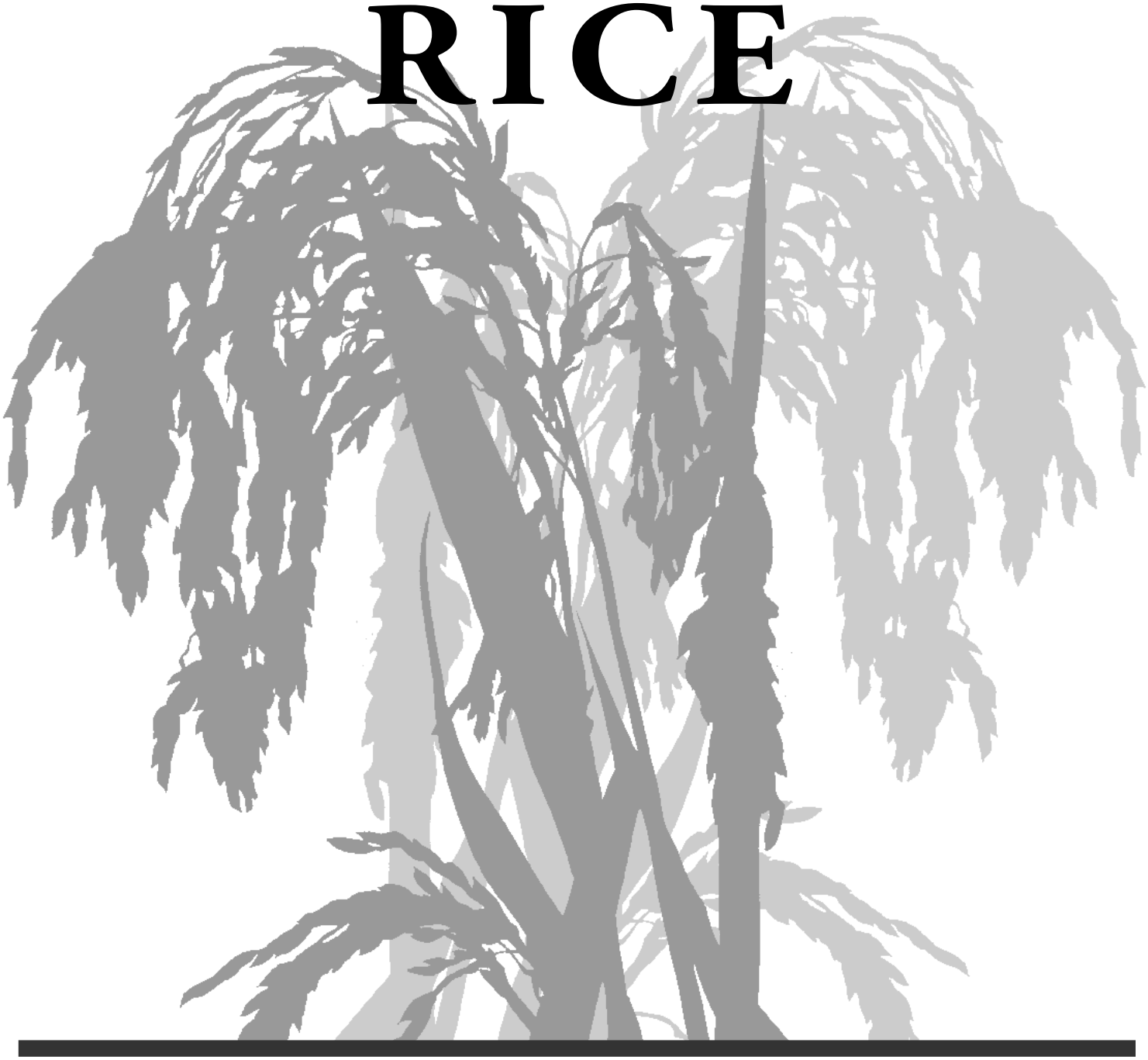
Information Bulletin 453 December 2009

MISSISSIPPI RICE



VARIETY TRIALS, 2009

MAFES

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NOTICE TO USER

This Mississippi Agricultural and Forestry Experiment Station Information Bulletin is a summary of research conducted under project number MIS-1530 at the Delta Research and Extension Center in Stoneville, Mississippi, and several other locations shown on the map on the third page. It is intended for colleagues, cooperators, and sponsors. The interpretation of data presented in this publication may change after additional experimentation. This information is not to be construed either as a recommendation for use or as an endorsement of a specific variety or product by Mississippi State University or the Mississippi Agricultural and Forestry Experiment Station.

This report contains data generated as part of the Mississippi Agricultural and Forestry Experiment Station research program. Joint sponsorship by the Mississippi Rice Promotion Board is gratefully acknowledged.

Trade names of commercial products used in this research project are included only for clarity and understanding. All available names (i.e., trade names, chemical names, experimental product code names or numbers, etc.) of products used in this research project are listed in the tables and footnotes contained in this report.

Mississippi Rice Variety Trials, 2009

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We would like to offer our sincere appreciation to the Mississippi Rice Promotion Board for financially supporting these research efforts. We also extend our thanks to the rice growers who provided their land, inputs, and willingness to endure the inconvenience these tests can cause. This report was approved for publication as MAFES Information Bulletin 453 of the Mississippi Agricultural and Forestry Experiment Station, Mississippi State University. It was published by the Office of Agricultural Communications, a unit of the Mississippi State University Division of Agriculture, Forestry, and Veterinary Medicine.

