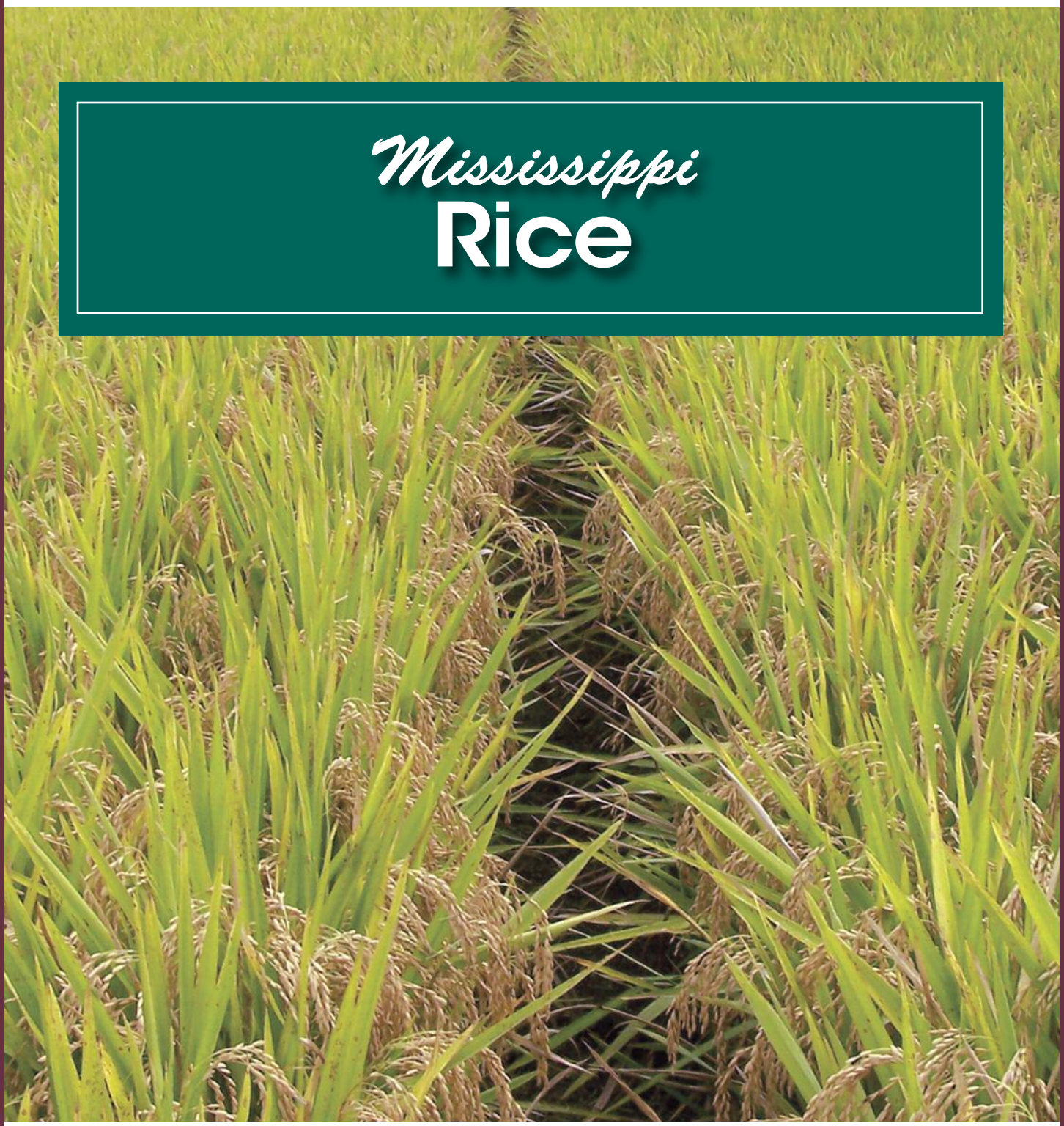
Information Bulletin 517 March 2017

Mississippi Rice



VARIETY TRIALS, 2016

MISSISSIPPI'S OFFICIAL VARIETY TRIALS

MISSISSIPPI STATE UNIVERSITY™
MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

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. 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, 2016

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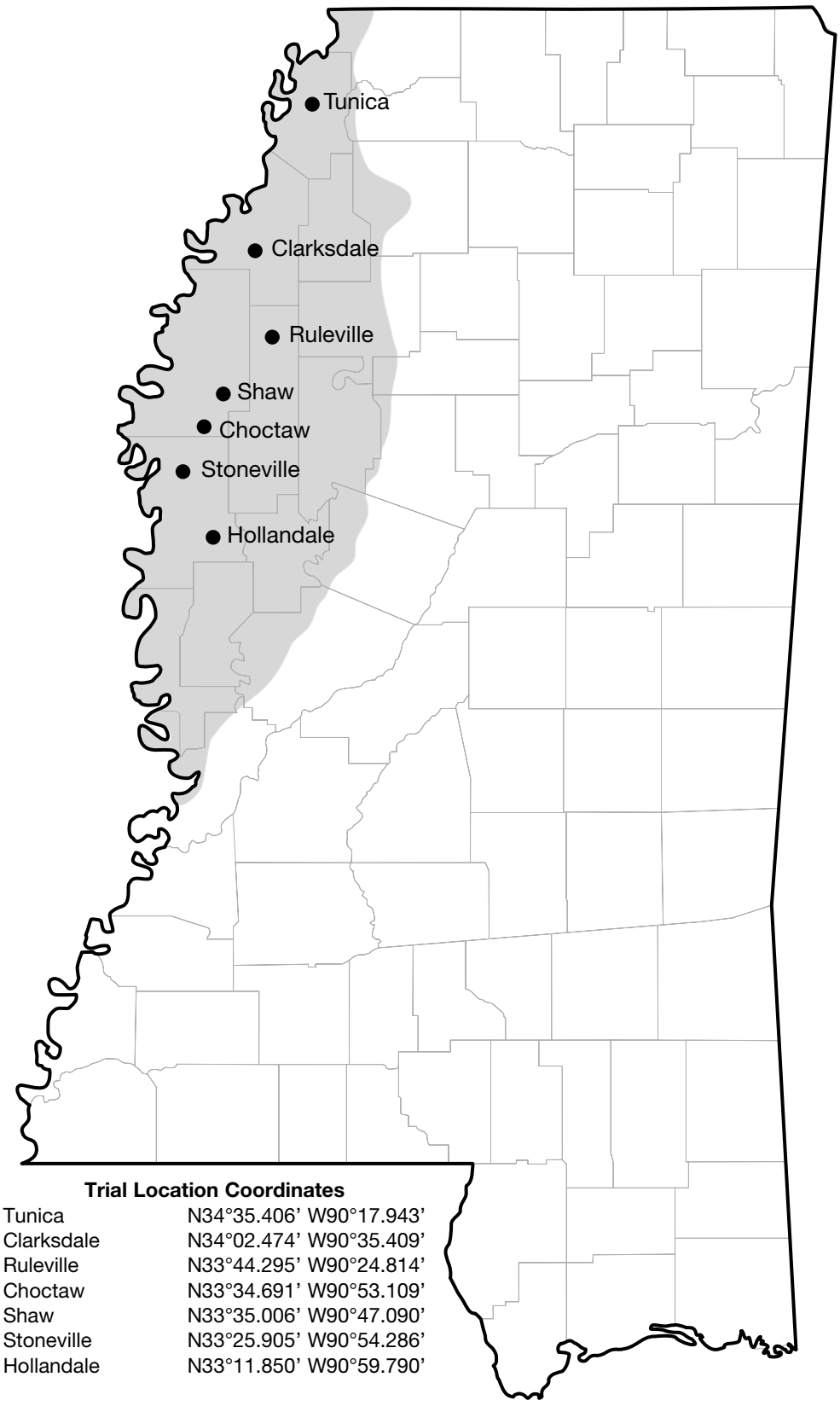
Find variety trial information online at ***mafes.msstate.edu/variety-trials***.



Trial Location Coordinates

Tunica	N34°35.406' W90°17.943'
Clarksdale	N34°02.474' W90°35.409'
Ruleville	N33°44.295' W90°24.814'
Choctaw	N33°34.691' W90°53.109'
Shaw	N33°35.006' W90°47.090'
Stoneville	N33°25.905' W90°54.286'
Hollandale	N33°11.850' W90°59.790'

Figure 1. Locations of the 2016 Rice On-Farm Variety Trials in the Mississippi Delta.

Mississippi Rice Variety Trials, 2016

INTRODUCTION

The Mississippi rice-harvested area for 2016 was estimated by the USDA National Agricultural Statistics Service (NASS) in its November 2016 report to be 194,000 acres. The 2016 rice acreage is 45,000 (30%) acres more than in 2015 and 4,000 (2%) acres more than the state average for the preceding 10 years (2006–15; Table 1).

Mississippi was forecasted to produce 13.8 million hundredweight (626,000 metric tons) in 2016. This amount is 30 percent higher than the 2015 production of 10.6 million hundredweight (481,000 metric tons) and 0.4 million hundredweight (3%) more than the average production of 13.4 million hundredweight (607,000 metric tons).

