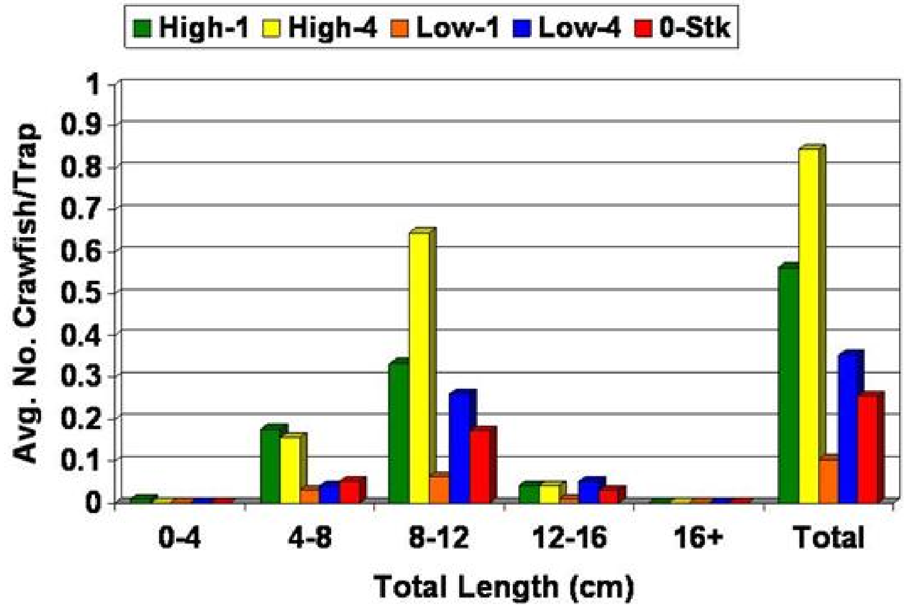
Figure 1. Average catch with sampling gear by sampling period (December, early January, late January, early February, late February, and early March). Rice Research Station, Crowley, LA. 2007.

Table 4. Average yield and sampler catches for edge of pond sampling with baited large- and small-mesh traps, dip nets, and drop samplers. Correlation coefficients are based on these averages by pond. Rice Research Station, Crowley, LA. 2007.

Treatment	**Total Stocked**	**Yield** (lb/A)	**Yield** (No.)	**Large Trap Catch** (No./trap)	**Small Trap Catch** (No./trap)	**Dip Net Sweep** (No./dip)	**Drop Sampler Catch** (No./set)
High - 1	28,485	206.1	2202	0.833	0.500	0	-
High - 1	28,517	90.1	1134	0.167	0.208	0.017	0.083
High - 4	23,872	359.0	3983	0.583	2.250	0.050	-
High - 4	23,821	435.4	4730	1.250	1.292	0.067	0.667
Low - 1	12,170	133.0	1387	0.042	0.292	0.000	0.000
Low - 1	12,216	64.3	832	0.125	0.125	0.033	-
Low - 4	11,020	204.0	2308	0.542	1.000	0.050	0.167
Low - 4	11,045	237.8	2824	0.667	2.208	0.017	-
0 Stocked	0	95.3	1116	0.292	0.375	0.017	-
0 Stocked	0	168.1	1969	0.583	0.500	0.017	-
0 Stocked	0	118.3	1535	0.250	0.042	0	0.167
0 Stocked	0	67.4	897	0.167	0.167	0.050	-

Correlation	**Coefficient**
Yield (lb) to total crawfish stocked	0.27623403
Yield (#) to total crawfish stocked	0.25935273
Large trap catch to total crawfish stocked	0.35249102
Large trap catch to yield (lb)	0.86312414
Large trap catch to yield (#)	0.86078803
Small trap catch to total stocked	-0.0749788
Small trap catch to yield (lb)	0.77517418
Small trap catch to yield (#)	0.79616247
Dip net sweep count to total crawfish stocked	-0.00662517
Dip net sweep count to yield (lb)	0.51101328
Dip net sweep count to yield (#)	0.51891547
Drop sampler catch to total crawfish stocked	0.35867357
Drop sampler catch to yield (lb)	0.95017711
Drop sampler catch to yield (#)	0.96752626

Large Mesh Traps – Edge Sampling



Large Mesh Traps – Interior Sampling

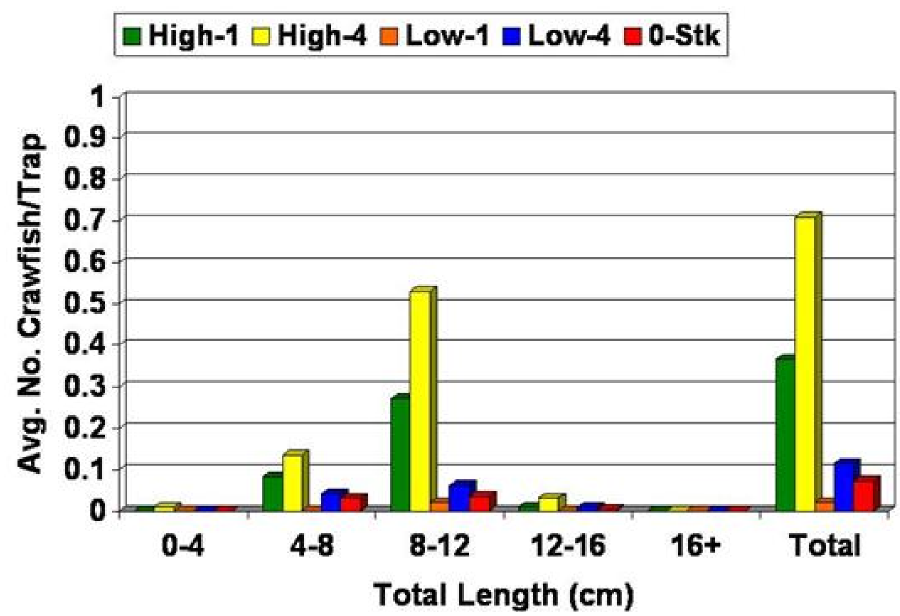
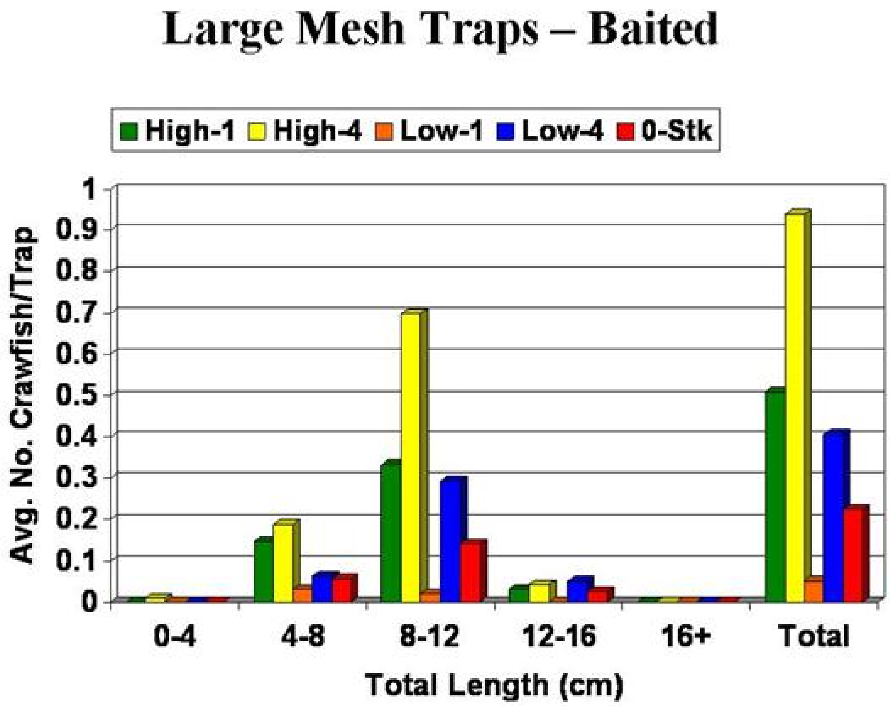


Figure 2. Average catch by size category (and average total catch) per trap lift with large-mesh traps set near the pond edge (top chart) or in the interior of the pond (bottom chart). Rice Research Station, Crowley, LA. 2007.



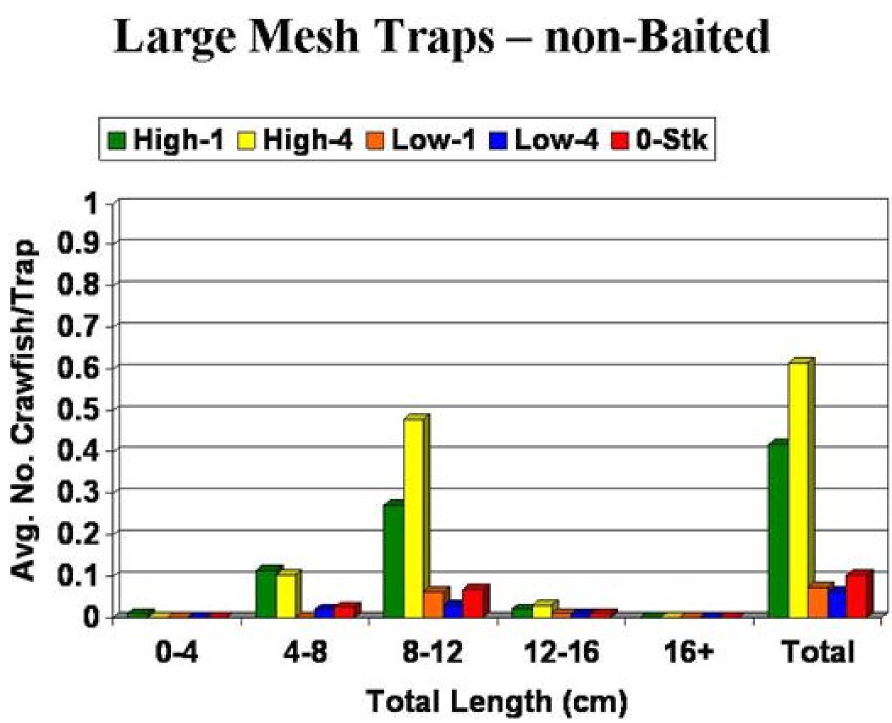
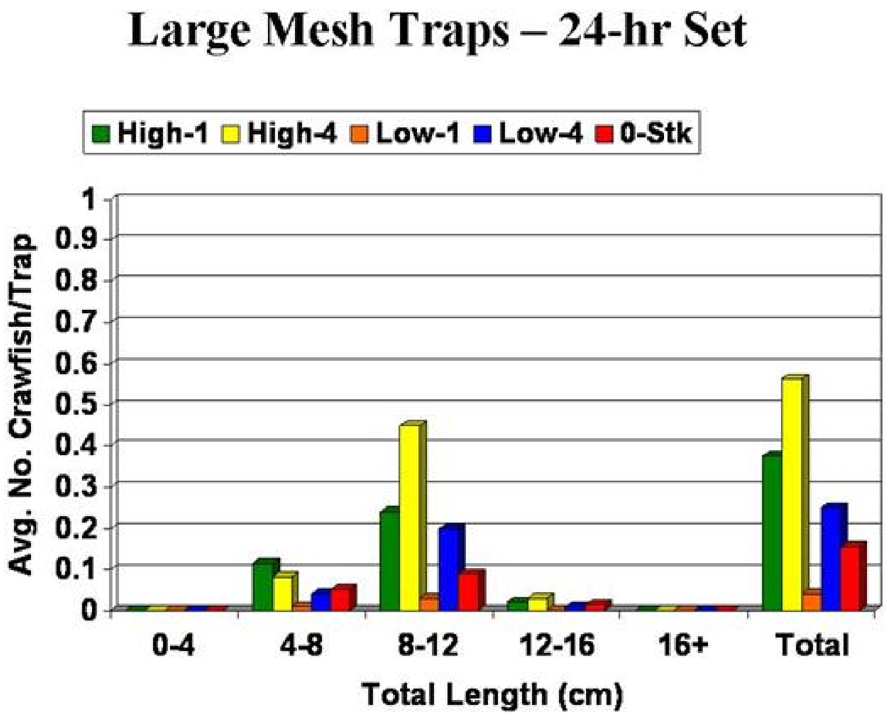


Figure 3. Average catch by size category (and average total catch) per trap lift with large-mesh traps baited (top chart) or non-baited (bottom chart). Rice Research Station, Crowley, LA. 2007.



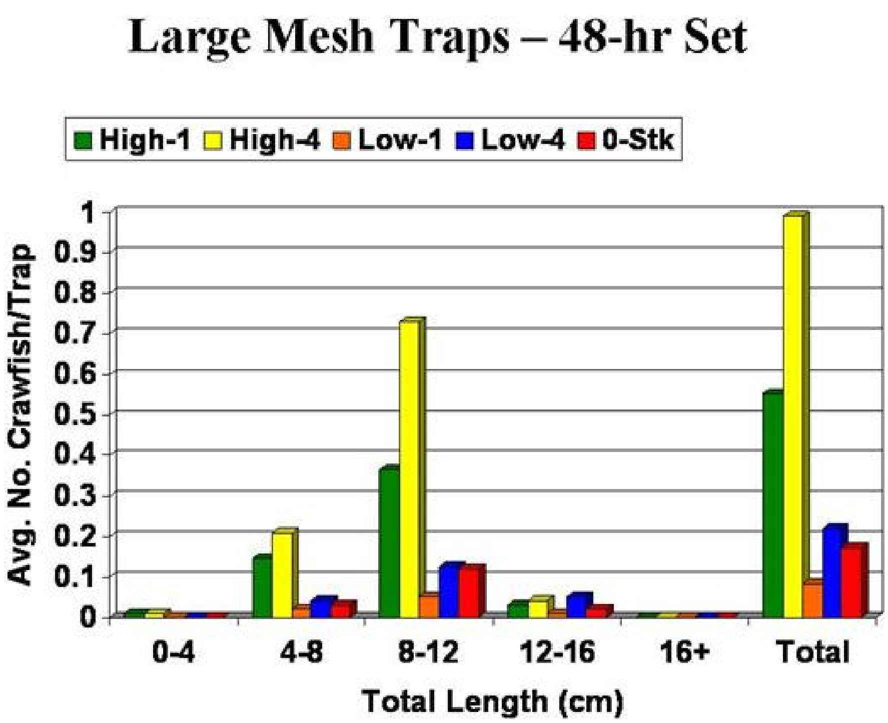
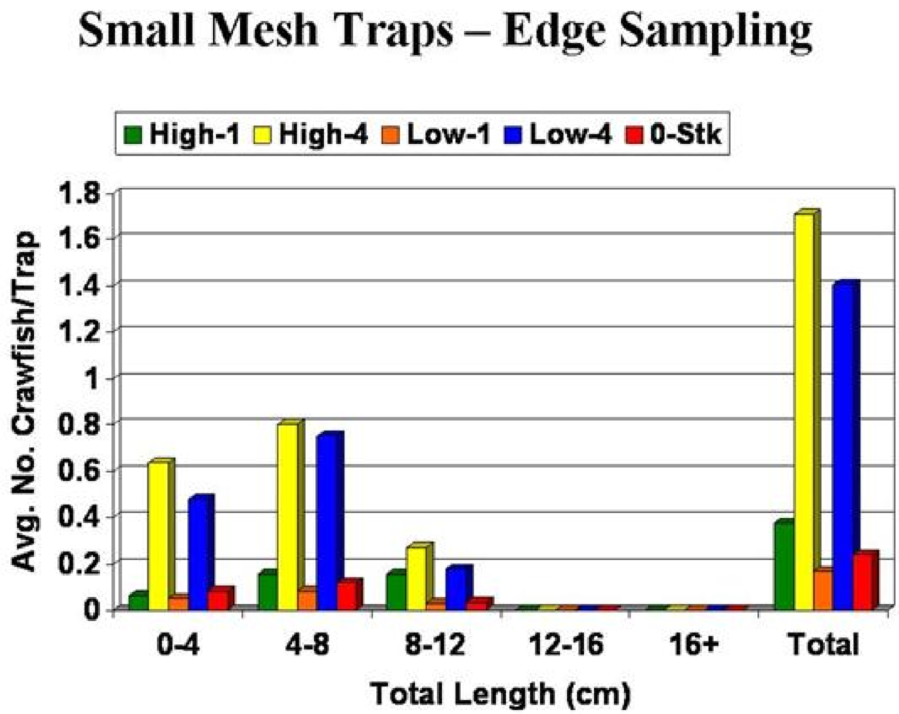


Figure 4. Average catch by size category (and average total catch) per trap lift with large-mesh traps set for 24 hours (top chart) or 48 hours (bottom chart). Rice Research Station, Crowley, LA. 2007.



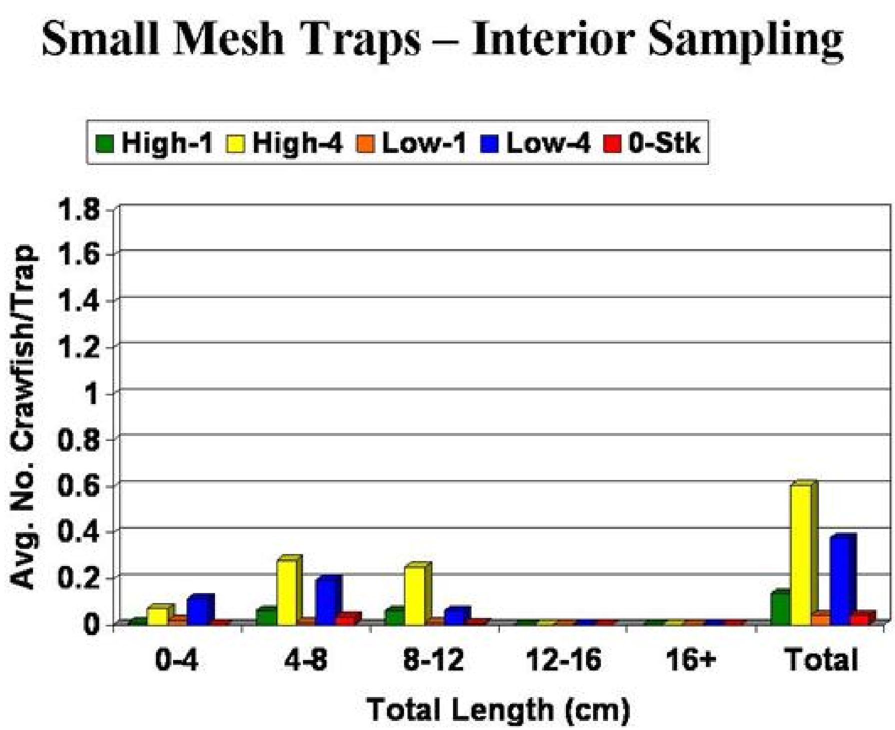
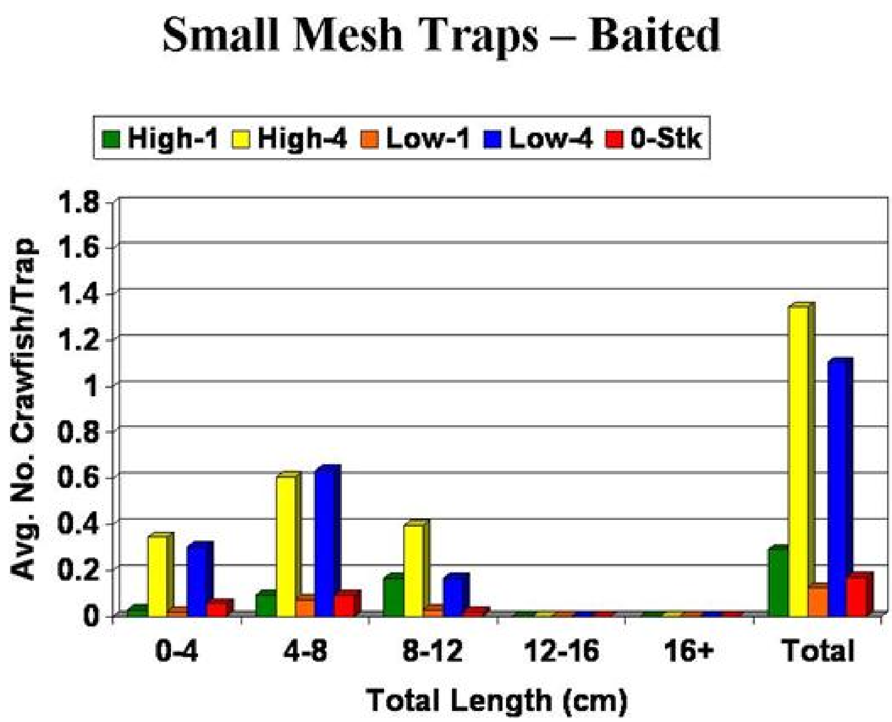


Figure 5. Average catch by size category (and average total catch) per trap lift with small-mesh traps set near the pond edge (top chart) or in the interior of the pond (bottom chart). Rice Research Station, Crowley, LA. 2007.



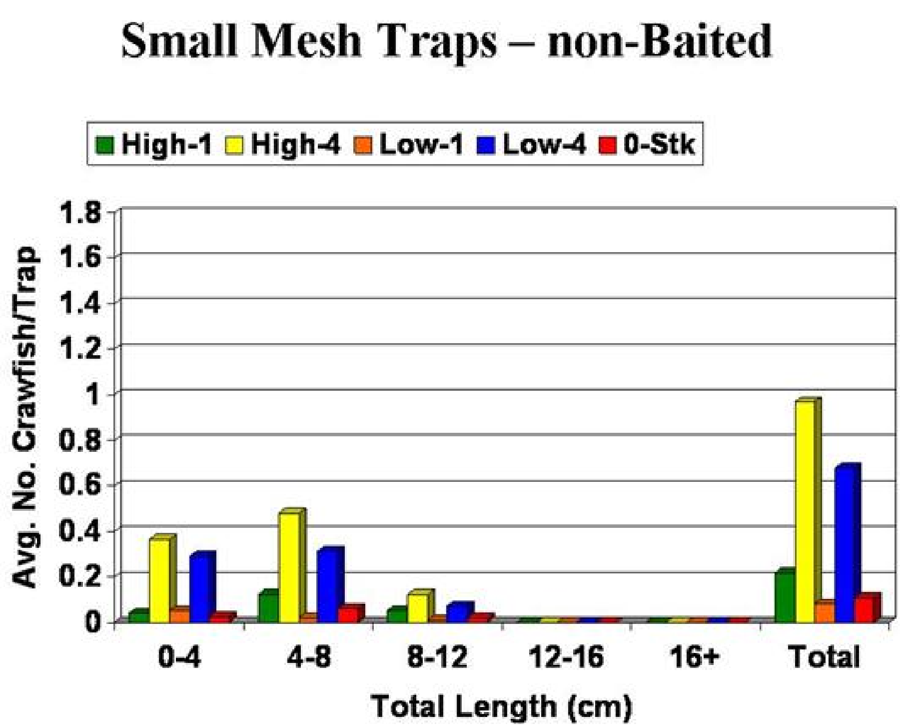
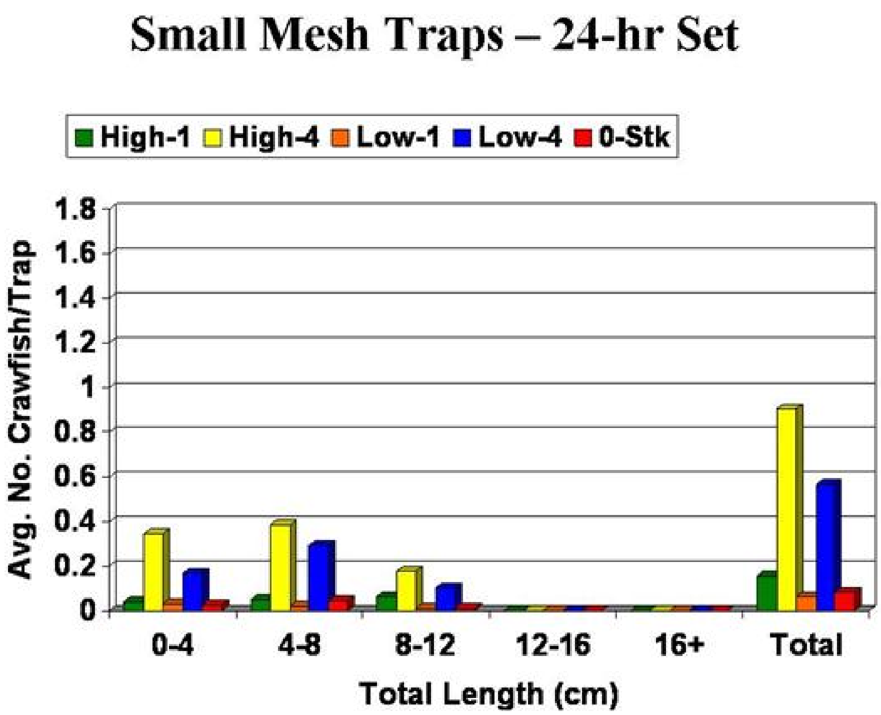


Figure 6. Average catch by size category (and average total catch) per trap lift with small-mesh traps baited (top chart) or non-baited (bottom chart). Rice Research Station, Crowley, LA. 2007.



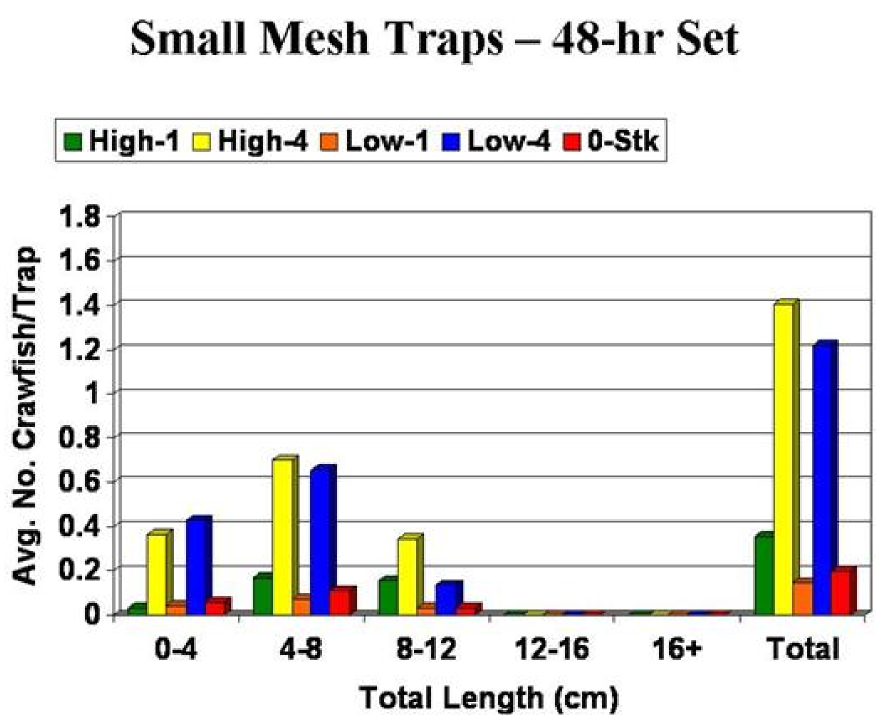
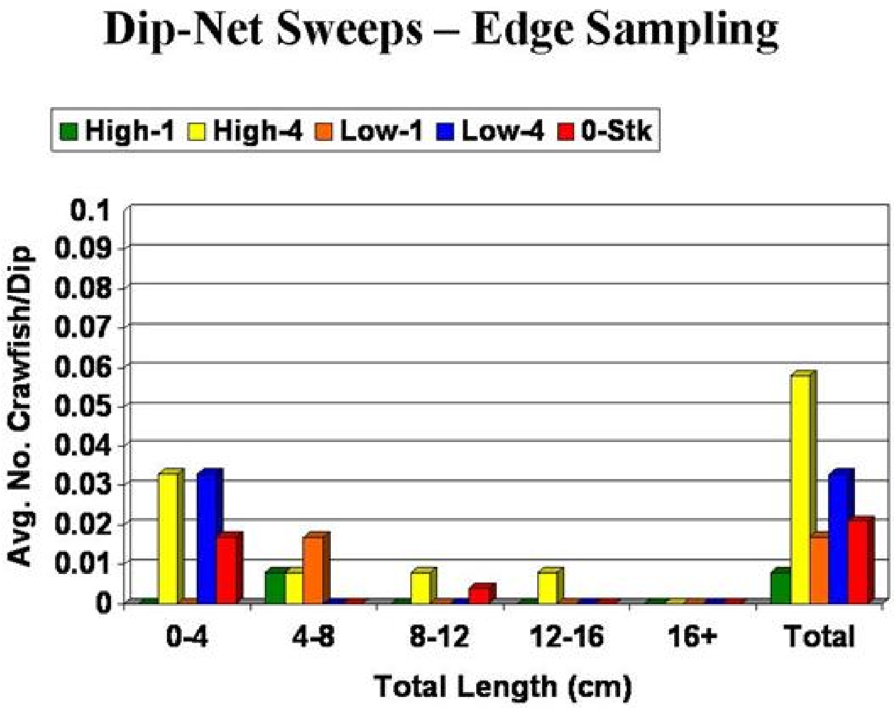


Figure 7. Average catch by size category (and average total catch) per trap lift with small-mesh traps set for 24 hours (top chart) or 48 hours (bottom chart). Rice Research Station, Crowley, LA. 2007.



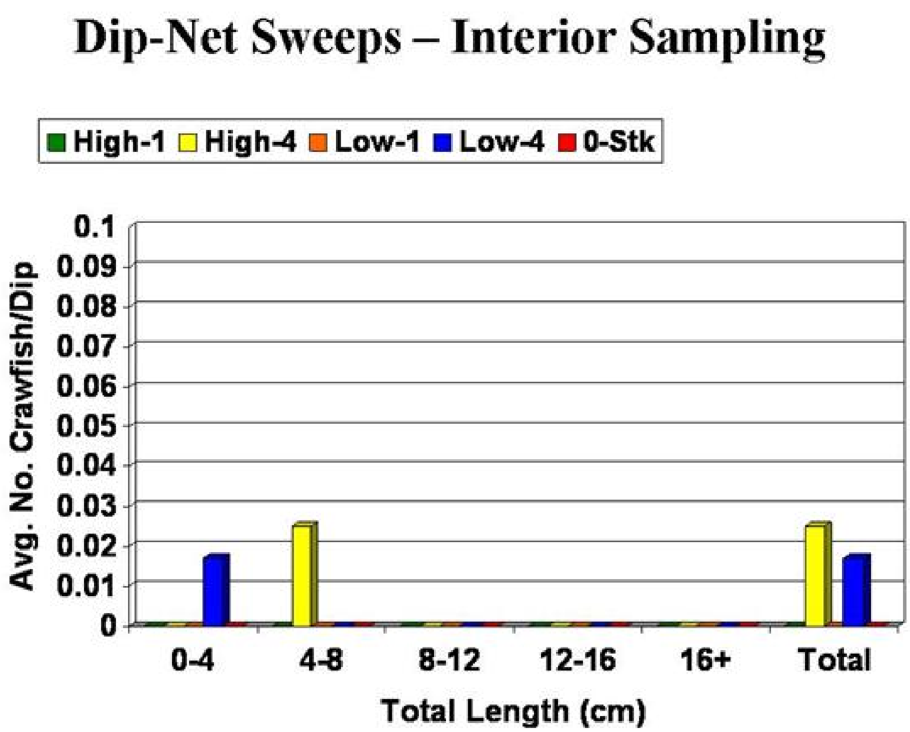


Figure 8. Average catch by size category (and average total catch) per dip-net sweep for edge of pond (top chart) or pond interior (bottom chart) sampling. Rice Research Station, Crowley, LA. 2007.