Dedication

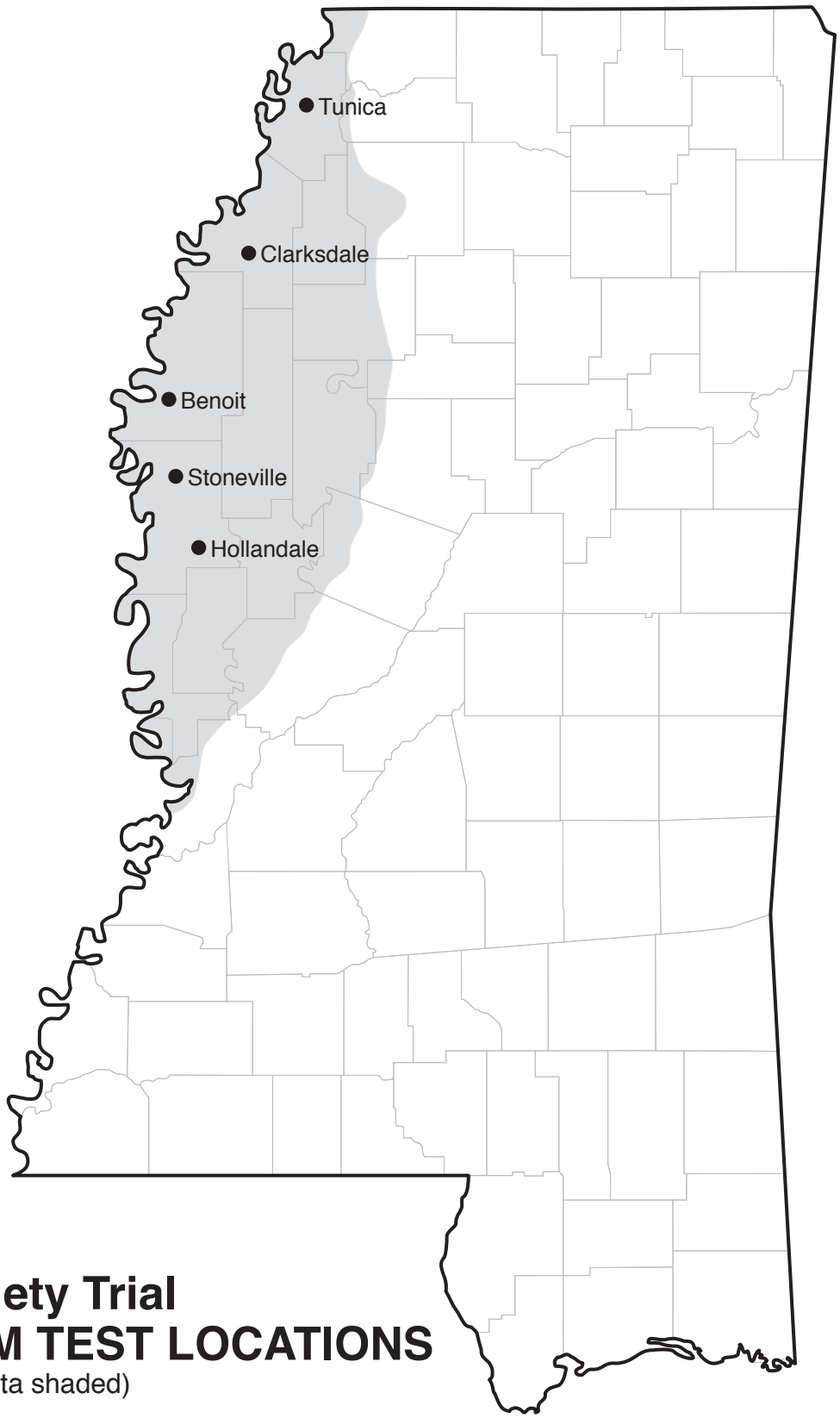
Information Bulletin 453 is dedicated to Dr. Theodore (Ted) C. Miller in honor of his 33 years of service to the Mississippi Rice Variety Trials.

After serving as a helicopter pilot in Vietnam and receiving a Purple Heart in recognition of his battle wounds, Miller earned his master's degree in Extension education and his doctorate in agronomy from Louisiana State University. In 1976, he began his research and Extension career at the Delta Branch Experiment Station in Stoneville, Mississippi, and conducted his first on-farm variety trial that same year.

Miller continued to dedicate his time and efforts to conducting variety trials while serving as the Mississippi Extension rice specialist from 1982 to 1996. Typical of Miller's work ethic, he did not rest after his retirement in 1996 but instead started his own private consulting firm, Tri-M Agronomics, LLC. Miller contracted with the Mississippi Rice Promotion Board to assist the breeding program in conducting the variety trials from 1996 to 2008.

His tireless efforts for 33 years have ensured precise and accurate information for new varieties and experimental lines. In addition to his extensive knowledge of rice production, Miller has a warm and welcoming personality that benefits him greatly in working with growers and county agents to coordinate experiment sites and procedures.

The Delta Research and Extension Center rice research team and the entire Mississippi rice industry will greatly miss Miller's efforts and vast experience in the field for many years to come. We wish Miller and his family great happiness in his retirement.



Rice Variety Trial
ON-FARM TEST LOCATIONS

(Mississippi Delta shaded)

Mississippi Rice Variety Trials, 2009

Introduction

In 2009, approximately 240,000 acres of rice were planted in the Delta counties of Mississippi. This represented a 4% increase in planted acreage from 2008. Clearfield rice varieties CL151 and CL131 occupied the majority of the planted acreage at approximately 65%. The remaining acreage was planted to Cocodrie, Cheniere, Bowman, and Sabine. Hybrid rice, which is provided exclusively by RiceTec and Bayer, was planted on less than 10% of the Mississippi rice acres.

Every year provides a different mix of challenges for rice producers, and 2009 was no exception. Two weeks of excessive rainfall at the first of May delayed planting on approximately 25% of the total state acres until after May 15. Rice was also replanted on a portion of the acres due to the rainfall. In June, temperatures were above normal, which contributed to some kernel blanking on the earliest planted rice. September and October were some of the wettest months on record. Problems associated with lodging were exacerbated with the wet harvest conditions, especially seed sprouting. CL151 was planted for the first time in 2009 on a large acreage. Though there was information that suggested it was susceptible to lodging, it has exceeded most expectations in that regard. Current USDA yield prediction for Mississippi is 6,800 pounds per acre (151 bushels per acre), which is similar to last year and the 5-year average. As mentioned earlier, the extreme weather patterns throughout the growing season have significantly affected this year's crop.

The purposes for conducting on-farm rice variety trials are multiple. Advanced experimental lines are evaluated under various production environments, which gives the breeding program necessary information to select lines for release as public varieties. Specific information includes yield and milling performance, insect and disease susceptibility, and lodging. By placing these trials at multiple locations throughout the Delta, rice lines and varieties are exposed to conditions and practices that are common to commercial production that cannot always be reproduced at the Experiment Station. In addition to providing the breeder and agronomist worthwhile information, growers are provided with side-by-side comparisons of the currently available rice varieties and hybrids. This information can be used to guide variety selection in the succeeding year. Variety selection is one of the most important decisions a grower makes in production planning. Growers should attempt to select varieties that offer the best combination of yield and quality, while also considering the variety's susceptibility to yield-limiting factors. Furthermore, breeders and agronomists use the variety trials as an educational tool for research and Extension staff, farmers, private consultants, and industry personnel. Oftentimes, these trials are used to give interested parties the "first look" at new or potential releases from Mississippi State University and other rice breeding institutions, as well as private industry.