Average yield statewide for 2016 was forecasted at 7,100 pounds per acre or 158 bushels per acre, down 10 pounds from 2015 but about 30 pounds (0.4%) higher than the 10-year state yield average of 7,073 pounds per acre or 157 bushels per acre. The record for average yield statewide, which was attained in 2014, remains at 7,420 pounds per acre (165 bushels per acre or 8,316 kilograms per hectare).

As in recent years, 17 counties in the Mississippi Delta accounted for almost all of the state's 2016 rice acreage as certified by the USDA Farm Service (Table 2). Seven counties planted more than 10,000 acres: Bolivar (47,839), Tunica (34,812), Quitman (20,515), Sunflower (19,944), Coahoma (12,855), Tallahatchie (12,330), and Washington (12,135).

Table 1. United States Department of Agriculture historical survey data of rice acreage in Mississippi (nearest thousand) by year, 1949–2016.

Year	Acres	Year	Acres	Year	Acres	Year	Acres
1949	5,000	1969	60,000	1989	235,000	2009	243,000
1950	7,000	1970	51,000	1990	250,000	2010	303,000
1951	26,000	1971	51,000	1991	220,000	2011	157,000
1952	40,000	1972	51,000	1992	275,000	2012	129,000
1953	51,000	1973	62,000	1993	245,000	2013	129,000
1954	77,000	1974	108,000	1994	313,000	2014	190,000
1955	52,000	1975	171,000	1995	288,000	2015	143,000
1956	44,000	1976	144,000	1996	208,000	2016	191,000
1957	31,000	1977	111,000	1997	238,000	2017	—
1958	39,000	1978	215,000	1998	268,000	2018	—
1959	44,000	1979	207,000	1999	323,000	2019	—
1960	44,000	1980	240,000	2000	218,000	2020	—
1961	44,000	1981	337,000	2001	253,000	2021	—
1962	49,000	1982	245,000	2002	253,000	2022	—
1963	49,000	1983	161,000	2003	234,000	2023	—
1964	49,000	1984	190,000	2004	234,000	2024	—
1965	50,000	1985	188,000	2005	263,000	2025	—
1966	55,000	1986	198,000	2006	189,000	2026	—
1967	55,000	1987	198,000	2007	189,000	2027	—
1968	67,000	1988	260,000	2008	229,000	2028	—

Four counties expanded their production area by more than 5,000 acres in 2016: Tunica (8,979), Quitman (8,295), Bolivar (5,700), and Tallahatchie (5,189). These counties are located in the middle to northern portions of the Mississippi Delta. Compared to the last 5 years' (2011–15) average area, the greatest expansions were recorded in these same counties: Quitman (10,244), Tunica (10,030), Bolivar (5,971), and Tallahatchie (4,392). By contrast, Washington County, located in the southern Delta, registered a net reduction in its 2016 area, compared to both its 2015 acreage (minus 892 acres) and the recent 5-year average (minus 2,612 acres).

Planting progress occurred at a significantly faster pace last year. As of April 15, 2016, only 40% of the total rice crop was planted. By May 19, however, 95% of the rice acreage was planted. This planting pace exceeded last year's—as well as the past 3-, 5-, and 10-year historical averages—resulting in most areas of the state being planted on time. The bulk of 2016 Mississippi rice was planted between April 21 and May 12.

Insect pest issues in 2016 were fairly average with respect to rice water weevil and army worm. Similar to 2015, rice stink bug infestations were above average for the first 10–20% of the crop that headed. As more rice headed, infestations declined to a more manageable level. Disease pest pressure in 2016 was slightly greater than that experienced during 2015, primarily due to environment. Late-season disease complexes took a toll on a limited number of acres. Sheath blight was more severe during 2016 and escalated to the top of the canopy in numerous varieties, most notably CL163. Bacterial panicle blight was observed in isolated fields in 2016 and influenced some acres more than others. Panicle blast caused significant yield decreases in susceptible varieties in the central rice-growing areas of Mississippi. However, leaf and rotten neck blast appeared to occur less frequently than in the previous two years.

The greatest concern in 2016—and one that definitely contributed partly to the reduced average yield in the state—was the environmental condition from July to August. The combination of heat, wind, and rain at unfortunate times around rice flowering held rice yield back in many areas of the state. The portion of the crop that flowered and matured in July met daily maximum air temperatures greater than 92 degrees for the first 27 days of the month. Daily air temperatures dropped in August, but wind and rain damage to flowering rice was just as detrimental as the early heat. Many suggest that environment played the largest role in the roller-coaster yields observed in many cases across the turn row during the 2016 growing season. The year 2016 shaped up to be what could be considered an average year for rice production overall.

Table 2. United States Department of Agriculture Farm Service Agency certified rice acres planted by county in Mississippi, 2009–2016.

County	2009	2010	2011	2012	2013	2014	2015	2016
Adams	240	0	0	192	0	0	0	157
Attala	0	0	10	0	0	0	0	0
Bolivar	72,333	80,255	50,813	34,956	33,734	47,702	42,139	47,839
Carroll	205	0	0	0	0	0	0	0
Coahoma	14,761	25,032	11,370	8,797	8,109	14,453	9,933	12,885
DeSoto	859	1,156	335	553	1,190	2,316	99	1,896
Grenada	171	321	328	282	282	0	893	402
Holmes	1,485	1,448	234	141	121	203	195	655
Humphreys	3,656	8,241	1,996	1,955	1,475	3,426	2,576	5,695
Issaquena	783	2,702	880	890	1,115	483	345	764
Jackson	55	35	0	0	0	0	0	0
Lee	10	11	8	10	3	3	0	3
Leflore	17,107	20,144	6,754	5,328	3,905	6,000	5,059	7,734
Panola	4,777	6,446	5,383	5,901	5,523	10,188	5,966	9,668
Quitman	11,031	20,170	6,360	8,440	8,766	15,565	12,220	20,515
Sharkey	1,951	5,390	855	306	433	857	789	1,123
Sunflower	38,227	45,676	19,351	14,253	13,635	25,241	15,612	19,944
Tallahatchie	14,081	19,314	6,267	6,460	6,964	12,859	7,142	12,330
Tate	905	994	869	828	934	1,082	955	1,123
Tunica	23,913	27,041	23,167	21,696	24,603	28,608	25,833	34,812
Washington	29,507	35,736	18,854	14,687	11,480	15,690	13,027	12,135
Yazoo	1,841	1,907	2,273	765	0	867	914	1,571
Total	237,898	302,019	156,107	126,440	122,272	185,543	143,697	191,251

ON-FARM VARIETY TRIALS

On-farm varietal evaluation is a vital step in the variety development process for many crops, including rice. Conducting variety trials under producers' field conditions helps identify the released varieties or hybrids as well as elite experimental breeding lines that are best suited to specific growing environments, including niche markets. It also helps determine which specific entries are widely adapted to and/or have consistent performance across varying growing conditions. This information not only helps in future breeding, but also is important for proper deployment of released varieties.

It is typical in on-farm variety trials for standard varieties and hybrids, new releases, and elite experimental lines to be evaluated in the environments to which they are targeted for release. In the case of elite breeding lines, based on their performance in these multienvironment tests, the most promising are selected for possible release as new varieties. The information collected on these lines include yield and milling performance, insect and disease susceptibility, tolerance to environmental stresses, and vigor and lodging scores. However, apart from using the data generated for line advancement decisions, they could also be used to recycle yet-imperfect lines back into the hybridization program.

With the inclusion of released varieties from Mississippi and the Midsouth as entries in the on-farm trials, the testing process also helps local rice producers determine the most suitable released varieties to plant on their respective farms based on the test locations. By placing these trials at multiple key locations throughout the Mississippi Delta, varieties, hybrids and elite lines are exposed to the prevalent growing conditions and practices commonly used in commercial production in Mississippi. Many of these growing conditions and management practices cannot be reproduced at the Delta Branch Experiment Station in Stoneville, thus giving great value to the on-farm evaluations from the research and development perspective. In return, growers have the opportunity to evaluate current varieties and hybrids in commercial circulation side by side under their own management conditions. Ultimately, this process helps them in deciding which variety or hybrid to use on their farms the following year and in placing advanced seed orders for the chosen varieties accordingly from the seed suppliers.

Variety selection is one of the most important decisions a grower makes in crop production planning. Growers should attempt to select varieties that offer the best combination of yield and quality factors while also considering the variety's tolerance or susceptibility to both biological and environmental factors that could limit yield potential.

As grain quality is becoming more important for improving U.S. rice global competitiveness, producers will benefit from having grain quality data for the commercial varieties evaluated in the variety trials. Millers, consolidators, and traders may also use this grain quality data in implementing strategies related to identity preservation, which is an increasingly important part of improving overall rice grain quality.

Rice research and Extension specialists, on the other hand, can use the variety trials as an educational platform for demonstrating the merits of on-farm evaluation to other scientific or technical staff, growers, private consultants, rice industry personnel, students, policy makers, and the general public. Through these trials, interested parties are afforded a "first look" at new or potential releases, not only from Mississippi State University but also from other participating rice-breeding programs, including those from private industry.