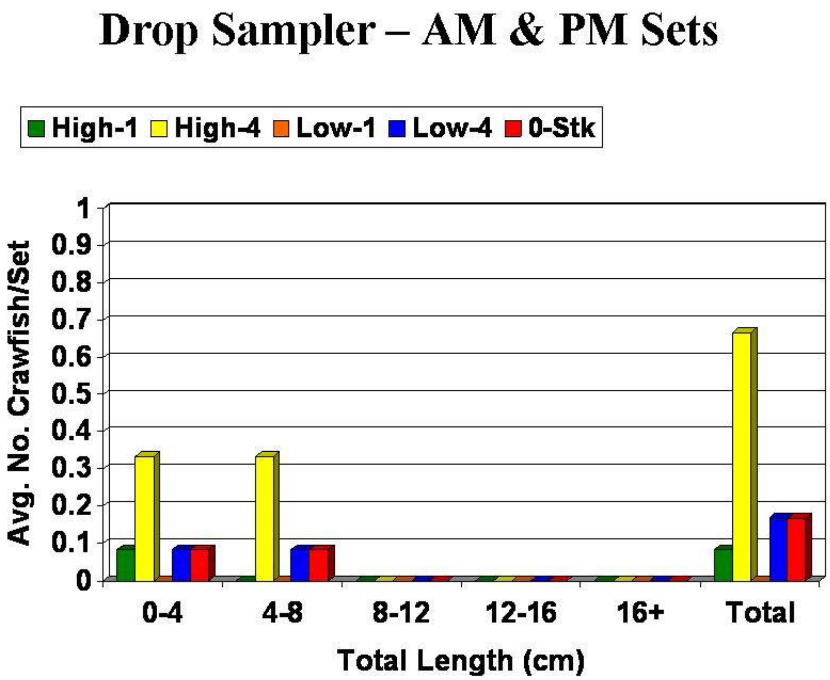


Figure 9. Average catch by size category (and average total catch) per drop sampler. Rice Research Station, Crowley, LA. 2007.

Figure 10. A drop sampler, set and ready to trip with a slight tug on the rope from the levee. Crawfish are retrieved by pumping out the water from the caisson while the cylinder walls are in contact with the mud bottom, exposing any crawfish trapped within. Rice Research Station, Crowley, LA. 2007.

EVALUATIONS OF AN EXPERIMENTAL PROTOCOL FOR TESTING BAIT PREFERENCE OF CRAWFISH IN COOL WATER UNDER CONFINEMENT

W.R. McClain and J.J. Sonnier

INTRODUCTION

Crawfish farmers and fishermen use fresh-frozen fish for crawfish bait in cooler water (< 68°F) – not by choice but by necessity. The low catch with current commercially available formulated baits in cool water generally does not justify their use until waters warm in late spring. Since manufactured crawfish baits were first developed, fish for crawfish bait has become expensive. Price of fish bait has increased 50% in the past four years, and it is often in very short supply, necessitating shipment of fish baits into Louisiana from other states. The price of fish as bait in Louisiana is at least $0.30/lb to $0.34/lb ($600 to $680/ton). Manufactured crawfish baits retail for about $0.16/lb to $0.20/lb ($360 to $400/ton). Trapping crawfish during winter comprises nearly 50 to 60% of the harvest effort (late November through mid-March) in many ponds. Nearly 50% of bait sold annually for trapping crawfish is menhaden and gizzard shad, so the potential market for an effective winter crawfish bait could equal that of formulated baits used in warm water (12,000-14,000 tons) and could approach $6-7 million annually. Numerous chemoattractants and flavoring agents have been tested as chemical feeding stimulants for shrimp and lobsters, but not crawfish. Bait studies conducted by LSU AgCenter scientists in the early 1980s did show some promise for identifying formulated baits that had good catch characteristics in cool water but further studies were not pursued because of the relatively low cost and wide availability of fish baits at that time.

It is difficult to test cold water formulations based solely on pond studies. Most feed mills can only make minimum batches of a test formulation in 2.5-ton batches, and few companies and universities (including LSU) do not have mills to manufacturer small batches of bait for experimental testing. A more practical, time-efficient, and less costly approach is to screen a large number of potential chemoattractants alone and in mixtures that might have attractive properties to crawfish in cold and cool water in the laboratory to identify those compounds that might have the highest success in a commercial bait formulation, after which experimental cold-water bait formulation can be formulated, manufactured, and evaluated in field trials. However, it is first necessary to develop a protocol for examining various baits and possible attractants for cool water testing in the lab on a small scale. An effective laboratory-scale protocol and specific testing facility that could operate with chilled water would facilitate the testing of possible attractants/baits in low quantities and at target water temperatures year-round with rapid results. This would effectively allow for the prescreening of numerous products/processes, some expensive and/or hard to come by, allowing only the most promising to be followed-up in field tests under more typical conditions.

Despite numerous attempts under various conditions of experimentation, it was found that "captive" crawfish would not respond to bait stimuli under laboratory conditions, even at optimal temperatures. Various acclimation and starvation protocols were tried, as were attempts at feed training and utilization of larger pool/troughs, but no effort has thus far been successful in getting captive crawfish to respond predictably to proven baits. Therefore, lab-reared crawfish, accustomed to accepting feed under confinement, was used for this study to test small-scale laboratory protocols for testing known baits.

Experimental Systems: Tanks consisted of two 20-gallon aquaria, one small rectangular vat (21 x 18 x 12 inches) with opaque sides, bottom, and lid, and one large rectangular vat (29 x 72 x 24 inches) with opaque sides and bottom. The tanks were filled approximately half full of fresh well water several days prior to each trial. Each unit was equipped with a larger holding area and two small bait chambers fashioned on one end, with supplemental aeration diffused through one "airstone" placed in each bait chamber. Supplemental aeration facilitated water (and scent) movement out of the chambers via the single openings and into the central holding area. The bait chambers consisted of solid walls and were sealed except for one entrance hole equipped with a funnel opening in each chamber. The opening to each chamber was blocked off during the acclimation period.

Crawfish: Red swamp crawfish juveniles (38 - 51 mm total length), hatched and reared in the lab, were used. Five crawfish per aquaria, 5 per small vat, and 10 crawfish per large vat were placed within the holding chambers of each vat and allowed to acclimate approximately 12 hours prior to each test. No feed was offered during the acclimation period.

Baits: The baits included fresh frozen fish (shad or herring), a winter formulation of a commercial manufactured bait (Purina's "Early On"), or no bait. Bait, when used, was placed in the bait chambers at 0-hr.

Temperature: All tests were conducted only during cool days so that ambient water temperatures were at or below 62°F. Water temperature was recorded at the beginning of each trial.

Observations: Experimental systems were isolated from normal activity of the lab, and following introductions of the bait, the systems were observed periodically with minimal disturbance. Response to the bait was indicated by entrance of crawfish into the respected bait chamber. Number of crawfish inside each bait chamber was recorded at each observation interval.

Dates: Five trials were accomplished between 9 January and 14 February 2007.

Support: Louisiana Crawfish Promotion and Research Board

Comments: The time for the first crawfish to enter a bait chamber after introduction of the baits is noted in Table 1, as well as the maximum number of crawfish observed in a bait chamber at any given interval. Bait preference refers to the bait that attracted the most respondents. The results in Table 1 indicate that these experimental systems, regardless of size, appear to be inadequate testing devices for comparing the effectiveness of various bait types in cool water. Like with captive animals, the lab-reared crawfish seemed to respond poorly to proven baits under these conditions. Apparent preference for proven baits was not always discernable and response times were exceedingly long. In conclusion, this protocol for testing the effectiveness of experimental baits in cool water appears ineffective, even with the larger system. In short, more work is needed to devise a protocol that is more sensitive at determining the magnitude of attractability of crawfish to baits or attractants in confinement.

Table 1. Results of bait preference observations for lab-reared crawfish in experimental systems under cool water conditions. Rice Research Station, Crowley, LA. 2007.

Bait Test[1]	Water Temp (°F)	System Type	Bait Preference[2] (Max Response)	Maximum Response[3] (% of Individuals)	Response Time[4] (min)
WM vs Fish	58	Small Vat	WM	20%	103
		Aquarium #1	WM	20%	23
		Aquarium #2	-	0	-
	48	Large Vat	-	0	-
WM vs None	48	Small Vat	WM	40%	1305
		Aquarium #1	WM	40%	45
		Aquarium #2	-	0	-
	35	Large Vat	-	0	-
WM vs None	52	Small Vat	WM	20%	230
		Aquarium #1	WM	20%	1365
		Aquarium #2	None	20%	441
		Large Vat	-	0	-
WM vs None	62	Small Vat	WM	20%	105
		Aquarium #1	None	60%	175
		Aquarium #2	WM	40%	105
	58	Large Vat	-	0	-
WM vs Fish	54	Small Vat	Fish	20%	20
		Aquarium #1	-	0	-
		Aquarium #2	Fish	40%	97
	42	Large Vat	-	0	-

[1]Bait comparisons were with a winter formulation of a manufactured commercial crawfish bait (WM) versus fish or no bait.
[2]Bait preference refers to the bait choice that yielded the greatest number of respondents at any given observation period.
[3]Maximum response refers to the greatest number of respondents observed at the bait at any given period.
[4]Response time refers to the time (in minutes) where a crawfish was first observed at either bait.

OBSERVATIONS FOR POTENTIAL TOXICITY OF EXPERIMENTAL RICE INSECTICIDES TO CRAWFISH

W.R. McClain, M.J. Stout, and J.J. Sonnier

INTRODUCTION

Crawfish and rice production are well integrated in Louisiana and much of the crawfish are produced in rotational cropping systems where the rice field is subsequently used to produce crawfish. Typically, there is a short overlap in seasons, whereby newly planted rice fields are dispersed among crawfish ponds during the peak crawfish production season. Rice and crawfish ponds are often in close proximity and commonly are separated only by a narrow road or levee. In recent years, numerous incidents have occurred whereby crawfish production was halted or seriously damaged because of pesticide drift from an application to a nearby rice field, at great economic loss to the crawfish producer. The rice water weevil is a major pest in Louisiana and typically requires control with a pesticide for profitable production of rice. Therefore, efforts are underway to investigate alternative rice insecticide compounds and/or alternative methods of application, both to mitigate problems with drift and also for increased efficacy, economical, and resistance concerns in the main rice crop.

One compound, Trebon, a granular application, has received a Section 18 use permit and was applied in several commercial fields during 2006 and 2007. Preliminary tests to observe the potential impacts of Trebon application on crawfish were conducted in conjunction with some of these commercial applications. Other rice insecticides, both commercial and experimental were evaluated for potential adverse effects to crawfish in small plot studies at the Rice Research Station.

Following are the synopsis of four trials whereby crawfish were exposed to the rice insecticides under commercial or simulated commercial conditions during 2007. Included for each trial is a brief time line and set of experimental conditions, results in tabular format, and a short conclusion. Enclosures constructed of ½-inch mesh galvanized wire, 6 inches wide by 10 inches long by 10 inches high, were used to confine crawfish for observation. Fresh, healthy red swamp crawfish were stocked individually in cages. Similar mixtures of immature subadults and sexually mature adults and mixtures of males and females were employed for each trial. Each plot or field contained several replicates of caged crawfish.

Trial 1: Trebon Outfield Tests - 2007

Timeline and Experimental Conditions

April 16, 2007: Commercial fields near Eunice, LA, were treated with Trebon at 6 lb/A, 9 lb/A, and one field (non treated control) was not treated.

May 7, 2007: Crawfish were stocked individually in cages (12 reps per field) in each of the three fields near Eunice at 21 days after treatment (DAT). Equal numbers of immature and mature and males and females were stocked per field and assessed for mortality and/or moribundity over 1 week. Dead crawfish were replaced with fresh individuals at time of assessment.

May 16, 2007: Cages in the test fields near Eunice were stocked with fresh crawfish (12 per field at 30 DAT) and assessed for mortality/moribundity for 1 week. Equal numbers of immature and mature and males and females were stocked per field and dead crawfish were not replaced.

May 10, 2007: Commercial fields near Rayne, LA, were treated with Trebon at 6 lb/A, 9 lb/A, and one field (non treated control) was not treated.

June 7, 2007: Crawfish were stocked individually in cages (12 reps per field) in each of the three fields near Rayne at 28 DAT. Equal numbers of immature and mature and males and females were stocked per field and assessed for mortality and/or moribundity over 1 week. Dead crawfish were not replaced.

Results

Table 1. Mortality of red swamp crawfish placed individually in enclosures after permanent flood in commercial rice fields treated with Trebon (ai=etofenprox) at the low (6 lb/A) or high rate (9 lb/A). Mortality (number and percentage dead) was assessed at various times after stocking, and results are cumulative. Same location at Eunice, LA, was used for the 21 and 30 DAT trials.

Initial Stocking	Days After Stocking	Untreated Control		Etofenprox Low		Etofenprox High	
		Min-Max °F	Mortality	Min-Max °F	Mortality	Min-Max °F	Mortality
Eunice Location							
21 DAT	2	70-96	1 (8%)	72-84	1 (8%)	72-90	1 (8%)[1]
	4	69-82	4 (33%)	73-84	4 (33%)	70-94	8 (67%)
	7	70-86	4 (33%)[2]	72-84	4 (33%)[2]	70-88	8 (67%)[2]
Eunice Location							
30 DAT	2	68-76	1 (8%)	63-79	0	68-76	0
	5	63-78	1 (8%)	63-77	0	60-88	0
	7	70-79	1 (8%)	66-75	0	70-78	0
Rayne Location							
28 DAT	1	79-90	1 (8%)	84-88	1 (8%)	80-92	0
	4	79-93	3 (25%)	79-93	1 (8%)	80-99	1 (8%)
	7	79-93	3 (25%)	82-91	1 (8%)	78-97	2 (17%)

[1] Two additional crawfish were moribund.
[2] Four of the 19 replacement crawfish died (two in Control, one each in the other treatments).

Conclusions

At 3 weeks after Trebon application to the rice fields, crawfish mortality in the high-rate treatment was greater than for the non-treated control and low-rate treatments. This suggests that at the higher rate of application and under these experimental conditions, there appears to be some residual toxic activity to crawfish. However, approximately 4 weeks after treatment, in both locations, excessive crawfish mortality was not observed for either treatment rate. These results have been corroborated by similar such studies. It is therefore recommended that until application rate and environmental factors can be further assessed, introductions of crawfish into a rice crop treated with Trebon be postponed until at least 4 weeks after insecticide application.

Trial 2: Crawfish Bioassays in Simulated Rice Plots, Rice Research Station - 2007

Timeline and Experimental Conditions – at Permanent Flood

March 22, 2007: Seeded small plots with rice.

April 23, 2007: Flooded plots.

April 23, 2007: Treatments were applied in duplicate plots as follows: Trebon (ai=Etofenprox) at a low rate of 6 lb/A (200 gm ai/A); Trebon at a high rate of 9 lb/A (300 gm ai/A); Karate at 0.03 lb ai/A; Dinotefuran at 120 gm ai/A; and duplicate plots remained untreated.

April 25, 2007: Crawfish were placed individually in small cages (six crawfish per plot) randomly distributed throughout plots to achieve a total of 12 replicated animals per treatment. A mixture of males and females and immature and mature crawfish were used in each plot.

April 27-May 2, 2007: Crawfish were assessed after 2, 5, and 7 days for mortality and/or moribundity.

Results – at Permanent Flood

Table 2. Mortality of red swamp crawfish placed in enclosures after permanent flood in simulated rice plots treated with various rice insecticides. Mortality (number and percentage dead) was assessed at 2, 5, and 7 days after stocking, and results are cumulative.

Days After Stocking	Min - Max Temp. °C	Untreated Control	Trebon Low Rate	Trebon High Rate	Karate	Dinotefuran
2	64 - 85	1 (8%)	0	0[2]	2 (17%)	1 (8%)
5	62 - 100	2 (17%)	7 (58%)[1]	9 (75%)[1]	8 (67%)[2]	3 (25%)
7	68 - 96	2 (17%)	9 (75%)[1]	12 (100%)	9 (75%)[3]	3 (25%)

[1] Three additional crawfish were moribund.
[2] Two additional crawfish were moribund.
[3] One additional crawfish was moribund.

Timeline and Experimental Conditions – after Reflooding

May 18, 2007: Water was drained and plots remained dry for about 10 days.

May 29, 2007: Plots reflooded.

May 30, 2007: To test for residual chemical activity, fresh crawfish were placed individually in small cages randomly distributed throughout plots.

June 1, 2007: Crawfish were assessed for mortality, and only 8% mortality was observed – reflected by one crawfish in each of the previous treatments (including the Untreated Control).

June 1, 2007: Those four cages were replenished with fresh crawfish and plots were treated with Karate (0.03 lb ai/A), Valent compound (0.2 lb ai/A), and Dinotefuran (120 gm ai/A), with three replicated plots per treatment. (N=12 crawfish per treatment, representing equal mixtures of male and females, and immature and matures).

June 4-8, 2007: Crawfish were assessed after 3, 5, and 7 days for mortality and/or moribundity.

Results – after Reflooding

Table 3. Mortality of red swamp crawfish placed in enclosures after reflooding and retreating with various rice insecticides. Mortality (number and percentage dead) was assessed at 3, 5, and 7 days after stocking, and results are cumulative.

Days After Stocking	Min - Max Temp. °C	Untreated Control	Karate	Valent	Dinotefuran
3	72 - 92	5 (42%)	12 (100%)	7 (58%)	5 (42%)[1]
5	-	5 (42%)	12 (100%)	7 (58%)	6 (50%)
7	-	5 (42%)	12 (100%)	7 (58%)	6 (50%)

[1] One additional crawfish was moribund.

Conclusions

Although very preliminary, the results of this trial suggest that Dinotefuran may be less toxic to crawfish than Trebon or Karate when exposure to a treated field occurs shortly after insecticide application. When compared with Karate in a subsequent application, Valent also seems less toxic, but more data is needed before that conclusion can be drawn.

Trial 3: Crawfish Bioassays in Simulated Rice Plots, Rice Research Station - 2007

Timeline and Experimental Conditions

April 4, 2007: Drill-seeded small plots with Icon-treated seed, Rynaxypyr-treated seed, or untreated seed.

May 1, 2007: First flush (was deeper than normal) and crawfish were placed in untreated control (UTC), Icon, and Rynaxypyr plots immediately after filling. Crawfish were placed individually in small cages (10 crawfish per plot) randomly distributed throughout plots. Each plot contained eight mature and two immature individuals with 50% of each being females.

May 3, 2007: Crawfish were assessed after 48 hr for mortality and/or moribundity.

May 4, 2007: Water was drained.

May 14, 2007: One of the plots, previously seeded with untreated seed on Apr 24, was treated with Dinotefuran (preflood application).

May 16, 2007: Permanent flood established and fresh crawfish were placed in cages (n=12 per plot, consisting of equal numbers of males and females and mature and immatures) within the Icon, Rynaxypyr, and UTC plots.

May 17, 2007: Crawfish were placed in cages (n=12 per plot, consisting of equal numbers of males and females and mature and immatures) within the Dinotefuran plot.

May 19-27, 2007: Crawfish were assessed after 2, 5, and 7 days for mortality and/or moribundity, except for those exposed to Dinotefuran, which were assessed at 1, 4, and 6 days after stocking.

Results

Table 4. Mortality of red swamp crawfish placed in enclosures at first flush in simulated rice plots treated with various rice insecticides. Mortality, number and percentage dead, was assessed at 2 days after stocking.

Days After Stocking	Min - Max Temp. ^{o}C	Untreated Control	Icon	Rynaxypyr
2	19 - 31	0	2 (20%)[1]	2 (20%)[2]

[1] Dead = One immature and one mature; and three (30%) additional crawfish were moribund.
[2] Dead = Two mature.

Table 5. Mortality of red swamp crawfish placed in enclosures after permanent flood in simulated rice plots treated with various rice insecticides. Mortality, number and percentage dead, was assessed at 2, 5, and 7 days after stocking, and results are cumulative.

Days After Stocking	Min - Max Temp. ^{o}C	Untreated Control	Icon	Rynaxypyr	Dinotefuran[7]
2	17 - 32	3 (25%)[1]	2 (17%)[2]	3 (25%)[3]	0
5	15 - 35	5 (42%)[4]	3 (25%)[5]	3 (25%)[3]	0
7	19 - 30	5 (42%)[4]	4 (33.3)[6]	4 (33.3)[6]	0

[1] Dead = One immature and two mature.
[2] Dead = Two mature.
[3] Dead = Three immature.
[4] Dead = Two immature and three mature.
[5] Dead = Three mature; and one additional crawfish (8%) was moribund.
[6] Dead = Three immature and one mature.
[7] Assessments for crawfish in Dinotefuran treatment were actually 1, 4, and 6 days after stocking, respectively.

Conclusions

Crawfish mortality associated with insecticide treatments at first flush was not high enough to conclude with any degree of certainty that those deaths were a direct result of the insecticides. Chance mortality associated with handling and/or environmental stress cannot be ruled out. This is corroborated by the observation that mortalities in the treated groups after the permanent flood were lower than non-treated controls. Therefore, further tests are needed to better define the potential (or lack thereof) for crawfish mortality for these products under similar experimental conditions.

Trial 4: Crawfish Consumption of Rynaxypyr-treated Rice Seed

Timeline and Experimental Conditions

- Six crawfish were place in each aquarium (three mature males and three mature females).
- Two aquaria (reps) were used per treatment.
- Crawfish were acclimated to aquaria for 5 days (without feed) prior to treatments.
- Seed treatments were: Control (non-treated seed), Rynaxypyr: low treatment rate (0.0125 mg), Rynaxypyr: high treatment rate (0.05 mg).
- 18 whole seeds (avg. = three seeds per crawfish) were placed in aquaria at days 0, 1, 3, and 7.
- Average weight per seed was 23.8 mg.
- Water temperature ranged between 72 and 80^{o}F during trial.
- Crawfish were observed for mortality for 4 weeks and then offered a larger quantity of seed.
- Crawfish were fed an average of 12 seeds per crawfish on Day 28.
- All seeds were eaten by Day 29 with no additional deaths.
- Terminated trial on Day 37.

Results

Table 6: Number of crawfish dead at various days after initiation of feeding and final mortality as a percentage of original number at Day 28 and Day 37.

	Days From Initiation of Trial								
	1	**3**	**7**	**9**	**18**	**21**	**28**	**30**	**37**
Control (Rep 1)	0	0	0	0	0	0	0	0	0
Control (Rep 2)	0	0	0	0	0	0	0	0	0
Control (%)							**0**		**0**
Low (Rep 1)	0	0	0	1	1	0	0	0	0
Low (Rep 2)	0	0	0	0	0	0	0	0	0
Low (%)							**16.7**		**16.7**
High (Rep 1)	0	0	0	0	0	0	0	1	0
High (Rep 2)	0	0	0	0	0	0	0	0	0
High (%)							**0**		**8.3**

Conclusions

Although no mortality was observed in the control group (i.e., those fed non-treated seeds), only two of 24 crawfish (or 8.3%) offered treated seed died within the first 4 weeks of the trial, and those two deaths were in one group receiving the low rate of treated seed. Following the subsequent offering of larger quantities of seed at Day 28, only one crawfish died. It was found dead in one replicate of the high treatment rate 2 days after feeding. Therefore, after observing crawfish for 37 days that were offered treated seeds in modest amounts on four occasions and a large amount on one occasion, mortality was observed in only 12.5% of the specimens. Although no mortality was observed in crawfish receiving non-treated seed, this difference is not great enough to conclude with a high degree of confidence that those mortalities were a direct result of toxicity from the treated seed. However, the occurrence of so few deaths in this trial suggests the relative innocuous nature of this compound to crawfish under these conditions, but more work is needed.

RICE DISEASE CONTROL RESEARCH

RICE DISEASE CONTROL STUDIES, 2007[1]

D.E. Groth, X.H. Wang, J. Nugent, and M.J. Frey

Sheath blight, bacterial panicle blight, and blast are three of the most important diseases of rice. How a farmer manages these diseases often means the difference between a profit and a loss. A number of factors affect disease development, including varietal resistance, cultural practices, cropping history, and pesticide usage. Environmental conditions also greatly affect disease development but are out of the farmer's hand. However, knowing which conditions are favorable for disease development allows the producer to initiate the appropriate disease control conditions. Cultural management often plays an important role as evidenced by the fact that sheath blight was a minor disease until the introduction of semidwarf varieties, high N rates, and soybeans as a rotational crop.

Data from research tests suggest that rice diseases annually cause at least an average range of 12 to 15% loss in yield in the South. With present production costs and the price of rice, this average yield loss translates into an average of 33 to 40% loss in potential net return because of rice diseases. 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 disease blast, caused by Pyricularia grisea; sheath blight, caused by Thanatephorus cucumeris (Rhizoctonia solani); stem rot, caused by Magnaporthe salvinii (Sclerotium oryzae); 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. Bacterial panicle blight has been identified as a major disease and is caused by the bacterium Burkholderia glumae. 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.

Host resistance and fungicides play an important role in limiting these losses. The objective of these studies is to develop disease management practices that economically reduce rice diseases and increase the yield and quality of rice.

This report is on current research evaluating both registered and experimental compounds. It also represents only one year of data, and multiple years are needed to effectively evaluate agronomic practices. Therefore, no specific recommendation of a product or practice is implied. For specific recommendations and more information, contact your local Cooperative Extension Agent.

The use of a foliar fungicide to reduce rice diseases is often justified under severe disease conditions. Some factors that favor the use of a fungicide include: 1) history of disease in the field, 2) varietal susceptibility, 3) high yield potential, 4) rice being grown for seed, 5) rice planted late, and 6) rice ratooned. The primary targets for rice fungicide applications are sheath blight and blast. Generally, secondary rice diseases are not severe enough to justify a fungicide application. However, control of these secondary diseases, from sheath blight and blast applications, often contributes to the overall increase in yield and quality.

[1] This research is supported in part by funds provided by rice producers through the Louisiana Rice Research Board and various agricultural chemical companies.

All of the fungicides tested have benefits and disadvantages. Tilt gives good narrow brown leaf spot and Cercospora sheath blotch and leaf smut control but no control of blast. Moncut had good activity against sheath blight, but it had the narrowest disease control spectrum. Quadris combines excellent sheath blight activity with control of blast but is weak against narrow brown leaf spot and Cercospora sheath blotch.

Many other factors affect fungicide efficacy, including application timing, cultural practices, inoculum levels, weather, varietal resistance, spray volume, type of adjuvants added to the spray solution, and the application method used. Problems can develop from these factors that limit fungicide activity. One problem occurs when fungicides are applied by air. Most of the material is deposited on the upper third of the canopy. Redistribution by rain and dew is then required to move the fungicide into the lower canopy where most of the disease is present. Redistribution into the lower canopy is necessary since these fungicides are either non-systemic, or if systemic, they are only locally systemic or only move upward in the plant. Weathering associated with redistribution is also detrimental since some fungicidal activity is lost. Other conditions that limit fungicide activity include drift, volatility, and calibration errors. Rainfall immediately after application, before the fungicide can dry on the plant or be absorbed by the plant, can remove significant amounts of fungicides from the foliage and impair yield performance. Normally, a 4-hour drying period is adequate after application.

Since all fungicides labeled are very specific as to the diseases they control, scouting rice is extremely important to determine disease incidence and severity. Fields should be scouted weekly for disease development beginning when the first tillers begin to develop and continuing through heading. Rice should be sampled at several (20 or more) locations throughout the field. The size of the field and the disease distribution will determine the extent of sampling. At each sampling location, 25 to 50 tillers should be examined for disease symptoms (refer to back pages and the Louisiana Agricultural Experiment Station Bulletin No. 828, Rice Diseases and Disorders in Louisiana). Other diseases that require fungicides for control, especially the rice blast disease, must be noted between scouting stops as damaging levels can develop from light infestations that were not detected at the scouting stops. For sheath blight, the percentage of tillers infected at the sampling locations should be averaged to determine the disease incidence for the field. Spraying a fungicide for sheath blight is warranted if an average of 5 to 10% of the tillers (approximately 20-40% positive stops) are infected during joint elongation stages of growth in susceptible varieties. Spraying moderately susceptible varieties are warranted if more than 15% of the tillers are infected (approximately 50% positive stops). Unfortunately, there is no good scouting/prediction system for blast or bacterial panicle blight at this time, and when leaf blast is found, preventative sprays to protect the head are recommended for susceptible varieties. Prevailing temperatures at heading predict bacterial panicle blight. Disease identification is extremely important since several diseases can be confused.

Table 1. List of fungicides tested in 2007.

	Common Name	**Company**
Quadris 2.08 SC	Azoxystrobin	Syngenta
Stratego 2.08 EC	Trifloxystrobin/Propiconazole	Bayer
GEM 500 SC	Trifloxystrobin	Bayer
Quilt 1.16 SC	Azoxystrobin/Propiconazole	Syngenta
Moncut 2 SC	Flutolanil	Gowan
Tilt 3.6 EC	Propiconazole	Syngenta

2007 Varietal and URN Disease Resistance Evaluation

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: Various

Plot Size: 6-ft rows

Planting Method/Date: Drill-seeded, Mar 20 with a Hege 6-row planter

Fertilization: Preplant 24-72-72, Mar 19; preflood 46-0-0, Apr 25; topdress 46-0-0, May 16

Experimental Design: Randomized complete block design with two to four replications

Water Management: Flooded, Apr 27; drained, May 1; reflooded, May 12

Herbicides: 1 gal Propanil + 1 oz Permit, Apr 13; 3qt Arrosolo, Apr 25; 1 pt Zinc + 1.5 pt Basagran, May 11; 16.5 oz Clincher, June 20

Insecticides: 4 oz Karate + 2 oz Londax, May 10

Fungicides: None

Inoculation Dates: Sheath blight, May 30; bacterial panicle blight at early heading, various dates

Application Equipment: N/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
N/A							

Disease Ratings: Various, see tables

Drained: July 20

Harvest: N/A

Results: See Tables 2-9

Comments. Sheath blight was severe, and plots inoculated with the *Burkholderia glumae* had severe bacterial panicle blight.

Table 2. Disease reaction of various varieties and experimental lines to sheath blight (SB), bacterial panicle blight (BPB), rotten neck blast (RNB), narrow brown leaf spot (NBLS), brown spot (BS), and leaf smut (LS) at the Rice Research Station, Crowley, LA. 2007. (Variety Trial).