Test Procedures

A total of 41 entries including named varieties, hybrids, and experimental lines were planted at five "on-farm" locations and at the Delta Research and Extension Center (DREC). One on-farm location was abandoned shortly after planting as stands were extremely variable due to the excessive rainfall received in early May. Of the 41 entries, 23 were included in this report. Of those 23 entries, 10 were conventional public-released varieties, three privately owned conventional hybrids, one Clearfield hybrid, three Clearfield varieties, and seven experimental lines from Mississippi. Except for the medium-grain Neptune, all other reported entries are long-grain. Individual plots consisted of 8 drill rows 15 feet in length and spaced 8 inches apart. Varieties and experimental lines were planted at 90 pounds of seed per acre, and hybrids were planted at 35 pounds of seed per acre. Seeds were planted approximately 1.25 inches deep into stale seedbeds at all locations. All entries were replicated three times at each location. Two on-farm locations (Hollandale and Tunica) received all agricultural inputs based on the whole field. Due to other experiments being conducted in the

same field, the Benoit site received only one application of urea at the rate of 150 pounds of N per acre immediately before flood establishment. The Clarksdale site received 150 pounds of N per acre preflood and an additional 45 pounds of N per acre applied at ½-inch internode elongation. Herbicide, insecticide, and fungicide applications were made according to the need of the field at all locations. All management applications are included in Tables 1–5 [Note: Readers who may be less familiar with pesticide formulations and application rates may wish to refer to pesticide product label information available on the Web or to the *2009 Weed Control Guidelines for Mississippi* (MSU-ES/MAFES Pub. No. 1532)].

Agronomic data were collected at appropriate times during the growing season. Sheath blight and lodging ratings were obtained on a plot-by-plot basis. The entire plot was harvested with a small-plot combine equipped with a computerized weigh system and moisture meter. Due to differences in maturity, the majority of the entries at each location had to achieve appropriate harvest moisture before the test was harvested. Average harvest grain moisture for each entry is reported in Tables 1–5. Subsamples of each entry were collected at harvest. Those subsamples were used to conduct milling, bushel weight, and 1,000 seed weight analyses. Plot grain yields may be as much as 15% higher than what would be achieved in the production field. This is largely due to the higher ratio of rice subjected to the border effect. Hybrid yields appear to be affected more by the border effect than varieties due to heterosis. Plot yields for entries should be compared in a relative manner rather than looking at reported yield potential alone.

All relevant data were subjected to analysis of variance procedures using SAS statistical software. The least significant difference test at the 5% significance level was used to differentiate between entries. If yields of two entries reported in Tables 1–6 were greater than the LSD value reported, the entries are statistically different. In addition, a coefficient of variation (CV) was calculated for each test. This measurement is an indication of the level of precision of each test. Lower CV values indicate greater reliability of the test. The LSD and CV values are reported in the footnotes of Tables 1–6 and 8. Statistical analyses included all 41 entries though only 23 entries are reported.

RESULTS

The performance of each variety in the five individual test locations is presented in Tables 1–5. Substantial sheath blight was observed only at the Tunica location (Table 1). Lodging was observed at Tunica (Table 1) and Hollandale (Table 5). Lodging at Tunica was correlated with sheath blight incidence. Proof of this is that CL131, which is rated resistant to lodging, was observed to have 80% lodging. It also was observed to have 50% sheath blight infection. Harvest moisture at Hollandale was relatively low for most entries, which increased the chance for lodging, especially for hybrids. Average grain yields for individual locations ranged from 178 bushels per acre at Tunica to 227 bushels per acre at Benoit. The CVs for yield ranged from 5–11%, which is respectable for these types of experiments. Milling yields were good to excellent. Cooler weather during the grain-ripening stage, coupled with harvesting milling samples at harvest moisture as opposed to grain maturity, allowed for exceptional milling yields.

Table 6 provides a five-location summary of grain yields for the 23 entries. The hybrids outyielded varieties and lines by an average of 25%. This is common in small-plot research but is seldom realized across entire fields because of border effects mentioned previously. On the average, growers can realistically expect 10–15% greater yields when planting a hybrid compared with a standard high-yielding variety. For several years, the Hollandale location has been at or near the top for average yields. This year, rice yields were lower than in recent years. In addition to the lodging of some entries, Grasp herbicide was applied (Table 5 footnotes). Grasp is a sulfonyl-urea herbicide that is more injurious to rice under elevated soil pH. The average soil pH for Hollandale was 8.2. Early-season rice injury symptoms were observed up to 4 weeks after flood. Symptoms included stunting, yellowing, and lack of canopy closure due to plants having a more erect growth habit (commonly referred to as spindly rice). Interestingly, injury symptoms were not as severe for rice hybrids and Clearfield varieties and Clearfield experimental lines compared with conventional varieties and lines.

RU0804083, an experimental line from Mississippi averaged 212 bushels per acre across all locations. This ranked it slightly below CL151 in yield but greater than other conventional and Clearfield varieties and experimental lines. In 2008, RU0804083 also yielded higher than other conventional and Clearfield varieties and lines. This line averaged more than 60% whole milled rice, stands approximately 40 inches tall, and is similar in maturity to Cocodrie. Because of its performance in Mississippi and in the Uniform Regional Rice Nursery conducted in the South, it is expected to be released as a variety in early 2010. In addition to RU0804083, two Clearfield lines showed promise in their first year of multistate and on-farm testing. RU0904077 and 06 CFP 952 produced average grain yields of 203 and 207 bushels per acres, respectively. Both also milled greater than 60% whole grain. These two lines were superior to CL131 in yield, and lodging was minimal. These two lines have been sent to Puerto Rico for line purification and seed increase so that they can be further evaluated in 2010 (Table 8).

Bowman, a release from Mississippi in 2007, showed average performance in 2009. Its yield was comparable to Cocodrie and Wells. Observations from Bowman in 2009 indicated that it was more sensitive to cooler conditions in the late summer, which delayed heading and maturity. A positive observation was that it resisted lodging under the poor weather

conditions during harvest, and it yielded above average in many producer fields. If conventional rice is planted, Bowman will provide a viable option to Cocodrie, Cheniere, and Wells. Table 9 provides agronomic, yield, and milling data from select rice varieties and hybrids that have been included in on-farm tests for multiple years. Variety selection should include emphasis on performance stability over many environments. Varieties such as Cocodrie and Wells have been relatively stable over many years, thus they have been popular varieties in Mississippi and the Midsouth for several years.

Variety and hybrid reactions to common diseases and straighthead disorder are found in Table 10. Decisions about the use of fungicides should be made considering a variety's susceptibility to a particular disease, the potential for the disease to cause economic loss, and the efficacy of fungicides that are available to combat or prevent the respective disease.

Nitrogen fertilization rate guidelines are provided in Table 11. These guidelines were generated from multiyear, multisite N response studies conducted for newly released cultivars. Current economics, combined with the individual cultivars' yield potential and susceptibility to lodging, are included in the determination of rate guidelines. Year after year, coarse-textured soils, commonly referred to as silt loams, require approximately 30 pounds of nitrogen per acre less than fine-textured or clay soils. By applying less N on silt loam soils, disease and lodging incidence are subject to decrease without sacrificing yield and quality.