TEST PROCEDURES

For 2016, the Rice On-Farm Variety Trials consisted of 34 entries, including five hybrids (three Clearfield® and two conventional types), 10 Clearfield types (6 released varieties and 4 elite experimental lines), and 19 conventional types (13 released varieties and 6 elite experimental lines). All hybrids were provided by RiceTec. All Clearfield types were provided by HorizonAg. Conventional released varieties came from the public breeding programs of Mississippi (3), Arkansas (5), Louisiana (3), and Texas (2). The trials were conducted at seven locations from across the Mississippi Delta: Tunica, Clarksdale, Ruleville, Shaw, Choctaw, Stoneville, and Hollandale (**Figure 1**). Individual plots consisted of eight drilled rows that were 15 feet in length and spaced 8 inches apart. Varieties and experimental lines were planted at a

seeding rate of 85 pounds of seed per acre, while the hybrids were planted at 25 pounds of seed per acre. Seeds were mechanically drilled approximately 1.25 inches deep into stale seedbeds at all locations. All entries were replicated three times at each location using a randomized complete block experimental design. Crop management practices for each location, as well as the stresses encountered, are presented in **Tables 3–9.**

Readers who may be less familiar with pesticide formulations and application rates may wish to refer to pesticide product label information available on the Internet or to the *2017 Weed Control Guidelines for Mississippi* available both in print and online (MSU Extension Service Publication 1532, http://msucares.com/pubs/publications/p1532.pdf).

Agronomic and crop phenology data were collected at appropriate times during the growing season. Lodging ratings were obtained on a plot-by-plot basis. Entire plots were harvested with a small-plot combine equipped with a computerized weighing system and moisture meter. Due to differences in maturity, most entries at each location were required to have achieved the appropriate harvest moisture level before the tests were harvested. Average harvest grain moisture levels for each entry are reported in **Tables 3–9**. Subsamples of each entry were collected at harvest, and these were used for measuring milling-related traits, chalkiness, bushel weight, and 1,000-seed weight parameters. For yield, previous replicated research has shown that the border effect common in small-plot research could result in increases in grain yield estimates of 10% for inbred varieties and 15% for hybrids. Therefore, the plot yields reported for the test entries should be compared in a relative manner rather than just through the absolute values for the reported yield potential.

Analysis of variance procedures were conducted for all relevant data gathered from the trials using SAS statistical software. The least significant difference (LSD) test at the 5% significance level may be used to determine significant differences between entries. If the value of the yield difference between any two trial entries at a location (as computed from the yields reported in **Tables 3–9**) is greater than the LSD value for that particular location, the entries are deemed to be statistically different from each other. In addition, a coefficient of variation (CV) was calculated for each test. This measure is an indication of the variability or "noise" in the trial, thus the level of precision of each test. Lower CV values indicate greater reliability of the test. CV values of 10% or less are generally considered to be optimum for plant-breeding trials, and CV values above 25% are considered unacceptable. The LSD and CV values for yield in these tests are reported in the footnotes of **Tables 3–9** and are included for the other measured variables in **Table 11**.

RESULTS

To assist Mississippi rice producers in their variety selection process for 2017, preliminary results of the 2016 rice variety trials were immediately processed and made available online as early as October 15, 2016, via the Mississippi Agricultural and Forestry Experiment Station Variety Trials website (http://www.mafes.msstate.edu/variety-trials). Hard copies of the preliminary results were distributed to rice producers attending the Delta Rice Producers Meeting in Cleveland, Mississippi, in November 2016.

Complete details on the performance of each entry at each of the seven test locations are presented in **Tables 3–9**. Planting times spanned a narrow window of only 3 weeks, with all sites planting between April 5 to April 8, except for Hollandale (April 25). The Stoneville trial was the only one planted on a branch experiment station. In general, plant stands were excellent, with uniform emergence and optimum plant density for all locations. Among the diseases reported at some point in the growing season were leaf blast, panicle blast, and sheath blight. However, none of these factors occurred to a level that was economically damaging, or that completely wiped out any test entry. Lodging was reported at four of the seven locations. As in the previous year, the most lodging occurred in Tunica and Choctaw Counties. Significant bird damage occurred in Stoneville.

The average rice yield across entries and locations for the 2016 trials was 205 bushels per acre. This amount was close to the average yield of 213 bushels per acre for all variety trials conducted in the last 10 years (2006–15). However, it was 15 bushels less than the 2015 average and 37 bushels less than the highest recorded average trial yield (242 bushels) in 2014. This yield trend in the trials closely mirrors Mississippi statewide yield trends based on the NASS data. Location yield averages ranged from 140 bushels per acre in Stoneville to 241

bushels per acre in Shaw. Hollandale, which was the highest-yielding location for the last 2 years, was outyielded by all locations except Stoneville in 2016. The coefficient of variation or CV values for yield ranged from 7–12%, which are acceptable levels for breeding trials. The lowest-yielding site (Stoneville) also had the highest CV (12%), a reflection of the heavy bird damage. Total milling yields tended to be normal for most entries, but substantial differences among the trial entries were observed for whole milled rice.

Grain yield summary data for all entries at each location are provided in **Table 10.** Moreover, summary data for all other measured parameters averaged over the seven locations are provided in **Table 11**. The conventional hybrid rice XL753, developed by RiceTec Inc., again topped this year's test with an average yield across locations of 274 bushels per acre. The same hybrid has been the highest-yielding entry during the preceding 3 years with average yields of 275 bushels per acre in 2015, 306 bushels in 2014, and 278 bushels in 2013. Thus, its yield superiority over other hybrid and conventional pureline entries, both released and experimental, has been consistent over the years. Closely following XL753 in terms of yield performance were XL760, a conventional hybrid that also was the second-highest-yielding hybrid in 2015; and Gemini 214 CL, a new Clearfield hybrid, both with average yields of 273 bushels per acre.

Historically, hybrids have performed 20% or greater relative to purelines or conventional varieties in Mississippi. During 2016, several entries produced yields that were at least 80% of XL753's yield. These entries included the Arkansas-developed conventional varieties Diamond and Taggart and the newly released Mississippi variety Thad. Several other pureline entries had yields that were at least 75% of the yield from the most productive hybrid, XL753. For Clearfield types, these entries included the newly released medium-grain variety CL272 and the experimental entry RU1504083. For conventional types, they included Rex (the most popular conventional variety in Mississippi), Lakast from Arkansas, and the experimental breeding line RU1404122. Yields of Rex and Lakast were within 80% of the yields XL753 produced in 2015. Considering that the plot border effect is greater on hybrids, the actual field yield differences may actually be closer when comparing the highest-yielding hybrid to the highest-yielding pureline.

In this year's tests, the newly released MSU-bred variety Thad (220 bushels per acre) was the second-highest-yielding entry after Diamond (229 bushels), a new long-grain release from Arkansas. Rex, on the other hand, was the fourth-highest yielder (213 bushels) among conventional varieties. In terms of whole milled rice or head rice recovery, however, both Thad and Rex were significantly better than Taggart, Lakast, or the highest-yielding hybrid, XL753 (Table 11). Good yield performance combined with superior head rice recovery should make Thad and Rex desirable to rice producers and millers. Moreover, in 2015 tests conducted by the USA Rice Federation, all seven participating rice mills found Thad to be acceptable for milling quality traits. These positive traits of Thad and Rex should help further expand the acreage occupied by both varieties in Mississippi.

Entries that begin with "RU" designations are elite experimental breeding lines that have performed well in the sequential, multistage, yield evaluation conducted by the MSU rice-breeding program. They usually have been entered or are currently entered in the multistate Rice Uniform (RU) Research Nursery (URRN). This evaluation system is conducted by public breeding institutions in the U.S. to evaluate elite lines in other rice-growing states while sharing elite materials among U.S. breeders. The entries represent the best lines from different breeding programs and are typically at the final stages of testing. Entries from Mississippi in the URRN have the number "4" as the first digit of the last four digits of the RU designation (e.g., RU140**4**122).

The Clearfield type experimental lines that performed well in the 2016 variety trials were RU1504083 (209 bushels per acre) and RU1504197 (197 bushels). Both outyielded CL163 (196 bushels), the MSU-developed Clearfield variety released in 2015. On the other hand, RU1404122 (207 bushels) was the highest-yielding conventional experimental breeding line with a yield comparable to Thad and Rex. In 2015, RU1404122 (230 bushels) also had a yield comparable to Rex, and it was within at least 80% of the yield of the top-yielding hybrid entry, XL753. RU1404122 also has shown excellent milling traits for 2 years in a row in the variety trials, with 73% and 72% milling recovery and 64% and 60% whole milled rice in 2015 and 2016, respectively—among the highest values obtained traits from all entries.

Table 12 provides the agronomic, yield, and milling data for select rice varieties that have been included in on-farm tests for the last 3 years. Substantial variation was observed among the test entries for the milling

traits, and several high-yielding entries did not necessarily have the best grain quality characteristics. For example, among conventional varieties, Rex and Thad had significantly higher whole milled rice yield and head rice recovery than Lakast, which was the highest yielding variety in the past 3 years. Aside from these trait considerations for variety selection, performance stability over many environments and years also needs to be taken into account. Varieties such as Cocodrie and Cheniere have been relatively stable over many years, thus they have been popular varieties in Mississippi and the Midsouth. Rex has also shown good stability over multiple locations both in Mississippi and other rice-growing states in the Midsouth.