Pathogen Code		SB	BPB	RNB	NBLS	BS	LS
Rating Data Type		Severity	Severity	severity	Severity	Severity	Severity
Rating Unit		0-9	0-9	0-9	0-9	0-9	0-9
Rating Date		July 18	July 18	Sept 11	Sept 11	Sept 11	Sept 11
1	Banks	6.0 a-g	5.3 bc	3.0 b-g	0.3 ef	3.7 a-e	0.7 def
2	CL131	7.3 abc	6.7 ab	2.0 d-h	3.7 a	2.7 a-f	1.3 b-f
3	CL151	7.3 abc	6.7 ab	5.0 abc	2.3 a-e	2.7 a-f	3.7 ab
4	CL161	7.0 a-d	5.0 bcd	3.0 b-g	2.0 a-f	1.0 ef	0.7 def
5	CL171	7.0 a-d	6.3 ab	3.0 b-g	2.0 a-f	1.3 def	1.0 c-f
6	Cocodrie	8.0 a	6.7 ab	3.3 b-f	1.7 b-f	2.0 b-f	1.7 b-f
7	Cypress	7.3 abc	7.3 ab	2.0 d-h	1.7 b-f	1.7 c-f	1.7 b-f
8	Cybonnet	7.3 abc	7.0 ab	1.0 fgh	0.3 ef	1.7 c-f	2.0 a-f
9	Cheniere	6.7 a-e	5.3 bc	4.3 a-e	3.0 abc	1.0 ef	4.0 a
10	Dellmati	5.7 b-g	3.7 cde	1.7 e-h	0.7 def	4.0 a-d	0.3 ef
11	Dellrose	5.3 c-h	4.0 cde	1.7 e-h	0.7 def	4.0 a-d	3.3 abc
12	Della	4.3 fgh	3.3 cde	1.7 e-h	0.3 ef	3.0 a-e	1.3 b-f
13	Jefferson	6.3 a-f	5.7 bc	3.7 b-f	3.7 a	2.0 b-f	1.7 b-f
14	Spring	5.7 b-g	5.0 bcd	5.7 ab	2.7 a-d	2.7 a-f	2.0 a-f
15	Trenasse	8.0 a	8.0 a	2.7 c-h	1.3 c-f	4.7 ab	1.7 b-f
16	Wells	5.7 b-g	6.3 ab	5.0 abc	0.0 f	2.0 b-f	1.0 c-f
17	TORO-2	5.0 d-h	6.3 ab	1.0 fgh	0.3 ef	1.7 c-f	1.0 c-f
18	CLXL730	5.3 c-h	2.3 e	1.7 e-h	0.3 ef	4.0 a-d	0.7 def
19	CLXL729	5.0 d-h	3.0 de	1.7 e-h	0.3 ef	3.3 a-e	0.0 f
20	CLXP745	5.0 d-h	2.0 e	2.3 c-h	0.3 ef	4.3 abc	0.3 ef
21	CLXP746	6.7 a-e	2.0 e	2.7 c-h	0.3 ef	3.7 a-e	0.0 f
22	XL723	4.7 e-h	2.0 e	3.3 b-f	0.3 ef	4.3 abc	0.0 f
23	XP744	4.0 gh	2.7 e	2.7 c-h	1.0 def	5.0 a	1.0 c-f
24	Bengal	5.0 d-h	5.7 bc	4.7 a-d	1.0 def	2.7 a-f	2.7 a-e
25	Jupiter	4.3 fgh	3.7 cde	3.3 b-f	0.3 ef	3.0 a-e	1.3 b-f
26	Pirogue	4.0 gh	4.0 cde	2.0 d-h	0.0 f	3.0 a-e	1.0 c-f
27	MS0404191	6.0 a-g	5.3 bc	6.7 a	1.0 def	2.3 a-f	0.0 f
28	LA0302028	7.0 a-d	5.7 bc	2.3 c-h	0.7 def	2.7 a-f	1.7 b-f
29	LA0502177	7.7 ab	5.0 bcd	5.0 abc	0.3 ef	2.3 a-f	1.7 b-f
30	LA0402028	4.0 gh	3.7 cde	0.3 gh	0.0 f	1.7 c-f	1.0 c-f
31	LA0402125	5.0 d-h	5.0 bcd	2.3 c-h	3.3 ab	1.3 def	1.0 c-f
32	Cocodrie Check	7.3 abc	7.0 ab	5.0 abc	2.0 a-f	2.3 a-f	3.0 a-d
33	Purple	3.3 h	3.7 cde	0.0 h	0.0 f	0.0 f	0.0 f
LSD (P=.05)		1.23	1.32	1.57	1.16	1.49	1.33
Standard Deviation		0.75	0.81	0.96	0.71	0.92	0.82
CV		12.76	16.55	33.26	61.64	34.45	60.72
Replicate F		1.627	2.606	0.989	0.421	3.412	0.562
Replicate Prob(F)		0.2046	0.0816	0.3776	0.6582	0.0391	0.5730
Treatment F		9.279	13.285	7.989	7.571	5.035	5.025
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 3. Disease reaction of various varieties and experimental lines to sheath blight (SB), bacterial panicle blight (BPB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group I).

Pathogen Code		SB	BPB	RNB	NBLS
Rating Data Type		Severity	Severity	Severity	Severity
Rating Unit		0-9	0-9	0-9	0-9
Rating Date		July 18	July 18	Sep 11	Sep 11
1	NWBT/3/LBNT/9902//LB	4.0 d	4.0 d	0.3 e	0.3 ef
2	CCDR/9502008-A	6.3 ab	5.0 bcd	4.5 abc	2.5 bcd
3	((NWBT/RU8303181)/RS	6.5 ab	5.3 bcd	4.0 bcd	2.8 bc
4	L201/7402003//KATY/N	4.3 cd	4.5 cd	0.5 e	0.5 def
5	9901081/CCDR	6.5 ab	6.3 a-d	6.5 a	1.8 b-f
6	((NWBT/RU8303181)/RS	5.8 a-d	5.8 a-d	3.5 bcd	2.5 bcd
7	NWBT/3/LBNT/9902//LB	5.3 bcd	4.8 bcd	4.3 bcd	0.3 ef
8	KATY/CPRS//JKSN/3/AR	6.5 ab	6.0 a-d	4.8 abc	2.3 b-e
9	((NWBT/RU8303181)/RS	7.5 a	6.5 abc	4.5 abc	1.0 c-f
10	DREW/UA99-52	6.0 abc	6.0 a-d	2.3 d	0.0 f
11	CPRS/KBNT//9502008-A	6.5 ab	5.5 a-d	2.8 cd	0.8 c-f
12	((NWBT/RU8303181)/RS	6.5 ab	5.0 bcd	4.0 bcd	2.0 b-f
13	LBNT/9902/3/DAWN/969	5.8 a-d	4.5 cd	3.8 bcd	0.5 def
14	CPRS/JKSN	6.8 ab	7.5 a	5.0 abc	4.8 a
15	RSMT/KATY	6.5 ab	6.5 abc	5.0 abc	3.5 ab
16	TBNT/LA110//LMNT/3/T	6.0 abc	4.8 bcd	5.8 ab	3.5 ab
17	SPRING	5.3 bcd	5.3 bcd	4.8 abc	1.0 c-f
18	TRENASSE	7.8 a	7.0 ab	4.0 bcd	1.0 c-f
19	PRESIDIO	5.0 bcd	4.8 bcd	3.5 bcd	0.3 ef
20	CYBONNET	6.0 abc	5.3 bcd	3.3 cd	1.5 b-f
LSD (P=.05)		1.19	1.27	1.31	1.25
Standard Deviation		0.84	0.90	0.92	0.88
CV		13.96	16.39	24.07	54.4
Replicate F		4.073	4.801	0.054	0.192
Replicate Prob(F)		0.0109	0.0047	0.9834	0.9015
Treatment F		4.978	4.147	10.993	8.872
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 4. Disease reaction of various varieties and experimental lines to bacterial panicle blight (BPB), sheath blight (SB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group II).

Pathogen Code		BPB	SB	RNB	NBLS
Rating Data Type		Severity	Severity	Severity	Severity
Rating Unit		0-9	0-9	0-9	0-9
Rating Date		July 17	June 17	Sept 11	Sept 11
21	BRAZ/TBNT/3/164986-4	7.0 abc	4.5 de	0.5 i	1.3 a-d
22	CCDR/5/MARS/M201//MA	6.5 a-d	7.5 a	2.8 d-h	1.8 a-d
23	(CPRS/(KATY//GFMT/PC	4.0 ef	5.5 a-e	3.0 d-g	1.5 a-d
24	BRAZ/TBNT/3/164986-4	6.0 a-e	5.5 a-e	5.8 abc	0.3 cd
25	96 INT/AHRENT	4.0 ef	4.3 e	1.5 f-i	3.0 a
26	(CPRS/PELDE)/JEFF	5.5 b-e	6.0 a-e	2.0 e-i	2.3 abc
27	DREW/UA99-52	6.5 a-d	6.0 a-e	1.5 f-i	0.8 bcd
28	BNGL//MERC/RICO/3/ME	4.5 def	4.8 cde	0.8 hi	0.3 cd
29	(CPRS/PELDE)/JEFF	5.0 c-f	5.3 b-e	4.0 b-e	0.3 cd
30	WLLS/UA99-52	7.0 abc	6.5 a-d	1.0 ghi	1.3 a-d
31	CCDR/5/MARS/…/6/L202	5.5 b-e	6.8 abc	4.5 a-d	1.5 a-d
32	(CPRS/PANDA)/JEFF*2	5.0 c-f	6.5 a-d	3.8 c-f	2.5 ab
33	8603006/3/MARS/NWRX/	5.0 c-f	6.0 a-e	6.3 ab	0.0
34	JODN/AR1121/7/CCDR/…	5.0 c-f	6.8 abc	6.0 abc	1.3 a-d
35	8904186sel919/880301	7.8 a	6.5 a-d	6.0 abc	0.0 d
36	8902031/NWBT	5.0 c-f	5.3 b-e	6.8 a	2.5 ab
37	JUPITER	3.0 f	4.0 e	4.5 a-d	1.3 a-d
38	BENGAL	5.0 c-f	4.3 e	3.3 def	1.0 a-d
39	CL131	7.5 ab	7.0 ab	3.8 c-f	2.8 ab
40	FRANCIS	6.8 abc	4.0 e	4.5 a-d	0.0 d
LSD (P=.05)		1.27	1.22	1.45	1.20
Standard Deviation		0.90	0.86	1.02	0.85
CV		16.09	15.28	28.43	67.27
Replicate F		0.684	3.564	1.369	0.526
Replicate Prob(F)		0.5656	0.0196	0.2616	0.6664
Treatment F		7.986	6.256	14.633	5.198
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 5. Disease reaction of various varieties and experimental lines to bacterial panicle blight (BPB), sheath blight (SB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group III).

Pathogen Code		BPB	SB	RNB	NBLS
Rating Data Type		Severity	Severity	Severity	Severity
Rating Unit		0-9	0-9	0-9	0-9
Rating Date		July 17	July 17	Sept 11	Sept 11
41	LMNT//82CAY21/CICA8/	5.0 b	4.3 d	3.0 abc	0.3 bc
42	9502008/CPRS	7.0 ab	7.3 a	2.5 abc	0.8 abc
43	Kaybonnet/Zhongyouza	6.3 ab	7.0 ab	3.8 abc	1.8 abc
44	DREW/UA99-52	5.0 b	6.0 a-d	1.5 bc	0.3 bc
45	9502008-A/DREW	5.0 b	6.0 a-d	1.5 bc	0.5 abc
46	(VSTA/LBNT//RSMT)/LM	5.8 b	5.3 bcd	1.5 bc	2.5 a
47	L201//TBNT/BLMT/3/CP	6.8 ab	6.0 a-d	2.5 abc	1.3 abc
48	9502008-A//AR 1188/C	6.0 ab	6.0 a-d	3.5 abc	2.3 ab
49	((NWBT/RU8303181)/GF	6.0 ab	6.3 abc	0.8 c	2.0 abc
50	LBNT/9902//NWBT/3/KA	6.5 ab	6.8 ab	2.8 abc	0.3 bc
51	9502008-A//AR 1188/C	7.0 ab	7.0 ab	3.8 abc	1.8 abc
52	Texmont/TeQing	5.8 b	5.5 a-d	2.3 abc	1.0 abc
53	CPRS/3/L201//TBNT/BL	7.0 ab	6.3 abc	2.5 abc	0.5 abc
54	CPRS/3/L201//TBNT/BL	7.8 a	5.8 a-d	2.8 abc	1.5 abc
55	CPRS/3/L201//TBNT/BL	6.5 ab	6.0 a-d	1.0 bc	1.5 abc
56	SABER	6.8 ab	5.8 a-d	2.8 abc	0.3 bc
57	PRISCILLA	5.3 b	4.8 cd	1.8 bc	0.0 c
58	CHENIERE	5.5 b	6.3 abc	5.5 a	1.0 abc
59	COCODRIE	6.0 ab	7.3 a	4.5 ab	2.3 ab
60	CL171 AR	5.3 b	6.3 abc	3.3 abc	1.8 abc
LSD (P=.05)		1.11	1.07	1.94	1.18
Standard Deviation		0.78	0.75	1.37	0.83
CV		12.83	12.4	51.46	71.62
Replicate F		2.232	2.144	1.196	1.797
Replicate Prob(F)		0.0943	0.1047	0.3194	0.1580
Treatment F		4.143	4.224	2.975	3.617
Treatment Prob(F)		0.0001	0.0001	0.0008	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 6. Disease reaction of various varieties and experimental lines to bacterial panicle blight (BPB), sheath blight (SB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group IV).

Pathogen Code	BPB	SB	RNB	NBLS
Rating Data Type	Severity	Severity	Severity	Severity
Rating Unit	0-9	0-9	0-9	0-9
Rating Date	July 17	July 17	Sept 11	Sept 11
61	5.3 def	4.3 cd	1.0 ef	0.0 c
62	7.0 abc	4.8 cd	5.0 ab	0.3 c
63	6.8 a-d	7.5 a	0.8 f	0.8 bc
64	6.3 cde	5.5 bc	1.8 def	1.3 bc
65	6.8 a-d	6.0 bc	4.8 ab	0.3 c
66	5.5 c-f	5.8 bc	1.3 ef	0.8 bc
67	5.8 c-f	6.8 ab	4.3 a-d	0.8 bc
68	7.8 ab	5.5 bc	2.8 b-f	0.8 bc
69	6.5 b-e	6.8 ab	1.3 ef	1.3 bc
70	5.0 ef	4.3 cd	4.5 abc	1.0 bc
71	5.5 c-f	4.5 cd	5.3 ab	0.0 c
72	5.3 def	5.0 cd	0.8 f	2.0 b
73	8.0 a	5.8 bc	3.8 a-e	3.3 a
74	5.5 c-f	6.0 bc	6.0 a	1.0 bc
75	3.8 g	3.5 d	0.0 f	0.0 c
76	6.0 cde	5.3 bc	2.8 b-f	0.8 bc
77	4.3 fg	4.8 cd	0.8 f	0.3 c
78	6.5 b-e	5.0 cd	5.0 ab	0.3 c
79	5.0 ef	5.0 cd	1.0 ef	0.0 c
80	5.3 def	5.0 cd	2.0 c-f	0.0 c
LSD (P=.05)	0.92	1.01	1.75	0.89
Standard Deviation	0.65	0.71	1.24	0.63
CV	11.06	13.39	45.35	86.76
Replicate F	5.096	1.721	0.644	2.064
Replicate Prob(F)	0.0034	0.1728	0.5900	0.1151
Treatment F	11.008	7.228	9.510	6.512
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 7. Disease reaction of various varieties and experimental lines to sheath blight (SB), bacterial panicle blight (BPB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group V).

		SB	BPB	RNB	NBLS
Pathogen Code		SB	BPB	RNB	NBLS
Rating Data Type		Severity	Severity	Severity	Severity
Rating Unit		0-9	0-9	0-9	0-9
Rating Date		July 18	July 18	Sep 11	Sep 11
81	19991562	5.0 bcd	6.0 a-d	3.0 abc	1.0 cd
82	AR 1142/JODN/4/NWBT/	6.0 a-d	6.0 a-d	5.0 abc	1.0 cd
83	TBNT/LA110//LMNT/3/T	6.5 a-d	7.0 abc	6.5 ab	3.5 ab
84	DREW/UA99-52	7.0 abc	6.5 a-d	3.5 abc	1.0 cd
85	AR 1188/CCDR//950200	8.0 a	6.0 a-d	4.0 abc	0.0 d
86	((NWBT/RU8303181)/GF	6.5 a-d	6.5 a-d	3.5 abc	1.5 bcd
87	GP13416/KATY//PI3127	6.0 a-d	7.5 ab	6.0 abc	0.0 d
88	CCDR/9770532 DH1//LG	4.5 cd	5.0 a-d	4.5 abc	1.0 cd
89	IAC 600	7.0 abc	6.5 a-d	3.0 abc	0.5 cd
90	LBNT/9902/3/DAWN/969	6.0 a-d	7.0 abc	1.0 c	0.0 d
91	CPRS/9901081	6.0 a-d	6.5 a-d	5.5 abc	0.5 cd
92	(DLMT/(LMNT*3/JSMN))	-	-	-	-
93	WLLS/ZHE733	4.5 cd	6.0 a-d	3.5 abc	2.0 bcd
94	AR 1179/3/CPRS//…/4/	6.5 a-d	4.0 bcd	2.5 abc	0.0 d
95	Arborio	5.5 a-d	4.0 bcd	7.0 a	3.5 ab
96	LBNT/9902//NWBT/3/KA	4.5 cd	4.5 a-d	1.0 c	0.5 cd
97	CPRS/97T1280 DH1/3/C	4.0 d	4.0 bcd	3.5 abc	0.5 cd
98	CPRS/LGRU	6.0 a-d	4.5 a-d	4.5 abc	2.0 bcd
99	WLLS/PI 584698//ZHE	4.0 d	3.0 d	2.0 abc	0.5 cd
100	IR36/8603006	5.0 bcd	5.5 a-d	4.0 abc	2.0 bcd
101	MDSN/((NWBT/RU830318	7.0 abc	5.5 a-d	2.5 abc	0.0 d
102	91642//KATY/NWBT/5/R	6.0 a-d	8.0 a	3.0 abc	5.0 a
103	FRAN/CCDR	5.5 a-d	7.0 abc	5.0 abc	1.5 bcd
104	(GFMT/RU8703196)TX61	6.0 a-d	3.5 cd	5.0 abc	0.0 d
105	LBNT/9902//NWBT/3/KA	4.0 d	6.5 a-d	1.0 c	0.0 d
106	CPRS/KBNT/4/9502008/	6.5 a-d	6.0 a-d	4.0 abc	2.0 bcd
107	(RU8803072/(KATY//GF	6.5 a-d	5.5 a-d	4.0 abc	0.0 d
108	LBNT/9902/3/DAWN/969	4.0 d	5.5 a-d	1.5 bc	0.0 d
109	9502008-A//AR 1188/C	8.0 a	6.5 a-d	2.5 abc	1.0 cd
110	(DF5-68)/TX8946	6.5 a-d	6.5 a-d	5.5 abc	1.5 bcd
111	FRNS/6/LBNT/9902/3/D	5.0 bcd	6.0 a-d	7.0 a	0.5 cd
112	9502008-A/TACAURI//C	7.5 ab	7.0 abc	5.0 abc	1.5 bcd
113	CPRS/LGRU	6.5 a-d	7.0 abc	1.0 c	0.5 cd
114	DLMT/KATY	7.0 abc	5.5 a-d	4.5 abc	0.0 d
115	KATY/CPRS//NWBT/…/3/	7.5 ab	7.0 abc	6.0 abc	0.0 d
116	CPRS/LGRU	7.5 ab	6.5 a-d	2.0 abc	2.5 bc
117	COCODRIE	7.0 abc	6.0 a-d	5.5 abc	2.5 bc
118	HILDAGO	7.5 ab	6.5 a-d	7.0 a	4.5 a
119	L205	8.0 a	6.0 a-d	6.0 abc	1.5 bcd
120	DIXIEBELLE	4.0 d	6.0 a-d	5.0 abc	1.0 cd
LSD (P=.05)		1.58	1.93	2.87	1.25
Standard Deviation		0.78	0.95	1.42	0.62
CV		12.95	16.15	35.35	51.79
Replicate F		14.114	20.399	0.516	0.034
Replicate Prob(F)		0.0006	0.0001	0.4769	0.8555
Treatment F		4.963	2.789	3.106	8.533
Treatment Prob(F)		0.0001	0.0010	0.0004	0.0001

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 8. Disease reaction of various varieties and experimental lines to sheath blight (SB), bacterial panicle blight (BPB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group VI).

Pathogen Code	SB	BPB	RNB	NBLS
Rating Data Type	Severity	Severity	Severity	Severity
Rating Unit	0-9	0-9	0-9	0-9
Rating Date	July 18	July 18	Sep 11	Sep 11
121 RU9901127/GP-2	6.5 a-d	7.5 ab	1.0 de	1.0 a
122 IR36/8603006	6.0 a-d	5.5 ab	5.0 abc	1.5 a
123 ((NWBT/RU8303181)/GF	6.5 a-d	6.5 ab	2.5 a-e	1.5 a
124 DREW/UA99-167	5.0 bcd	5.0 ab	2.0 b-e	0.0 a
125 MBLE/ALAN/4/L201//…/	7.0 abc	7.0 ab	5.5 ab	2.0 a
126 ((NWBT/RU8303181)/RS	7.0 abc	5.0 ab	1.0 de	0.0 a
127 LGRU//KATY/STBN/3/NW	6.0 a-d	5.5 ab	3.5 a-e	0.5 a
128 9602097/...//JAF4/…/	6.0 a-d	5.0 ab	5.0 abc	1.0 a
129 (DLMT/(LMNT*3/JSMN))	6.0 a-d	6.0 ab	2.5 a-e	0.0 a
130 WLLS/INIAP-12//ZHE 7	-	-	-	-
131 MBLE/ALAN/6/CCDR/5/M	5.5 a-d	6.0 ab	6.0 a	0.5 a
132 (DLMT/(LMNT*3/JSMN))	6.0 a-d	5.0 ab	2.5 a-e	0.0 a
133 KATY/NWBT//L201/7402	4.0 d	5.5 ab	1.5 cde	0.0 a
134 CCDR/5/MARS/…/6/CCDR	8.0 a	7.0 ab	4.5 a-d	2.0 a
135 (AF5-144-1-2)/(DLMT/	6.5 a-d	7.0 ab	4.5 a-d	1.0 a
136 STG99F5-13-025/MDRK	6.5 a-d	7.5 ab	1.0 de	0.0 a
137 TXMT/…/5/AR1053/7/CC	5.0 bcd	6.0 ab	4.5 a-d	1.0 a
138 CPRS/3/CPRS/NWBT/KAT	7.0 abc	4.5 b	4.5 a-d	2.0 a
139 SHUFENG 121-1655	-	-	3.0 a-e	0.0 a
140 L202/LEAH//TORO/3/IR	7.5 ab	5.5 ab	5.5 ab	0.0 a
141 LCSN/LGRU	6.5 a-d	5.5 ab	4.0 a-d	1.0 a
142 L-29-079/LGRU	5.5 a-d	5.5 ab	3.5 a-e	0.5 a
143 06TT-11	4.5 cd	6.0 ab	5.0 abc	0.5 a
144 CPRS/CCDR	7.0 abc	6.0 ab	3.0 a-e	1.0 a
145 PI 584720/ZHE 733	7.5 ab	4.5 b	2.5 a-e	0.5 a
146 CPRS/LGRU//97 KDM X2	5.5 a-d	7.0 ab	2.5 a-e	0.5 a
147 CPRS/CCDR	6.5 a-d	6.5 ab	3.5 a-e	0.0 a
148 IRGA409/RXMT/5/BRAZ/	6.0 a-d	7.0 ab	3.5 a-e	1.5 a
149 DLRS//KBNT/JODN	6.5 a-d	5.5 ab	3.0 a-e	3.0 a
150 ((NWBT/RU8303181)/GF	7.0 abc	5.0 ab	4.0 a-d	3.0 a
151 MDRK/UA99-123	5.5 a-d	6.5 ab	0.0 e	0.0 a
152 06SBYT-67	4.5 cd	6.0 ab	5.0 abc	0.5 a
153 L201/SABR	7.5 ab	6.5 ab	5.0 abc	0.0 a
154 GFMT/TBNT/LA110	6.5 a-d	6.5 ab	4.0 a-d	0.0 a
155 05 SBYT 119	5.0 bcd	6.0 ab	4.5 a-d	0.0 a
156 CPRS//NWBT/KATY	5.5 a-d	5.5 ab	4.5 a-d	1.0 a
157 DLMT/KATY	5.0 bcd	4.5 b	4.0 a-d	0.0 a
158 DELLROSE	5.0 bcd	5.5 ab	3.0 a-e	0.5 a
159 SABINE	4.5 cd	6.5 ab	5.5 ab	2.0 a
160 FRANCIS	6.0 a-d	8.0 a	6.0 a	0.5 a
LSD (P=.05)	1.56	1.60	2.07	2.16
Standard Deviation	0.77	0.79	1.02	1.07
CV	12.74	13.24	28.19	138.76
Replicate F	2.689	1.345	10.304	1.620
Replicate Prob(F)	0.1095	0.2535	0.0027	0.2110
Treatment F	3.167	2.502	4.293	1.244
Treatment Prob(F)	0.0003	0.0032	0.0001	0.2543

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

Table 9. Disease reaction of various varieties and experimental lines to sheath blight (SB), bacterial panicle blight (BPB), rotten neck blast (RNB), and narrow brown leaf spot (NBLS) at the Rice Research Station, Crowley, LA. 2007. (URN Group VII).

Pathogen Code	SB	BPB	RNB	NBLS
Rating Data Type	Severity	Severity	Severity	Severity
Rating Unit	0-9	0-9	0-9	0-9
Rating Date	July 18	July 18	Sep 11	Sep 11
161 LGRU/3/LMNT/KATY//LM	4.5 cde	4.5 bcd	3.5 abc	0.0 b
162 BNGL//MERC/RICO/3/ME	5.5 a-e	7.0 ab	4.5 ab	1.0 ab
163 ((NWBT/RU8303181)/GF	7.0 abc	6.0 a-d	5.0 ab	0.5 ab
164 LBNT/9902/3/DAWN/969	4.0 de	6.0 a-d	3.5 abc	0.5 ab
165 EARL/9902028	5.5 a-e	7.5 a	5.0 ab	1.0 ab
166 4484-1665	3.5 e	3.5 de	2.5 abc	0.0 b
167 FRNS/6/LBNT/9902/3/D	6.0 a-e	7.0 ab	6.0 a	0.0 b
168 EARL/9902028	7.0 abc	6.5 abc	6.0 a	0.5 ab
169 ((NWBT/RU8303181)/GF	6.5 a-d	6.5 abc	5.0 ab	1.0 ab
170 LBNT/9902/3/DAWN/969	5.0 b-e	7.5 a	4.0 ab	0.5 ab
171 BNGL//MERC/RICO/3/ME	5.0 b-e	7.0 ab	4.5 ab	0.5 ab
172 CCDR/L202	6.0 a-e	4.0 cde	4.5 ab	0.5 ab
173 LBNT/9902/3/DAWN/969	5.0 b-e	7.5 a	4.5 ab	0.0 b
174 CFX-18//CCDR/9770532	8.0 a	5.5 a-d	5.5 ab	2.0 ab
175 LCSN/LGRU	6.0 a-e	5.0 a-d	3.5 abc	0.0 b
176 LBNT/9902/3/DAWN/969	5.5 a-e	6.5 abc	2.5 abc	0.0 b
177 FRANCIS/CLR 13	6.0 a-e	5.0 a-d	4.0 ab	1.5 ab
178 HB-1	4.0 de	7.0 ab	0.0 c	0.0 b
179 LBNT/9902/3/DAWN/969	5.0 b-e	5.5 a-d	4.0 ab	1.0 ab
180 TACAURI/3/CPRS//82CA	7.5 ab	5.0 a-d	5.0 ab	2.5 a
181 CPRS/CCDR	6.0 a-e	6.0 a-d	3.0 abc	0.5 ab
182 LBNT/9902/3/DAWN/969	5.0 b-e	7.5 a	2.5 abc	0.0 b
183 CFX-26/9702128	6.5 a-d	7.5 a	5.5 ab	0.0 b
184 L201/SABR	7.0 abc	5.0 a-d	5.0 ab	1.0 ab
185 RU9201176/4/LBNT/STB	4.0 de	5.0 a-d	3.0 abc	0.0 b
186 CPRS//NWBT/KATY	6.5 a-d	7.0 ab	3.0 abc	0.0 b
187 Tesanai 2	6.0 a-e	6.0 a-d	5.0 ab	2.0 ab
188 LGRU//KATY/STBN/5/LG	5.0 b-e	5.5 a-d	5.0 ab	0.0 b
189 DREW/CFX-18	7.0 abc	4.0 cde	3.5 abc	0.0 b
190 CCDR/L202	7.0 abc	6.5 abc	6.0 a	0.0 b
191 GFMT/TBNT/LA110	6.5 a-d	6.5 abc	5.0 ab	0.0 b
192 CFX-26/9702128	8.0 a	7.0 ab	5.0 ab	0.5 ab
193 NWBT/C4-63	5.0 b-e	4.0 cde	2.0 bc	0.0 b
194 88040032/KATY	4.5 cde	6.5 abc	3.5 abc	0.0 b
195 9502008-A/TACAURI//C	7.5 ab	7.0 ab	5.0 ab	2.5 a
196 8904186/sel919/NWBT	5.0 b-e	6.5 abc	5.0 ab	1.0 ab
197 IR36/8603006	6.0 a-e	6.5 abc	5.0 ab	0.5 ab
198 9002065/NWBT	5.5 a-e	4.0 cde	3.5 abc	0.0 b
199 CYPRESS	7.0 abc	7.0 ab	3.5 abc	0.5 ab
200 XL 723	5.5 a-e	2.0 e	5.0 ab	0.0 b
LSD (P=.05)	1.49	1.41	1.98	1.14
Standard Deviation	0.74	0.70	0.98	0.56
CV	12.66	11.76	23.5	104.85
Replicate F	18.028	12.451	2.545	0.354
Replicate Prob(F)	0.0001	0.0011	0.1187	0.5552
Treatment F	4.743	7.100	3.237	3.180
Treatment Prob(F)	0.0001	0.0001	0.0002	0.0002

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Blast and Secondary Disease Nurseries

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: Various, ~90 lb/A

Plot Size: 6-ft rows

Planting Method/Date: Drill-seeded, May 15

Fertilization: Preplant 24-72-72, Mar 19; preflood 120-0-0, June 18

Experimental Design: Randomized complete block with two to four replications

Water Management: Flooded, June 18; drained to induce blast, June 29

Herbicides: 3 qt Propanil + 1 oz Permit, June 8; 4 oz Arrosolo + 1 pt Basagran, June 15; 16.5 oz Clincher, June 20

Insecticides: 4 oz Mustang Max, June 25; 4 oz Mustang Max, July 16

Fungicides: None

Inoculation Dates: None, all from natural sources

Application Equipment: N/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
N/A							

Disease Ratings: Various, see Tables 2-9

Drained: Aug 22

Harvest: N/A

Results: See Tables 2-9

Comments: Blast severity was light, and other diseases were very light and erratic.

2007 Sheath Blight Rice CAPS Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: Various varieties and lines, ~70 lb/A

Plot Size: One 6-ft row

Planting Method/Date: Hege planter (drill-seeded), Apr 10

Fertilization: Preplant 24-72-22, Mar 14; preflood 90-0-0, May 10; topdress 46-0-0, June 6

Experimental Design: Randomized complete block design with three replications

Water Management: Flushed, Apr 12, May 2; permanent flood, May 14

Herbicides: 3 qt Arrosolo, May 3; 3 qt Arrosolo + 1 oz/A Permit, May 11; 15 oz Clincher, May 31

Insecticides: 1 oz Icon preplant, Apr 13; 4 oz Karate Z, May 16; 2.4 pt Prolix, May 3; 4 oz Karate, July 13

Fungicides: None

Inoculation Dates: 10 ml/plot of *Rhizoctonia solani* culture grown on a rice grain: rice hull mixture, June 16

Application Equipment: None

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
N/A							

Disease Ratings: Sheath blight severity ratings, July 22-Aug 15

Drained: Field allowed to dry naturally

Harvest: Aug 25 and 26

Results: Sheath blight ratings ranged from 2.7 to 8.0. Plant heights ranged from 68 to 109 cm. Heading dates ranged from July 13 to July 30. Data is available on request.

Comments: Sheath blight severity was severe.

2007 Sheath Blight Fungicide Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: CL161, 90 lb /A

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, Mar 20

Fertilization: Preplant 24-72-72, Mar 19; preflood 46-0-0, Apr 25; topdress 46-0-0, May 16

Experimental Design: Randomized complete block with four replications

Water Management: Flooded, Apr 27; drained, May 1

Herbicides: 1 gal Propanil + 1 oz Permit, Apr 13; 3 qt Arrosolo, Apr 25; 1 pt Zinc + 1.5 pt Basagran, May 11; 16.5 oz Clincher, June 20

Insecticides: 4 oz Karate + 2 oz Londax, May 10

Fungicides: Various, Boot spray, June 14

Inoculation Dates: Sheath blight, May 30

Application Equipment: CO_2, backpack sprayer, 8002 tips, 15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Boot	June 14	1:37 pm	91°F	1.6 mph	60%	30%	None

Disease Ratings: July 16

Drained: July 20

Harvest: Aug 6

Results: See Table 10

Comments: Sheath blight severity was high; other diseases were very light. Milling differences were not very pronounced due to high variability.

Table 10. Effect of various fungicides, rates, and timings on sheath blight (SB) development and yield of Cocodrie rice at the Rice Research Station, Crowley, LA. 2007.