Suggested varieties for Mississippi rice growers are Bowman, Cocodrie, Cheniere, and Wells. Sabine is often grown on limited acreage by contract. XL723 is a good choice for conventional hybrid rice production. For growers who need to use the Clearfield technology to control red rice, CL151 and CL131 varieties will be available in 2010. Furthermore, CLXL729 has proven itself as a good choice for those interested in growing Clearfield hybrid rice. Seed costs for Clearfield rice have increased substantially in recent years. Clearfield rice should be used as a tool with careful attention given to stewardship so that the technology can last into the future. Incidences of outcrossing increase each year in the Midsouth, which jeopardizes this technology. On average, CL151 has the greatest yield potential of any inbred cultivar grown in the Midsouth. However, careful attention should be given to managing CL151 so that the yield potential is realized. Lodging is a serious problem with CL151. High yield potential, overfertilization, and susceptibility to stem and sheath rot appear to be the major reasons for its susceptibility to lodging. Harvesting CL151 at higher grain moisture may help. Therefore, it is important to make planting plans for it considering your ability to harvest and handle green rice (17–20%). CL131, though not a workhorse from a yield-potential standpoint, will still play a role in 2010 plantings for those who need Clearfield rice. In red-rice-infested fields, it provides growers a return on their investment with essentially minimal to no risk of lodging. With the current cultivars that rice producers have to choose from, there are pluses and minuses for each of them. Rice producers seek high-yielding cultivars, but other traits such as milling quality, straw strength, and disease resistance also are important. As 2009 has shown, there is a need for high-yielding cultivars that are stable across field conditions.

Table 1. Performance of rice cultivars and lines grown on Keyespoint silty clay soil near Tunica, Tunica County, Mississippi, 2009.[1]

Entry	Yield[2]	Milled head rice	Whole milled rice	Total milled rice	Harvest moisture	Bushel weight	Plant height	50% heading[3]	Maturity	Lodging	1000 seed weight[4]	Sheath blight[5]
	bu/A	*lb/A*	*%*	*%*	*%*	*lb*	*in*		*days*	*%*	*g*	*%*
CLXL729	261	7249	61.7	72.0	14.4	39.3	46	87	125	0	25	3
XL723	249	6922	61.8	71.8	15.7	38.2	46	86	125	5	24	8
ARIZE 1003	231	6193	59.5	68.7	23.2	36.6	47	106	131	0	26	1
TEMPLETON	222	6692	67.0	72.3	17.5	44.0	43	95	122	0	22	5
TAGGART	205	5930	64.2	71.1	19.4	43.6	45	96	124	0	27	3
RONDO	197	5721	64.6	68.7	23.7	36.6	42	101	123	0	26	1
RU0804083	195	5476	62.3	70.1	16.4	41.5	40	90	122	0	28	8
RU0904194	188	5364	63.5	72.5	14.8	41.9	37	90	122	0	25	6
CHENIERE	186	5347	63.8	70.0	17.2	40.7	39	94	125	5	21	12
RU0904077	183	4873	59.1	70.0	17.7	40.5	44	92	124	0	26	3
CL151	183	5024	61.1	70.3	16.4	41.2	40	89	125	5	22	18
RU0804196	180	5581	69.0	73.7	16.0	43.2	39	93	124	0	28	7
RU0704197	179	5169	64.1	70.3	15.3	42.9	42	90	120	0	21	12
BOWMAN	177	4763	59.8	67.9	18.4	43.0	39	95	126	0	25	3
RU0904193	176	5218	66.0	73.4	15.9	41.7	39	92	125	0	26	5
WELLS	176	5206	65.8	73.3	17.7	42.8	42	92	123	0	26	7
06 CFP 952	175	4861	61.7	71.0	17.2	41.6	41	88	123	40	25	17
COCODRIE	175	5037	64.0	71.9	17.2	41.8	39	90	123	10	24	20
CATAHOULA	174	4977	63.6	72.1	15.8	41.4	40	91	123	0	24	8
CL111	171	4885	63.5	70.8	15.1	41.5	43	88	123	0	26	13
JAZZMAN	166	5074	67.9	72.1	17.1	41.7	39	93	121	0	27	4
NEPTUNE[6]	154	4511	65.0	69.2	20.2	41.0	36	92	123	10	28	11
CL131	119	3184	58.4	66.3	15.3	38.9	36	91	120	80	22	50

[1]**Planting date:** April 24. **Emerged:** May 2. **Herbicides:** 1 pound per acre of glyphosate on April 15; 24 fluid ounces per acre of Ricestar HT plus 1 fluid ounce per acre of Aim on June 6; 15 fluid ounces per acre of Clincher on June 29. **Fertilizer:** 260 pounds per acre of urea on June 8; 130 pounds per acre of urea on June 27. **Stopped pumping:** August 26**. Harvested:** September 9.
[2]Rough rice at 12% moisture. **A difference of 32 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 11%.**
[3]Days after emergence.
[4]Weight of 1,000 kernels.
[5]Sheath blight rating using average percent of plants infected on a plot basis.
[6]Medium grain.

Table 2. Performance of rice cultivars and lines grown on Dowling clay soil near Clarksdale, Coahoma County, Mississippi, 2009.[1]