Variety and hybrid reactions to common diseases and straight head disorder are found in **Table 13**. 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 efficacy of fungicides that are available to combat or prevent the disease.

Nitrogen fertilization rate guidelines are provided in **Table 14**. These guidelines were generated from multi-year, multisite N response studies conducted for newly released varieties. A combination of current economics, individual varieties' susceptibility to lodging, and yield potential are included in determining the rate guidelines. Annually, 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.

Based on this year's variety trials results and also taking into consideration previous years' performance, the conventional varieties suggested for Mississippi rice growers are Thad, Taggart, Rex, and Lakast. The new release Diamond will be further tested in 2017 to confirm its excellent performance under Mississippi conditions. The conventional varieties Cheniere, Bowman, and Mermentau have not performed as well, although they have done well in Mississippi in the past.

Sabine is often grown on limited acreage by contract, primarily due to its high amylose content and related cereal chemistry characteristics desired by the canned/packaged rice industry. The recent release of Thad and CL163, both high-amylose varieties with excellent grain qualities, provides more varietal options to the U.S. food-processing industry as well as U.S. rice export markets requiring high-amylose rice.

For conventional hybrid rice production, XL753 is the best option, followed by XL760. For growers who need to utilize the Clearfield technology to control red rice, Gemini 214 CL and CLXL766 are the best options for hybrids offered by RiceTec Inc. On the other hand, CL163, CL153, and CL172, which are offered exclusively by HorizonAg, are the best choices among conventional Clearfield types. Information for production of Clearfield hybrid rice is available at RiceTec Inc. Seed costs for Clearfield rice have increased in recent years. Clearfield rice should be used as a tool with careful attention given to stewardship so the technology can last into the future. Stewardship should encompass minimizing the potential for outcrossing of red rice and Clearfield rice. Stewardship should also include addition of postemergence and residual herbicides for grass control so that selection pressure that could break down herbicide resistance is minimized. It must be noted that incidences of ALS-resistant (Newpath®, Beyond®) barnyardgrass and sedges have increased in the last few years. Outcrossing and grass resistance jeopardize this important technology.

As rice producers know well, no variety or hybrid is perfect for all cropping conditions at all times. Each cropping year potentially brings about recurring or new biological and/or environmental factors with potential to negatively impact varietal performance and, ultimately, a rice producers' bottom line. Breeders must, therefore, continue to develop new strains that not only satisfy the needs of the rice growers who are faced with an ever-changing production landscape, but also cater to the varying needs of millers, processors, the food industry, and consumers who continually demand higher quality rice. The best of these new strains must perform well under farm conditions before they can be released. Each new variety release would be expected to have qualities or characteristics that add value to end users. Ultimately, varietal performance over time and in different environments, in addition to economics, should be considered when choosing which variety to plant among the many available options.

This is where the regular conduct of on-farm trials derives great value for rice producers. For varieties with high yield potential, producers should consider risks such as lodging and disease incidence and plan to manage for those yield-limiting factors to derive maximum benefit. Planting several varieties or hybrids, both Clearfield and conventional types, may help mitigate the risks associated with rice production in large production areas such as those commonly found in Mississippi.

Table 3. Performance of rice varieties, hybrids, and lines grown on Sharkey clay soil near Choctaw, Mississippi (N33°34.691' W90°53.109'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
XL760	320	57.5	70.7	8.9	14.6	38.0	49.5	88	0	1	23.0
XL753	308	57.6	72.5	7.3	16.5	40.0	44.8	84	0	1	22.5
CLXL766	307	56.2	71.4	11.1	13.8	37.6	44.8	80	0	1	22.0
Gemini 214 CL	286	58.6	71.7	8.3	14.4	39.6	50.0	88	25	2	22.5
CLXL745	280	55.1	72.0	11.5	13.2	38.7	41.5	84	0	1	24.0
Clearfield											
RU1504083	228	53.8	70.6	13.2	14.0	41.2	37.0	84	0	1	24.0
CL272	227	57.2	70.3	9.1	14.9	42.0	39.5	89	0	1	22.0
RU1504122	220	57.9	71.5	11.7	14.8	41.5	43.0	86	0	1	22.5
RU1504197	213	60.1	71.1	11.0	15.6	43.4	37.5	86	0	1	22.0
CL153	200	60.1	71.7	5.7	13.6	39.0	42.8	88	0	1	22.0
CL111	189	52.0	71.3	10.0	14.5	39.5	41.0	82	73	4	23.0
CL172	181	59.0	71.3	4.7	15.0	42.4	43.3	89	20	2	21.0
CL163	176	53.3	70.2	11.9	14.0	33.7	42.3	90	43	3	22.0
CL151	176	53.7	70.9	10.4	14.8	38.6	41.3	85	43	3	23.0
RU1504154	158	51.7	70.1	7.3	14.0	35.5	44.5	83	75	4	22.5
Conventional											
Thad	254	57.8	70.9	6.5	14.6	42.9	41.3	90	0	1	24.0
Taggart	235	53.3	71.4	5.9	14.7	43.5	46.3	93	13	2	24.0
Titan	230	58.3	70.0	6.8	13.6	44.0	40.3	82	0	1	26.0
Rex	228	55.1	68.5	10.8	14.2	40.4	43.5	86	13	2	25.0
RU1404154	227	58.4	67.9	5.7	15.2	40.3	43.3	87	0	1	23.5
Diamond	226	52.4	70.7	10.1	14.6	40.1	42.8	89	0	1	22.5
RU1504198	215	57.8	71.0	9.3	15.0	35.9	48.8	88	20	2	19.0
LaKast	214	50.1	70.8	8.4	14.4	41.7	44.8	88	0	1	24.0
Antonio	212	63.4	72.3	8.4	15.9	42.0	44.0	88	0	1	21.5
RU1404122	207	58.5	72.9	10.2	14.7	41.4	40.5	90	0	1	20.5
Cheniere	207	63.6	73.7	4.4	14.6	38.1	40.8	90	0	1	20.5
Bowman	204	60.4	71.7	3.8	14.9	41.6	41.0	91	38	2	24.0
Mermentau	202	63.3	71.6	12.3	16.4	41.7	43.8	90	0	1	20.5
Sabine	201	61.2	71.0	5.3	14.6	39.6	42.0	87	0	1	23.0
RoyJ	200	56.2	72.7	4.7	17.5	41.3	46.3	93	0	1	21.0
Cocodrie	189	63.8	72.2	7.6	16.6	41.8	43.8	91	0	1	21.0
RU1604191	188	55.2	72.9	9.6	15.4	37.5	47.5	89	18	2	19.5
RU1404156	186	52.6	72.0	7.4	13.5	38.0	44.0	87	0	1	22.0
RU1504114	186	61.2	72.1	5.0	14.5	36.9	49.3	90	18	2	20.5