Pathogen Code							SB	SB	Yield	Milling	Milling
Rating Data Type							Severity	Infest		Whole	Total
Rating Unit							0-9	%	lb/A	%	%
Rating Date							July 16	July 16	Aug 06		
Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg					
1	Unsprayed Check						7.3 a	85.5 a	6326 bc	61.9 a	70.5 a
2	Tilt	3.6	EC	10	FL OZ/A	B	6.8 ab	75.3 abc	6419 abc	62.5 a	70.0 a
3	Quadris	2.08	SC	9	FL OZ/A	B	4.0 ef	29.3 ef	6823 abc	64.3 a	71.2 a
4	Quadris	2.08	SC	12	FL OZ/A	B	4.0 ef	23.8 f	7143 ab	63.0 a	70.4 a
5	Stratego	2.08	EC	16	FL OZ/A	B	6.5 ab	68.0 bc	6571 abc	62.5 a	70.2 a
6	Gem	25	DF	8	OZ/A	B	4.8 def	36.8 ef	7094 ab	63.3 a	70.1 a
7	Moncut	70	DF	1.0	LB/A	B	5.5 bcd	53.3 d	6540 abc	60.7 a	69.8 a
8	Quilt	4	SC	28	FL OZ/A	B	5.0 c-f	39.5 ef	7468 a	63.6 a	70.3 a
9	Stratego		EC	19	FL OZ/A	B	6.3 abc	65.3 c	6730 abc	60.9 a	69.8 a
10	Stratego		EC	19	FL OZ/A	B	5.5 bcd	35.5 ef	6925 abc	62.5 a	70.2 a
	Gem		DF	3	OZ/A	B					
11	Quilt		SC	21	OZ/A	B	3.8 f	26.8 f	7002 ab	62.8 a	70.9 a
	Quadris		SC	4	OZ/A	B					
12	QRD 143		SC	2	QT/A	B	6.3 abc	76.0 abc	6134 bc	60.5 a	68.7 a
	Organosilicone		SC	0.25	% V/V	B					
13	QRD 143		SC	1	QT/A	B	7.3 a	84.3 ab	6286 bc	60.0 a	69.5 a
	Organosilicone		SC	0.25	% V/V	B					
14	QRD 143		SC	1	QT/A	B	6.8 ab	72.5 abc	6592 abc	61.8 a	69.6 a
	Organosilicone		SC	0.25	% V/V	B					
	Quadris		SC	4	OZ/A	B					
15	QRD 143		SC	2	QT/A	B	6.3 abc	73.3 abc	6465 abc	61.1 a	69.4 a
	Organosilicone		SC	0.25	% V/V	B					
	Quadris		SC	4	OZ/A	B					
16	QRD 143		SC	2	QT/A	B	5.3 b-e	44.3 de	7065 ab	63.3 a	70.2 a
	Organosilicone		SC	0.25	% V/V	B					
	Quadris		SC	8.5	OZ/A	PD					
17	Quilt		SC	14	OZ/A	B	4.0 ef	30.0 ef	7127 ab	60.5 a	70.0 a
	Quadris		SC	6	OZ/A	B					
LSD (P=.05)							0.95	11.31	621.4	3.93	1.56
Standard Deviation							0.66	7.92	439.4	2.38	0.95
CV							12.32	15.37	6.53	3.85	1.35
Replicate F							1.008	0.725	0.711	8.916	11.635
Replicate Prob(F)							0.3975	0.5421	0.5493	0.0007	0.0001
Treatment F							18.490	36.307	3.511	1.115	1.282
Treatment Prob(F)							0.0001	0.0001	0.0001	0.3753	0.2509

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Yield Loss Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: CL131, Cheniere, Trenasse, Jupiter, Catahoula, Cybonnet, Spring, 90 lb /A

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, Mar 20

Fertilization: Preplant 24-72-72, Mar 19; preflood 46-0-0, Apr 25; topdress 46-0-0, May 16

Experimental Design: Factorial arranged in a randomized complete block with four replications

Water Management: Flooded, Apr 27; drained, May 1

Herbicides: 1 gal Propanil + 1 oz Permit, Apr 13; 3 qt Arrosolo, Apr 25; 1 pt Zinc + 1.5 pt Basagran, May 11; 16.5 oz Clincher, June 20

Insecticides: 4 oz Karate + 2 oz Londax, May 10

Fungicides: Quadris at Boot, June 14

Inoculation Dates: Sheath blight, May 30

Application Equipment: CO_2, backpack sprayer, 8002 tips, 15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Boot	14 June	11:00 am	88°F	4-5 mph	80%	10%	None

Disease Ratings: July 17

Drained: July 20

Harvest: Aug 6

Results: See Table 11

Comments: Sheath blight severity was high; other diseases were very light. Milling differences were not very pronounced due to high variability.

Table 11. Effect of varietal resistance, sheath blight (SB) inoculation, and fungicide applications on sheath blight development and yield of rice at the Rice Research Station, Crowley, LA. 2007.

Pathogen Code Rating Data Type Rating Unit Rating Date Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg	SB Severity 0-9 July 17	SB Infest % July 17	Yield Grain lb/A Aug 06	Milling Head %	Milling Total %
1	CL131 Uninoculated						3.8 fgh	22.3 fgh	6774 a-e	62.0 a	69.6 abc
2	CL131 Inoculated Unsprayed						8.0 a	91.0 a	5530 ef	57.7 abc	68.6 abc
3	CL131 Inoculated Quadris	2.08	SC	9	OZ/A	Boot	4.8 efg	35.8 ef	6935 a-d	59.1 ab	69.9 abc
4	Trenasse Uninoculated						5.0 ef	31.3 efg	7366 abc	55.3 a-d	67.5 abc
5	Trenasse Inoculated Unsprayed						7.8 ab	82.5 a	5182 f	52.7 b-e	66.7 abc
6	Trenasse Inoculated Quadris	2.08	SC	9	OZ/A	Boot	5.5 de	51.8 cd	7335 abc	56.1 a-d	67.4 abc
7	Cybonnet Uninoculated						4.0 fgh	20.5 fgh	6007 c-f	61.4 a	70.0 abc
8	Cybonnet Inoculated Unsprayed						6.8 bc	57.3 bc	5223 f	56.3 a-d	68.8 abc
9	Cybonnet Inoculated Quadris	2.08	SC	9	OZ/A	Boot	3.8 fgh	24.0 fgh	6313 b-f	59.8 ab	69.6 abc
10	Cheniere Uninoculated						4.3 fg	23.0 fgh	6854 a-e	59.5 ab	69.2 abc
11	Cheniere Inoculated Unsprayed						6.3 cd	58.8 bc	5854 def	56.6 a-d	68.9 abc
12	Cheniere Inoculated Quadris	2.08	SC	9	OZ/A	Boot	3.5 gh	23.3 fgh	7214 abc	60.1 ab	70.8 a
13	Spring Uninoculated						4.0 fgh	22.0 fgh	5551 ef	50.5 cde	69.6 abc
14	Spring Inoculated Unsprayed						6.5 cd	68.5 b	5575 ef	49.5 de	69.5 abc
15	Spring Inoculated Quadris	2.08	SC	9	OZ/A	Boot	4.0 fgh	22.8 fgh	5796 def	48.2 e	68.0 abc
16	Jupiter Uninoculated						2.8 hi	12.8 gh	6826 a-e	59.9 ab	66.0 c
17	Jupiter Inoculated Unsprayed						5.5 de	41.3 de	6745 a-e	58.4 ab	66.7 abc
18	Jupiter Inoculated Quadris	2.08	SC	9	OZ/A	Boot	2.0 i	8.3 h	7637 ab	62.2 a	66.1 bc
19	Catahoula Uninoculated						4.0 fgh	20.8 fgh	7693 a	56.2 a-d	70.8 a
20	Catahoula Inoculated Unsprayed						7.8 ab	88.0 a	6158 c-f	53.3 b-e	70.3 abc
21	Catahoula Inoculated Quadris	2.08	SC	9	OZ/A	Boot	3.5 gh	25.0 fgh	7131 a-d	57.5 abc	70.5 ab
LSD (P=.05)							0.84	11.70	799.1	4.51	2.41
Standard Deviation							0.59	8.27	565.0	2.73	1.46
CV							12.1	20.92	8.74	4.82	2.12
Replicate F							2.365	0.895	2.090	0.971	11.832
Replicate Prob(F)							0.0799	0.4493	0.1110	0.3873	0.0001
Treatment F							32.583	37.672	8.124	6.460	3.289
Treatment Prob(F)							0.0001	0.0001	0.0001	0.0001	0.0007

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Blast Fungicide Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: Bengal, 90 lb/A

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, May 15

Fertilization: Preplant 24-72-72-, Mar 19; Preflood 120-0-0, June 18

Experimental Design: Randomized complete block with four replications

Water Management: Flooded, June 18; drained to induce blast, June 29

Herbicides: 3 qt Propanil + 1 oz Permit, June 8; 4 oz Arrosolo + 1 pt Basagran, June 15; 16.5 oz Clincher, June 20

Insecticides: 4 oz Mustang Max, June 25; 4 oz Mustang Max, July 16

Fungicides: Various, see Table 12

Inoculation Dates: None, all from natural sources

Application Equipment: CO_2, backpack sprayer, 8002 tips, 15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Heading	Aug 8	9:00 AM	85 F	4 mph	84%	10%	Heavy

Disease Ratings: Sept 10

Drained: Aug 22

Harvest: Sept 10

Results: See Table 12

Comments: Blast severity was light; other diseases were very light.

Table 12. Effect of fungicide applications on blast development and yield of rice at the Rice Research Station, Crowley, LA. 2007.

Pathogen Code Rating Data Type Rating Unit Rating Date Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg	RNB Infest % Sept 10	Yield Grain lb/A Sept 10	Milling Whole %	Milling Total %
1	Unsprayed Check						15.8 a	6854 a	60.5 a	64.5 a
2	Quadris	2.08	SC	12	OZ/A	H	5.3 b	7275 a	62.5 a	65.3 a
3	Quadris	2.08	SC	9	OZ/A	H	7.0 b	7054 a	62.8 a	66.0 a
4	Stratego	2.18	EC	16	OZ/A	H	5.3 b	7207 a	62.9 a	66.2 a
5	Stratego	2.18	EC	19	OZ/A	H	2.8 b	7196 a	62.5 a	65.8 a
6	Quilt	1.04	SC	28	OZ/A	H	5.8 b	7084 a	62.1 a	65.1 a
7	Quilt	1.04	SC	32	OZ/A	H	5.3 b	7029 a	62.6 a	65.7 a
8	Gem	25	WG	8	OZ WT/A	H	2.8 b	7129 a	62.6 a	65.8 a
LSD (P=.05)							4.33	743.5	2.97	2.16
Standard Deviation							2.94	505.5	1.25	0.91
CV							47.33	7.12	2.01	1.39
Replicate F							1.514	1.125	0.009	0.374
Replicate Prob(F)							0.2400	0.3615	0.9259	0.5600
Treatment F							7.821	0.268	0.755	0.770
Treatment Prob(F)							0.0001	0.9599	0.6401	0.6304

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Narrow Brown Leaf Spot Trial

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam (pH 6.0, Clay 12%, Silt 71%, Sand 17%, CEC 9.4 cmole/kg)

Variety/Seed Rate: CL131, 60 lb /A

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, Apr 23

Fertilization: Preplant 24-72-72, Apr 23; preflood 46-0-0, June 7; topdress 46-0-0, June 5

Experimental Design: Randomized complete block with four replications

Water Management: Flooded, June 8

Herbicides: 3 qt Arrosolo + 1.5 pt Basagran, May 14

Insecticides: 4 oz Karate + 2 oz Londax, May 10

Fungicides: Various, see Table 13

Inoculation Dates: From natural sources

Application Equipment: CO_2, backpack sprayer, 8002 tips,15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Boot	Aug 5	2:00 PM	79°F	1.8 mph	89%	80%	Heavy
Heading	Aug 16	1:00 PM	79°F	2.0 mph	90%	70%	Light

Disease Ratings: Aug 20

Drained: Aug 9

Harvest: Aug 21

Results: See Table 13

Comments: Disease pressure was light; and due to diseases, yield reductions were low.

Table 13. Effect of fungicide applications on leaf smut (LS), narrow brown leaf spot (NBLS) development and yield of rice at the Rice Research Station, Crowley, LA. 2007.

Pathogen Code Rating Data Type Rating Unit Rating Date Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg	LS Severity 0-9 Aug 20	NBLS Severity 0-9 Aug 20	Grain Yield lb/A Aug 21	Milling Whole %	Milling Total %
1	Unsprayed Check						5.0 a	4.0 a	5265 a	56.3 a	65.9 a
2	Tilt	3.6	EC	6	OZ/A	B	2.0 b	1.8 bc	5689 a	60.2 a	66.5 a
3	Tilt	3.6	EC	6	OZ/A	H	1.8 b	1.3 bc	5316 a	54.2 a	66.0 a
4	Stratego		SC	19	OZ/A	B	2.5 b	2.5 b	5245 a	60.5 a	66.6 a
5	Quilt	1.66	SC	28	OZ/A	B	2.0 b	2.0 bc	5250 a	54.9 a	63.9 a
6	Quilt	1.66	SC	21	OZ/A	B	2.3 b	2.3 b	5098 a	59.6 a	66.9 a
	Quadris	2.08	SC	3	OZ/A	B					
7	Tilt	3.6	EC	4	OZ/A	B	3.0 b	2.5 b	4905 a	53.6 a	65.0 a
8	Quadris	2.08	SC	9	OZ/A	B	2.8 b	3.5 a	5326 a	58.1 a	66.2 a
9	Quilt	1.66	SC	28	OZ/A	H	1.5 b	1.0 c	5347 a	54.9 a	65.6 a
10	Domark	1.9	ME	6	OZ/A	B	2.5 b	2.3 b	5556 a	58.8 a	66.4 a
LSD (P=.05)							1.21	0.82	576.3	4.82	2.06
Standard Deviation							0.83	0.56	397.2	2.13	0.91
CV							33.03	24.54	7.49	3.73	1.38
Replicate F							3.104	1.465	1.333	0.780	1.357
Replicate Prob(F)							0.0432	0.2462	0.2843	0.4001	0.2739
Treatment F							5.549	10.605	1.194	3.096	1.971
Treatment Prob(F)							0.0002	0.0001	0.3386	0.0538	0.1633

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Lake Arthur Fungicide Trial

Location: Errol Lounsberry Farm, Lake Arthur, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: CL161, 90 g /plot

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, Mar 21

Fertilization: 8-24-24, Mar 21; 46-0-0, Apr 18

Experimental Design: Randomized block design with four replications

Water Management: Standard

Herbicides: 3 qt Arrosolo, Apr 6; 3 qt Arrosolo + 2.8 oz Grasp + 1 oz Permit, Apr 19

Insecticides: Unknown

Fungicides: See Table 14

Inoculation Dates: All inoculum was from natural sources

Application Equipment: CO_2, backpack sprayer, 8002 tips, 15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Boot	15 June	10:55	85°F	3 mph	72%	60%	Med.

Disease Ratings: July 16

Drained: July 20

Harvest: Aug 3

Results: See Table 14

Comments: Sheath blight severity was very severe.

Table 14. Effect of fungicide applications on sheath blight (SB) development and rice yield and milling at the Lounsberry Farm, Lake Arthur, LA. 2007.

Pathogen Code Rating Data Type Rating Unit Rating Date Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg	SB Severity 0-9 July 16	SB Infestation % July 16	Yield lb/A Aug 3	Milling Whole %	Milling Total %
1	Unsprayed Check						8.0 a	98.4 a	4636 de	53.9 a	66.3 a
2	Tilt	3.6	EC	10	FL OZ/A	B	8.0 a	97.0 a	4421 e	57.0 a	67.7 a
3	Quadris	2.08	SC	9	FL OZ/A	B	6.2 c	73.0 b	5923 a	56.2 a	67.1 a
4	Quadris	2.08	SC	12	FL OZ/A	B	5.2 d	60.2 c	5722 ab	58.0 a	68.6 a
5	Stratego	2.08	EC	16	FL OZ/A	B	7.2 b	92.2 a	4957 cd	53.6 a	65.6 a
6	Gem	25	DF	8	OZ/A	B	6.2 c	74.6 b	5622 ab	53.2 a	65.6 a
7	Moncut	70	DF	1.0	LB/A	B	6.6 bc	81.6 b	5324 bc	52.2 a	65.8 a
8	Quilt	4	SC	28	FL OZ/A	B	7.2 b	90.2 a	5060 cd	55.4 a	66.8 a
LSD (P=.05)							0.54	7.68	441.6	6.49	4.66
Standard Deviation							0.41	5.93	341.0	2.74	1.97
CV							6.07	7.11	6.55	4.99	2.96
Replicate F							0.583	0.664	7.817	0.007	0.202
Replicate Prob(F)							0.6773	0.6225	0.0002	0.9362	0.6668
Treatment F							27.146	25.607	12.228	1.111	0.613
Treatment Prob(F)							0.0001	0.0001	0.0001	0.4468	0.7330

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

2007 Fenton Fungicide Trial

Location: Jimmy Hoppe Farm, Fenton, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: CL161, 90 g /plot

Plot Size: 4 x 16 ft

Planting Method/Date: Drill-seeded, Mar 3

Fertilization: 8-24-24, Mar 20; 46-0-0, Apr 13; 46-0-0, May 7

Experimental Design: Randomized complete block design with four replications

Water Management: Standard

Herbicides: 6 oz Newpath + 1 gal Arrosolo + 1 qt Basagran , Apr 13; 2 qt Basagran +1% surfactant, June 12

Insecticides: Unknown

Fungicides: See Table 15

Inoculation Dates: All natural inoculum

Application Equipment: CO_2, backpack sprayer, 8002 tips, 15 gal/A

Application Dates:

Growth Stage	Date	Time	Temp	Wind	RH	Clouds	Dew
Boot	14 June	11:16 am	87°F	2 mph	67%	5%	None

Disease Ratings: July 17

Drained: July 20

Harvest: July 31

Results: See Table 15

Comments: Sheath blight was severe; other diseases were light.

Table 15. Effect of fungicide applications on sheath blight (SB) development rice yield and milling at the Hoppe Farm, Fenton, LA. 2007.

Pathogen Code						SB	SB	Yield	Milling	Milling
Rating Data Type						Severity	Infestation		Whole	Total
Rating Unit						0-9	%	lb/A	%	%
Rating Date						July 17	July 17	July 31		
Trt No.	Treatment Name	Form Amt	Fm Ds	Rate	Rate Unit	Grow Stg				
1	Unsprayed Check						8.0 a	87.4 a	5695 b	60.1 b	67.5 a
2	Tilt	3.6	EC	10	FL OZ/A	B	7.4 ab	67.8 b	7092 a	63.2 a	70.5 a
3	Quadris	2.08	SC	9	FL OZ/A	B	6.6 cd	49.6 c	7258 a	64.0 a	71.5 a
4	Quadris	2.08	SC	12	FL OZ/A	B	6.0 cd	39.8 c	7483 a	61.3 ab	70.2 a
5	Stratego	2.08	EC	16	FL OZ/A	B	6.8 bc	50.6 c	7235 a	60.0 b	69.0 a
6	Gem	25	DF	8	OZ/A	B	5.8 d	34.8 c	7535 a	62.7 ab	70.4 a
7	Moncut	70	DF	1.0	LB/A	B	6.0 cd	42.2 c	7127 a	62.6 ab	71.4 a
8	Quilt	4	SC	28	FL OZ/A	B	6.0 cd	43.2 c	7189 a	62.6 ab	70.1 a
LSD (P=.05)							0.62	12.60	475.2	1.75	2.39
Standard Deviation							0.48	9.73	366.9	0.74	1.01
CV							7.24	18.74	5.18	1.19	1.45
Replicate F							4.024	4.398	9.151	7.720	1.744
Replicate Prob(F)							0.0106	0.0070	0.0001	0.0274	0.2282
Treatment F							13.717	16.062	12.506	7.648	3.330
Treatment Prob(F)							0.0001	0.0001	0.0001	0.0077	0.0675

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls).

DISEASE RESISTANCE AND MANAGEMENT IN RICE [1]

M.C. Rush, P.A. Bollich, R. Nandakumar, N.P. Nyaupane,
X.Y. Sha, D.E. Groth, and S.D. Linscombe

INTRODUCTION

Sheath blight (SB), caused by the fungal pathogen *Rhizoctonia solani*, is the most serious rice disease in Louisiana because of its endemic, and occasionally epidemic, development each year and also because of the significant yield losses experienced by Louisiana rice growers. Significant losses are also experienced by growers in Texas, Arkansas, and Mississippi, making SB the most consistent and serious disease of rice grown in the southern United States. Bacterial panicle blight (BPB), caused by the bacterial pathogens *Burkholderia glumae* and *Burkholderia gladioli*, as identified by our laboratory in 1996, is a seedborne disease of rice that affects the florets in developing panicles and causes linear, bordered sheath lesions. In years of unusually high temperatures at night, the disease can reduce potential yields up to 40%. The use of resistant cultivars, if they were available, would be the best way to control both of these diseases. At this time, only partial resistance is known for both diseases. The sources for SB resistance used in our program have different genes for partial resistance and were crossed with susceptible commercial cultivars, our elite resistant lines, and lines from our progeny row selections. Nurseries to determine the resistance levels of lines and varieties currently being used in the rice breeding program to BPB were conducted by our laboratory for several years. Sources of high-level partial resistance to BPB were identified, including Nipponbare, Teqing, AB649, LM-1, and LR2065 (LR2065 = MCR00-6145 from Cross # MCR 93-143, pedigree = LSBR5/LMNT//H4CODF/NTAI). These materials were used as resistant parents in reciprocal crosses with Cocodrie, a susceptible commercial variety.

Germplasm and all progeny rows for SB and BPB resistance were evaluated in field nurseries at the Rice Research Station in Crowley, Louisiana, for disease resistance, agronomic characteristics, and yield potential in the 2006 season. Selected progeny rows harvested in 2006 and found to have the grain quality characteristics required by the rice industry were placed in the Rice Breeding/Rice Pathology yield test at the Rice Research Station for yield testing and further disease evaluation in 2007. Progeny rows not cut in 2006 for the 2007 yield test were evaluated for SB and BPB resistance and panicles were selected for further evaluation as panicle rows in 2007. The intent of the current program is to identify resistance sources to SB and BPB, to determine the mode-of-inheritance of high-level partial resistance in newly obtained resistance sources, selected cultivars, and elite lines, and to transfer genes conferring partial resistance to lines typical of American long- and medium-grain varieties. These lines will be further tested in the Rice Breeding Program for use as resistance sources.

In 2007, we also conducted tests to determine the control of seedborne *Burkholderia* spp. on seed presprouted in water treated with antibacterial compounds. Theoretically, uptake of antibacterial solutions by germinating (presprouting) seeds should kill the bacterial pathogens in the seed.

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

MATERIALS AND METHODS

A. Development of SB-Resistant Lines:

Resistance sources and crosses - Our SB resistance sources include LSBR-5, LSBR-33, H4/CODF, Taducan, Rice/Grass, Teqing, Jasmine 85, Leah, Katy, Yangdao-4, Yangdao-6, Earl, Bengal, other varieties, and selected lines with combined SB resistance sources from our program. Panicle rows tested in 2007 were derived from crosses made in 1997 through 2004, based on the modified recurrent selection scheme that we have been using for many years. F_2 populations from these crosses were evaluated in the field during the 2001-2005 seasons and panicle rows through the F_9 generation planted, inoculated, and evaluated in 2007.

Inoculation and evaluation for SB resistance - An autoclaved grain:rice hull (1:2) mixture was inoculated with *Rhizoctonia solani* Kühn (isolate #LR 172) and cultured at room temperature for 48 hours. This grain-rice hull mixture was used as inoculum on all 6-ft panicle rows and yield tests. Each row or plot was inoculated evenly at the late tillering/green ring stages of growth with 50 ml inoculum per 6-ft panicle row or 300 ml per 48 sq ft yield plot by hand. Rows were evaluated for SB resistance at maturity based on the standard SB rating scale (0-9).

The cultivar M201, highly susceptible to the rice blast disease, was planted around each set of progeny rows. Naturally occurring blast infected the M201, which served as a source of inoculum to the progeny rows and yield plot tests. All progeny rows and yield test entries were evaluated for blast resistance at green ring and maturity, and all lines showing rice blast infections were discarded.

Selection of SB-resistant progeny rows - Lines/plants with both SB and blast resistances, as well as good agronomic characteristics, were selected for advancement in our program or for further testing in the Rice Breeding Program.

SB Results – 2007:

A total of 4,600 progeny/panicle rows and control rows were planted and inoculated with *Rhizoctonia solani* and/or *Burkholderia glumae* in 2007 for various disease resistance evaluations, including rice blast, SB, and BPB. Field evaluations of germplasm for SB and blast resistance included 4,061 progeny rows from F_2 to F_{10} generations, 302 F_5 progeny rows for BPB resistance, and 439 rows for germplasm increase. In 2007, 63 advanced SB-resistant lines selected in 2006 were planted in harvest-size plots to obtain grain quality and yield data in the joint breeding/pathology yield test in cooperation with Drs. Xueyan Sha and Don Groth. The five check varieties Bengal, Cocodrie, Trenasse, Jupiter, and Wells were planted with the lines for comparison purposes. The experimental lines were grown in yield plots using standard rice production practices and a split plot design with two replicates. In each replicate, one plot (split) was inoculated with *R. solani* grown on a rice grain:rice hull mixture and one plot was not inoculated (healthy rice) for determination of the effect of SB infection on yield. The lines and varieties were rated for SB development at maturity and agronomic characteristics were evaluated. Due to limited seed, a second yield test with 23 entries and the same five control varieties (two-plot test) was planted with one replicate of split plots.

Sixteen lines yielded as high as or higher than the control varieties, except for Jupiter, and had SB ratings ranging from 1 to 7. The control varieties had SB ratings of 4 (Jupiter) to 9 (Trenasse). Many of these lines had agronomic characteristics similar to commercial long-grain varieties. In the two-plot test, six lines yielded with the noninoculated commercial varieties and had SB ratings ranging from 4 to 7 and the agronomic characteristics of commercial varieties (grain quality, milling, days to heading, height, and tillering ability). The control varieties had SB ratings from 4 (Jupiter) to 8 (Trenasse). The lines with acceptable milling characteristics will be further tested in 2008 in cooperation with Drs. X. Sha and Don Groth. Nineteen lines were selected from the 2007 yield test for retesting in 2008 (Table 1).

Table 1. Nineteen lines selected from the 2007 yield test for retesting in the 2008 SB yield test.

Plot #	2006 panicle row #	Generation	Pedigree	SB Rating (0-9)
07-2PL-19	06-3285	F9	IAC202/DREW	3
07SBYT14	06-2745	F10	CPRS//JA85/TQNG/3/LSBR5/LMNT//TQNG	3
07SBYT15	06-2756	F10	CPRS/AZMIL	3
07SBYT16	06-2763	F10	CPRS/AZMIL	3
07SBYT17	06-2799	F9	CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	5
07SBYT18	06-2855	F9	CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	3
07SBYT19	06-2858	F9	CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	2
07SBYT20	06-2862	F9	CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	5
07SBYT26	06-3200	F9	CPRS//TQNG/CPRS/4/CPRS/3/MBLE//TQNG/MBLE	3
07SBYT27	06-3205	F9	CPRS//TQNG/CPRS/4/CPRS/3/MBLE//TQNG/MBLE	4
07SBYT29	06-3277	F9	IAC202/DREW	5
07SBYT30	06-3283	F9	IAC202/DREW	6
07SBYT43	06-3397	F9	CPRS//TQNG/CPRS/3/LMNT	3
07SBYT45	06-2854	F9	CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	3
07SBYT49	06SBYT67	F7	(LSBR5/LMNT//TQNG/4/LSBR5/LMNT/3/H4CODF//NTAI(03-10993-11019)	3
07SBYT53	06SBYT66	-	MCR02-2215/ CCDR/4/MBLE//TQNG/MBLE/3/MBLE//MBLE/JA85	4
07SBYT54	06SBYT87	F9	CPRS//TQNG/CPRS/4/CPRS/3/MBLE//TQNG/MBLE	3
07SBYT58	06TOL-5	F9	MCR02-6322/TQNG/3/TDCN/SBNT//LSBR5/LMNT	5
07SBYT12	06-2521	-	LSBR5/LMNT//GCHW/3/LSBR5/LMNT//H4CODF/NTAI	6

Thirty-seven progeny rows were harvested for the yield test in 2008 to be conducted by Drs. X. Sha and Don Groth (Table 2).

Table 2. Panicle rows harvested in 2007 for the 2008 SB yield test.

Row #	Seed for SB Yield Test (g)	Generation	Pedigree	SB Rating (0-9)
07-0507	240	F5	(MCR00-0219) C93-137* KATY/CPRS/JA85/(03-1921) PSCL/4/MBLE//TQNG/MBLE/3/MBLE//MBLE/JA85	4
07-0515	300	F5	(MCR00-0219) C93-137 KATY/CPRS/JA85/(03-1921) PSCL/4/MBLE//TQNG/MBLE/3/MBLE//MBLE/JA85	4
07-0616	300	F5	(MCR00-0219) C93-137 KATY/CPRS/JA85/(03-1974) LSBR5/LMNT//TQNG/3/KATY/CPRS/JA85	2
07-0921	400	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(MCR00-0219) C93-137 KATY/CPRS/JA85	4
07-0949	400	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(MCR00-0219) C93-137 KATY/CPRS/JA85	3
07-1243	240	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(03-7953) C93-139 LSBR5/LMNT//TQNG	5
07-1264	300	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(03-7953) C93-139 LSBR5/LMNT//TQNG	3
07-1279	240	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(03-7953) C93-139 LSBR5/LMNT//TQNG	5
07-1286	240	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/(03-7953) C93-139 LSBR5/LMNT//TQNG	4
07-1393	400	F5	(03-1921) C99-1287 PSCL/4/MBLE//TQNG/MBLE/3/MBLE//MBLE/JA85/(MCR00-0219) C93-137 KATY/CPRS/JA85	2
07-1448	240	F5	(MCR00-1216) C94-180 JODN/3/TDCN/SBNT//LSBR5/LMNT/(MCR01-5765) C96-659 CPRS/3/CPRS//TQNG/CPRS	2
07-1452	240	F5	(MCR00-1216) C94-180 JODN/3/TDCN/SBNT//LSBR5/LMNT/(MCR01-5765) C96-659 CPRS/3/CPRS//TQNG/CPRS	2
07-1494	240	F5	(MCR00-1216) C94-180 JODN/3/TDCN/SBNT//LSBR5/LMNT/(MCR01-5765) C96-659 CPRS/3/CPRS//TQNG/CPRS	2
07-1537	240	F7	C00-1803 KBNT/RICE GRASS//TQNG/LSBR5	2
07-1605	240	F7	C00-1615 TQNG/3/TDCN/LSBN//LSBR5/LMNT/4/CPRS/YD-6	2
07-1625	300	F7	(Coo-2173) CPRS/3/LSBR5/LMNT//TQNG/4/YD4/RSMT/5/CPRS//STRN/CR11 13/4/LSBR5/LMNT //TQNG/ 3/CPRS//JA85/TQNG	3
07-1631	300	F7	(Coo-2173) CPRS/3/LSBR5/LMNT//TQNG/4/YD4/RSMT/5/CPRS//STRN/CR11 13/4/LSBR5/LMNT //TQNG/ 3/CPRS//JA85/TQNG	3
07-1643	400	F7	(Co1-2273) TQNG/3/LSBR5/LMNT//LMNT/4/RSMT/JA85	3
07-1695	300	F7	(Coo-1940) red H4CODF/4/IR8/3/CPRS//S47//SGD5//5/CCDR/RICEGRASS/LMNT /6/KATY/CPRS//JA85/3/CPRS	3
07-1701	300	F7	(Coo-1940) red H4CODF/4/IR8/3/CPRS//S47//SGD5//5/CCDR/RICEGRASS/LMNT /6/KATY/CPRS//JA85/3/CPRS	2
07-1762	240	F10	C98-868 CPRS//JA85/TQNG/3/LSBR5/LMNT//TQNG	3
07-1767	240	F10	C98-868 CPRS//JA85/TQNG/3/LSBR5/LMNT//TQNG	5
07-1779	240	F10	C98-974 CPRS/AZMIL	2
07-1785	240	F10	C98-974 CPRS/AZMIL	2
07-1814	240	F9	C99-1249 CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	3
07-1928	240	F9	C99-1249 CPRS/4/LSBR5/LMNT//TQNG/3/H4CODF	3
07-1953	240	F9	C98-868 CPRS//JA85/TQNG/3/LSBR5/LMNT//TQNG	1
07-1972	240	F9	C99-1164 LSBR/LMNT//TQNG/3/CCDR/4/JEFF	4

Continued.