Entry	Yield[2]	Milled head rice	Whole milled rice	Total milled rice	Harvest moisture	Bushel weight	Plant height	50% heading[3]	Maturity	Lodging	1000 seed weight[4]	Sheath blight
	bu/A	*lb/A*	*%*	*%*	*%*	*lb*	*in*		*days*	*%*	*g*	*%*
CLXL729	289	8588	66.0	72.8	16.1	41.1	47	92	115	0	25.5	0
ARIZE 1003	268	6826	56.5	66.9	18.1	39.0	43	105	124	0	27.8	0
XL723	266	7979	66.7	73.3	16.4	41.4	47	92	123	0	26.7	0
TAGGART	246	7212	65.2	72.0	19.4	45.1	46	98	125	0	28.5	0
NEPTUNE[5]	238	7540	70.5	72.8	20.0	45.5	38	97	125	0	28.2	0
CL151	235	6846	64.7	71.0	18.6	42.9	40	92	126	0	22.4	0
TEMPLETON	227	7018	68.9	73.6	17.9	45.7	43	98	120	0	23.9	0
RU0804083	222	6640	66.3	71.2	17.8	43.4	42	92	125	0	27.7	0
COCODRIE	220	6624	67.0	72.7	17.7	44.7	38	93	116	0	23.4	0
CL111	219	6702	68.1	72.7	17.5	43.7	42	92	116	0	25.7	0
WELLS	217	6674	68.2	73.6	18.3	45.5	42	96	125	0	25.2	0
RU0904194	217	6602	67.6	72.9	17.0	44.0	38	95	115	0	24.9	0
RU0804196	209	6753	71.9	75.4	18.6	44.8	38	98	125	0	24.9	0
BOWMAN	208	6190	66.1	70.9	19.2	45.2	39	98	125	0	25.1	0
RU0904077	208	6080	65.2	72.2	19.7	43.5	43	96	114	0	26.0	0
CL131	207	6541	70.1	74.0	16.4	44.1	35	92	114	0	23.7	0
RU0704197	207	6295	67.6	72.1	18.8	45.0	41	97	125	0	21.6	0
JAZZMAN	206	6528	70.4	73.3	19.7	44.2	41	96	125	0	26.2	0
CATAHOULA	205	6465	70.0	74.4	18.8	45.2	38	96	124	0	24.7	0
RU0904193	204	6253	68.1	73.4	18.7	43.1	42	99	124	0	25.8	0
CHENIERE	199	6007	66.6	72.5	19.3	43.3	37	99	124	0	21.9	0
06 CFP 952	196	5738	65.2	71.4	19.6	44.1	42	95	125	0	26.7	0
RONDO	189	5650	66.3	70.4	20.4	39.1	40	100	124	0	25.0	0

[1]**Planting date:** April 27. **Emergence:** May 7. **Herbicides:** 1 quart per acre of Glyphos plus 1 pint per acre of Command on April 26; 1 gallon per acre of Ricebeaux plus 13 fluid ounces per acre of Grandstand on June 1; 15 fluid ounces per acre of Clincher on June 10; 0.5 ounce per acre of Regiment on July 8. **Fertilizer:** 325 pounds per acre of urea on June 3; 100 pounds per acre of urea on July 5. **Permanent Flood:** June 5. **Drained:** August 20. **Harvested:** September 12.

[2]Rough rice at 12% moisture. **A difference of 20 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 6%**

[3]Days after emergence.

[4]Weight of 1,000 kernels.

[5]Medium grain.

Table 3. Performance of rice cultivars and lines grown on Sharkey clay soil near Benoit, Bolivar County, Mississippi, 2009.[1]

Entry	Yield[2]	Milled head rice	Whole milled rice	Total milled rice	Harvest moisture	Bushel weight	Plant height	50% heading[3]	Maturity	Lodging	1000 seed weight[4]	Sheath blight
	bu/A	*lb/A*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*g*	*%*	
XL723	314	8981	63.6	71.3	13.6	40.9	45	91	126	0	26.5	0
CLXL729	298	8541	63.7	71.3	13.5	41.4	44	92	127	0	24.6	0
CL151	262	8035	68.1	72.2	15.8	44.0	39	94	127	0	23.2	0
ARIZE 1003	255	6311	55.0	65.8	21.2	39.4	45	105	128	0	26.6	0
CHENIERE	250	7422	66.0	71.7	16.4	44.0	38	99	126	0	25.3	0
06 CFP 952	248	7396	66.2	71.5	16.8	45.4	44	94	126	0	26.2	0
CL111	247	7651	68.8	72.5	15.1	44.3	44	94	126	0	26.4	0
RU0904194	242	7251	66.6	72.0	15.6	43.0	39	95	126	0	24.5	0
RU0704197	239	6896	64.2	70.3	14.5	44.5	42	95	125	0	21.7	0
RU0904077	238	6793	63.4	69.5	18.4	43.2	44	98	125	0	26.7	0
RU0804083	238	6984	65.3	70.3	16.2	42.2	41	95	126	0	26.3	0
JAZZMAN	235	7270	68.7	72.4	16.8	43.2	42	96	127	0	26.7	0
TEMPLETON	230	6734	65.1	70.1	18.6	45.2	41	104	128	0	23.0	0
COCODRIE	230	6728	65.1	71.0	16.5	43.8	39	97	126	0	24.0	0
NEPTUNE[5]	229	7238	70.2	71.5	18.8	44.7	35	99	126	0	28.4	0
RONDO	224	5855	58.0	67.5	19.9	39.0	40	103	129	0	25.4	0
WELLS	223	6400	63.9	71.3	19.0	45.0	42	101	127	0	26.5	0
CATAHOULA	222	7070	70.6	73.8	17.4	45.0	38	99	127	0	25.1	0
CL131	221	6916	69.4	72.7	14.9	43.6	36	95	125	0	22.9	0
BOWMAN	217	5970	61.1	67.3	19.8	44.9	39	103	127	0	26.2	0
RU0904193	213	6338	66.0	71.5	17.5	42.7	41	98	126	0	28.7	0
RU0804196	212	6691	70.3	73.6	16.9	44.7	38	100	124	0	26.0	0
TAGGART	193	5096	58.8	69.6	21.3	43.1	43	105	129	0	26.8	0

[1]**Planting date:** April 7. **Emergence:** April 26. Herbicides: 1 quart per acre of Roundup plus 0.5 fluid ounce per acre of Aim on April 15; 2 pounds per acre of Propanil plus 0.5 pound per acre of Facet; 17 fluid ounces per acre of Ricestar HT plus 0.3 pound per acre of Facet on May 26; 0.6 ounce per acre of Regiment on June 9**. Fertilizer:** 325 pounds per acre of urea on June 3. **Permanent Flood:** June 5. **Insecticide:** 1.8 fluid ounces per acre of Karate Z on June 9 and August 7. **Fungicide:** 17 fluid ounces per acre of Quilt on July 21. **Drained:** August 21. **Harvested:** September 2.
[2]Rough rice at 12% moisture. **A difference of 20 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 5%.**
[3]Days after emergence.
[4]Weight of 1000 kernels.
[5]Medium grain.