[1]Planting date: April 7. Emergence: April 23. Herbicides: Envy at 32 oz/A, Sharpen at 2 oz/A, Command at 21 oz/A, Invade at 1%, and Traverse at 1% on April 19; Propanil at 2 qt/A, Prowl H_2O at 1 qt/A, Facet 75D at 30 oz/A, and Navigator at 1pt/A on May 5. Fertilizer: 125 lb/A mixed fertilizer on May 5; 150 lb/A urea on May 19; 100 lb/A urea on May 31; 100 lb/A urea on June 16; and 100 lb/A urea on June 23. Insecticide: Karate at 1.8 oz/A on July 19. Fungicide: Stratego at 17 oz/A on July 2. Harvested: September 7–8.
LSD = A difference of 34 bu/A is required for one variety to differ from another at the 5% probability level. CV = 9%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 4. Performance of rice varieties, hybrids, and lines grown on Alligator clay soil near Clarksdale, Mississippi (N34°2.474' W90°35.409'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
Gemini 214 CL	264	56.1	69.8	8.0	13.6	38.8	45.5	86	0	1	22.5
XL760	264	58.2	70.1	7.7	14.0	38.7	44.5	86	0	1	22.5
CLXL745	261	57.3	71.7	8.2	12.9	40.0	40.8	84	0	1	24.5
XL753	261	57.6	71.1	7.6	13.8	40.2	43.0	85	0	1	23.0
CLXL766	251	52.0	70.2	9.9	12.9	39.2	42.5	83	0	1	22.5
Clearfield											
RU1504154	219	60.4	69.4	4.5	13.9	41.5	42.8	85	0	1	22.5
CL272	214	62.8	69.8	6.7	14.5	44.1	40.3	86	0	1	23.5
CL163	214	59.1	69.3	7.1	14.2	41.9	42.0	88	0	1	22.0
RU1504083	213	56.9	69.6	13.1	14.3	43.5	35.5	85	0	1	29.0
CL153	212	63.5	70.6	4.6	14.3	41.7	40.5	87	0	1	21.0
CL111	211	60.8	71.0	6.5	13.8	42.7	39.3	85	0	1	22.0
RU1504197	194	61.4	70.5	9.0	14.4	45.4	36.5	85	0	1	25.0
CL151	189	62.6	71.0	6.8	14.4	42.9	38.5	85	0	1	21.5
RU1504122	186	61.8	70.9	8.4	14.7	43.1	39	85	0	1	22.5
CL172	181	62.3	71.0	2.4	14.6	43.5	38.8	86	0	1	22.0
Conventional											
Titan	228	63.8	69.5	5.2	14.9	45.9	40.8	82	0	1	26.0
Diamond	219	53.2	69.7	5.2	14.7	42.5	42.0	86	0	1	21.5
Taggart	216	52.9	70.1	5.3	15.0	43.4	47.8	90	0	1	23.5
Rex	212	60.4	69.2	7.5	14.4	43.4	41.5	87	0	1	25.5
Thad	207	60.2	69.7	4.9	14.9	44.9	40.8	89	0	1	23.5
RU1504114	201	63.0	72.2	3.3	14.9	43.8	45.8	89	0	1	21.0
RU1504198	198	58.8	69.6	5.4	14.3	41.4	45.3	87	0	1	18.5
LaKast	195	50.3	69.8	4.1	14.1	43.4	42.8	88	0	1	25.0
RU1404122	192	62.3	71.8	7.1	14.9	41.5	43.5	87	0	1	19.5
RU1604191	190	61.4	72.2	4.8	14.2	41.7	41.5	89	0	1	18.0
RU1404154	187	59.3	68.3	3.9	15.4	42.9	40.3	88	0	1	21.5
Bowman	185	61.9	70.2	2.7	15.7	44.3	40.0	90	0	1	23.5
RU1404156	183	54.8	70.6	6.2	14.6	41.2	40.5	90	0	1	21.0
Mermentau	167	63.9	71.0	11.0	15.2	42.4	39.5	91	0	1	21.5
Cheniere	166	64.7	73.0	2.0	13.8	42.8	36.5	89	0	1	21.0
RoyJ	164	59.3	71.5	3.7	17.1	42.5	43.3	95	0	1	21.0
Sabine	159	62.8	70.6	3.6	14.6	43.7	39.8	90	0	1	21.5
Antonio	155	64.6	72.1	4.1	15.2	43.8	38.8	87	0	1	24.0
Cocodrie	136	65.2	71.7	7.2	15.6	43.2	39.8	92	0	1	20.5

[1]Planting date: April 8. Emergence: April 24. Herbicides: Command at 1 gal/8 A on April 10; Ricebeax at 3 qt/A, Facet L at 28 oz/A, and Prowl at 1 qt/A on May 5. Fertilizer: MEZ (12-40-0-10-1) at 100 lb/A on April 28; urea at 100 lb/A on May 6; urea at 100 lb/A on May 26; urea at 100 lb/A on June 9; urea at 100 lb/A on June 16. Insecticide: Karate Z at 1 gal/80 A on July 22. Fungicide: Stratego at 19 oz/A on July 13. Permanent flood: May 16. Drained field: August 15. Harvested: August 30.
LSD = A difference of 23 bu/A is required for one variety to differ from another at the 5% probability level. CV = 7%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 5. Performance of rice varieties, hybrids, and lines grown on Sharkey clay soil near Hollandale, Mississippi (N33°11.850' W90°59.790'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
XL753	291	44.9	73.5	8.5	11.4	40.3	44.5	85	10	2	22.8
Gemini 214 CL	270	55.0	71.2	7.7	12.4	37.6	47.3	93	30	3	21.5
CLXL766	264	50.5	72.8	12.3	12.8	38.0	44.5	84	25	2	20.5
XL760	262	54.9	71.4	8.4	12.6	38.3	46.8	92	30	3	21.8
CLXL745	222	50.1	73.0	6.4	13.2	38.0	44.5	83	70	3	22.5
Clearfield											
CL272	216	45.9	70.5	6.9	13.6	41.6	41.0	89	0	1	21.5
RU1504083	213	48.8	71.3	16.6	12.9	41.3	37.3	85	0	1	22.0
RU1504197	197	59.8	71.8	7.7	13.9	42.2	38.8	86	5	2	21.5
CL172	187	59.9	72.1	3.7	13.0	40.7	39.0	88	0	1	21.0
RU1504122	179	60.4	74.0	9.8	15.4	40.0	40.5	85	20	3	21.0
CL153	176	60.4	72.1	4.7	15.1	39.3	40.0	90	68	4	20.5
CL163	174	60.8	70.7	10.2	16.1	38.3	41.3	94	85	4	22.5
CL151	151	54.0	71.9	12.7	14.3	38.4	39.3	85	90	4	21.5
RU1504154	150	54.7	70.8	6.2	15.3	36.6	46.0	84	78	4	22.5
CL111	141	56.1	72.0	9.7	16.2	38.9	40.8	86	85	4	22.0
Conventional											
Rex	217	55.8	69.7	7.7	13.1	39.8	40.0	86	0	1	23.3
Diamond	216	54.9	71.6	6.9	13.7	40.7	39.0	90	0	1	21.3
LaKast	209	50.5	71.2	7.2	12.9	41.0	42.5	88	0	1	23.0
RU1404122	207	59.0	73.2	3.7	13.3	41.5	40.5	91	0	1	20.0
Titan	202	42.8	70.3	6.8	13.4	43.3	38.0	89	20	2	24.0
Taggart	200	56.1	71.1	3.5	13.8	42.8	46.8	97	0	1	23.8
Thad	194	58.7	70.6	3.7	14.1	43.7	40.5	95	0	1	23.3
RU1404154	191	60.3	69.1	5.9	13.6	40.5	36.8	148	0	1	23.5
Cheniere	185	63.8	74.1	4.2	12.6	39.6	38.3	90	10	2	19.3
RU1504198	184	59.3	71.8	4.0	13.3	38.9	47.0	87	85	4	18.0
Mermentau	180	63.3	71.7	7.4	14.4	39.8	45.0	88	0	1	21.3
RoyJ	180	60.0	72.0	2.8	13.5	40.7	42.8	99	0	1	19.3
Bowman	173	60.5	70.4	2.5	13.7	42.2	41.0	97	0	1	23.8
Antonio	172	64.1	72.3	4.6	14.1	41.3	39.3	86	0	1	22.5
Cocodrie	172	65.1	72.8	4.1	13.8	41.2	40.5	92	0	1	21.5
RU1404156	169	47.4	72.7	5.0	13.2	38.2	39.0	88	45	3	21.0
RU1604191	162	55.9	73.5	7.5	14.3	39.4	42.8	89	75	4	18.0
RU1504114	161	61.8	73.2	4.3	17.9	40.4	43.5	92	88	4	20.5
Sabine	148	57.9	71.2	4.5	13.3	40.6	41.0	90	0	1	22.8

[1]Planting date: April 25. Emergence: May 2. Herbicides: Command at 1 gal/10 A, Sharpen at 2 oz/A, and Roundup at 1 qt/A on April 16; Superwham at 1 gal/A and Facet L at 21 oz/A on May 19; Regiment at 0.6 lb/A and Facet L at 18 oz/A on June 8. Fertilizer: Agrotain-treated urea at 100 lb/A on June 9; urea at 100 lb/A on June 13; urea at 100 lb/A on June 25; urea at 100 lb/A on July 2. Insecticide: Warrior II at 1 gal/65 A on August 3. Fungicide: Stratego at 19 oz/A on July 15. Permanent flood: June 9. Drained field: August 22. Harvested: September 19–20.
LSD = A difference of 26 bu/A is required for one variety to differ from another at the 5% probability level. CV= 8%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 6. Performance of rice varieties, hybrids, and lines grown on Alligator clay soil near Ruleville, Mississippi (N33°44.295' W90°24.814'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
CLXL766	318	63.1	72.6	11.1	15.2	36.5	43.5	78	0	1	24.3
Gemini 214 CL	310	63.3	72.3	11.8	16.3	38.6	48.0	86	0	1	23.5
XL753	292	64.1	72.6	11.4	13.8	37.7	41.0	81	0	1	25.5
XL760	272	61.9	71.1	8.6	16.0	38.2	46.0	85	0	1	24.3
CLXL745	267	64.0	72.9	10.1	15.3	34.3	39.5	82	0	1	25.3
Clearfield											
CL163	239	64.6	70.8	8.1	16.2	41.2	40.0	86	0	1	23.8
RU1504154	233	65.5	71.3	6.9	15.2	39.1	44.0	83	0	1	23.0
CL272	220	64.0	68.3	4.9	17.3	42.8	39.8	85	0	1	26.3
CL153	213	68.7	72.5	5.2	15.4	40.7	38.5	83	0	1	23.0
RU1504122	200	65.9	72.4	13.0	16.8	41.4	37.3	81	0	1	22.5
RU1504197	198	64.8	72.1	9.7	17.1	43.3	36.5	84	0	1	23.5
RU1504083	197	64.4	71.5	12.4	16.4	41.3	34.0	81	0	1	24.3
CL151	185	66.8	72.5	10.6	15.3	40.9	36.3	81	0	1	22.3
CL172	184	65.0	71.1	4.5	16.3	41.1	35.8	84	0	1	23.5
CL111	175	67.8	73.0	7.5	15.4	41.4	36.5	83	0	1	24.5
Conventional											
Diamond	251	59.7	71.1	8.6	16.1	41.6	41.8	83	0	1	23.3
Thad	235	66.2	71.5	4.7	17.6	45.3	38.5	84	0	1	24.8
RU1504114	227	67.0	73.5	5.1	15.4	43.8	45.0	87	0	1	21.8
Bowman	223	65.4	71.0	3.7	17.3	43.4	38.5	87	0	1	25.5
Rex	218	63.4	69.8	7.3	16.4	42.5	40.3	85	0	1	26.8
RU1404122	218	67.5	73.3	6.0	16.1	41.6	42.3	88	0	1	21.3
Taggart	216	61.1	71.9	4.9	15.8	43.0	44.5	89	0	1	26.0
Titan	207	65.6	68.2	3.2	17.6	45.2	37.5	81	0	1	28.5
LaKast	207	56.0	70.9	6.2	15.9	41.7	41.5	86	0	1	25.0
RoyJ	200	62.4	72.8	4.5	16.8	41.5	38.8	90	0	1	23.5
RU1604191	199	63.6	73.2	7.5	14.8	40.9	39.8	84	0	1	20.8
RU1404156	188	63.2	72.8	5.9	15.1	41.9	36.8	86	0	1	24.5
Mermentau	181	66.5	72.1	10.7	17.6	41.3	40.0	85	0	1	23.3
Sabine	175	67.4	71.8	4.4	17.9	42.0	36.5	86	0	1	23.3
Cheniere	172	68.2	74.0	3.9	16.2	41.5	36.0	86	0	1	21.5
Antonio	162	66.5	72.5	6.7	20.0	41.4	38.3	86	0	1	23.3
RU1504198	157	62.6	70.9	6.1	14.5	41.0	45.0	82	0	1	20.8
RU1404154	157	63.6	69.9	4.6	19.6	42.1	36.5	86	0	1	25.0
Cocodrie	131	66.9	73.1	10.0	21.8	40.5	38.5	87	0	1	22.5