Table 2 (continued).

Row #	Seed for SB Yield Test (g)	Generation	Pedigree	SB Rating (0-9)
07-2264	240	F9	C98-988 CPRS/3/LSBR5/LMNT//TQNG	3
07-2288	240	F9	C99-1130 CPRS//TQNG/CPRS/4/CPRS/3/MBLE//TQNG/MBLE	3
07-2485	240	F10	C93-524 KATY/3/RICEGRASS/LSBR5/LMNT	3
07-2545	240	F8	PSCL/CPRS/LSBR5/LMNT/TQNG	2
07-2588	300	F8	LMNT//LMNT/TQNG/3/MGSOMECLONE/MARS	6
07-2884	240	F9	C99-1128 CPRS//TQNG/CPRS/3/LMNT	2
07-2888	240	F9	C99-1166 LSBR5/LMNT//TQNG/3/CCDR/4/PSCL	2
07-2913	300	F9	C99-1166 LSBR5/LMNT//TQNG/3/CCDR/4/PSCL	1
07-3026	240	Re-select	MCR03-2114/ LSBR5/LMNT//TQNG/3/CCDR/4/JEFF	-

Five panicles each were selected from other progeny rows for further testing as progeny rows in 2008. Several collections were made for our germplasm collection. These were progeny rows with SB ratings at the 1 to 3 level. They will be used in future crosses with susceptible commercial varieties.

The last phase of the SB aspects of this project ran from 2000-2007. During that period, 96,280 progeny rows, including generations from F_2 through $F_{9,}$ were planted, inoculated with *Rhizoctonia solani*, evaluated for SB development, and superior lines were advanced to yield trials. Progeny rows were developed from selections among progeny generated in 1,026 crosses among SB resistance sources, commercial varieties, and breeding lines with different sources of genes for partial resistance and superior agronomic characteristics. Yield tests included 1,931 combine-harvested plots with test lines having comparisons of SB inoculated and noninoculated plots for yield, SB development, lodging, agronomic characteristics, and grain quality characteristics. Lines with yield potential equivalent to or greater than commercial variety controls, SB ratings from moderate to highly resistant, heights and days to heading in the range of commercial varieties, and typical long- or medium-grain quality were advanced to the LSU Agricultural Center rice breeding program conducted at the Rice Research Station. The breeding program has placed three or more lines from our project in the U.S. rice breeders Uniform Rice Nursery (URN) each year of this project. In 2007, three lines were included in the URN, 20 lines in breeding program yield tests, and several lines were used in the breeder's crossing block as germplasm.

Lines with little or no difference in yield between inoculated and noninoculated plots were placed in tolerance yield tests in 2003, 2004, 2005, and 2006 whatever the SB rating. Susceptible lines that did not respond to inoculation with a loss of yield were considered candidates for a type of resistance called "tolerance," which means that the disease did not significantly affect yield components. Several lines were identified as possibly having tolerance.

Our research for developing SB resistance also involved using biotechnology techniques to incorporate disease resistance PR protein genes for production of beta glucanase and chitinase enzymes and thionin into rice. We transformed 79 Taipei 309 plants with the beta-1, 3-glucanase, chitinase, *bar*, and hygromycin B resistance genes by cotransformation with the genes in separate plasmids and transplanted these plants to the field, inoculated them with *R. solani*, and evaluated them for SB resistance. Several of the transformed plants were highly resistant to SB. These plants were crossed with the SB susceptible variety Cocodrie to study inheritance of the resistance and to transfer the resistance to lines with commercial characteristics. Resistant progeny were identified and the presence of the transgenes was demonstrated by PCR and southern blot tests. Several plants appeared to have all four resistance genes. Permits were obtained from USDA, APHIS by submitting Release Notification Letters. None of this material was planted in 2007.

Three years of field trials to study control of rice SB with Liberty herbicide sprays on plants transformed with the *bar* gene in our laboratory demonstrated that Liberty was fungicidal and gives control of SB equal to or better than that given by the commercial fungicides Moncut or Quadris when the proper rates and timings of applications were used.

During the term of this project, five new diseases were identified and research conducted.

B. BPB:

In 1996, our laboratory identified *Burkholderia glumae* and *B. gladioli* as causes of BPB in the United States. In this project, numerous screening trials have been conducted searching for resistance to BPB. The varieties and lines Nipponbare, Teqing, LM-I, LR2065 (MCR00-6145), RU0202183, RU0103190, RU0103153, and AB649 were shown to have high levels of partial resistance. Several of these materials were crossed with Cocodrie, a susceptible commercial variety, and the resistances segregated as dominant genes. Taipei 309 plants transformed for thionin production were successfully field tested, with resistant plants crossed to Cocodrie. The resistance segregated as a single dominant gene. A permit was obtained from USDA, APHIS by submitting a Release Notification Letter. Research was conducted to demonstrate the etiological agents for this disease, and PCR, real-time PCR, and ELISA techniques were developed to identify and quantify the pathogens in infected seed-lots.

BPB Results – 2007:

Screening and selection

Three hundred and three progeny rows in the F_5 generation, selected from crosses among and between lines and varieties discovered by our laboratory to have high levels of partial resistance to BPB and the susceptible variety Cocodrie, were grown in the field in 2007, inoculated with *B. glumae* and *R. solani*, and reselected for disease resistance (BPB and SB) and desirable agronomic characteristics. Panicle selections were made from 13 rows for continued selection in 2008. These rows had a very high level of partial resistance to BPB and most of them had SB ratings ranging from 3 to 4 (Table 3). This material will be further tested as panicle rows by Dr. Don Groth in 2008.

Eight rows were harvested for yield testing in 2008 (Table 4). These rows were highly resistant to BPB and had SB ratings ranging from 2 to 6 on the 0-9 SB rating scale. These eight lines will be tested in yield-sized plots for disease resistance, yield potential, milling, grain quality characteristics, height, days to heading and other agronomic characteristics in 2008 by Drs. Don Groth and Xueyan Sha. The resistant parents were lines LR 2065, AB647, LM-1, and the variety Nipponbare.

Table 3. Panicles collected for planting F_6 panicle rows in 2008[a].

2007 panicle row #	#Panicles	Generation	Pedigree
07-0002	5	F5	NPB/CCDR
07-0004	5	F5	NPB/CCDR
07-0019	5	F5	NPB/CCDR
07-0025	5	F5	NPB/CCDR
07-0032	5	F5	NPB/CCDR
07-0048	10	F5	LM-1/CCDR
07-0062	5	F5	LM-1/CCDR
07-0068	5	F5	LM-1/CCDR
07-0145	5	F5	LR2065/CCDR
07-0165	5	F5	LM-1/CCDR
07-0265	5	F5	CCDR/LR2065
07-0764	5	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/LR2065
07-0829	5	F5	(MCR01-0216) C94-180 JODN/3/TDCN/SBNT//LSBR-5/LMNT/LR2065

[a] Lines and panicles were selected for agronomic characters as all were resistant to BPB in several years of inoculated tests, except lines MCR07-0764 and MCR07-0829, which were first tested for BPB resistance in 2007.

Table 4. Eight panicle rows resistant to BPB and harvested for use in the 2008 BPB yield test.[a]

2007 panicle Row #	Weight/g	Generation	Pedigree	SB Rating (0-9)
07-0017	400	F5	NPB/CCDR	6
07-0052	240	F5	LM-1/CCDR	3
07-0083	300	F5	LM-1/CCDR	4
07-0115	240	F5	LR2065/CCDR	4
07-0117	240	F5	LR2065/CCDR	3
07-0124	300	F5	LR2065/CCDR	3
07-0184	240	F5	NPB/MCR00-0219// KATY/CPRS/JA85	3
07-0244	240	F5	CCDR/LR2065	2

[a]These lines will to be planted in 2008 as two replicates of split plots where one plot of each split will be inoculated with *B. glumae* at the beginning of heading.

Determining genes for resistance to BPB

In 2007, we began a study of gene expression analysis in the variety Jupiter that we have shown to have a high level of partial resistance to BPB in previous studies under this project. It is desirable to identify the molecular basis of partial resistance to efficiently develop resistant varieties. Resistance is due to the expression of certain genes during plant-plant pathogen interactions. Identification of these genes and their products, through use of genomic methods, will help elaborate the basis for high-level partial resistance either directly or indirectly. This research was to identify resistance-related genes at the molecular level using genomic approaches like microarray, using the rice Affymetrix GeneChip which contains probes for 51,279 genes, to contrast partially resistant and susceptible rice cultivars before and after inoculation with the BPB pathogen *B. glumae*. Results to date indicate that the medium-grain rice variety Jupiter exhibits significant partial resistance with average disease ratings of 3.0 on a 0-9 scale, where susceptible varieties had ratings ranging from 6 to 9 in two field trials conducted during the 2006 season. Rice panicle samples of both the partially resistant variety (Jupiter) and the susceptible variety (Trenasse) were collected in 2006 for microarray analysis. A method for extracting total RNA from rice panicles was standardized. Microarray analysis with panicle samples collected from Trenasse and Jupiter 2 days before and after inoculation with the BPB pathogen indicated that the seed development protein gene clusters (glutelin, prolamin and globulin), defense-related genes, especially defensin and several genes involved in the signal transduction process, were over-expressed several fold in Jupiter rice in response to inoculation with the pathogen. Production of the seed development genes was totally shut down in Trenasse. The cross comparison between Jupiter and Trenasse inoculated plants revealed that over 1340 genes were up regulated in Jupiter compared with Trenasse. Identification and confirmation of over-expressed genes using real-time PCR in Jupiter rice are now in progress. This research will continue as long as Dr. Nandakumar is working in my laboratory (through 2008).

BPB toxin studies

Pathogenic *B. glumae* strains produce a toxin, toxoflavin, which is considered to be the main pathogenicity factor for this bacterium. The genes responsible for this toxin production have been characterized. The non-toxigenic strains obtained from spontaneous mutation, repeated subculturing, or gene knockout studies with toxin producing genes failed to cause disease. This has been demonstrated under greenhouse conditions but has not yet been studied under field conditions. The intent of another project in 2007 was to develop several toxoflavin minus mutants of *B. glumae* strain and test them under field conditions.

We have developed four toxin minus mutants of wild type *B. glumae* using site specfic mutagenesis. The mutants did not produce toxoflavin in culture medium, which was confirmed by mass spectrometry. Two *B. glumae* mutants along with a natural *B. glumae* mutant and the wild type strain were tested under field conditions at the LSU AgCenter, Central Research Station, Ben Hur, Baton Rouge, during June-Sept. 2007. Results indicated that the toxin minus mutants are still capable of causing panicle blight symptoms (disease ratings 2-4 on 0-9 scale) under field conditions. However, the mutants were less virulent than the wild type strain (ratings 8-9) in causing BPB symptoms. These results suggest that other pathogenicity systems in *B. glumae* can still cause disease in rice when the gene for toxoflavin is removed. Reisolation of mutants from diseased rice seeds, confirming their toxin production, and their effects on rice yield are in progress. We are also identifying microorganisms that can degrade toxoflavin to determine the genes responsible and transfer these genes to rice. This research is ongoing.

Controlling BPB with chemical treatment of seeds during pre-sprouting for water-seeding

Studies were initiated in 2007 with a Masters degree student, Mr. Narayan Nyaupane, to develop a method for treating the water used to presprout rice seeds before water seeding with chemicals that would kill the seedborne *Burkholderia glumae* and *B. gladioli* pathogens on the seed. Antibacterial compounds, such as, Starner, acids (acetic acid, lactic acid), and copper compounds (Kocide 2000, Copper chloride, Copper sulfate) were used at various concentrations in laboratory tests to determine treatment rates that would not be phytotoxic to rice. Trenasse seed from plots inoculated with *B. glumae* in 2006 and foundation Trenasse seed were used in this test. Controls included foundation Trenasse, inoculated Trenasse seed, and inoculated seeds that were hot water treated to kill the pathogen. Chemical treatments were on the Trenasse seed from inoculated plots in 2006 and included two rates each of Starner (oxolinic acid), lactic acid, acetic acid, Clorox^{TM}, copper sulfate, copper chloride, and a 5,000 ppm solution of Kocide 2000. The first field test was water seeded with these treatments on May 24, 2007, after presprouting the seed for 30 hours in water or the various antibacterial solutions. Both rates of lactic acid, the high rate of acetic acid and the high rate of copper chloride greatly reduced stands (52-79%), in spite of appearing non-phytotoxic in laboratory tests. Using a 0 to 5 disease rating with 0 = no disease and 5 = severe disease, the lactic acid, acetic acid, Clorox^{TM}, and copper treatments, except for Kocide 2000, had greatly reduced BPB compared with the disease control treatment. The Trenasse plots from foundation seed (very light natural infection) averaged 8,254 lb/A at 12% moisture and the inoculated check seed (diseased) averaged 7,366 lb/A and had a high level of BPB. Plots grown from seed presprouted in 0.1% acetic acid averaged 8,631 lb/A, 3% Starner = 8,372 lb/A, 7.5% Clorox^{TM} = 8,294 lb/A, 1% copper sulfate = 8,294 lb/A, and 0.6% copper chloride = 8,485 lb/A. These treatments had few panicles showing BPB. Kocide 2000 (5,000 ppm) had a mean yield of 7,175 lb/A and many infected panicles. Its active ingredient is copper hydroxide, which has a low solubility in water.

A second planting was made with seed from inoculated and noninoculated plots of the Francis variety in 2006. The same antimicrobial compounds were used with the acid and copper sulfate and copper chloride concentrations reduced to prevent phytotoxicity to seedlings. The results were similar with excellent disease control by presprout treatment with Starner (oxolinic acid), lactic acid, acetic acid, Clorox^{TM}, copper sulfate, and copper chloride. It was clear from the laboratory and two field tests in 2007 that it is possible to significantly decrease the amount of *B. glumae* in infected seeds by presprouting seed in solutions of weak acids, Clorox^{TM} and Copper solutions and to see these results reflected in increases in yield of rice at maturity. We will pursue this research with Dr. Don Groth in 2008 field tests using antibacterial compounds pre-tested in the laboratory for efficacy and phytotoxicity.

Summary of results on BPB research to date:

Among the results from this project to date, we identified *B. glumae and B. gladioli* as causes of the panicle blight disorder in the United States and carried out extensive studies to confirm the identifications on the pathogens associated with BPB. We determined that the disease was present in Arkansas, Louisiana, Mississippi, and Texas. Extensive chemical control studies were conducted in laboratory and field tests, demonstrating that only Starner gave significant control of this disease using seed treatment or field spraying. We developed several methods for identifying BPB infections using PCR, real-time PCR, the semi-selective medium SP-g, and serology. We developed transgenic rice resistant to BPB. We identified six sources of partial resistance to BPB and have crossed these sources with Cocodrie and each other to develop resistant rice lines and to study the nature of inheritance of the resistance genes involved. We also demonstrated the high–level partial resistance in the variety Jupiter and are conducting studies to identify the genes involved and the pathogenicity systems operating in *B. glumae* and *B. gladioli*. A preliminary test in 2007 indicated a high level of probability that the seedborne pathogens causing BPB can be controlled by presprouting seed for water seeding in water solutions of antimicrobial compounds.

RICE PRODUCTION ECONOMICS RESEARCH

M.E. Salassi

Enterprise budget projections for 2008 were developed in the fall of 2007 for alternative rice production systems. A summary of the enterprise budgeting analysis for rice production systems in Southwest Louisiana is presented in Tables 1 and 2. Values presented represent rice breakeven prices to cover direct (variable) and total estimated rice production costs per hundredweight and per barrel of rice produced for selected yield levels. Direct production costs include expenses for seed, fertilizer, chemicals, fuel, labor, repairs, custom charges, and interest on operating capital. Total specified expenses include direct expenses plus fixed costs on machinery and equipment. These values can also be interpreted as the breakeven price or income per output unit required to cover total production costs. Tenant-operator situations shown in the tables were budgeted for each enterprise with a 70/30 share rent arrangement with the landlord/waterlord paying the irrigation pumping costs.

Rice production costs were estimated for the following types of rice production systems: water planted, drill planted, conventional variety, Clearfield variety, conventional tillage, stale seedbed, in rotation, and fallow land. The base yield level for southwest Louisiana was 58.0 cwt/A for water- and drill-planted rice. Variable production costs ranged from $9.84 to $10.71/cwt ($15.93 to $17.34/barrel) for water-planted rice and $8.90 to $9.87/cwt ($14.42 to $15.98/barrel) for drill-planted rice at the base yield level of 58.0 cwt (35.8 barrels)/A. Cost differences were influenced by use of conventional or herbicide-resistant variety, conventional versus stale seedbed tillage system, and rice production in rotation or on fallow land. Total projected rice production costs for 2008 ranged from $10.89 to $12.35/cwt ($17.64 to $20.01/barrel) for water-planted rice and $10.15 to $11.03/cwt ($16.44 to $17.87/barrel) for drill-planted rice at the base yield level of 58.0 cwt (35.8 barrels)/A. Detailed enterprise budgets and supporting data were published in A.E.A. Information Series Number 252, January 2008 (Dept. of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, L.S.U. Agricultural Center).

The Projected 2008 Rice Farm Cash Flow Model was developed to assist producers in planning for the 2008 crop year. The model is an Excel spreadsheet which allows rice producers to enter projected acreage, yield, market price, and production cost data for 2008 to estimate net returns above variable production costs and to easily evaluate the impact of changing percent of base planted on net returns. The primary purpose of the model is to evaluate the impact on net returns above variable production costs for alternative rice rental arrangements and percent of base acreage planted. The model also includes entry cells for whole farm fixed expenses to estimate projected returns from rice production over all costs. The model is available on the LSU AgCenter web page (*Projected 2008 Rice Farm Cash Flow Model*, Dept. of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, L.S.U. Agricultural Center, Staff Report No. 2008-01, January 2008).

A study was conducted to estimate the economic impact of crawfish production on a rice enterprise in a rice/crawfish/rice rotation. Crawfish production in Year 2 of a rice/crawfish/rice production rotation would have three direct impacts in the rice enterprise before and after the crawfish crop. In Year 1, a ratoon rice crop would be prevented due to the flooding of land in preparation for crawfish production. In Year 2, following the crawfish crop, additional field work would be necessary to smooth out boat ruts. In Year 3, additional herbicides would be required to control aquatic weeds. Using a 16 cwt ratoon yield, a $12.80/cwt price, a 70% grower share, and $81.60 variable cost/A, estimated loss of ratoon crop net returns would be $61.76/A. The cost of additional field work in Year 2 was estimated at $26.35/A. An estimation of possible additional herbicide use is shown in Table 3. Additional herbicide cost following crawfish was estimated to range from $11.66/A for conventional rice to $52.07/A for Clearfield rice.

A survey was conducted in the summer of 2007 to obtain data in current rice rental arrangements in Louisiana. Five parishes in southwest Louisiana and one parish in northeast Louisiana were surveyed. A 16.5% survey response rate yielded data on 334 share rent tracts and 94 cash rent tracts. Rice cash rent arrangements averaged $79/planted acre. The seven most common share rent arrangements are shown in Figure 1, with an 80/20 arrangement being the most common, followed by a 60/40 arrangement.

Table 1. Rice Breakeven Prices to Cover Variable Production Costs for Selected Yield Levels, Southwest Louisiana, 2008.

Crop Description	Yield Level (cwt/A)				
	-10%	-5%	Base	+5%	+10%
	52.2	55.1	58.0	60.9	63.8
	($/cwt)				
Southwest Louisiana:					
(1) Water Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	11.00	10.49	10.02	9.61	9.23
- Fallow Land	11.34	10.81	10.33	9.90	9.51
(ii) Stale Seedbed:					
- In Rotation	10.79	10.29	9.84	9.43	9.06
- Fallow Land	11.14	10.62	10.15	9.73	9.34
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	11.41	10.88	10.40	9.96	9.57
- Fallow Land	11.76	11.20	10.71	10.26	9.85
(ii) Stale Seedbed:					
- In Rotation	11.20	10.68	10.21	9.78	9.39
- Fallow Land	11.55	11.01	10.52	10.08	9.68
(2) Drill Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	9.754	9.30	8.90	8.53	8.20
(ii) Stale Seedbed:					
- In Rotation	10.06	9.59	9.18	8.80	8.46
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	10.37	9.89	9.45	9.06	8.71
(ii) Stale Seedbed:					
- In Rotation	10.82	10.32	9.87	9.46	9.08
	Yield Level (barrels/A)				
	-10%	-5%	Base	+5%	+10%
	32.2	34.0	35.8	37.6	39.4
	($/barrel)				
Southwest Louisiana:					
(1) Water Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	17.82	16.99	16.24	15.56	14.95
- Fallow Land	18.38	17.52	16.74	16.04	15.41
(ii) Stale Seedbed:					
- In Rotation	17.48	16.66	15.93	15.27	14.67
- Fallow Land	18.05	17.20	16.45	15.76	15.14
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	18.49	17.62	16.84	16.14	15.50
- Fallow Land	19.05	18.15	17.34	16.62	15.95
(ii) Stale Seedbed:					
- In Rotation	18.15	17.30	16.54	15.85	15.22
- Fallow Land	18.72	17.84	17.05	16.33	15.68
(2) Drill Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	15.79	15.07	14.42	13.83	13.29
(ii) Stale Seedbed:					
- In Rotation	16.29	15.54	14.87	14.26	13.70
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	16.79	16.01	15.32	14.68	14.11
(ii) Stale Seedbed:					
- In Rotation	17.53	16.72	15.98	15.32	14.72

Table 2. Rice Breakeven Prices to Cover Total Specified Production Costs for Selected Yield Levels, Southwest Louisiana, 2008.

	Yield Level (cwt/A)				
	-10%	-5%	Base	+5%	+10%
Crop Description	52.2	55.1	58.0	60.9	63.8
	($/cwt)				
Southwest Louisiana:					
(1) Water Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	12.53	11.94	11.40	10.92	10.48
- Fallow Land	13.17	12.54	11.98	11.47	11.00
(ii) Stale Seedbed:					
- In Rotation	11.96	11.39	10.89	10.43	10.01
- Fallow Land	12.60	12.01	11.47	10.98	10.54
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	12.94	12.33	11.77	11.27	10.82
- Fallow Land	13.58	12.93	12.35	11.82	11.34
(ii) Stale Seedbed:					
- In Rotation	12.37	11.78	11.26	10.78	10.35
- Fallow Land	13.02	12.40	11.84	11.34	10.88
(2) Drill Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	11.13	10.61	10.15	9.72	9.34
(ii) Stale Seedbed:					
- In Rotation	11.40	10.86	10.38	9.95	9.55
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	11.58	11.04	10.55	10.11	9.70
(ii) Stale Seedbed:					
- In Rotation	12.12	11.55	11.03	10.57	10.14

	Yield Level (barrels/A)				
	-10%	-5%	Base	+5%	+10%
	32.2	34.0	35.8	37.6	39.4
	($/barrel)				
Southwest Louisiana:					
(1) Water Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	20.30	19.34	18.47	17.69	16.98
- Fallow Land	21.34	20.32	19.41	18.58	17.83
(ii) Stale Seedbed:					
- In Rotation	19.37	18.46	17.64	16.89	16.22
- Fallow Land	20.42	19.45	18.58	17.79	17.08
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	20.97	19.97	19.07	18.26	17.53
- Fallow Land	22.01	20.95	20.01	19.15	18.37
(ii) Stale Seedbed:					
- In Rotation	20.04	19.09	18.24	17.47	16.76
- Fallow Land	21.09	20.09	19.18	18.37	17.62
(2) Drill Planted – Tenant Operator:					
(a) Conventional Variety:					
(i) Conventional Tillage:					
- In Rotation	18.04	17.19	16.44	15.75	15.13
(ii) Stale Seedbed:					
- In Rotation	18.46	17.60	16.82	16.11	15.47
(b) Clearfield Variety:					
(i) Conventional Tillage:					
- In Rotation	18.76	17.88	17.09	16.37	15.72
(ii) Stale Seedbed:					
- In Rotation	19.63	18.71	17.87	17.12	16.43

Table 3. Estimated Cost Differences in Herbicide Programs Before and After Crawfish.

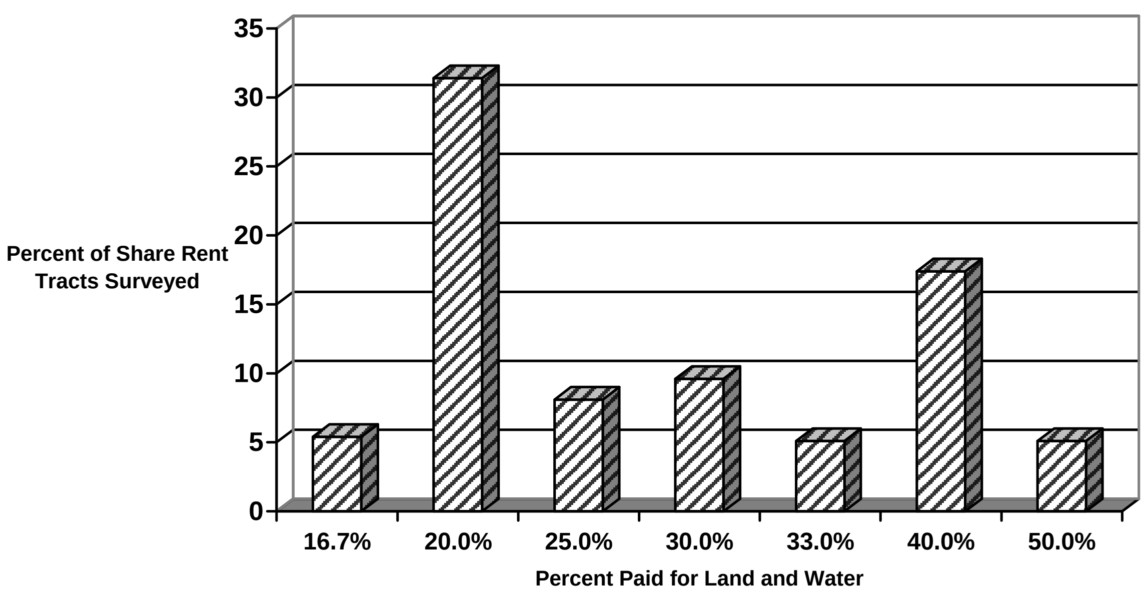
Conventional Rice Production

Herbicide Program Before Crawfish		Herbicide Program After Crawfish	
Herbicide	Rate	Herbicide	Rate
Facet	0.5 lb	Command	12 oz
Londax	1.0 oz	Clincher	15 oz
2,4-D	2.5 pt	Permit	1.0 oz
Cost	$40.93	Cost	$52.59

Clearfield Rice Production

Herbicide Program Before Crawfish		Herbicide Program After Crawfish	
Herbicide	Rate	Herbicide	Rate
Newpath	8.0 oz	Newpath	12.0 oz
Aim	1.6 oz	Grasp	2.8 oz
		Londax	1.6 oz
Cost	$38.11	Cost	$90.18

Figure 1. Most Common Rice Share Rental Arrangements (percent paid for land and water).



RICE INSECTS RESEARCH

EVALUATION OF PRE- AND POSTFLOOD APPLICATIONS OF GRANULAR DINOTEFURAN FOR RICE WATER WEEVIL CONTROL

M.J. Stout and M.J. Frey

A granular formulation of dinotefuran, a neonicotonoid insecticide (Mitsui Chemicals, Inc.), has been evaluated over the past several years for efficacy against the rice water weevil, and results of these prior trials have been encouraging. Various rates and timings of dinotefuran were again evaluated in a drill-seeded, small-plot experiment in 2007.

Location: Rice Research Station, Crowley, LA

Variety/Seeding Rate: Cocodrie, ~90 lb/A

Plot Size: 4.1 x 18 ft; plots were separated by at least 5 ft in all directions.

Planting Method/Date: Drill-seeded, 17 Apr 2007

Fertilization/Weed Control: Standard for drill-seeded rice

Water Management: Permanent flood, 10 May

Experimental Design: Randomized complete block, seven treatments, four replicates

Treatments*:

1. Non-treated control
2. Dinotefuran, granular, 120 gm ai/A preflood + 120 gm ai/A postflood
3. Dinotefuran, granular, 80 gm ai/A preflood
4. Dinotefuran, granular, 120 gm ai/A preflood
5. Dinotefuran, granular, 80 gm ai/A preflood + 80 gm ai/A postflood
6. Dinotefuran, granular, 120 gm ai/A late postflood
7. Dinotefuran, granular, 240 gm ai/A late postflood

* Preflood applications of dinotefuran were made 1 day before flooding; postflood applications were made 10 days after flooding; late postflood applications were made 20 days after flooding

Sampling: Cores/plot: four core samples per plot

Sampling Dates: 24 May [14 dpf (days postflood)], 7 June (28 dpf), 13 June (34 dpf)

Harvested: 8 Aug

Data Analysis: A mean number of larvae per core was calculated for each plot at each sampling date by averaging numbers of larvae from the four core samples at each sampling date. Treatment effects on mean numbers of larvae per core were analyzed by PROC MIXED with treatment as fixed effect and block as random effect (Tukey mean separation). Plot yields in grams per plot were adjusted to 12% moisture and analyzed by mixed-model ANOVA.

Results:

Densities of rice water weevil larvae and pupae and grain yields in a small-plot test of various rates, timings, and use patterns of dinotefuran.

Treatment	**Larvae per Core Sample**			**Yield (kg/ha) at 12% Moisture**
	14 d after flood	*28 d after flood*	*34 d after flood*	
Untreated	2.3 ± 0.9	32.8 ± 6.3	27.7 ± 1.6	5571.6 ± 84.4
80 preflood	0.6 ± 0.4	8.9 ± 1.4	13.0 ± 3.7	5959.9 ± 182.3
120 preflood	0.3 ± 0.1	18.0 ± 2.1	15.8 ± 4.0	5985.7 ± 106.0
80 pre+post	1.6 ± 1.3	10.0 ± 2.7	17.1 ± 2.5	6012.1 ± 64.9
120 pre+post	3.0 ± 1.1	6.3 ± 1.1	22.1 ± 5.0	5958.8 ± 116.3
120 late post	4.1 ± 2.4	13.4 ± 0.8	22.0 ± 6.0	5692.1 ± 114.2
240 late post	2.5 ± 1.2	16.3 ± 2.5	20.4 ± 2.8	5738.3 ± 111.1

Conclusions: At 28 days postflood, all dinotefuran treatments significantly reduced weevil densities ($P < 0.05$ for all Tukey comparisons). The magnitude of reduction in larval densities at 28 days after flood ranged from 45 to 81%. The overall effect of treatment on larval densities at 34 days after flood was significant, but the effect of treatment on yield was not significant. In sum, the level of control observed in this experiment was generally lower than observed in previous years. This is perhaps attributable to the high larval pressure in this experiment. Nonetheless, the results of this experiment are consistent with the results of experiments conducted with dinotefuran in prior years. As in previous years, preflood + postflood split applications were generally more effective than other use patterns. The efficacy of postflood applications (either alone or coupled with a preflood application) in this and prior experiments suggests the possibility that granular dinotefuran may possess larvicidal activity. This possibility was confirmed in a greenhouse experiment conducted in 2007. Of all the potential alternatives to pyrethroid insecticides for weevil control currently being tested, granular dinotefuran is the only product that could potentially be used as a “rescue” treatment and is the product most likely to be compatible with a water-seeded cultural system. Further work involving a range of rates and timings in both water- and drill-seeded rice will be conducted in 2008.