Table 4. Performance of rice cultivars and lines grown on Tunica clay soil near Stoneville, Washington County, Mississippi, 2009.[1]

Entry	Yield[2]	Milled head rice	Whole milled rice	Total milled rice	Harvest moisture	Bushel weight	Plant height	50% heading[3]	Maturity	Lodging	1000 seed weight[4]	Sheath blight
	bu/A	*lb/A*	*%*	*%*	*%*	*lb*	*in*		*days*	*%*	*g*	
CLXL729	282	8436	67	73	14.2	41.7	45	78	117	0	25.8	0
XL723	272	8218	67	74	14.9	41.3	47	74	116	0	25.9	0
ARIZE 1003	263	7625	64	70	19.6	39.7	45	89	118	0	27.3	0
NEPTUNE[5]	212	6847	72	74	17.3	45.7	38	80	116	0	28.5	0
CHENIERE	205	6367	69	75	15.0	43.5	38	75	113	0	22.6	0
RU0904077	197	5720	65	72	15.2	42.3	42	79	114	0	24.7	0
RU0804083	196	5990	68	73	15.5	43.6	40	77	110	0	27.9	0
RU0804196	196	6162	70	75	17.3	43.7	39	84	114	0	25.9	0
BOWMAN	195	5784	66	72	16.2	44.7	40	82	115	0	25.9	0
TAGGART	190	5630	66	73	17.2	44.9	45	85	115	0	27.4	0
JAZZMAN	189	5919	70	74	16.1	43.2	41	80	114	0	23.3	0
RU0904194	188	5978	71	75	15.1	43.4	39	79	112	0	25.3	0
TEMPLETON	182	5785	71	75	15.2	45.4	44	83	113	0	22.4	0
06 CFP 952	181	5602	69	74	15.6	44.0	40	77	112	0	26.4	0
RU0904193	181	5662	70	76	16.2	43.1	41	82	112	0	27.8	0
WELLS	177	5595	70	75	16.3	45.3	42	79	112	0	26.4	0
COCODRIE	174	5391	69	74	16.5	43.6	39	77	113	0	23.9	0
CL151	173	5349	69	74	16.0	43.7	38	78	111	0	24.8	0
CL111	170	5317	69	74	15.3	43.9	40	77	111	0	25.2	0
RONDO	163	4983	68	72	17.5	39.1	41	85	112	0	22.0	0
RU0704197	157	4730	67	72	16.4	44.1	43	84	114	0	21.0	0
CL131	134	4293	71	75	14.6	43.4	31	81	109	0	21.6	0
CATAHOULA	132	4255	71	76	14.9	44.2	38	80	112	0	24.8	0

[1]**Planting date:** May 19. **Emergence:** May 26. **Herbicides:** 16 fluid ounces per acre of Command plus 23 fluid ounces per acre of Roundup on May 19; 1 quart per acre of Prowl H2O and 0.5 pound per acre of Facet on June 5; 1 gallon per acre of Arrosolo and 0.75 ounce per acre of Permit on June 9. **Fertilizer:** 325 pounds per acre of urea on June 16. **Permanent Flood:** June 17. **Insecticide:** 2 fluid ounces per acre of Karate on June 16. **Harvested:** September 22.

[2]Rough rice at 12% moisture. **A difference of 31 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 10%**

[3]Days from emergence.

[4]Weight of 1,000 kernels.

[5]Medium grain.

Table 5. Performance of rice cultivars and lines grown on Sharkey clay soil near Hollandale, Washington County, Mississippi, 2009.[1]

Entry	Yield[2]	Milled head rice	Whole milled rice	Total milled rice	Harvest moisture	Bushel weight	Plant height	50% heading[3]	Maturity	Lodging	1000 seed weight[4]	Sheath blight
	bu/A	*lb/A*	*%*	*%*	*%*	*lb*	*in*		*days*	*%*	*g*	
XL723	270	7028	58	73	13.0	38.9	44	79	116	80	25	0
CLXL729	257	6663	57	73	12.7	39.5	44	78	114	80	24	0
ARIZE 1003	255	6548	57	68	18.7	37.0	46	101	123	40	23	0
CL151	247	6133	55	74	14.2	41.5	39	82	114	60	23	0
CL111	231	5726	55	73	13.6	42.7	42	78	110	0	26	0
06 CFP 952	225	5277	52	73	13.8	41.9	41	83	116	40	25	0
RU0804083	209	5578	59	71	13.8	42.3	36	91	116	0	26	0
TAGGART	206	5363	58	73	14.7	44.3	36	94	117	0	28	0
RU0904194	205	4924	53	73	13.4	42.7	35	90	115	0	23	0
JAZZMAN	198	5818	65	72	15.8	41.7	37	92	118	0	25	0
CL131	198	5517	62	73	12.8	39.9	34	85	114	0	22	0
CHENIERE	197	5523	62	74	13.5	41.8	35	88	114	0	21	0
RU0804196	194	5879	67	75	15.1	43.3	34	93	117	0	24	0
RU0904193	193	5272	60	73	14.2	41.5	34	92	115	0	26	0
RU0704197	193	4837	56	73	13.3	43.6	37	89	114	0	22	0
BOWMAN	192	5372	62	71	18.6	44.4	38	98	120	0	26	0
COCODRIE	191	5332	62	74	13.5	42.9	32	83	114	0	23	0
RU0904077	188	4445	52	71	14.5	38.0	40	88	119	60	24	0
NEPTUNE[5]	187	5798	69	73	15.6	44.4	31	93	115	0	27	0
RONDO	185	4352	52	65	16.0	36.8	38	96	118	0	21	0
TEMPLETON	185	4787	57	73	13.9	43.7	36	91	116	0	21	0
CATAHOULA	177	3929	49	75	13.1	42.8	34	86	114	0	23	0
WELLS	173	4485	57	74	16.1	42.9	36	93	117	0	24	0

[1]**Planting date:** April 8. **Emergence:** April 21. **Herbicides:** 21 fluid ounces per acre of Roundup plus 21 fluid ounces per acre of Command on April 8; 18 fluid ounces per acre of Grasp Extra on May 19. **Fertilizer:** 100 pounds per acre of 21-0-0-24 on April 27; Urea at 100 pounds per acre on May 21, May 30, June 17, and June 24. **Permanent Flood:** May 22. **Insecticides:** 3.4 fluid ounces per acre of Mustang Max on May 19 and July 22. **Fungicide:** 14 fluid ounces per acre of Stratego on July 7. **Drained:** August 5. **Harvested:** September 1.
[2]Rough rice at 12% moisture. **A difference of 25 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 8%**
[3]Days after emergence.
[4]Weight of 1,000 kernels.
[5]Medium grain.

Table 6. Average rough rice yields of varieties, hybrids, and lines evaluated in on-farm trials at five locations, 2009.

Entry	Tunica	Clarksdale	Benoit	Stoneville	Hollandale	Average
	bu/A	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*
CLXL729	261	289	298	282	257	277
XL723	249	266	314	272	270	274
ARIZE	231	268	255	263	255	255
CL151	183	235	262	173	247	220
RU0804083	195	222	238	196	209	212
TEMPLETON	222	227	230	182	185	209
RU0904194	188	217	242	188	205	208
TAGGART	205	246	193	190	206	208
CL111	171	219	247	170	231	208
CHENIERE	186	199	250	205	197	208
06 CFP 952	175	196	248	181	225	207
NEPTUNE[1]	154	238	229	212	187	204
RU0904077	183	208	238	197	188	203
JAZZMAN	166	206	235	189	198	199
RU0804196	180	209	212	196	194	198
COCODRIE	175	220	230	174	191	198
BOWMAN	177	208	217	195	192	198
RU0704197	179	207	239	157	193	195
RU0904193	176	204	213	181	193	193
WELLS	176	217	223	177	173	193
RONDO	197	189	224	163	185	192
CATAHOULA	174	205	222	132	177	182
CL131	119	207	221	134	198	176
Mean	178	208	227	181	196	198
LSD	32	20	20	31	25	20
CV	11	6	5	10	8	14
Planting Date	April 24	April 27	April 7	May 19	April 8	—

[1]Medium grain.