[1]Planting date: April 5. Emergence: April 21. Herbicides: Facet at 1 qt/A, Command at 1 pt/A, and Roundup at 22 oz/A on April 8; Command at 12 oz/A on April 23. Fertilizer: DAP at 50 lb/A and potash at 100 lb/A on April 18; Agrotain-treated urea at 200 lb/A on May 10; urea at 100 lb/A on May 19; urea at 100 lb/A on June 7. Insecticide: Karate at 1 gal/70 A on July 19. Fungicide: Quilt at 15 oz/A on June 1. Permanent flood: April 14. Drained field: August 10. Harvested: August 24.
LSD = A difference of 34 bu/A is required for one variety to differ from another at the 5% probability level. CV= 10%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 7. Performance of rice varieties, hybrids, and lines grown on Forestdale clay soil near Shaw, Mississippi (N33°35.006' W90°47.090'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
XL760	331	52.6	67.5	10.0	14.5	39.8	50.5	89	0	1	24.5
Gemini 214 CL	324	54.9	67.6	8.6	15.8	39.5	49.3	90	58	2	24.0
CLXL766	308	47.7	68.9	12.2	14.6	40.6	45.5	84	0	1	23.5
XL753	304	47.7	69.8	10.7	13.8	41.5	47.3	84	0	1	25.5
CLXL745	294	53.2	69.7	8.4	14.8	39.8	47.0	83	38	2	25.5
Clearfield											
CL272	256	56.6	69.4	8.3	15.2	44.0	44.0	87	0	1	24.5
RU1504083	244	54.7	68.1	18.5	15.4	43.1	38.8	86	0	1	25.5
RU1504154	242	57.3	68.2	4.6	15.4	41.4	47.3	86	0	1	22.5
CL153	233	60.5	69.0	4.2	16.6	41.7	43.8	90	38	3	22.0
RU1504122	232	59.3	69.8	11.0	16.1	42.9	43.5	86	0	1	23.0
CL172	227	58.3	68.9	2.7	16.1	42.9	40.0	90	0	1	23.0
RU1504197	223	56.0	68.0	12.2	16.4	45.1	37.8	87	5	2	23.5
CL151	222	59.3	69.1	7.3	15.4	43.2	41.5	87	0	1	23.5
CL111	221	58.0	69.2	6.1	15.2	42.9	43.5	89	35	3	24.5
CL163	208	53.8	67.0	9.2	16.6	41.0	43.3	93	55	3	23.5
Conventional											
Diamond	269	47.8	66.4	7.5	16.6	43.2	45.0	90	0	1	23.0
Taggart	262	47.2	67.7	5.1	16.5	43.8	49.0	93	0	1	28.0
RU1404122	250	54.5	69.0	5.6	16.3	42.5	41.3	89	0	1	21.0
RU1604191	246	53.0	69.7	7.7	16.0	42.0	45.5	88	25	2	20.5
Bowman	245	54.8	67.9	4.5	17.0	43.9	40.8	92	0	1	26.0
LaKast	239	45.8	67.1	5.9	15.7	42.2	45.5	87	0	1	26.0
Titan	232	56.7	68.6	4.0	16.1	45.8	40.0	83	0	1	27.5
RU1404156	231	51.6	69.3	6.0	15.1	41.9	42.0	88	0	1	22.5
Rex	231	55.8	66.4	8.9	15.3	42.8	45.3	87	0	1	26.0
Thad	230	53.5	66.7	6.4	16.8	44.5	41.0	91	0	1	25.0
RU1504198	229	53.9	68.2	4.7	14.7	42.6	47.8	87	10	2	21.5
RoyJ	224	49.4	69.4	3.5	16.8	42.4	43.5	94	0	1	23.5
Mermentau	217	56.5	67.3	7.0	16.7	41.8	43.3	89	0	1	22.5
Sabine	214	59.1	68.4	5.1	16.8	43.9	41.5	89	0	1	23.5
Cheniere	212	56.9	70.8	3.8	15.4	42.7	39.0	89	0	1	21.5
RU1504114	210	55.1	69.7	4.7	16.3	44.2	47.8	91	38	2	22.0
Antonio	209	60.3	69.3	8.6	16.5	43.2	44.0	87	0	1	22.5
RU1404154	205	57.2	65.9	4.8	15.2	43.7	39.8	85	0	1	25.0
Cocodrie	173	59.8	69.0	7.9	16.7	43.3	42.0	87	0	1	22.5

[1]Planting date: April 7. Emergence: April 23. Herbicides: Section Three at 6.67 oz/A, Shredder 2,4-D LV6 at 1.33 pt/A, and Roundup PowerMAX II at 32 oz/A on February 8; Herbivore at .50 oz/A, Quinvac 75DF at .60 lb/A, Stam M4 at 1 gal/A on April 8; and Navigator at 1 qt/A and Clincher SF at 15 oz/A on May 31. Fertilizer: 99 lb/A urea on June 1; 100lb/A urea on June 6; 100 lb/A urea on June 17; and 100 lb/A urea on July 15. Permanent flood: June 4. Drained field: August 6. Harvested: September 6.
LSD = A difference of 29 bu/A is required for one variety to differ from another at the 5% probability level. CV= 8%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 8. Performance of rice varieties, hybrids, and lines grown on Sharkey clay soil near Stoneville, Mississippi (N33°25.905' W90°54.286'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
XL760	150	50.0	66.2	12.6	14.2	37.9	45.5	86	0	1	20.5
Gemini 214 CL	146	48.5	65.7	13.2	14.4	37.7	46.5	83	0	1	22.0
XL753	142	48.8	66.9	13.3	13.0	38.0	41.3	83	0	1	22.5
CLXL766	110	47.6	65.9	18.2	13.8	36.5	42.8	80	0	1	21.5
CLXL745	108	48.7	65.9	10.1	12.5	36.7	43.3	83	0	1	23.0
Clearfield											
RU1504083	168	51.9	65.9	19.0	14.2	39.9	37.3	82	0	1	22.0
CL272	164	57.5	65.3	6.5	15.6	44.1	39.8	84	0	1	23.5
CL163	163	53.9	66.1	12.4	14.5	41.4	41.0	90	8	2	22.5
CL172	159	56.9	68.0	3.9	14.8	42.9	36.0	86	0	1	21.5
RU1504197	147	51.6	66.3	11.6	15.3	43.5	36.5	83	0	1	21.5
CL153	105	55.0	67.3	7.9	14.4	40.3	37.8	83	0	1	20.0
CL151	103	52.9	66.6	16.7	15.1	39.5	38.3	81	0	1	19.5
RU1504122	96	52.6	67.3	13.4	15.4	39.0	38.0	81	0	1	20.5
CL111	82	52.9	66.8	13.7	13.8	39.0	38.3	84	0	1	20.5
RU1504154	79	50.9	65.4	15.3	13.0	35.9	44.0	81	0	1	20.5
Conventional											
Thad	212	57.8	68.2	3.9	14.9	44.7	40.5	89	0	1	23.0
Diamond	188	46.5	65.9	8.4	14.6	42.7	39.5	86	0	1	21.5
Bowman	180	59.7	68.8	3.1	15.8	44.4	40.0	89	0	1	23.0
Rex	178	54.5	66.5	9.7	15.0	42.7	41.3	85	0	1	24.5
Taggart	175	48.1	67.4	6.3	14.3	43.2	44.0	89	0	1	24.0
LaKast	168	43.7	66.3	9.2	14.4	41.9	41.0	86	0	1	23.0
RU1504114	165	54.6	69.1	6.4	14.3	42.1	44.5	86	0	1	20.5
RU1404122	163	56.2	68.7	4.0	14.3	42.3	40.5	87	0	1	20.0
RoyJ	161	51.6	69.3	2.9	17.0	41.2	43.3	91	0	1	21.0
Cheniere	152	58.9	70.8	5.5	13.8	40.7	34.8	84	0	1	20.0
RU1404156	145	48.7	67.1	6.8	13.9	40.8	41.8	86	0	1	20.5
Mermentau	144	54.1	66.9	6.1	15.9	39.9	38.3	84	0	1	20.0
RU1404154	139	53.9	63.7	5.1	16.8	41.4	40.5	83	0	1	22.0
RU1504198	134	50.7	66.8	5.1	14.1	40.3	46.0	87	0	1	19.0
RU1604191	121	51.2	68.9	10.6	13.9	40.1	43.3	84	0	1	18.5
Sabine	111	60.8	69.0	4.5	15.8	42.7	38.0	86	0	1	22.0
Titan	110	59.1	66.1	8.1	14.9	43.8	37.0	79	0	1	25.5
Antonio	97	58.0	69.1	7.6	16.0	41.3	39.5	82	0	1	20.5
Cocodrie	88	57.7	69.0	5.7	16.7	38.3	40.5	84	0	1	20.5