EVALUATION OF INSECTICIDES FOR CONTROL OF THE RICE STINK BUG, 2007

M.J. Stout and M.J. Frey

In 2007, two new treatments were evaluated against the rice stink bug, the most important late-season pest of rice in Louisiana. The first was a combination of methyl parathion and Prolex, at various rates; the second was dinotefuran, a neonicotinoid insecticide.

Location: Rice Research Station, Crowley, LA

Variety/Seeding Rate: Cocodrie, ~90 lb/A

Plot Size: 4.1 x 18 ft (7 rows at 7-in spacing); untreated plots were present on N, E, and W borders of the field.

Planting Method/Date: Drill-seeded, 21 May 2007

Fertilization/Weed Control: Standard for drill-seeded rice

Water Management: Permanent flood, 15 June

Experimental Design: Randomized complete block, six treatments, four replicates

Treatments*:

8. Non-treated control
9. Prolex, 0.0171 lb ai/A
10. Methyl parathion, 0.5 lb ai/A
11. Dinotefuran, 120 gm ai/A
12. Prolex + methyl parathion, 0.25 and 0.009 lb ai/A, respectively
13. Prolex + methyl parathion, 0.5 and 0.0171 lb ai/A, respectively

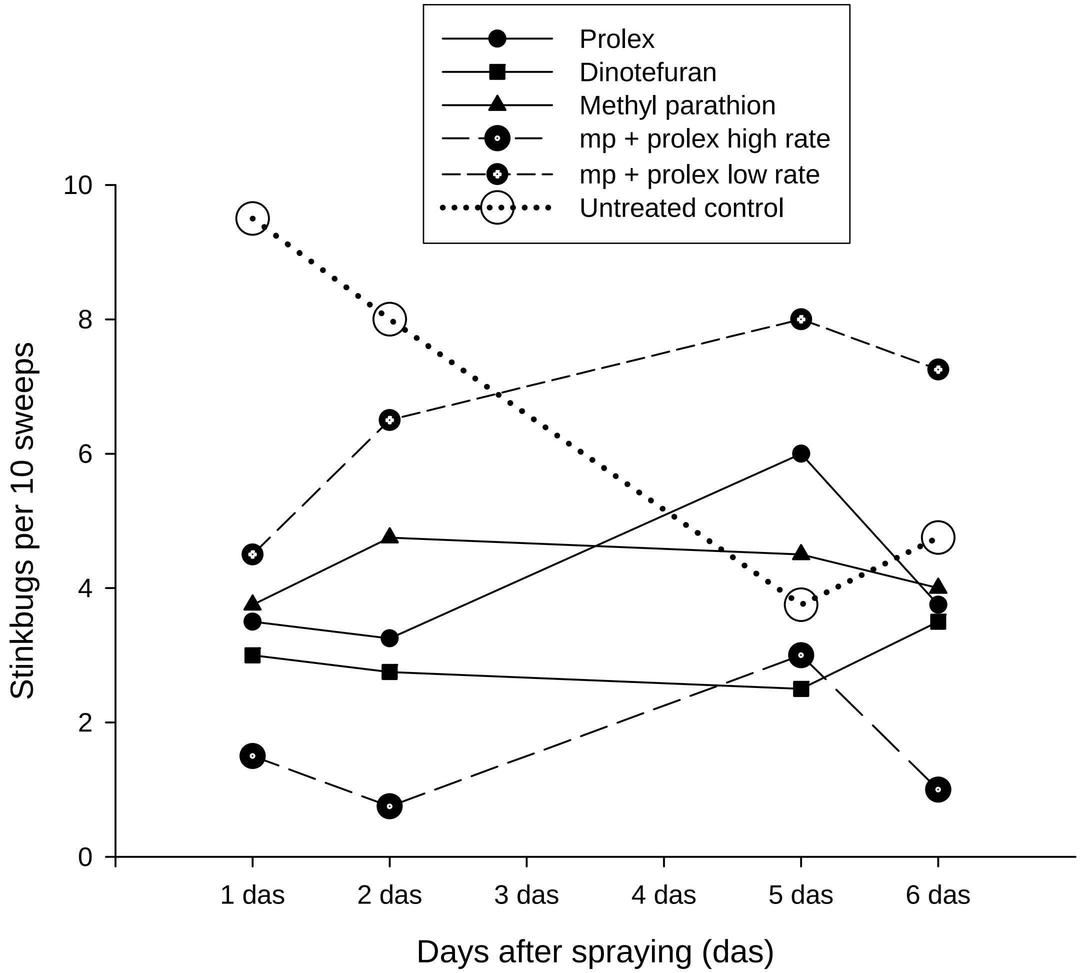
* All applications were made as foliar sprays on 8 August. Applications were made with a backpack, CO_2-powered sprayer with water as a carrier (15 gal/A). Rice was at 50 to 75% heading on 8 Aug.

Sampling: 10 sweep samples per plot using a standard sweep net

Sampling Dates: 1, 2, 5, and 6 days after spray applications (9 Aug, 10 Aug, 13 Aug, and 14 Aug)

Data Analysis: Numbers of bugs per plot (10 sweeps of a standard sweep net) were analyzed by repeated-measures ANOVA in PROC MIXED with treatment, time, and treatment*time as fixed effects and block and block*treatment as random effects (Tukey mean separation).

Results:



Conclusions: Numbers of stinkbugs per plot were extremely variable, and no significant differences were found among treatments (P = 0.10). Nonetheless, it appears that both dinotefuran and the methyl parathion/Prolex combination treatments hold potential for management of rice stink bug infestations and will be evaluated further in 2008.

EVALUATION OF RYNAXYPYR™ SEED TREATMENT AGAINST THE RICE WATER WEEVIL, 2006-2007

M.J. Stout and M.J. Frey

The insecticide Rynaxypyr™ (chlorantraniliprole) is a new insecticide that belongs to a novel class of insecticides, the anthranilic diamides. This insecticide has been tested as a seed treatment over the past 3 years and has provided good to excellent control of the rice water weevil in all 3 years. A Section 18 petition was submitted to the EPA in October 2007 for the use of Rynaxypyr as a seed treatment in 2008. The seed treatment will be marketed under the brand name Dermacor™. Results of Dermacor™ field trials conducted in 2006 and 2007 are presented below.

2006 Trial

Location: Rice Research Station, Crowley, LA

Variety/Seeding Rate: Cypress, 100 lb/A (all seed supplied by DuPont)

Plot Size: 4.1 x 16 ft (7 rows at 7-in spacing)

Planting Method/Date: Drill-seeded, 16 May 2006

Agronomic practices: Standard for drill-seeded rice

Water Management: Permanent flood, 7 June

Experimental Design: Randomized complete block, five treatments, four replicates

Treatments (seeds treated by Dupont):

1. Check (untreated control)
2. Icon, 0.1 mg ai/seed*
3. Rynaxypyr low rate, 0.025 mg ai/seed*
4. Rynaxypyr mid rate, 0.05 mg ai/seed *
5. Rynaxypyr high rate, 0.1 mg ai/seed *

mg ai/seed = milligrams of active ingredient per seed

Sampling: Four root/soil core samples per plot

Sampling Dates: June 27 [20 dpf (days postflood)], July 6 (29 dpf), July 12 (35 dpf)

Harvested: 5 Sept (interior five rows only harvested)

Data Analysis: A mean number of larvae per core sample was calculated for each plot at each sampling date by averaging numbers of larvae from the four core samples at each sampling date. Treatment effects on mean numbers of larvae per core were analyzed by PROC MIXED in SAS with treatment as fixed effect and block as a random effect (Tukey mean separation). Plot yields were converted to lb/A (adjusted to 12% moisture) and analyzed by mixed-model ANOVA.

Results:

Results of a small-plot evaluation of Dermacor™ X-100 conducted at the LSU AgCenter Rice Research Station, Acadia Parish, Louisiana, in 2006.

Treatment	Larvae per Core Sample ± s.e. on:		
	June 27	July 6	July 12
Untreated control	20.5 ± 3.2	37.1 ± 7.6	30.4 ± 3.2
Rynaxypyr, low rate (0.025 mg ai/seed)	1.1 ± 0.4 *	2.6 ± 0.8 *	4.2 ± 0.8 *
Rynaxypyr, mid rate (0.05 mg ai/seed)	0.6 ± 0.3*	2.1 ± 0.5 *	1.3 ± 0.5 *
Rynaxypyr, high rate (0.1 mg ai/seed)	0.1 ± 0.1 *	1.4 ± 0.9 *	2.3 ± 0.4 *
Icon , 0.1 mg ai/seed	2.1 ± 0.6 *	6.4 ± 0.8 *	9.3 ±0.8 *

Treatment	Adjusted Yields (lb/A) ± s.e.
Untreated control	2430.6 ± 301.2
Rynaxypyr seed treatment, low rate	5116.8 ± 218.7 *
Rynaxypyr seed treatment, mid rate	5521.4 ± 111.2 *
Rynaxypyr seed treatment, high rate	5340.2 ± 196.9 *
Icon	4861.8 ± 140.3 *

An * denotes a mean significantly different from control mean (Tukey, $P < 0.05$) in the same column.

2007 Trial

Location: Rice Research Station, Crowley, LA

Variety/Seeding Rate: Cocodrie, ~90 lb/A (75 gm/plot); XL 723 (hybrid), ~30 lb/A (25 gm/plot) (all seed supplied by DuPont)

Plot Size: 4.1 x 18 ft (7 rows at 7-in spacing)

Planting Method/Date: Drill-seeded, 21 May 2007

Agronomic practices: Standard for drill-seeded rice

Water Management: Permanent flood, 15 June (plants at 3- to 4-leaf stage)

Experimental Design: Randomized complete block, 10 treatments, four replicates

Treatments (seeds treated by Dupont):

Treatment No.	Variety	Treatment (all seed treatments; rate refers to milligrams active ingredient per seed of Rynaxypyr)
1	Cocodrie	0 mg ai/seed
2	XL 723	0 mg ai/seed
3	Cocodrie	0.0125 mg ai/seed
4	Cocodrie	0.025 mg ai/seed
5	Cocodrie	0.05 mg ai/seed
6	Cocodrie	0.1 mg ai/seed
7	XL 723	0.025
8	XL 723	0.05
9	XL 723	0.1
10	Cocodrie	Untreated/0 mg ai/seed (originally intended as a Karate treatment, but treatment was not made)

Sampling: Three to four root/soil core samples per plot

Sampling Dates: 3 July [18 dpf (days postflood)], 9 July (24 dpf), 15 July (30 dpf)

Harvested: 17 Sept (interior five rows only harvested)

Data Analysis: A mean number of larvae per core sample was calculated for each plot at each sampling date by averaging numbers of larvae from the three or four core samples at each sampling date. Treatment effects on mean numbers of larvae per core were analyzed by PROC MIXED in SAS with treatment as a fixed effect and block as a random effect (Tukey mean separation). Plot yields were adjusted to 12% moisture but were not converted to lb/A; yields are expressed as grams of seed per plot.

Results of a small-plot evaluation of Dermacor™ X-100 conducted at the LSU AgCenter Rice Research Station, Acadia Parish, Louisiana, in 2007, using two varieties of rice, Cocodrie and a hybrid variety.

Treatment	Larvae per Core Sample ± s.e. on:			Yields (gm/plot) at 12% Moisture
	18 d Postflood	25 d Postflood	32 d Postflood	
Cocodrie:				
Untreated control	15.9 ± 4.1	25.6 ± 3.3	10.0 ± 2.3	2877.8 ± 228.4
Rynaxypyr (0.0125 mg ai/seed)	4.0 ± 0.5	3.4 ± 1.9	3.1 ± 1.0	3244.5 ± 64.5
Rynaxypyr (0.025 mg ai/seed)	2.8 ± 0.8	3.9 ± 1.3	2.4 ± 0.7	2897.3 ± 121.9
Rynaxypyr (0.05 mg ai/seed)	2.8 ± 0.8	2.9 ± 0.9	2.4 ± 0.3	2909.8 ± 139.5
Rynaxypyr (0.1 mg ai/seed)	2.2 ± 1.0	2.7 ± 1.7	3.6 ± 1.0	3213.9 ± 76.4
Hybrid:				
Untreated control	11.5 ± 2.5	12.6 ± 0.9	7.6 ± 1.4	4158.8 ± 108.1
Rynaxypyr (0.025 mg ai/seed)	7.0 ± 0.4	5.8 ± 2.0	3.8 ± 0.9	3996.9 ± 117.9
Rynaxypyr (0.05 mg ai/seed)	8.0 ± 1.4	4.9 ± 1.2	3.0 ± 0.8	3921.4 ± 143.0
Rynaxypyr (0.1 mg ai/seed)	6.2 ± 1.9	4.9 ± 1.7	3.0 ± 0.5	3781.7 ± 181.2

Comments: The efficacy of Dermacor™ seed treatment was excellent in 2005 and 2006 (2005 data not shown). Dermacor™ was more effective at reducing weevil densities in 2005 and 2006 than was Icon, even when rates of Dermacor™ were lower than rates of Icon. Efficacy was also good in the 2007 experiment, although the response to the seed treatment was not as dramatic in 2007. In particular, efficacy of Dermacor™ on the hybrid variety was only adequate in 2007, and there was no yield response to seed treatments on Cocodrie or the hybrid in 2007.

If the pending Section 18 petition for Dermacor™ is approved for the 2008 growing season, Dermacor™ will be registered for use only on dry-seeded rice. The efficacy of Dermacor™ in water-seeded cultural systems has not yet been evaluated. In addition, questions still remain about the most appropriate rate for Dermacor™ in rice fields planted with hybrid rice varieties.

EVALUATION OF THIOMETHOXAM AS A SEED TREATMENT AGAINST THE RICE WATER WEEVIL, 2007

M.J. Stout and M.J. Frey

Thiomethoxam is a neonicotinoid insecticide that has been evaluated as a seed treatment (Cruiser®) over the past several years at the Rice Research Station. The efficacy of thiomethoxam in these previous tests was inconsistent. This inconsistency may be attributable to the use of rates that were lower than needed to control the rice water weevil. A drill-seeded experiment was conducted in 2007 to evaluate the effectiveness of a thiomethoxam seed treatment (Cruiser®) at rates higher than had been used previously.

Location: Rice Research Station, Crowley, LA

Variety/Seeding Rate: Cocodrie, ~ 90 lb/A (seed supplied by Syngenta)

Plot Size: 4.1 x 18 ft (7 rows at 7-in spacing)

Planting Method/Date: Drill-seeded, 21 May 2007

Agronomic practices: Standard for drill-seeded rice

Water Management: Permanent flood, 15 June

Experimental Design: Randomized complete block, six treatments, four replicates

Treatments (seeds treated by Dupont):

6. Check (untreated control)*
7. Cruiser, 80 gm ai/100 kg seed*
8. Cruiser, 95 gm ai/100 kg seed*
9. Cruiser, 115 gm ai/100 kg seed*
10. Cruiser, 135 gm ai/100 kg seed*
11. Icon, 42 gm ai/100 kg seed*

* All seed was treated and supplied by Syngenta; gm ai/100 kg seed = grams of active ingredient per 100 kilograms of seed

Sampling: Four root/soil core samples per plot

Sampling Dates: 5 July [20 dpf (days postflood)], 11 July (26 dpf), 18 July (33 dpf)

Harvested: 17 Sept (interior five rows only harvested)

Data Analysis: A mean number of larvae per core sample was calculated for each plot at each sampling date by averaging numbers of larvae from the four core samples at each sampling date. Treatment effects on mean numbers of larvae per core were analyzed by PROC MIXED in SAS with treatment as fixed effect and block as a random effect (Tukey mean separation). Plot yields were adjusted to 12% moisture but were not converted to lb/A. Yields were analyzed by mixed-model ANOVA.

Results:

Treatment	Larvae per Core Sample ± s.e. on:			Yields (gm/plot) at 12% Moisture
	20 d Postflood	26 d Postflood	33 d Postflood	
Untreated control	16.2 ± 2.5	17.5 ± 2.9	7.8 ± 3.2	3060.4 ± 162.0
Cruiser 80	3.3 ± 1.0	5.5 ± 1.6	4.1 ± 0.8	3291.0 ± 21.5
Cruiser 95	5.0 ± 2.3	5.9 ± 1.1	3.3 ± 0.7	3147.2 ± 100.0
Cruiser 115	4.0 ± 0.6	4.3 ± 1.2	5.3 ± 0.9	2974.6 ± 200.2
Cruiser 135	2.3 ± 0.5	3.4 ± 0.8	2.2 ± 0.6	3308.3 ± 80.2
Icon	1.7 ± 0.5	3.1 ± 0.6	4.8 ± 1.0	3387.1 ± 72.2

Results: Thiomethoxam seed treatment provided good to very good control of rice water weevil larvae over the first two core sampling dates ($P < 0.05$ on both dates for effect of treatment). Reduction in larval numbers in thiomethoxam-treated plots ranged from 69 to 86% at 20 days after flooding and ranged from 66 to 81% at 26 days after flooding. Reductions in larval densities at 33 days after flooding were not significant ($P = 0.16$). The effect of treatment on yields was marginally significant (p = 0.08). The level of control given by thiometoxam at the highest rate was comparable with that given by Icon. Greenhouse experiments with thiomethoxam-treated seeds indicate that the insecticide is transported systemically in the plant from seed to leaves and kills adult weevils when they feed on leaves. Because this insecticide is systemic, it may also provide control of other leaf-feeding pests, such as grape colaspis, thrips, and fall armyworm. Experiments with other insecticides in the neonicotinoid class suggest that they are much less toxic to crawfish than the pyrethroid insecticides that are currently registered. Thiomethoxam is currently being considered for registration in drill-seeded rice only.

COASTAL EROSION CONTROL RESEARCH

MOLECULAR MARKER ANALYSIS OF SMOOTH CORDGRASS

H.S. Utomo, M.D. Materne, and S.A. Harrison

Considerable differences in morphological and physiological characteristics have been documented among smooth cordgrass (*Spartina alterniflora*) ecotypes from Atlantic and Gulf coasts. DNA markers, such as amplified fragment length polymorphism (AFLP) and microsatellite or simple sequence repeats (SSR), can provide a quantitative measurement of genetic diversity among natural populations. A better understanding in genetic diversity coupled with quantification of population structure and natural distribution of gene pools may help establish a better policy to achieve successful habitat restoration. Genetic information from marker analysis can also be used during cultivar development or to select combinations of genotypes that can maximize the ecosystem functionality. The objective of this study was to determine genetic relationship and diversity of *S. alterniflora* accessions originating from four coastal basins of Louisiana using AFLP markers.

Plant materials and DNA Isolation

USDA - Natural Resources Conservation Service (NRCS) accessions collected from four Louisiana coastal basins (18 accessions per basin) were used in this study. A young leaf tissue weighing approximately 0.2 g was used to extract the genomic DNA. The DNA was isolated using the DNeasy kit (QIAGEN, Cat. No.69104). Its quantity and quality were estimated both spectrophotometrically using the NanoDrop and visually by ethidium bromide staining on agarose gels using uncut λ DNA standards.

AFLP Analysis

The AFLP procedure was conducted according to the Vos's protocol that was supplied by Li-Cor Biosciences with the IRDye™ Fluorescent AFLP® Kit for Large Plant Genome Analysis. The restriction-ligation reactions were carried out using *Eco*RI and *Mse*I restriction enzymes according to the protocol. The preamplification was done using *Eco*RI+A and *Ms*eI+C primers in a PTC-100™ thermocycler (MJ Research, Watertown, MA) for 20 cycles at 94°C denaturation for 30 seconds, 56°C annealing for 1 minute, 72°C extension for 1 minute, and soak at 4°C. The preamplification product was diluted 40-fold and used for selective amplification reactions. Selective amplification was performed using four primer combinations that consisted of the *Mse*I primer and the IRDye-700 labeled *Eco*RI primer or IRDye-700 and -800 labeled *Eco*RI primers for multiplexing. These primers were selected based on the number of informative markers or fragments generated and their reproducibility. When multiplexing was carried out, the concentration of the 800 labeled *Eco*RI primer and dNTPs was increased 25% more than recommended to produce comparable band intensity with that of IRDye-700 labeled primers. Selective amplification was carried out in a thermocycler using a "touchdown" program: 1 cycle of 90°C for 30 seconds, 65°C for 30 seconds, and 72°C for 1 minute; 12 cycles of subsequently lowering the annealing temperature (65°C) by 0.7°C per cycle while keeping denaturation at 94°C for 30 seconds and extension at 72°C for 1 minute; and 23 cycles of 94°C for 30 seconds, 56°C for 30 seconds, and 72°C for 1 minute, followed by soaking at 4°C (Li-Cor's manual, PN 984-06248, 05/01). To stop the reaction, 5 µl Blue Stopping Solution (Li-Cor, Lincoln, NE) was added to each sample.

Gel Analysis

The denatured sample of 1.0 µl was loaded with a Hamilton multi-channel pipette (Hamilton, Reno, NV) onto 25-cm gels prepared with 6.5% KB Plus Polyacrylamid Gel Matrix (Li-Cor, Lincoln, NE) with a gel thickness of 0.25 mm. Electrophoresis and detection of AFLP fragments were performed on a Li-Cor IR^2 automated DNA sequencer (Li-Cor, Lincoln, NE). After pre-running for 30 min., the electrophoresis conditions were set to 1500 V, 40 W, 40 mA, and 45°C, with a scan speed of 4 for 3 hours. Gel images were saved as TIF (tagged image file format) files for further analysis.

Data Analysis

The TIF files containing fragment images from each of the primer sets were scanned into a computer and scored using Saga^{MX} Ver. 3.1, Automated AFLP Analysis Software (Li-Cor, Inc.). Unambiguous AFLP bands were scored as present (1) or absent (0) for each sample and assembled in a data matrix. The data were exported into a spreadsheet and formatted for further analysis.

Both monomorphic and polymorphic bands were included in the binary data set to provide unbiased estimates of genetic similarity. A pair-wise genetic similarity was calculated using the method of Nei and Li (1979):

$Sij=2a/(2a+b+c)$,
where Sij is the similarity between two individuals i and j,
a is the number of bands present in both individuals,
b is the number of bands present in i and absent in j, and
c is the number of bands absent in i and present in j.

For estimates of genetic similarity, the data were arranged in the following groups: all accessions and basin group. Total gene diversity (H_t) and diversity within four groups were calculated based on Nei's formula (1973) assuming Hardy-Weinberg equilibrium. The POPGENE software was used and calculations were performed with all markers, both poly- and monomorphic.

Ordination analysis via non-metric multidimensional scaling was used to represent the relationships between the accessions in three dimensions using MDSCALE module of Rohlf's NTSYSpc Version 2.1. To evaluate goodness of fit of the ordination analysis to the original distance matrix, the cophenetic correlation was calculated using the MXCOMP function in NTSYSpc. The neighbor joining method was applied to estimate phylogeny from distance (1-Sij) matrix to obtain unrooted tree using NEIGHBOR programs from NTSYSpc. Version 2.1. The matrix correlation between geographic and genetic distance was estimated with Mantel's test statistic Z, using the MXCOMP procedure of NTSYS.

AMOVA and Bayesian clustering were used to evaluate population subdivision based on coastal basins. The distance matrices were used to construct an input file for AMOVA using Schneider's Arlequin 2.0 software. The total variance was partitioned into variance among and within coastal basins.

Results

A total of 250 unambiguous AFLP bands were amplified using four selective primer combinations, with fragment size mostly ranging from 60 to 360 bp (Fig. 1). A small portion of the bands were between 360 to 530 bp. The primers generated an average of 62 bands per primer combination, ranging from 52 to 87 bands. The highest number of polymorphic fragments was produced by the primer combination M-CTT/E-ACC, while M-CTT/E-AGC yielded the fewest polymorphic fragments. Out of these bands, 186 or 74.4% were polymorphic at a species level. Polymorphic levels based on location (at population level) ranged from 55.2 to 62.8%. A good portion of the AFLP bands (61.2%) is common in the four coastal basins and 2% of the bands was considered unique; 0.4% unique to Barataria-Breton, Terrebonne, and Mermentau basin and 0.8% unique to Calcasieu basin. The Shannon's information index (I) at a population level ranged from 0.28 to 0.32, and Nei's gene diversity ranged from 0.18 (Mermentau) to 0.21 (Barataria-Breton). The number of migrants (N_m) was estimated at 2.92 migrants per generation.

Phenetic Analysis

The Neighbor-Joining analysis showed no tight genetic clustering associated with basin origin (Figure 2). Genetic similarity index ranged from 0.699 to 0.928, with an average value of 0.803. Results from the PCA analysis showed that the 72 accessions were loosely distributed across the three dimensional plains, further corroborate the results from the Neighbor-Joining analysis. Unbiased measures of genetic distance among basins were weak, ranging from 0.0163 (Mermentau-Calcasieu) to 0.0812 (Terrebonne-Barataria), indicating no isolation by distance.

Likewise, the unbiased measures of identity among basin groups were high, ranging from 0.9677 (Mermentau-Terrebonne) to 0.9839 (Mermentau-Calcasieu). Coefficient population differentiation (G_{st} value) was low (0. 0671), suggesting a lack of association between geographical origin and population differentiation.

Genetic Diversity

Based on estimated Nei's parameters associated with genetic diversity, only 6.7% of total variation in allele frequencies was apportioned among basin groups. The average genetic diversity within coastal basins (H_s) was 0.20. Among the four coastal basins evaluated, *S. alterniflora* from Mermentau had the lowest genetic diversity (H_s=0.18). They also had the lowest polymorphic level. The highest genetic diversity was found among *S. alterniflora* from Barataria – Breton basin with H_s of 0.22.

Habitat Restoration and Breeding Implications

Results from this study suggest that maintaining high levels of genetic diversity for habitat restoration can be accomplished through the use of selected genotypes based on their genetic distance indexes. If populations to be developed without genetic data, an adequate number of *S. alterniflora* samples collected from a large area within each coastal basin will produce population that has a high level of genetic diversity. Should uniform policies regarding the use of planting materials be applied in coastal restoration and habitat restoration projects, the effective number of essential lines needed in a foundation population for planting purposes can directly be determined. For breeding purposes and other plant development, choosing for parental lines from several Louisiana coastal basins will not increase genetic variability among the progeny lines.

Table 1. Proportion of AFLP alleles (%) commonly found in four, three, and two coastal Louisiana basins, or unique in one coastal Louisiana basin.

Unique and Common Alleles

	Basin	Proportion (%)
1	Barataria-Breton	0.4
2	Terrebonne	0.4
3	Mermentau	0.4
4	Calcasieu	0.8
5	Barataria-Breton and Terrebonne	2.4
6	Barataria-Breton and Mermentau	0.0
7	Barataria-Breton and Calcasieu	2.4
8	Mermentau and Terrebonne	1.2
9	Calcasieu and Terrebonne	0.0
10	Calcasieu and Mermentau	1.2
11	Barataria-Breton, Mermentau, and Terrebonne	0.0
12	Barataria-Breton, Calcasieu, and Mermentau	2.4
13	Barataria-Breton, Calcasieu, and Mermentau	1.2
14	Calcasieu, Mermentau, and Terrebonne	0.4
15	Barataria-Breton, Calcasieu, Mermentau, and Terrebonne	61.2
16	Non-polymorphic alleles	25.6

Figure 1. DNA fingerprints of smooth cordgrass accessions from four Louisiana basins. Amplified fragment length polymorphism (AFLP) markers were produced through PCR reaction using a primer combination of E-ACT/M-CTA. Each lane represents one accession. Marker size standards were placed in the first, 8th, 15th, 22nd, 29th, 36th, 43rd, 50th, 57th, and 59th lanes were size standards.

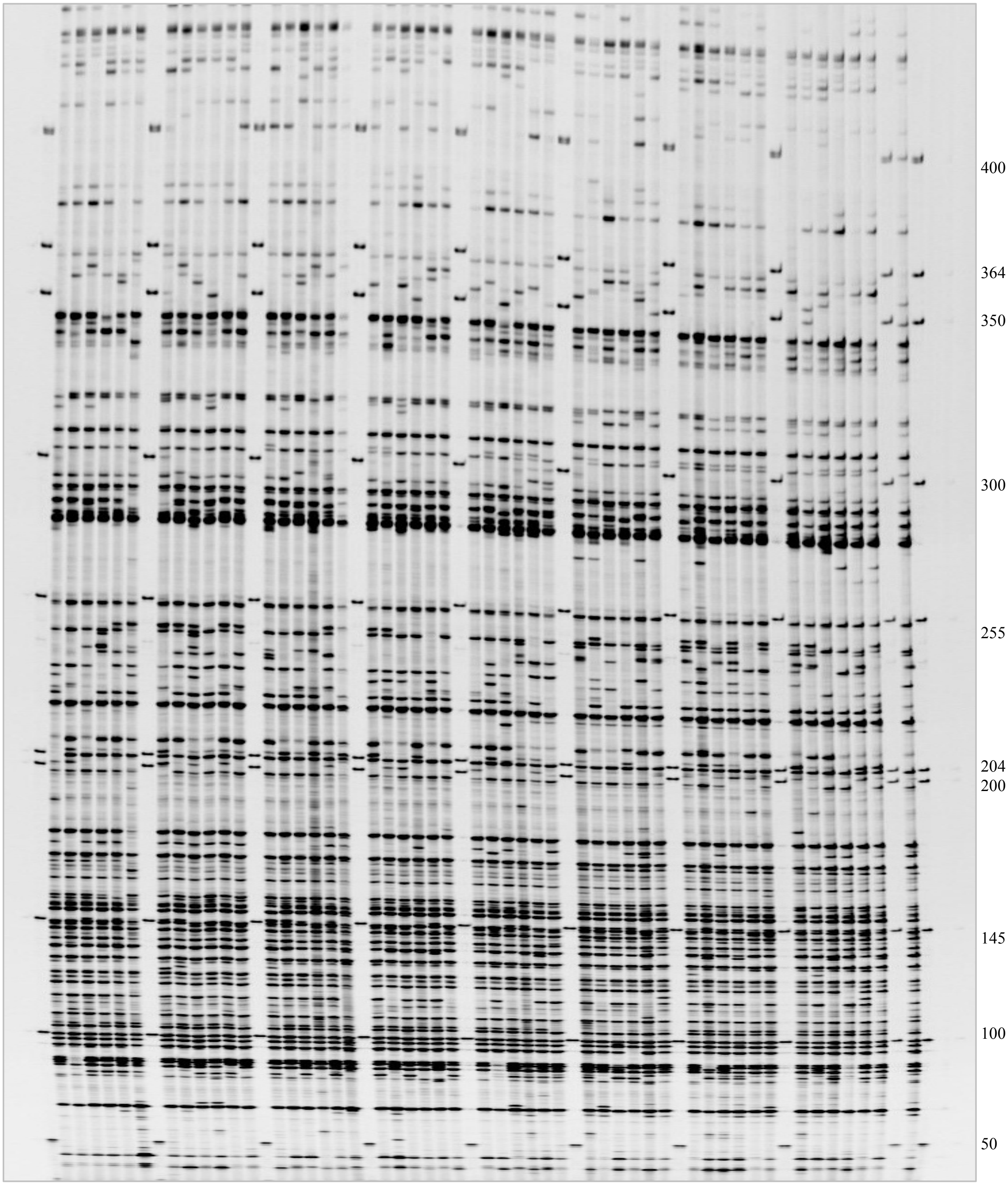


Figure 2. Neighbor-Joining dendrogram of 72 *Spartina alterniflora* accessions from four Louisiana coastal basins based on the Nei and Li similarity index estimated from 186 AFLP markers. The scale bar represents Neighbor-Joining distance. (B-B = Barataria-Brenton; Cal = Calcaseau; Trb = Terrebonne; Mrm = Mermentau basin. An accession within a basin is identified by the number following the letters used to identify basin.