Table 7. Annual and average grain yields and agronomic characteristics of long-grain commercial varieties grown at the Delta Research and Extension Center, Stoneville, Mississippi, 1990–2009.

Variety[1]	Origin[2]	Grain yield[3]			Years	Milling yield		Plant	50%	Lodging	Bushel
		2009	3-yr. avg.	Avg.	in test	Total	Whole	height	heading		weight
		bu/A	*bu/A*	*bu/A*	*no.*	*%*	*%*	*in*	*days*	*%*	*lb*
Bowman	MS	204	212	213	6	66.8	50.5	40	87	9	42.8
Catahoula	LA	198	201	194	7	68.3	53.8	40	87	7	42.5
Cheniere	LA	191	197	194	10	68	54.2	37	84	7	41.8
CL 151	LA	234	—	—	1	68.6	62.1	39	87	0	42.4
CL 171 AR	AR	169	170	170	3	69.8	53.6	41	86	0	43.9
Cocodrie	LA	188	199	190	15	67.3	54.8	39	82	7	42.1
Cybonnet	AR	171	181	176	10	68.0	56.2	39	85	5	42.7
Frances	AR	203	216	206	11	66.2	48.9	41	84	14	42.5
Hidalgo	TX	194	196	176	10	66.2	53.1	39	81	30	40.8
Jazzman	LA	201	196	194	4	67.1	58.6	40	88	0	40.5
JES	AR	202	—	—	1	72.2	68.5	35	85	0	40.5
Presidio	TX	198	207	190	11	67.4	53.4	39	83	5	43.4
Priscilla	MS	204	208	185	16	67.0	51.4	40	84	8	42.8
Rondo	TX	202	213	222	4	66.3	53.1	42	89	29	38.1
Sabine	TX	174	201	179	9	66.7	50.5	35	86	7	42.7
Spring	AR	208	185	179	9	65.1	44.3	42	78	19	42.1
Taggart	AR	209	204	204	4	68.5	56.2	46	88	0	43.7
Templeton	AR	193	200	211	6	68.4	55.0	42	88	13	45.2
Trenasse	LA	193	162	176	8	64.4	45.6	40	81	30	40.6
Wells	AR	190	201	195	14	69.2	48.8	42	83	3	44.1

[1]Bowman and Sabine have the Rexmont cooking and processing qualities; Jazzman and JES are long-grain aromatics.
[2]Origin: AR = Arkansas, CL = Horizon Ag, LA = Louisiana, MS = Mississippi, TX = Texas.
[3]In 2002, 2004, and 2005, variable size areas of stunted plant growth and development, perhaps from chemical drifting, occurred at random in the field across the tests, affecting results and variety performance.

Table 8. Average agronomic and milling performance of varieties, hybrids, and lines grown at five on-farm locations, 2009.

Variety or line	Origin[1]	Average yield		Milling yield		Bushel weight	Plant height	50% heading[3]	Maturity[3]	Lodging	1000 seed weight[4]	Sheath blight[5]	Approximate seed/pound
		Rough rice[2]	Head rice	Total	Whole								
		bu/A	*lb/A*	*%*	*%*	*lb*	*in*	*days*	*days*	*%*	*g*	*score*	*no.*
CLXL729	RT	277	7895	63.1	72.3	40.6	45	85	119	11	25.0	1	18165
XL723	RT	274	7826	63.4	72.6	40.2	46	85	121	16	25.6	2	17740
ARIZE 1003	Bayer	255	6711	58.6	68.0	38.4	45	101	125	9	26.1	0	17440
CL151	LA-HA	220	6278	63.5	72.2	42.6	39	87	121	11	23.1	4	19689
RU0804083	MS	212	6134	64.2	71.1	42.6	40	89	120	0	27.2	2	16700
TEMPLETON	AR	209	6203	65.7	72.7	44.8	41	94	120	0	22.2	1	20489
RU0904194	MS	208	6024	64.3	73.1	43.0	38	90	118	0	24.5	1	18506
TAGGART	AR	208	5846	62.4	71.7	44.2	43	95	122	0	27.5	1	16487
CL111	LA-HA	208	6056	64.9	72.6	43.2	42	86	117	0	25.8	3	17559
CHENIERE	LA	208	6133	65.5	72.6	42.7	37	91	120	0	22.4	2	20379
06 CFP 952	MS	207	5787	62.4	72.0	43.3	42	88	120	5	25.9	3	17556
NEPTUNE	LA	204	6387	69.3	72.2	44.3	36	92	121	1	28.0	2	16192
RU0904077	MS	203	5582	60.9	70.9	41.5	42	91	119	9	25.5	1	17835
JAZZMAN	LA	199	6122	68.4	72.8	42.8	40	91	121	0	25.6	1	17739
RU0804196	MS	198	6213	69.7	74.5	43.9	38	94	121	0	26.1	1	17397
COCODRIE	LA	198	5822	65.4	72.7	43.4	37	88	118	1	23.7	4	19177
BOWMAN	MS	198	5616	63.1	69.8	44.4	39	95	123	0	25.6	1	17703
RU0704197	MS	195	5585	63.7	71.6	44.0	41	91	120	0	21.5	2	21149
RU0904193	MS	193	5749	66.0	73.5	42.4	39	92	120	0	26.8	1	16926
WELLS	AR	193	5672	65.1	73.4	44.3	41	92	121	0	25.6	1	17727
RONDO	TX	192	5312	61.8	68.8	38.1	40	97	121	0	23.9	0	19135
CATAHOULA	LA	182	5339	64.8	74.2	43.7	38	90	120	0	24.3	2	18666
CL131	LA-HA	176	5290	66.1	72.3	42.0	34	89	117	5	22.4	10	20245
Mean		198	5754	64.7	72.2	43.1	39	91	120	2	25.0	2	18289
LSD		20	691	3.5	1.2	1.0	2	5	4	8	1.2	5	912
CV		14	16	7.3	2.3	3.3	6	8	5	528	4.0	325	4

[1]Origin: AR = Arkansas; Bayer = Bayer Cropscience; LA = Louisiana; LA-HA = Louisiana-released and marketed by Horizon Ag, LLC.; MS = Mississippi; RT = RiceTec, Inc.; TX = Texas.
[2]Rough rice at 12% moisture. **A difference of 20 bushels per acre is required for one variety to differ from another at the 5% probability level. C.V. = 14%.**
[3]Days after emergence.
[4]Weight of 1,000 kernels.
[5]Sheath blight rating using average percent of plants infected.