[1]Planting date: April 5. Emergence: April 22. Herbicides: Command at 1 pt/A and Gramoxone at 2 pt/A on April 5; Permit at 0.67 oz/A and Ricebeaux at 2 qt/A on May 5; Permit Plus at 0.75 oz/A, Prowl at 1 qt/A, and Stam at 1.5 qt/A on May 17. Fertilizer: urea at 326 lb/A on May 18. Insecticide: N/A. Fungicide: N/A. Permanent flood: May 18. Drained field: August 14. Harvested: August 25.
LSD = A difference of 28 bu/A is required for one variety to differ from another at the 5% probability level. CV = 12%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 9. Performance of rice varieties, hybrids, and lines grown on Sharkey clay soil near Tunica, Mississippi (N34°35.406' W90°17.943'), 2016.[1]

Entry	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]
	bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*
Hybrids											
XL753	321	59.5	72.4	11.2	14.2	40.6	46.3	79	0	1	24.3
Gemini 214 CL	309	57.1	70.7	9.3	14.0	38.9	51.3	81	0	1	24.5
XL760	309	57.3	70.5	9.2	14.7	38.8	51.5	83	25	2	24.5
CLXL766	305	57.0	71.6	11.4	14.5	40.0	46.3	77	0	1	24.5
CLXL745	282	59.1	72.6	8.9	14.2	39.3	48.0	78	50	4	26.3
Clearfield											
CL151	246	58.9	71.5	10.5	14.7	42.1	41.3	79	13	2	22.8
CL153	234	60.2	70.7	6.1	14.1	41.8	41.5	82	0	1	22.5
RU1504122	222	60.0	71.9	13.4	14.7	42.5	41.8	81	0	1	22.5
CL111	219	58.3	71.4	9.1	13.7	42.5	40.5	80	0	1	24.0
RU1504197	209	58.8	70.5	9.5	14.4	45.1	38.8	80	0	1	23.8
RU1504154	208	55.6	70.5	7.1	14.0	40.4	47.5	78	38	5	22.8
CL163	199	61.0	70.5	8.5	14.1	41.6	43.0	83	0	1	23.3
RU1504083	196	56.9	71.3	11.1	14.4	42.5	36.5	80	0	1	24.3
CL172	184	59.4	70.4	4.8	14.7	42.8	39.3	81	0	1	23.3
CL272	183	58.8	68.1	4.9	15.8	45.1	45.5	85	0	1	24.5
Conventional											
RU1604191	244	59.6	73.4	9.0	14.1	43.2	45.0	79	0	1	19.5
Diamond	235	50.0	70.2	10.2	14.5	43.4	42.3	80	0	1	23.5
LaKast	233	50.9	70.5	6.4	14.0	43.1	48.5	80	0	1	24.5
Taggart	230	54.4	71.2	5.0	14.6	44.4	48.3	83	0	1	26.3
RU1504114	223	62.3	73.3	4.6	14.3	44.9	48.3	82	0	1	21.3
RU1404156	218	55.0	72.5	8.3	14.8	41.9	42.8	81	0	1	22.3
RU1504198	216	59.8	71.3	8.8	14.5	42.0	48.5	78	0	1	19.0
Thad	212	59.4	70.5	4.7	14.3	45.6	40.0	80	0	1	25.0
RU1404122	211	61.8	73.0	8.3	14.5	42.8	41.5	81	0	1	20.8
Titan	208	61.3	68.8	3.9	15.6	46.4	43.3	79	0	1	27.5
Rex	207	58.9	69.5	8.7	14.8	42.3	46.5	80	0	1	25.3
RU1404154	203	60.4	69.4	6.2	15.4	43.9	40.8	79	0	1	24.3
Sabine	194	64.7	71.6	4.4	14.4	44.0	39.3	81	0	1	22.5
RoyJ	188	58.0	72.6	4.1	14.9	42.7	43.8	70	0	1	22.3
Bowman	185	60.5	71.0	4.2	14.8	44.8	38.3	82	0	1	25.3
Cheniere	185	65.8	74.0	3.8	14.2	43.2	37.8	81	0	1	21.5
Mermentau	184	62.4	71.2	13.1	15.5	37.5	44.8	82	0	1	21.8
Antonio	181	63.4	72.2	7.8	15.2	43.7	42.5	79	0	1	23.8
Cocodrie	175	65.2	72.5	10.6	15.0	44.1	43.0	83	0	1	22.5

[1]Planting date: April 8. Emergence: April 20. Herbicides: Glyphosate at 32 oz/A and Command at 1 gal/6 A on April 8; Facet L at 32 oz/A and Aim at 1 oz/A on May 12. Fertilizer: 292 lb/A 41-0-0-4 on May 12; 130 lb/A urea on June 10. Insecticide: Ravage at 1 gal/35 A on July 13. Fungicide: Stratego at 17 oz/A on July 6. Permanent flood: May 18. Drained field: August 3. Harvested: August 30.
LSD = A difference of 24 bu/A is required for one variety to differ from another at the 5% probability level. CV= 7%.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 10. Average rough rice yields of varieties, hybrids, and lines evaluated in on-farm trials at seven locations, 2016.

Entry	Choctaw	Clarksdale	Hollandale	Ruleville	Shaw	Stoneville	Tunica	Average	Stability[1]
	bu/A	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	*bu/A*	
Hybrids									
CLXL745	280	261	222	267	294	108	282	245	26
CLXL766	307	251	264	318	308	110	305	266	28
Gemini 214 CL	286	264	270	310	324	146	309	273	22
XL753	308	261	291	292	304	142	321	274	22
XL760	320	264	262	272	331	150	309	273	22
Clearfield									
CL111	189	211	141	175	221	82	219	177	29
CL151	176	189	151	185	222	103	246	182	26
CL153	200	212	176	213	233	105	234	196	23
CL163	176	214	174	239	208	163	199	196	14
CL172	181	181	187	184	227	159	184	186	11
CL272	227	214	216	220	256	164	183	212	14
RU1504154	158	219	150	233	242	79	208	184	32
RU1504197	213	194	197	198	223	147	209	197	12
RU1504083	228	213	213	197	244	168	196	209	12
RU1504122	220	186	179	200	232	96	222	191	24
Conventional									
Antonio	212	155	172	162	209	97	181	170	23
Bowman	204	185	173	223	245	180	185	199	13
Cheniere	207	166	185	172	212	152	185	183	12
Cocodrie	189	136	172	131	173	88	175	152	23
Diamond	226	219	216	251	269	188	235	229	11
LaKast	214	195	209	207	239	168	233	209	11
Mermentau	202	167	180	181	217	144	184	182	13
Rex	228	212	217	218	231	178	207	213	8
RoyJ	200	164	180	200	224	161	188	188	12
Sabine	201	159	148	175	214	111	194	172	21
Taggart	235	216	200	216	262	175	230	219	13
Thad	254	207	194	235	230	212	212	220	9
Titan	230	228	202	207	232	110	208	203	21
RU1404122	207	192	207	218	250	163	211	207	13
RU1404154	227	187	191	157	205	139	203	187	16
RU1404156	186	183	169	188	231	145	218	189	15
RU1504114	186	201	161	227	210	165	223	196	14
RU1504198	215	198	184	157	229	134	216	190	18
RU1604191	188	190	162	199	246	121	244	193	23
Mean	220	203	195	213	241	140	222	205	
LSD	34	23	26	34	29	28	24	25	
CV	9%	7%	8%	10%	8%	12%	7%	20%	
Planting Date	April 7	April 8	April 25	April 5	April 7	April 5	April 8		

[1]Stability is calculated by dividing the standard deviation by the mean and multiplying by 100. The lower the number, the more stable it is across multiple locations.