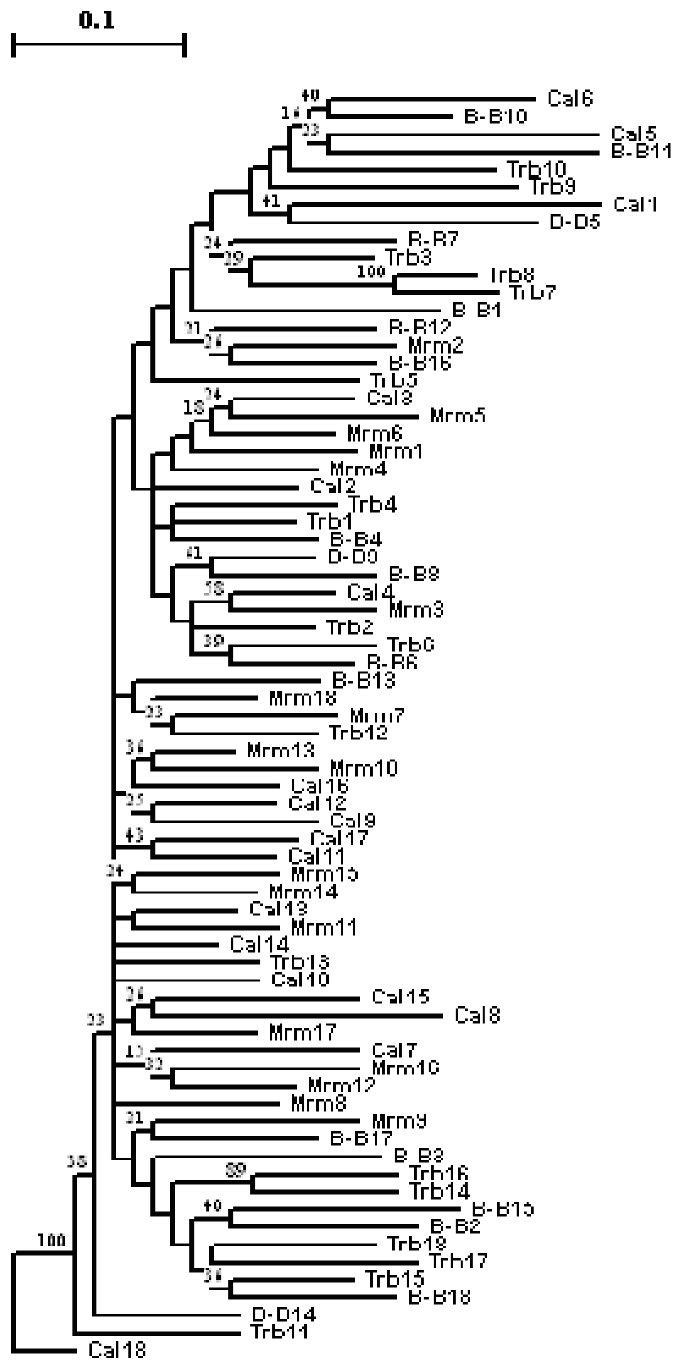
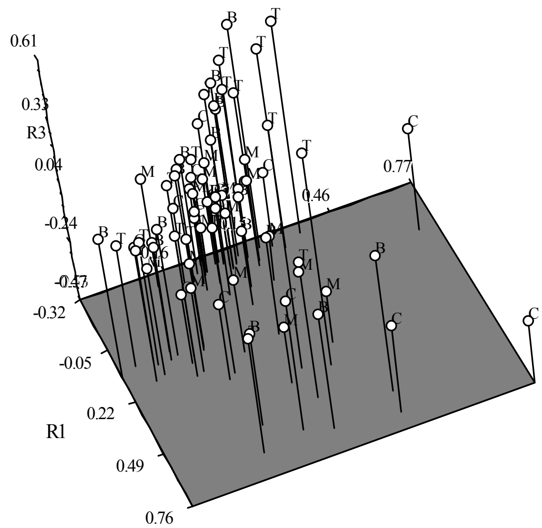


Figure 3. Principal coordinate plot of *Spartina alterniflora* genotypes for the three principal co-ordinates estimated with 250 AFLP markers, using Dice similarity matrix. (B=Barataria-Breton, C=Calcasieu, M=Mermentau, and T=Terrebonne accessions)



SEED-BASED PROPAGATION OF SMOOTH CORDGRASS

H.S. Utomo, I. Wenefrida, S. Harrison, and M. Materne

A seed-based *Spartina alterniflora* propagation method can expedite the establishment of vegetation over a large area quickly and economically. A large production of *S. alterniflora* seed is a prerequisite of successful aerial seeding. Through aerial seeding, a large-scale coastal marsh restoration and erosion control become possible. Capable of reaching marsh interiors most affected by erosion, the aerial seeding can deliver coastal plant materials to these sites not only for coastal marsh restoration but also for long-term maintenance of Louisiana saltmarsh systems. Current planting practices in the restoration project are both laborious and costly involving hand transplanting of sprigs, plugs, or potted saltmarsh plants. With seed, hundreds of acres can be planted aerially in a day at a fraction of the cost of current planting practices. The objectives of seed-based propagation studies conducted at the Rice Research Station are (1) to evaluate yield potential of a blend population consisting of a mixture of 13 genetically diverse and high seed-producing lines of *S. alterniflora* and (2) to determine seed production aspects, including germination rate, seed set, and seed storage requirement.

Genetic Materials

A 250 m^2 polycross plot was established by planting a total of 169 plugs from 13 high seed-producing lines, VRES-1, VRES-2, VRES-3, VRES-4, VRES-5, VRES-6, VRES-7, VRES-8, VRES-9, VRES-10, VRES-11, VRES-12, and VRES-13. The plants were arranged randomly in 4- x 4-ft spacings to produce blend seed. These lines have an average seed set of 52%, ranging from 33 to 94%, with an average germination rate of 60%, ranging from 53 to 90%. The soil type was Crowley silt loam. Fertilization was done in the spring and summer using urea (46% N) at 165 lb/A rate. Plants were grown in permanent flood with an occasional drain for weed control. RoundUp (glyphosate) (1 qt/A) and Basagran (bentazon) (1 qt/A) were used to spray around or adjacent to the smooth cordgrass plants to control weeds. To control rust, Benlate (benomyl) was applied at the rate of 1 lb ai/A.

Harvest

Seed was hand harvested on November 11, 2006, prior to shattering by cutting the panicles. The panicles were stored under room temperature in plastic bags to provide 100% humidity for approximately 1 month to allow all seed to mature and shatter to obtain maximum harvest. The 2007 harvest was done on November 16. The seed is being cold stratified and no germination data has been obtained yet.

Seed Treatment

Cold stratification to break dormancy was conducted by storing the seed at 2^{o}C in 100% humidity for 1 month. To minimize fungus contamination, seed were placed in a 13- x 18-in Ziploc bag to about 2/3 full, and 200 ml Vitavax solution (5 mg/L) was added to the bag to wet the seed. The excess of the Vitavax solution was removed and each bag was air tightly sealed. The treated seed was stored in the cooler with the temperature set to 2±1^{o}C for 1 month. Seed was checked periodically for contamination.

Seed Germination

A standard germination test was carried out by placing 50 seeds in a Petri dish containing 8 ml of Vitavax solution (5 mg/L) layered with a filter paper. The seed was harvested in eight batches, and a random sample of 50 seeds from each batch was used in germination tests. The test was repeated three times. The seed was germinated in the incubator at 25^{o}C for 14 days. Germination was recorded when the radicle emerged. Seed germination was determined based on an average value and expressed as percentage.

Results

Significant seed yield improvement was obtained in 2006 (146.9 lb/A compared with 84.4 lb/A in 2005) (Fig. 1A). This difference was due mainly to the plant density. The population was significantly less dense in the first year of growth (2005) compared with that in the second year (2006). Fertile tiller density was higher in 2006 than in 2005 (Table 1). Both germination rate and percent seed set of blend population were higher for the seed harvested in 2005 (72.1% germination rate and 67.2% seed set) than that harvested in 2006 (60.7% germination rate and 50.4% seed set) (Fig. 1C). Though panicle weight and seed mass per panicle were higher in the first year, it was not significant.

Stratified, nondormant seed from 2006 harvest produced visible shoots after 10 hours at 27^{o}C. Initial root germination was visible at least 15 hours later. Time to 50% visible shoot germination was 20 to 25 hr at three temperature regimes of 27, 32, and 37^{o}C. Time to 50% visible root germination was 30 hr at 27 and 32^{o}C but was not observed until after 80 hr at 37^{o}C. Upon 1-month cold stratification, a few seed started to germinate in the cold storage (2^{o}C). As the time went on, more seed germinated in the storage. Seedling establishment of blend seed for both nongerminated and germinated seed remains high for a 6-month period of storage (Fig. 1D). However, its viability becomes rapidly deteriorated thereafter. We have identified a genotype (Line FF23) in which its seedling could be stored for 2 years in a cold storage without losing its viability (Fig. 1D). Line FF23 was transplanted in a bigger plot last year for further studies.

Seeds of *S. alterniflora* can be obtained by harvesting the seeds from the wild. The amount of seeds that can be harvested, however, varies from one year to another depending on the climatic conditions affecting seed production. This study demonstrates that *S. alterniflora* can be cultivated under a freshwater environment similar to rice. Through cultivation of *S. alterniflora*, a steady supply of *S. alterniflora* seed and the size of the operation can easily be adjusted if a large amount of seed is needed. Since genetic materials to produce seed have gone through extensive testing, the performance of the resulting *S. alterniflora* population will be more predictable than that of the seeds collected from the wild. Compared with rice yield, a production of *S. alterniflora* seed (number of seeds per area) is about one fifth (Table 2).

Table 1. Differences of seed biomass and selected seed components between consecutive growing seasons of *S. alterniflora* blend population during fall 2005 and 2006.

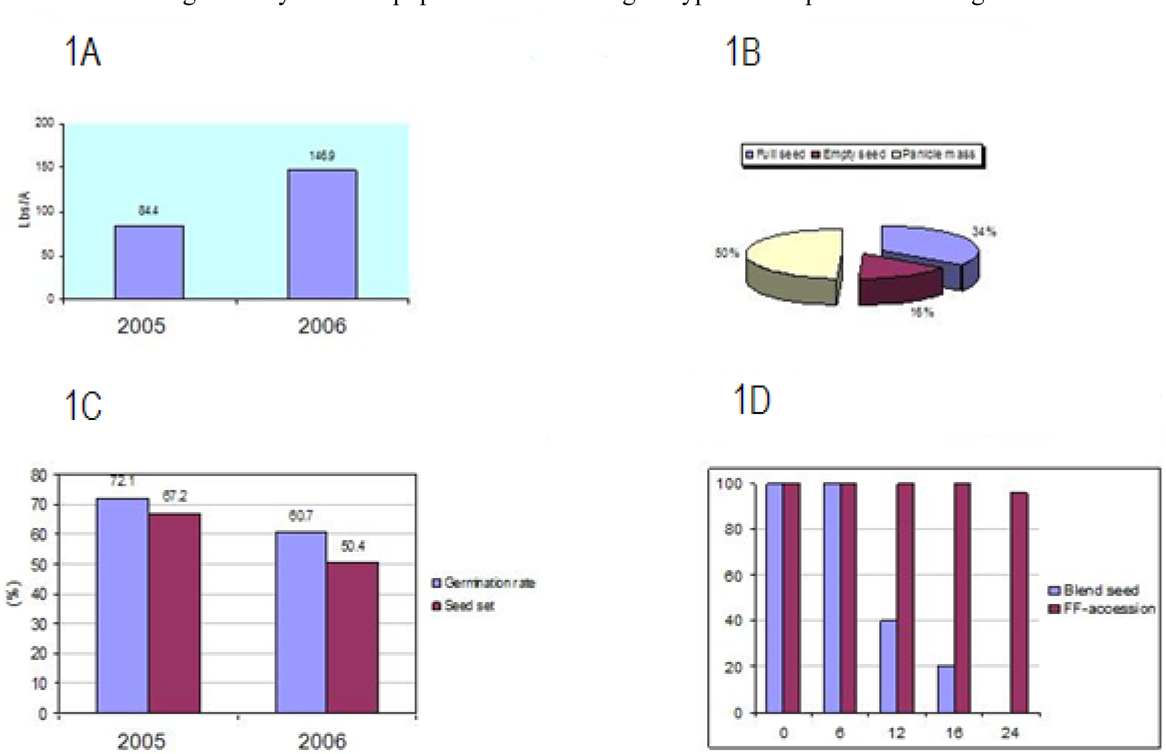
	Reproductive Component				
Year	Seed biomass (kg/ha)	Fertile tiller density (/m^2)	Panicle weight (g)	Seed mass per panicle (mg)	100-seed weight (mg)
2005	94.8**	7.2**	35.1	99.7	47.7*
2006	164.7	13.6	32.4	85.8	45.5

**,* Annual means significantly different at the 0.01 and 0.05 probability level, respectively.

Table 2. Seed production comparison between smooth cordgrass (*Spartina alterniflora)* and rice (*Oryza sativa*).

Crop	Yield: lb/A	Yield: No. seed (million)	Seeding rate	Area planted (using seed harvested)
Smooth cordgrass	146.9	20.2	16 lb/A (2.2 seeds/A)	9.2 A
Rice	5800.0	106.3	120 lb/A (2.2 seeds/A)	48.3 A

Figure 1A. Seed production of *S. alterniflora* blend population harvested in 2005 and 2006.
B. Composition of full seed, empty seed, and panicle mass based on their fresh weight.
C. Average germination rates and seed sets from blend *S. alterniflora* population.
D. Seedling viability of blend population and FF23 genotype in four periods of storage.



LOUISIANA RICE RESEARCH VERIFICATION PROGRAM - 2007[1]

J.K. Saichuk and K.J. Landry

Introduction

The Louisiana Rice Research Verification Program (LRRVP) began in 1997 in three parishes: Allen, Calcasieu and Jeff Davis. In 1998, the program was funded and expanded to 10 parishes: Acadia, Avoyelles, Calcasieu, East Carroll, Evangeline, Jeff Davis, Madison, Morehouse, St. Landry and Vermilion. From 1999 to 2006, 81 fields were included in the verification program. In 2007, the program only included seven fields because one cooperator dropped out at the last minute (Figure 1).

The fields were visited on at least a weekly basis by a specialist, county agent or the extension associate. Production practice recommendations were made by the specialist or agent. These recommendations included, but were not limited to, fertilization, weed control, disease control, insect control and water management to a limited degree. The fields were followed from planting to harvest.

Yield data were collected for each of the fields (Table 1). Yields of the first crop averaged 7,662 lb/A (170 bu/A or 47 bbl/A) at 12 % moisture. This is the highest first crop yield average the program has ever achieved. Second crop was harvested in Jeff Davis and Vermilion parishes adding another 2,057 lb/A to the total for a final average of 7,728 lb/A (172 bu/A or 48 bbl/A).

Economic data continue to reveal large production cost differences between growers. It is also clear that more needs to be done to help farmers reduce production costs (Table 2).

The program continues to provide an accurate evaluation of current recommendations and provide insight into other areas of research. The educational value of the program to all concerned (farmers, researchers and extension personnel) increases each year.

[1] This project is supported in part by funding provided by rice producers through their check-off contributions to the Louisiana Rice Research Board.

Figure 1. 2007 Louisiana Rice Research Verification Program Parishes.

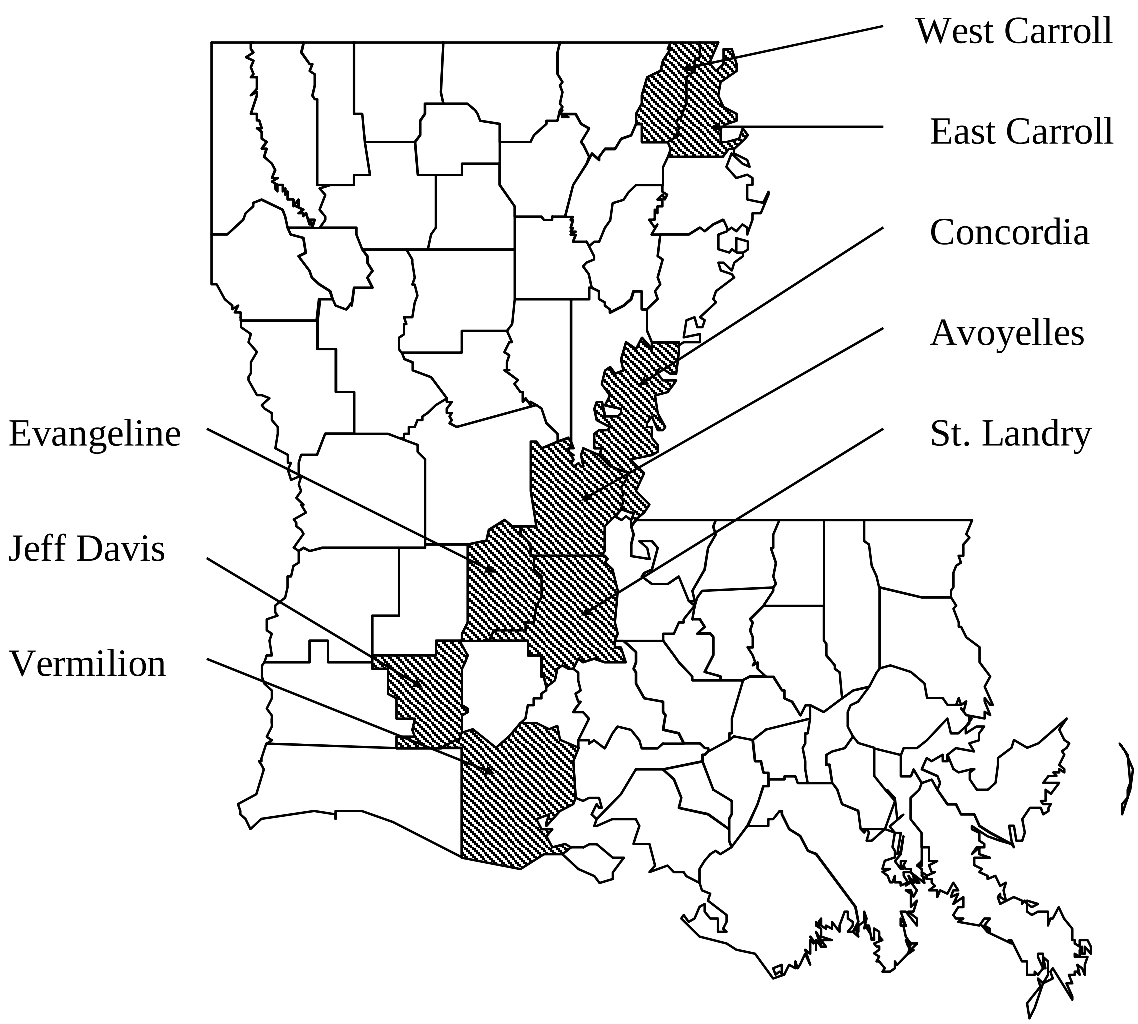


Table 1. 2007 Louisiana Rice Research Verification Program Yield Summary.

Parish	Acres in Verification Program	Verification Yield/A @ 12% Moisture		Verification Program			Average Parish Yield[1]	Parish Acreage	Total Parish Production
		1st Crop Alone	Second Crop	Total Yield/A	1st Crop Production	Total Production			
Avoyelles	40.9	9187	0	9187	375,748	375,748	6966	12,800	89,164,800
Concordia	53.8	8680	0	8680	466,984	466,984	6750	9,805	66,183,750
East Carroll	23.0	7917	0	7917	182,091	182,091	7650	6,002	45,915,300
Evangeline – St. Landry	33.9	8122	0	8122	275,336	275,336	6349	36,475	231,579,775
Jeff Davis	38.9	5630	1821	7451	219,007	289,844	6480	66,500	430,920,000
Vermilion	36.6	6739	2307	9046	246,647	331,084	5832	48,699	284,012,568
West Carroll	40.2	7356	0	7356	295,711	295,711	7650	3,076	23,531,400
TOTAL	**267.3**	**53,631**	**4128**						
						Verif. Avg.	**Parish Avg.**		**Difference**
Average yield (lb/A)					**7712**	**8293**	**6501**	**183,357**	**1792**

Table 2. 2007 Louisiana Rice Research Verification Program Yield, Milling and Economic Summary.

Parish	Variety	Yield @ 12% Moisture (cwt/A)[1]	Milling (% Whole / % Total)	Variable Costs ($/A)[2]	Cost of Production ($/cwt)[2]	Return on Variable Costs ($/A)[2,3]
Avoyelles	Cocodrie	9187	58.2 / 73.2	354.64	4.06	610.00
Concordia	Cocodrie	8680	60.4 / 71.2	384.63	4.40	526.77
East Carroll	CL171	7917	46.7 / 73.6	400.59	5.05	430.70
Evangeline – St. Landry	XP723	8122	63.5 / 72.8	396.23	5.11	456.58
Jeff Davis	Cocodrie	7451	62.9 / 71.9	551.27	6.51	231.08
Vermilion	CL171	9046	57.0 / 74.6	528.10	5.83	421.73
West Carroll	CL161	7356	64.2 / 71.5	346.57	4.70	425.81

1 - Figure includes ratoon crop yield.

2 - Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transporting, drying, storing or fixed costs.

3 - This value was obtained using a selling price of $10.50/cwt.

AVOYELLES PARISH

The field in Avoyelles Parish was laser leveled in 2006 but not put into production that year. This was the first time rice was grown on the field. It was set on zero grade so there were no internal levees in the field. The heavy red clay was plowed and grooved, producing an excellent seedbed into which Cocodrie seed was aerially sown.

At about the two-tiller growth stage, symptoms of phosphorus deficiency began to appear. Symptoms were worse in the two adjacent fields, which were in their second year of rice production, than in the verification field. This is a problem first noticed several years before and now considered a regular occurrence on the heavy red clay soils of Avoyelles and Rapides parishes. These soils typically test high in phosphorus content yet require the addition of phosphorus postflood because the nutrient is apparently tied up by high calcium levels. These soils also require sulfur in some situations.

When rice reached internode elongation (green ring), some areas in the field exhibited the aforementioned late-season sulfur deficiency symptoms. Instead of using urea as a topdressing we recommended 160 lb/A of a blend of urea and ammonium sulfate (33% N).

Even though no sheath blight could be found just prior to split boot, an application of fungicide was made to protect the crop from smut and the sheath rot/narrow brown leaf spot complex experienced in 2006.

One application of insecticide was applied when stink bugs remained at about 2/3 threshold for about 3 weeks. This application was based on experience rather than any published recommendation because there are no research data on long-term subthreshold stink bug populations on rice. Even though it is the opinion of the specialist, the application was warranted.

A record 9,717 lb/A (60 bbl/A or 216 bu/A) at 16.8% moisture was harvested. When adjusted to 12%, the yield was 9,187 lb/A (56.7 bbl/A or 204 bu/A). The somewhat lower head rice yields were probably associated with the lower than recommended grain moisture at harvest.

AVOYELLES PARISH

Cooperator: Johnny Coco
Agent: Carlos Smith and Trent Clark
Field Size: 40.9

Cultural Practices

Variety: Cocodrie
Method of Planting: Water Seeded
Water Management: Delayed Flood

Seeding Rate: 130 lb/A
Date of Planting: April 16
Date of Emergence: April 28

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	6-13	5-29
PD	6-25	6-8
50% Heading	7-18	7-3
Drain for Harvest	8-17	
Harvest	8-31	8-7

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	97.17	58.2/73.2	354.64	4.06	610.00
2nd Crop	--	--	--	--	--

Average Parish Yield (1st and 2nd Crop): cwt/A.

[1]Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.

[2]This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
5-22	46-0-0-+ agrotain	200	92		
6-1	0-46-0	50		23	
6-14	33-0-0-12S	160	53		
Total	--	--	145	23	

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
Pigweed, Sprangletop, Barnyardgrass, Narrowleaf Aster, Morningglory	5-9	1 gal Propanil
Morningglory, Sprangletop, Pigweed, Johnsongrass,	5-16	1 gal Duet

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
(preventative)	7-5	14 oz Stratego

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-26	Karate
Rice Stink Bug	7-24	Karate

CONCORDIA PARISH

In Concordia Parish, Cocodrie was drilled in a heavy clay soil on a slightly sloping but laser-smoothed field. Levees were pulled following drilling. Plastic irrigation tubing was used to both convey water to the field and flood it via gates installed in the tubing in each paddy. Flushing was not required because of timely rain.

Shortly after emergence, Command herbicide injury was observed in the top paddy and, to some extent, in the second paddy as well. Most of this injury, though, obviously was expected to be cosmetic only.

When the crop was ready for establishment of the permanent flood, a recommendation of Duet plus Permit to be followed by an application of 250 lb/A of urea and flood establishment was made. Two passes of the wrong herbicide were applied to the top and bottom of the field before the pilot could be alerted. Upon application of the recommended herbicide, the first four passes contained something that injured the crop severely. At harvest, we determined 2.2 acres of the 53.8 acres had been completely killed.

Just prior to split boot, a mixture of Quadris and Quilt was applied as a preventative measure for false smut, kernel smut and the sheath rot/narrow brown leaf spot complex.

This field is one of the few verification fields since the beginning of the program in 1997 that did not require an insecticide application to control stink bugs.

We harvested our second highest yield of 2007 from this field. Yield was 9,029 lb/A (56 bbl/A or 201 bu/A) at 15.4% moisture. This converted to 8,680 lb/A (54 bbl/A or 193 bu/A) at 12% grain moisture. Had the 2.2 acres not been lost, the yield would have been 9,414 lb/A (58 bbl or 209 bu/A) at 15.4% the equivalent of 9,050 lb/A (56 bbl/A or 201 bu/A) at 12%. This would have set our all-time record for the verification program.

CONCORDIA PARISH

Cooperator: Noble Guedon
Agent: Glen Daniels
Field Size: 53.8 Acres

Cultural Practices

Variety: Cocodrie
Method of Planting: No-till Drill
Water Management: Delayed Flood

Seeding Rate: 100 lb/A
Date of Planting: March 30
Date of Emergence: April 9

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	5-30	5-25
PD	6-15	6-5
50% Heading	6-28	6-28
Drain for Harvest	7-25	
Harvest	8-22	8-2

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	86.80	60.4/71.2	384.63	4.40	526.77
2nd Crop	--	--	--	--	--

Average Parish Yield (1st and 2nd Crop): cwt/A.
[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.
[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
3-7	9-15-27 Zn S	150	13.5	22.5	40.5
5-10	46-0-0	250	115		
6-1	46-0-0	100	46		
Total	--	--	174.5		

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
--	3-3	1 lb Roundup + .4 oz Harmony + Surfactant
--	3-31	1.13 lb Roundup + 24.1 oz Command
Morningglory, Barnyardgrass, Soybean, Sedge, Johnsongrass, Sesbania, Crabgrass	5-9	1 gal Duet + .75 Permit

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
Sheath Blight/ Hist. of Smut	6-26	14 oz Quilt + 6 oz Quadris

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-17	Karate

EAST CARROLL PARISH

The verification field in East Carroll Parish was one of two planted to CL171, a variety not yet receiving a recommendation from the LSU AgCenter; but because of its anticipated recommendation and the limited seed availability, we planted it with the intention of being able to give it a “real world” look.

The farmer drilled the seed at the rate of 83 lb/A, a rate more than adequate considering the ideal seed bed. Because a cold front brought low temperatures to the state at the time of planting and because the soil was too dry for emergence, we recommended holding off on flushing until temperatures began to rise. A few days later we recommended flushing. A perfect stand resulted. Diammonium phosphate (0-46-0) was applied at the rate of 75 lb/A just ahead of the flush. Early phosphorus deficiency had been noted the year before in surrounding area.

The initial application of Newpath plus Prowl was followed by Newpath plus Permit. By the end of the season, the field was still very clean. A hand application of 2,4-D was made to the levees to control hemp sesbania.

Mustang Max was used to control rice water weevils shortly after establishment of permanent flood.

A week prior to panicle differentiation (PD) sheath blight was picked up. This was the first field in the program in 2007 to show signs of heavy sheath blight pressure. When the crop reached late boot, an application of 14 ounces of Quilt plus 6 ounces of Quadris was made. The lower rate of Quilt and higher rate of Quadris were out of concern for the length of time protection from sheath blight would be needed. At harvest, very little sheath blight had come through the canopy.

One application of methyl parathion was made to control stink bugs.

The farmer harvested 8,206 lb/A (51 bbl/A or 182 bu/A) at 15.1% moisture, which translated to 7,917 lb/A (49 bbl/A or 176 bu/A) at 12% grain moisture. The disappointing head rice yields were in all likelihood a consequence of the low harvest moisture. This indicates that even though CL161 is one of the parents of this variety, it does not have the milling stability of CL161 at low moisture.

EAST CARROLL PARISH

Cooperator: Ken Fairchild
Agent: Donna Lee
Field Size: 22.9 acres

Cultural Practices

Variety: CL171
Method of Planting: Drill
Water Management: Delayed Flood

Seeding Rate: 83 lb/A
Date of Planting: April 7
Date of Emergence: April 21

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	6-7	6-1
PD	6-19	6-10
50% Heading	7-15	7-3
Drain for Harvest	8-2	
Harvest	8-27	8-7

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	79.17	46.7/73.6	400.59	5.05	430.70
2nd Crop	--	--	--	--	--

Average Parish Yield (1st and 2nd Crop): cwt/A.

[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.

[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
4-28	18-46-0	75	14	35	
5-16	46-0-0	240	110		
	46-0-0	120	55		
Total	--	--	179	35	

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
Sedge	--	New Path 4 oz + Prowl
Sesbania, Morningglory	5-15	New Path 4 oz + 1 oz Permit
Sesbania	6-18	2,4-D

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
Sheath Blight/Stem Rot	7-21	Quilt 14 oz + Quadris 6 oz

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-15	Mustang Max
Rice Stink Bug	7-19	Methyl Parathion

EVANGELINE – ST. LANDRY PARISH

Dry seed of the hybrid XP723 were flown into a less than ideal seedbed at the rate of 30 lb/A. The specialist should have recommended against this and will in all future similar situations. Under ideal conditions, this method might have been successful, but the conditions were not ideal. This was further complicated by a cold front while trying to flush the field. Eventually, some parts of the field had to be replanted.

As expected, the extended period of flushing and replanting compromised weed control. Conventional weeds were controlled with herbicides, but nothing could be done about red rice that emerged during the 2 to 3 weeks of alternately flooding and draining the field. This forced the farmer to abandon his intention of producing a second crop.

A nearby recreational fish pond restricted the use of insecticide as a spray to control rice water weevils. Because all of the early-season nitrogen had already been applied, Mustang EW was impregnated on 100 pounds of potassium fertilizer. Potassium was chosen as the carrier because it was the cheapest fertilizer source at the time.

Propiconazole fungicide was applied to prevent kernel smut, false smut and the sheath rot/narrow brown leaf spot complex. No sheath blight was observed prior to this fungicide application.

Determining drain time on this field proved to be very difficult for several reasons. First, the hybrids in general tended to shatter, making early drain imperative. The tillering ability of the hybrids also spreads out the maturity of panicles within a single plant along with the field in general. Replanting a portion of the field only added more to the mix. Because the best rice was in the area not replanted, drain timing was biased to favor that portion of the field.

The farmer harvested a very surprising 8,846 lb/A (55 bbl/A or 197 bu/A) at 19.2% grain moisture or 8,122 lb/A (50 bbl/A or 180 bu/A) at 12% moisture. There was some debate about the yield because of the difficulty encountered in the use of new truck scales. If anything, the yield was higher than we are reporting. Milling yield on this field was an exceptional 63.5/72.8% (head/total), the best in the verification program this year. Clearly, the hybrids must be harvested at high moisture to maximize both yield and milling. One can only wonder “what if” there had been a good stand to begin with and a second crop harvested as well.