Table 10. Annual and average grain yields along with agronomic and milling data averages of rice varieties grown in the Delta on-farm tests from 2003 to 2009.[1]

Variety or line	Grain yield[2]							3-year avg.	Total		Milling yield[4]		Bushel weight	Plant height	Days to[5]		Lodging	1000 seed weight[6]	Sheath blight[7]
	2003	2004	2005	2006	2007	2008	2009		avg.[3]	tests	Total	Whole			Heading	Maturity			
	bu/A	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*no.*	*%*	*%*	*lb*	*in*	*no.*	*no.*	*%*	*g*	*score*
Cocodrie	195	209	176	194	213	188	198	187	200	88	71.0	60.7	42.4	40	82	129	13	23.8	22
Wells	200	201	178	—	216	199	193	195	203	74	72.7	56.1	43.7	42	84	129	18	25.1	19
Cheniere	199	212	168	190	—	190	208	194	196	39	72.3	60.9	42.4	37	88	132	18	22.2	11
XL723	—	232	165	221	219	189	274	214	227	39	70.9	56.8	39.7	44	82	131	21	26.2	5
Sabine	—	183	177	192	200	198	—	190	197	34	70.4	60.5	43.4	38	85	132	14	24.1	1
CL 131	—	—	161	187	—	179	176	176	181	25	70.2	60.7	42.6	35	88	131	14	23.5	4
Bowman	—	—	—	—	216	200	198	205	205	18	68.5	54.3	44.0	39	86	131	16	25.8	5
CL151	—	—	—	—	—	194	220	206	—	11	69.7	57.2	42.2	39	86	129	30	24.1	2
Rondo	—	—	—	—	—	200	192	196	—	11	67.6	57.0	38.4	40	94	130	8	25.4	0.2
Templeton	—	—	—	—	—	199	209	204	—	11	71.0	60.0	44.3	42	88	127	12	23.0	1
Arize 1003	—	—	—	—	—	—	255	255	—	5	68	58.6	38.4	45	101	125	0.4	26.6	0.2
CL111	—	—	—	—	—	—	208	208	—	5	72.6	56.1	43.2	42	86	117	0	26.4	3
CLXL729	—	—	—	—	—	—	277	277	—	5	72.3	63.1	40.6	45	85	119	0.8	24.6	0.6
Jazzman	—	—	—	—	—	—	199	199	—	5	72.8	68.4	42.8	40	91	121	0	26.7	0.8
Neptune	—	—	—	—	—	—	204	204	—	5	72.2	69.3	44.3	36	92	121	2	28.4	2
Taggart	—	—	—	—	—	—	208	208	—	5	71.7	62.8	44.2	43	95	122	0	26.8	0.6

[1]Test locations were in farmers' fields extending from northern to southern Delta areas.
[2]Rough rice at 12% moisture content. Data columns for 1991–2002 were omitted, but their numbers were included in the average yield and total test numbers.
[3]Average of the three most recent years tested.
[4]Values for milling, agronomic characteristics, and sheath blight are accumulated means over all years of testing.
[5]Days after emergence.
[6]Weight of 1,000 kernels at 12% grain moisture content.
[7]Sheath blight scores using average percent of all plants infected on a plot basis.

Table 10. Reactions of rice varieties to common diseases.[1]

Variety/ Hybrid	Blast	Sheath blight	Kernel smut	Straight head	Brown leaf spot	Narrow brown leaf spot	Leaf smut	Stem rot	False smut	Bacterial panicle blight	Black sheath rot	Lodging
ARIZE 1003	—	MR	—	—	R	MS	—	MS	MS	—	MR	S
Bowman	S	MS	S	MS	R	MR	—	S	S	S	MS	MS
Catahoula	R	S	S	S	R	MR	—	S	S	MS	MS	MS
Cheniere	S	S	S	MR	MR	VS	MR	S	S	MS	MS	MS
CL131	MS	VS	S	S	MR	VS	—	S	S	VS	S	R
CL151	S	S	S	VS	R	S	—	S	S	S	S	S
CL161	S	VS	S	MR	MR	MS	MS	S	S	S	S	S
CL171-AR	S	VS	S	MS	R	MS	MR	S	S	S	S	MS
CLXL729	MR	MS	MS	MR	R	MS	—	MS	S	MR	MS	S
CLXL745	MR	MS	MS	—	R	MS	—	MS	S	MR	MS	S
Cocodrie	S	MS	S	VS	MR	MS	MS	S	S	VS	MS	MS
Sabine	S	S	S	—	R	MS	—	S	S	S	S	MR
Taggart	S	MS	S	—	—	—	—	S	S	S	S	MS
Templeton	R	MS	S	—	—	—	—	S	S	S	S	MS
Wells	S	MS	MS	MR	MR	R	—	S	S	VS	—	S
XL723	MR	MS	MS	MR	R	MS	—	MS	S	MR	MS	S

[1]Abbreviations: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible, VS = very susceptible.
Note: These ratings are subject to change as new or further information may become available.

Table 11. Nitrogen fertility rate guidelines.

Variety/	Clay soils[1]			Silt loam soils[2]		
Hybrid	Preflood	Midseason	Boot Split	Preflood	Midseason	Boot Split
	lb/A	*lb/A*	*lb/A*	*lb/A*	*lb/A*	*lb/A*
Bowman	120-150	30-60	0	90-120	30-60	0
Catahoula	120-150	30-60	0	90-120	30-60	0
Cheniere	120-150	30-60	0	90-120	30-60	0
CL111[3]	120-135	30-60	0	90-120	30-60	0
CL131	120-150	30-60	0	90-120	30-60	0
CL151[4]	90-120	30-60	30	90	30	30
Cocodrie	120-150	30-60	0	90-120	30-60	0
Sabine	120-150	30-60	0	90-120	30-60	0
ARIZE 1003	90	0	30	90	0	30
CLXL729	120-150	0	45	120	0	30
CLXL745	120-150	0	45	120	0	30
XL723	120-150	0	45	120	0	30

[1]Clay soils include soils with CEC greater than 20 $cmol_c\ kg^{-1}$.
[2]Silt loam soils include soils with CEC less than 20 $cmol_c\ kg^{-1}$.
[3]CL111 guidelines are the result of two locations for clay and silt loam in 2009 only.
[4]CL151 is highly prone to lodging.

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