EVANGELINE – ST. LANDRY PARISH

Cooperator: Jeffrey Sylvester
Agent: Keith Fontenot and Keith Normand
Field Size: 33.9 acres

Cultural Practices

Variety: XP723
Method of Planting: Water Seeded
Water Management: Pinpoint Flood

Seeding Rate: 29 lb/A
Date of Planting: March 28
Date of Emergence: April 4

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	5-26	
PD	6-4	
50% Heading	6-23	
Drain for Harvest	7-18	
Harvest	8-10	

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	81.22	63.5/72.8	396.23	5.11	456.58
2nd Crop	--	--	--	--	--

Average Parish Yield (1st and 2nd Crop): cwt/A.
[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.
[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
5-8	46-0-0	50	23		
5-8	18-46-0	100	18	46	
5-12	0-0-60	100			60
6-9	46-0-0	115	53		
Total	--	--	94	46	60

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
Knotgrass	5-7	15 oz Clincher + 1 pt Crop Oil
Sesbania, Cocklebur, Barnyardgrass, Sedge, Alligatorweed, Morningglory, Eclipta	5-8	1 oz Londax + .25 oz Permit
Sedge	5-22	1 oz Permit

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
--	6-21	Propimax

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-12	Mustang Max + K_20
Rice Stink Bugs	6-26	1 ½ pt Malathion

JEFF DAVIS PARISH

By the time we visited the field in Jeff Davis Parish that had been chosen to be in the verification program, it was under a deep flood, thus difficult to evaluate in terms of seedbed or potential weed problems. In spite of this, we agreed to the farmer's intentions of water seeding Cocodrie.

It was obvious as soon as the field was drained following seeding that we had made an error. A heavy population of knotgrass, alligatorweed, mannagrass, roundleaf mud plantain and other weeds greeted us. Potential for red rice necessitated careful water management in conjunction with critical decisions concerning herbicides.

Clincher was applied when rice was barely one leaf so a flood could be established to suppress red rice. Heavy rain and cold temperatures followed, necessitating an application of zinc chelate and delaying an application of herbicide to control the broadleaf weeds. The first application of nitrogen fertilizer was also applied during the brief drain interval between planting and reflooding. Once the rice had recovered and application of Londax plus Regiment was made.

By the following week, excellent herbicide activity was observed on the weeds. Rice water weevils were detected and an insecticide application recommended.

The next week the top paddy (in the center of the field with slope in two directions) was low on water while the bottom paddies had too much water in them. Herbicide injury to plants in the two bottom paddies caused us to recommend draining them. It was apparent later that water movement from the top paddy to the bottom paddies carried with it both nitrogen fertilizer and herbicide. We observed no herbicide injury in the top paddies, poorer weed control and nitrogen shortage in comparison with the bottom paddies, which suffered crop injury, excellent weed control and no nitrogen deficit.

The uneven maturity, crop injury and nearby sensitive plants prevented a 2,4-D injury to the first crop. Clearly, it would have been beneficial particularly in alligatorweed control. This field had the heaviest stink bug pressure of all of the verification fields. It was sprayed three times to keep the numbers down.

A disappointing 5,998 lb/A (37 bbl/A or 133 bu/A) at 17.7% moisture. When adjusted to 12% moisture, the yield was 5,630 lb/A (35 bbl/A or 125 bu/A).

The field was immediately fertilized with nitrogen, flooded and 2,4-D was applied to produce a second crop.

The second crop produced 1,821 lb/A (11.2 bbl/A or 40 bu/A) at 12% moisture. This brought the total for the field to 7,451 (46.0 bbl/A or 166 bu/A).

JEFF DAVIS PARISH

Cooperator: Ronnie “Blue” Zaunbrecher
Agent: Eddie Eskew
Field Size: 38.9 acres

Cultural Practices

Variety: Cocodrie
Method of Planting: Water Seeded (pre sprout)
Water Management: Pinpoint Flood
Seeding Rate: 120 lb/A
Date of Planting: March 29
Date of Emergence: April 3

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	5-16	5-14
PD	5-23	5-25
50% Heading	6-13	6-19
Drain for Harvest	7-15	
Harvest	8-6	7-24

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	56.30	62.9/71.9	464.95	8.26	126.20
2nd Crop	18.21	--	86.31	4.74	104.90

Average Parish Yield (1st and 2nd Crop): cwt/A.

[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.

[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
4-3	24-0-21	300	72		63
4-18	Zn	.75			
5-14	46-0-0	150	69		
Total	--	--	141		63

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
Knotgrass, Alligatorweed, Mannagrass, Roundleaf Mud Plantain	4-3	Clincher 15 oz/A + 1 qt Crop Oil
Alligatorweed, Roundleaf Mud Plantain	4-22	1 oz Londax + .5 oz Regiment + 2 gal UAN/100+Freeway

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
Sheath Blight	6-15	19 oz Stratego

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-4	Mustang Max
Rice Stink Bug	6-22	Karate
Rice Stink Bug	6-28	Karate
Rice Stink Bug	7-12	Karate

VERMILION PARISH

The verification field in Vermilion Parish is the second of two planted to CL171, a variety not yet receiving a recommendation from the LSU AgCenter; but because of its anticipated recommendation and the limited seed availability, we planted it with the intention of being able to give it a "real world" look.

The majority of this fall stale seedbed field did not require an application of burndown herbicide so we elected to omit it all together. Part of the decision was the knowledge that we would be able to apply Newpath herbicide shortly after planting. Only one weed persisted through all herbicide applications; the narrow-leaved aster. It is increasing throughout the rice growing area, especially in reduced tillage fields.

Record cold weather moved into the area requiring the application of a shallow flood to the field to provide some protection to the young seedlings. This also delayed some of the herbicide application. Once the weather changed, we were able to complete our herbicide application and make an application of insecticide to control the rice water weevil.

From there the crop took off. It looked outstanding. Fungicide was applied as a preventative to the narrow brown leaf spot/sheath rot complex. Insecticide was applied to control rice stink bugs.

Frequent rain after draining the field delayed harvest. Percent moisture was checked by hand and found to be in the mid-20s one week and had dropped to 14% by the next week as soon as it stopped raining. This low grain moisture at harvest contributed to the low milling yields.

The farmer reported this field had never produced more than 36 bbl/A. Looking at the field before the combines started harvesting we expected a yield in the middle to high 40s (bbl) per acre. Yield was 6,917 lb/A (43 bbl/A or 154 bu/A) at 14.3% moisture or 6,739 lb/A (42 bbl or 150 bu/A) at 12% grain moisture.

At the request of the farmer, we agreed to allow him to flail mow the field. It was also fertilized and flooded immediately to produce a second crop.

Second crop was harvested in standing water held for crawfish production. The no-till seedbed prevented the typical severe rutting of the field that would normally have been expected. Yield was 1,821 lb/A (11.2 bbl/A or 40 bu/A) at 12% moisture for a total of 7,451 lb/A (46 bbl/A or 166 bu/A). The farmer said this field had never produced more than 5,832 lb/A (36 bbl/A or 130 bu/A) before.

Although panicle rice mites were detected in the second crop, there was apparently little effect on yield of the second crop.

VERMILION PARISH

Cooperator: Christian Richard
Agent: Howard Cormier
Field Size: 36.6 acres

Cultural Practices

Variety: CL171
Method of Planting: No-till Drill
Water Management: Delayed Flood

Seeding Rate: 75 lb/A
Date of Planting: March 23
Date of Emergence: March 31

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	5-17	5-17
PD	6-3	5-26
50% Heading	6-25	6-19
Drain for Harvest	7-13	
Harvest	8-6	7-24

Yield, Milling and Economic Data

	Yield @ 12 % Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	67.39	57.0/74.6	424.00	6.29	283.67
2nd Crop	23.07	--	104.41	4.53	137.82

Average Parish Yield (1st and 2nd Crop): cwt/A.
[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.
[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
3-9	0-23-34 + S + Zn	250		58	85
4-18	46-0-0	180	83		
5-16	46-0-0	125	58		
8-8	46-0-0	160	74		
Total	--	--	140	58	85

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
Sedge, Narrow Leaved Aster, Dock, Gratiola, Barnyardgrass, Broadleaf Signalgrass, Jointvetch	4-2	NewPath 4 oz + NIS
Sedge	4-16	NewPath 4 oz + Permit 1 oz + Londax .25 oz

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
(preventative)	6-12	Quilt 21 oz + Quadris 3 oz

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	4-25	Mustang Max
Rice Water Weevil	5-2	Mustang Max
Rice Stink Bug	6-27	Mustang Max

WEST CARROLL PARISH

In West Carroll Parish, CL161 was drilled into heavy clay soil at 83 lb/A. Diammonium phosphate (DAP) was applied at the rate of 100 lb/A, and 4 oz of NewPath was sprayed just ahead of flushing. The DAP was applied because it was successful in the area in 2005. These are soils that will test high in phosphorus, but plants will exhibit early-season phosphorus deficiency. Even though it appears to be a transitory situation, the critical need for phosphorus early in the season warrants the application.

Prowl herbicide was included in the first NewPath application because of the history of sprangletop. The only other herbicide applied was the second application of NewPath a couple of weeks later.

Seventy percent of a total of 155 pounds of nitrogen was applied just ahead of initial flood establishment. Insecticide was applied shortly after flooding to control rice water weevils. A second application of Karate was made about 3 weeks later because rice water weevil adults were detected again.

A nearby application of glyphosate to soybeans apparently drifted across the field between permanent flood establishment and green ring. Although it is impossible to estimate its effect on yield, it clearly delayed maturity.

An application of fungicide was made to control sheath blight and to prevent both kernel smut and false smut.

Rice stink bugs reached threshold values and an appropriate insecticide was applied.

The field produced 8,012 lb/A (50 bbl or 178 bu/A) at 19.2% moisture, which equates to 7,356 lb/A (45 bbl/A or 164 bu/A) at 12% grain moisture. Considering the yield potential of CL161, this was an outstanding yield.

WEST CARROLL PARISH

Cooperator: Steve Rye
Agent: Myrl Sistrunk
Field Size: 40.2 acres

Cultural Practices

Variety: CL161
Method of Planting: Drill
Water Management: Delayed Flood

Seeding Rate: 83 lb/A
Date of Planting: March 23
Date of Emergence: April 1

Growth and Development

Stage	Observation Date	DD50 Date
Green Ring	5-31	5-27
PD	6-16	6-7
50% Heading	7-7	6-26
Drain for Harvest	7-30	-
Harvest	8-27	7-31

Yield, Milling and Economic Data

	Yield @ 12% Moisture (cwt/A)	Milling Yield (% whole / % total)	Variable Costs ($/A)[1]	Cost of Production ($/cwt)[1]	Return on Variable Costs ($/A)[1,2]
1st Crop	80.12	64.2/71.5	346.57	4.70	425.81
2nd Crop	--	--	--	--	--

Average Parish Yield (1st and 2nd Crop): cwt/A.

[1] Costs captured are from land preparation to getting the crop to the truck. They do not include land rent, transportation, drying, storage or fixed costs.

[2] This value was obtained using a selling price of $10.50/cwt.

Fertilization

Date	Source	Rate (lb/A)	N (lb/A)	P (lb/A)	K (lb/A)
4-13	18-46-0	100	18	46	
5-8	46-0-0	235	108		
5-31	46-0-0	100	46		
Total	--	--	172		

Weed Management

Weeds Present	Date of Treatment Decision	Recommendation
--	--	Touchdown
Barnyardgrass, History of Sprangletop	4-12	NewPath 4 oz + Prowl 2 1/3 pt
--	5-7	NewPath 4 oz + Surfactant
Sesbania	6-14	2,4-D Levees

Disease Management

Diseases Present	Date of Treatment Decision	Recommendation
Sheath Blight/Hist. of Smut	6-26	Quilt 14 oz + Quadris 5 oz/A

Insect Management

Insects Present	Date of Treatment Decision	Recommendation
Rice Water Weevil	5-11	Karate
Rice Water Weevil	5-24	Karate

Table 3. Ten-Year Louisiana Rice Research Verification Summary.

1998 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia*	53.0	32.8	118.1	5314
Avoyelles	32.5	42.9	154.4	6950
Calcasieu*	60.0	34.1	122.8	5524
East Carroll	33.9	41.1	148.0	6658
Evangeline	33.0	42.9	154.4	6950
Jeff Davis*	61.8	37.3	134.3	6043
Madison	36.6	39.0	140.4	6318
Morehouse	63.0	33.8	121.7	5476
St. Landry	37.1	38.2	137.5	6188
Vermilion	16.7	29.4	105.8	4763
TOTALS	**427.6**	**37.2**	**133.7**	**6018.4**

* Yields include second crop.

1999 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia*	31.1	37.4	134.6	6059
Avoyelles	32.5	46.6	167.8	7549
Calcasieu	49.3	34.6	124.6	5605
Catahoula	30.4	33.4	120.2	5411
East Carroll	36.1	47.0	169.2	7614
Evangeline	22.3	43.1	155.2	6982
Jeff Davis*	26.6	30.8	110.9	4990
Madison	38.1	39.0	140.4	6318
St. Landry	30.1	38.8	139.7	6286
Vermilion	23.8	36.5	131.4	5913
TOTALS	**320.3**	**38.7**	**139.4**	**6272.7**

* Yields include second crop.

2000 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia	53.3	39.4	141.8	6383
Avoyelles	63.2	36.7	132.1	5945
Calcasieu	22.1	25.1	90.4	4066
Catahoula	39.6	36.4	131.0	5897
East Carroll	45.1	49.1	176.8	7956
Evangeline	19.9	38.2	137.5	6188
Jeff Davis	30.6	26.7	96.1	4325
Morehouse	27.7	28.3	101.9	4585
St. Landry	70.7	39.2	141.1	6350
Vermilion*	21.6	37.7	135.7	6107
TOTALS	**393.8**	**35.7**	**128.4**	**5780.2**

* Yields include second crop.

Table 3. Continued.

2001 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia*	60.6	50.8	182.9	8230
Allen	41.6	35.1	126.4	5686
Avoyelles	63.2	38.1	137.2	6172
Calcasieu*	61.9	39.4	142.0	6388
Concordia	79.6	36.1	130.1	5853
Evangeline*	20.8	52.7	189.7	8538
Jeff Davis*	21.6	57.3	206.4	9289
Richland	65.9	46.0	165.5	7447
St. Landry*	40.6	51.1	184.0	8282
Vermilion*	33.3	52.4	188.7	8493
TOTALS	**489.1**	**45.9**	**165.3**	**7437.8**

* Yields include second crop.

2002 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia*	38.4	49.8	179.3	8068
Allen*	25.1	46.0	165.6	7452
Avoyelles	37.4	49.9	179.6	8084
Beauregard*	49.5	53.1	191.2	8602
Calcasieu*	41.4	42.4	152.6	6869
Concordia	67.6	48.2	173.5	7808
Evangeline	42.0	37.6	135.4	6091
Jeff Davis*	31.7	45.0	162.0	7290
Richland	35.8	42.1	151.5	6819
St. Landry	32.7	48.8	175.7	7906
Vermilion*	32.0	49.8	179.4	8072
TOTALS	**433.6**	**46.6**	**167.8**	**7551.0**

* Yields include second crop.

2003 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia	57.2	44.0	158.4	7128
Allen*	35.7	46.1	166.0	7469
Avoyelles	37.4	50.1	180.4	8116
Beauregard*	45.7	48.7	175.2	7884
Concordia	79.5	49.2	177.1	7970
Evangeline*	48.4	44.5	160.2	7209
Jeff Davis*	52.9	28.7	103.3	4649
Richland	40.2	44.7	160.8	7234
St. Landry*	32.7	61.1	220.0	9898
Vermilion*	33.0	40.0	144.0	6480
TOTALS	**462.7**	**45.7**	**164.5**	**7403.7**

* Yields include second crop.

Table 3. Continued.

2004 Verification Acres and Yields				
		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Allen*	53.2	40.9	147.1	6620
Avoyelles	33.3	32.8	118.0	5307
Beauregard*	21.8	42.5	153.3	6899
Concordia	82.3	36.0	130.0	5843
East Carroll	54.8	45.8	165.0	7427
Evangeline	30.7	34.8	125.2	5638
Jeff Davis*	42.3	38.5	138.6	6237
Natchitoches	47.2	44.1	158.8	7144
St. Landry*	60.1	65.1	234.3	10543
Vermilion*	30.0	42.1	151.6	6824
TOTALS	**455.7**	**42.3**	**152.2**	**6848.2**

*Yields include second crop.

2005 Verification Acres and Yields

		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Acadia	28.9	39.6	143.8	6427
Allen	76.7	25.6	92.0	4140
Avoyelles	32.1	35.9	129.3	5819
Calcasieu	49.0	51.0	184.0	8282
Concordia	60.5	43.0	156.0	7003
East Carroll	30.4	47.9	172.7	7771
Evangeline	30.0	37.1	133.6	6014
Jeff Davis	39.2	32.5	117.0	5264
Natchitoches	30.0	43.3	156.0	7022
Richland	47.4	49.2	177.2	7974
St. Landry	61.7	47.5	170.9	7689
Vermilion	52.8	40.9	147.3	6631
TOTALS	**538.7**	**41.1**	**148.3**	**6669.7**

*Yields include second crop.

2006 Verification Acres and Yields

		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Avoyelles	41.8	43.0	155.0	6972
Concordia	54.7	50.8	183.0	8237
East Carroll	60.4	44.5	150.0	7210
Evangeline	29.4	32.3	116.0	5227
Jeff Davis	21.5	43.8	157.8	6000
St. Landry	40.9	36.8	132.5	5962
Vermilion	29.6	37.0	133.3	7100
West Carroll	50.1	53.1	191.2	8603
TOTALS	**328.4**	**43.4**	**156.4**	**7040**

*Yields include second crop.

2007 Verification Acres and Yields

		Yield @ 12% Moisture		
Parish	**Acres**	**Barrels/A**	**Bushels/A**	**Pounds/A**
Avoyelles	40.9	56.7	204	9187
Concordia	53.8	53.6	193	8680
East Carroll	23.0	49.0	176	7917
Evangeline – St. Landry	33.9	50.1	180	8122
Jeff Davis*	38.9	55.8	201	9046
Vermilion*	36.6	46.0	166	7451
West Carroll	40.2	45.4	164	7356
TOTALS	267.3	51.2	184	8293

*Yields include second crop

1998 - 2007 Verification Summary					
Verification Totals			**Verification Parish Totals**		
Year	**Acres**	**Pounds/A**	**Acres**	**Pounds/A**	**Verification - Parish**
1998	427.6	6018.4	475,103	5052	966.4
1999	320.3	6272.7	444,015	5502	770.7
2000	393.8	5780.2	385,824	5620	160.2
2001	489.1	7437.8	412,286	5794	1643.8
2002	433.6	7551.0	412,630	5764	1787
2003	462.7	7403.7	327,843	5843	1560.7
2004	455.7	6848.2	311,606	5582	1266.2
2005	538.7	6669.6	402,759	6165	504.6
2006	328.4	7039.5	185,249	5644	1395.5
2007	267.3	8293.3	183,357	6501	1792
Totals	4117.2	6931.4	3,540,672	5746.7	1184.7

RICE WEED CONTROL

WEED MANAGEMENT IN HERBICIDE-RESISTANT/TOLERANT AND CONVENTIONAL RICE

E.P. Webster, S.L. Bottoms, J.B. Hensley, and J.S. Atwal

Introduction and Justification

Weed control studies were conducted at the Rice Research Station and producer fields in south Louisiana in 2007. A total of 57 studies were established with a total of 3,000 research plots. These studies indicate that weed control in rice will continue to be more effective as new technologies and new herbicides become available to the producers. Many of these studies have been conducted over 2 to 3 years and have been completed. However, several of these studies have 1 year of data and need to be repeated to verify the results over time. This project continues to work on different application methods for products in drill- and water-seeded rice, and it continues to supply data for herbicide development and to aid in the expansion of current herbicide labels.

The Use of Permit in Water-Seeded Rice

Permit was applied at 0.5, 1.0, and 2.0 oz/A at 14, 7, and 0 days prior to planting (DPP) and 3 and 5 days after planting. The area was conventionally tilled prior to the initial herbicide application (14 DPP) and no other tillage was performed after initial application. The 0 DPP application was applied, and a seeding flood was immediately established. Pregerminated Trenasse rice was hand seeded after flood establishment, and the area was drained 24 hours after planting to allow for seedling establishment. Barnyardgrass, broadleaf signalgrass, and Indian jointvetch control and crop injury were evaluated. This research indicates that broad spectrum weed control was achieved with Permit applied at 0.5, 1.0, and 2.0 oz/A at 14 and 7 DPP. Rice injury was below 20% when Permit was applied at 0.5 and 1.0 oz/A. This research will be used for label support by reducing the plant back interval for Permit.

Ducksalad Control in a Rice Production System

A study was established to evaluate several broadleaf herbicides for control of ducksalad. The area was conventionally tilled and a seeding flood was established to simulate a water-seeded system. Rice was not seeded to eliminate any competition from rice with ducksalad. The initial flood was removed 48 hours after flooding, and herbicides with residual activity were applied 24 hours later as a preemergence application prior to ducksalad emergence. Two postemergence applications were applied. The first postemergence application was applied to ducksalad in the cotyledon stage, and the second application timing was applied when ducksalad reached the spoon stage. At each timing, the flood was removed to guarantee herbicide coverage. Command was applied as a preemergence application and prevented ducksalad emergence for approximately 2 weeks, and this delay in emergence would allow for rice stand establishment that would compete with ducksalad. Newpath provided control of ducksalad when applied at all timings. V-10142 applied preemergence provided excellent control of ducksalad for approximately 30 days after application. Herbicides that provided excellent postemergence activity were Regiment, Strada, and Grasp.

Postemergence Grass Control with Command

A study was established to determine the size of barnyardgrass, broadleaf signalgrass, and sprangletop that Command can control when applied postemergence. This research indicates Command applied postemergence at 13 oz/A with 1% v/v crop oil concentrate can control all three grasses evaluated when their stage of growth is in the 1- to 3-leaf stage. Control decreases when all three grasses reach the tillering stage. Rice yields also support the control data observed in this study.

Newpath and Beyond Application Rates and Timings for Use in Clearfield Rice

This project has conducted over 100 field, greenhouse, and laboratory trials on the Clearfield rice production system. This project has focused on application timing and rate of Newpath, Clearpath, and Beyond to best control red rice and other weeds present in rice fields. With the rate change for Newpath, research was established to evaluate the use of Newpath at 12 oz/A applied over several application timings with or without the addition of 5 oz/A of Beyond. The results from this study indicate the most important factor for red rice control is the timing of Newpath. If the initial and sequential applications of Newpath are applied early to small actively growing red rice, control will approach 100%. However, if the applications of Newpath are delayed and larger red rice is present at the time of application, control will decrease, and this is also true with other weeds such as barnyardgrass, sprangletop, broadleaf signalgrass, etc. This research will continue to be evaluated in the next few years to better refine our recommendations in Louisiana for weed management decisions in a Clearfield rice production system.

Evaluation of Herbicide Drift in Rice with Roundup, Ignite, Newpath, and Beyond

Four studies were established to evaluate the impact of herbicide drift (Roundup, Ignite, Newpath, and Beyond) on the first crop and ratoon rice. All of the herbicides were applied at 0.125 and 0.0625 of the labeled use rate. The labeled rates for each herbicide were Roundup Weathermax at 22 oz/A, Ignite at 24 oz/A, Newpath at 4 oz/A, and Beyond at 5 oz/A. The application timings were 3-leaf to 1-tiller, panicle differentiation (PD), early boot, and 3 days prior to maturity.

Roundup Weathermax (glyphosate): The early application timing resulted in more injury to rice compared with later applications, and 3-leaf rice or younger did not recover from this application. The PD and boot applications resulted in reduced injury; however, yield was reduced compared with the nontreated. These timings also resulted in small multiple heads per tiller and short flag leaves. The maturity application did not injure rice and yield was not reduced. **Ignite (glufosinate):** Ignite resulted in the least amount of damage from an injury and yield prospective. The injury was usually slight yellowing and some necrosis at the leaf margins. In most cases, within 10 to 14 days, the visual symptoms were no longer present. **Newpath (imazethapyr):** Observations were very similar to Roundup Weathermax. The early application timing resulted in more injury to rice compared with later applications, and 3-leaf rice or younger did not recover from this application. The PD and boot applications resulted in reduced injury; however, yield was reduced compared with the nontreated. These timings also resulted in small multiple heads per tiller and short flag leaves. The maturity application did not injure rice and yield was not reduced. **Beyond (imazamox):** Observations were very similar to Roundup Weathermax and Newpath. The early application timing resulted in more injury to rice compared with later applications, and 3-leaf rice or younger did not recover from this timing. The PD and boot applications resulted in reduced injury; however, yield was reduced compared with the nontreated. These timings also resulted in small multiple heads per tiller and short flag leaves. The maturity application did not injure rice and yield was not reduced.

Fall Panicum Control

A study was conducted off-station to evaluate control of fall panicum in drill-seeded rice. Newpath at 6 oz/A plus Prowl H20 or Command applied early postemergence provided good control of fall panicum for 30 days after treatment. Clincher applied postemergence to rice under a flooded situation also provided excellent control as a salvage treatment.

Extension Activities

This project is continuing to extend the findings from the weed management research programs in Louisiana to producers, agents, and consultants. An annual report is published every year in a timely manner in order to transfer research findings to the clientele of the state and the region. This project continues to establish research and demonstration projects at on-farm locations throughout the rice growing region. This project has done numerous on-farm calls to aid producers, agents, and consultants by making herbicide recommendations and to identify weeds, consult on herbicide failures, and identify herbicide drift problems.

This is a summary of the research that was conducted in 2007. To see the complete weed control annual report, please go to **http://www.agronomy.lsu.edu/weedscience/annualreports.asp**.

STATION PERSONNEL

Steve Linscombe, Professor -- Resident Coordinator

Jodie R. Gautreaux	Administrative Coordinator
Kimberly G. Guidry	Accounting Specialist
Carol D. LeDoux	Administrative Program Specialist
Darlene M. Regan	Administrative Coordinator
Donna L. Sonnier	Custodian

S. Brooks Blanche, Assistant Professor/Research -- Rice Breeding

Gabriel Anderson[1]	Research Associate
Quentin J. Zaunbrecher[2]	Research Associate

Michael D. Dronet, Research Farm Maintenance Manager -- Shop

Rayford E. Ancelet	Maintenance Repairer I
A. Todd Cormier[3]	Maintenance Repairer I
Harold J. Doucet	Maintenance Repairer Master
Joshua P. Regan[4]	Maintenance Repairer I

Richard T. Dunand[5], Professor-- Rice Physiology

Raymond R. Dilly, Jr.	Research Associate

Donald E. Groth, Professor/Research Coordinator--- Rice Pathology

Marty J. Frey (25%)	Research Associate
Joseph Nugent	Research Farm Specialist II
Xin Hua Wang	Research Associate

Dustin Harrell, Assistant Professor --- Rice Agronomy/Rotational Crops

James P. Leonards	Research Associate
Ronald P. Regan	Research Associate
Douglas M. Walker	Research Associate

William J. Leonards, Jr., Research Associate/Coordinator/Manager ----------------------------- Farm Management

Brian D. Broussard	Research Farm Specialist II
Paul A. Miller[6]	Research Farm Assistant II
Timothy C. Miller	Research Farm Supervisor
Jimmy D. Pellerin	Research Farm Specialist II
Ronald J. Pellerin	Research Farm Manager I
Thomas J. Reed	Research Farm Specialist II
A. Rashad Shamsie[7]	Research Farm Specialist II

---

1 Resigned 09/30/07.
2 Appointed 09/12/07.
3 Appointed 04/09/07.
4 Appointed 11/12/07.
5 Retired 01/02/08.
6 Appointed 02/19/07.
7 Resigned 02/15/07.

STATION PERSONNEL
(Continued)

Steven D. Linscombe, Professor --- Rice Breeding

Karen F. Bearb	Research Associate
Corey A. Conner	Research Associate
Herman L. Hoffpauir	Research Farm Specialist II
Laura E. Leonards[8]	Research Farm Assistant I
Brent W. Theunissen	Research Associate

Mona M. Meche, Research Associate -- Rice Anther Culture/Tissue Culture

Jennifer Dronet	Research Farm Assistant II
Xue Jin	Research Farm Specialist I
Christie Louvier	Research Farm Assistant II

W. Ray McClain, Professor --- Aquaculture

John J. Sonnier	Research Farm Specialist II
Ricardo Ramalho[9, 10]	Visiting Scientist

John K. Saichuk, Professor--- Rice Agronomy/Extension

Kim Landry[11]	Extension Associate

Xueyan Sha, Assistant Professor -- Rice Breeding

Blake J. Henry[12]	Research Farm Specialist II
Shane J. Theunissen	Research Associate

Michael J. Stout (Baton Rouge) --Entomology

Marty J. Frey, Research Associate (75%)

Herry Utomo, Assistant Professor/Research --------------------Marker-Assisted Selection Breeding/Biotechnology

Anna L. McClain	Research Farm Specialist II
Jennifer L. Nash[13]	Research Associate
Sigit Mujiharjo[14]	Visiting Scientist

Ida Wenefrida, Post Doctoral Researcher --- Biotechnology

Lawrence M. White, III, Research Associate-- Foundation Seed Rice

The Rice Research Station is especially indebted to the Agricultural Chemistry Division of Louisiana for the chemical analyses of research samples and to the Department of Experimental Statistics for their help in planning of experimental designs and statistical analyses of research data.

___

[8] Appointed 11/12/07.
[9] Appointed 03/22/07.
[10] Resigned 06/21/07.
[11] Appointed 03/26/07.
[12] Appointed 01/02/07.
[13] Resigned 01/04/08.
[14] Resigned 08/02/07.

COOPERATING PERSONNEL

Cooperating personnel on research projects at the Rice Research Station include the following:

Lucas Aviles -- Rice Breeding
University of Puerto Rico Research & Extension Center
Lajas, Puerto Rico

Gary A. Breitenbeck --Salt Salinity
School of Plant, Environmental and Soil Sciences
Louisiana State University Agricultural Center

Marc A. Cohn--- Red Rice Control
Department of Plant Pathology & Crop Physiology
Louisiana State University Agricultural Center

James L. Griffin --- Soybean Weed Control
School of Plant, Environmental and Soil Sciences
Louisiana State University Agricultural Center

Steve A. Harrison --- Wheat and Coastal Erosion Control
School of Plant, Environmental and Soil Sciences
Louisiana State University Agricultural Center

Clayton A. Hollier--- Plant Pathology
Louisiana Cooperative Extension Service
Louisiana State University Agricultural Center

Fangneng Huang ---Sorghum Entomology
Department of Entomology
Louisiana State University Agricultural Center

Natalie Hummel -- Rice Insect Control
Department of Entomology
Louisiana State University Agricultural Center

Carrie A. Knott ---Marsh Breeding
School of Renewable Natural Resources
Louisiana State University Agricultural Center

Rick Mascagni --Grain Sorghum
Northeast Research Station
Louisiana State University Agricultural Center

Mike Materne-- Coastal Erosion Control
USDA-NRCS
Baton Rouge, Louisiana

Steve Moore -- Soybean
Dean Lee Research Station
Louisiana State University Agricultural Center

COOPERATING PERSONNEL

(Continued)

James H. Oard ---Rice Genetics
School of Plant, Environmental and Soil Sciences
Louisiana State University Agricultural Center

Anthony Rivera-- Rice Breeding
University of Puerto Rico Research & Extension Center
Lajas, Puerto Rico

Robert Romaire---Aquaculture
Aquaculture Research Station
Louisiana State University Agricultural Center

Milton C. Rush ---Rice Diseases
Department of Plant Pathology & Crop Physiology
Louisiana State University Agricultural Center

Brian Scheffler-- Plant Genomics
USDA-ARS MSA Genomics Laboratory
Stoneville, Mississippi

Raymond W. Schneider ---Soybean Diseases
Department of Plant Pathology & Crop Physiology
Louisiana State University Agricultural Center

Michael Stout --- Rice Insect Control
Department of Entomology
Louisiana State University Agricultural Center

Eric Webster -- Weed Control
School of Plant, Environmental and Soil Sciences
Louisiana State University Agricultural Center

Bill Williams-- Weed Control
Northeast Research Station
Louisiana State University Agricultural Center

E. Allen Wilson --- Bird Control
USDA Animal Damage Control
Crowley, Louisiana