Table 11. Average agronomic and milling performance of varieties, hybrids, and lines grown at seven on-farm locations, 2016.

Entry	Origin[1]	Yield[2]	Whole milled rice	Total milled rice	Chalk[3]	Harvest moisture	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging[6]	1,000 seed weight[7]	Approximate seeds/pound
		bu/A	*%*	*%*	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*	*no.*
Hybrids													
CLXL745	RT	245	55.3	71.1	9.1	13.7	38.1	44	82	23	2	24.4	18585
CLXL766	RT	266	53.4	70.5	12.3	13.9	38.3	44	81	4	1	22.7	20019
Gemini 214 CL	RT	273	56.2	69.8	9.6	14.4	38.6	48	86	16	1	22.9	19801
XL753	RT	274	54.3	71.2	10.3	13.8	39.7	44	83	1	1	23.7	19145
XL760	RT	272	56.1	69.6	9.3	14.4	38.4	48	87	8	1	23.0	19739
Clearfield													
CL111	LA-HA	177	58.0	70.7	9.0	14.7	40.8	40	84	27	2	22.9	19801
CL151	LA-HA	182	58.3	70.5	10.7	14.9	40.8	39	83	21	2	22.0	20636
CL153	LA-HA	196	61.2	70.5	5.5	14.8	40.6	41	86	15	2	21.6	21046
CL163	MS-HA	196	58.1	69.2	9.6	15.0	39.8	42	89	27	2	22.8	19925
CL172	AR-HA	186	60.1	70.4	3.8	14.9	42.3	39	86	3	1	22.2	20470
CL272	LA-HA	212	57.5	68.8	6.8	15.3	43.4	41	86	0	1	23.7	19173
RU1504154	MS	184	56.6	69.4	7.4	14.4	38.6	45	83	27	2	22.3	20339
RU1504197	MS	197	58.9	70.0	10.1	15.3	44.0	37	84	1	1	23.0	19770
RU1504083	MS	209	55.3	69.7	14.8	14.5	41.8	37	83	0	1	24.4	18585
RU1504122	MS	191	59.7	71.1	11.5	15.4	41.3	40	83	3	1	22.1	20570
Conventional													
Antonio	TX	170	62.9	71.4	6.8	16.1	42.2	41	85	0	1	22.6	20114
Bowman	MS	199	60.4	70.1	3.5	15.6	43.5	40	90	5	1	24.4	18585
Cheniere	LA	183	63.1	72.9	3.9	14.4	41.2	38	87	1	1	20.8	21880
Cocodrie	LA	152	63.4	71.4	7.6	16.6	41.8	41	88	0	1	21.6	21046
Diamond	AR	229	52.1	69.4	8.1	15.0	42.0	42	86	0	1	22.4	20307
LaKast	AR	209	49.6	69.5	6.8	14.5	42.1	44	86	0	1	24.4	18639
Mermentau	LA	182	61.4	70.2	9.7	16.0	40.6	42	87	0	1	21.5	21081
Rex	MS	213	57.7	68.5	8.6	14.7	42.0	43	85	2	1	25.2	18031
RoyJ	AR	188	56.7	71.5	3.7	16.2	41.7	43	90	0	1	21.6	20977
Sabine	TX	172	62.0	70.5	4.5	15.3	42.3	40	87	0	1	22.6	20050
Taggart	Bayer	219	53.3	70.1	5.1	15.0	43.4	47	90	2	1	25.1	18108
Thad	MS	220	59.1	69.7	5.0	15.3	44.5	40	88	0	1	24.1	18861
Titan	AR	203	58.2	68.8	5.4	15.1	44.9	40	82	3	1	26.4	17178
RU1404122	MS	207	59.9	71.7	6.4	14.9	41.9	41	87	0	1	20.4	22224
RU1404154	MS	187	59.0	67.7	5.2	15.9	42.1	40	93	0	1	23.5	19290
RU1404156	MS	189	53.3	71.0	6.5	14.3	40.5	41	86	6	1	22.0	20670
RU1504114	MS	196	60.7	71.9	4.8	15.4	42.3	46	88	20	2	21.1	21546
RU1504198	MS	190	57.5	69.9	6.2	14.4	40.3	47	85	16	2	19.4	23411
RU1604191	MS	193	57.1	72.0	8.1	14.7	40.7	44	86	17	2	19.3	23584
Mean		205.0	58	70	8	15	41	42	86	7	1	23	20094
LSD		24.5	3.4	1.4	1.6	0.9	1.4	1.7	5.2	14.0	0.5	1.0	
CV		19.7	7.9	2.7	28.5	9.5	4.4	5.5	8.1			6.1	

[1]AR = Arkansas; LA = Louisiana; MS = Mississippi; HA = Horizon Ag, in conjunction with the respective state; RT = RiceTec, Inc.
[2]Rough rice at 12% moisture.
[3]Winseedle chalk measurement
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 12. Average agronomic and milling performance of varieties, hybrids, and lines grown at on-farm locations from 2014–16.[1]

Entry	Origin[2]	Yield[3]	Whole milled rice	Total milled rice	Bushel weight	Plant height	50% heading[4]	Lodging[5]	Lodging score[6]	1,000 seed weight[7]	Approx. seeds/ pound
		bu/A	*%*	*%*	*lb*	*in*	*days*	*%*	*(1-5)*	*g*	*no.*
Conventional											
Antonio	TX	202	63	71	43.6	40	88	0	1.2	23.0	19715
Bowman	MS	210	59	69	44.5	40	92	2	1.0	24.5	18515
Cheniere	LA	211	63	73	43.1	38	90	1	1.1	21.2	21409
Cocodrie	LA	195	63	71	43.5	40	89	0	1.0	22.3	20334
Lakast	AR	241	53	70	43.7	44	89	1	1.0	25.2	17994
Mermentau	LA	208	62	70	42.9	41	89	0	1.0	21.9	20696
Rex	MS	232	59	68	43.6	42	89	1	1.0	26.3	17304
RoyJ	AR	200	58	71	43.2	44	96	0	1.0	22.8	19990
Sabine	TX	189	62	70	44.4	39	91	0	1.0	23.2	19583
Thad	MS	226	58	69	45.4	40	91	0	1.0	24.3	18661
XL753	RT	283	54	71	41.5	44	87	4	1.2	24.4	18583
Clearfield											
CL111	LA-HA	211	59	70	42.9	40	86	12	1.6	23.9	18999
CL151	LA-HA	227	59	70	43.1	40	87	13	1.6	22.9	19833
CL163	MS-HA	223	58	69	42.7	41	90	15	1.5	24.3	18706
CLXL745	RT	260	56	71	40.4	44	85	16	1.6	25.4	17898

[1]Data presented are the averages of 21 total sites that served as the On-Farm Variety Trials for 2014–16. Listed entries were included in all 3 years.
[2]AR = Arkansas; LA = Louisiana; MS = Mississippi; HA = Horizon Ag, in conjunction with the respective state; RT = RiceTec Inc.
[3]Rough rice at 12% moisture.
[4]Days after emergence.
[5]Percent of plot that was lodged.
[6]Severity of lodging: 1=plants totally erect, 5=plants completely on ground.
[7]Weight of 1,000 kernels.

Table 13. Reactions of rice varieties and hybrids to common diseases.[1]

Variety/ Hybrid	Sheath blight	Blast	Stem rot	Kernel smut	False smut	Brown leaf spot	Straight head	Lodging	Black sheath rot	Bacterial panicle blight	Narrow brown leaf spot	Leaf smut
Bowman	MS	S	S	S	S	R	MS	MS	MS	S	MR	—
Cheniere	S	S	S	S	S	MR	MR	MS	MS	MS	VS	MR
CL111	VS	S	VS	S	S	R	MS	S	S	S	S	
CL142-AR	MS	S	S	S	S	R	MS	MS	S	S	MS	
CL151	S	VS	VS	S	S	R	VS	S	S	VS	S	—
CL152	S	MS			S		MR	MR		MS	R	
CL162	S	S	S	S	S	—	MR	VS	S	MR	R	—
CL261	MS	MS	S	MS	S	R	S	MR	MS	S	S	
CLXL729	MS	MR	MS	MS	S	R	MR	S	MS	MR	MS	—
CLXL745	MS	MR	MS	MS	S	R	MR	S	MS	MR	MS	—
Cocodrie	S	S	S	S	S	MR	VS	MS	MS	VS	MS	MS
Mermentau	S	S					MS			MS		
Rex	S	VS					MR	MR		VS	VS	
RoyJ	MS	S	S	VS	S	MR	S	MR	MS	S	MR	
Sabine	S	S	S	S	S	R	—	MR	S	S	MS	—
Taggart	MS	S	S	S	S	—	—	MS	S	S	—	—
Templeton	MS	R	S	S	S	—	—	MS	S	S	—	—
Wells	S	S	S	MS	S	MR	MR	S	—	VS	R	—
XL723	MS	MR	MS	MS	S	R	MR	S	MS	MR	MS	—
XL753	R	MR								MR		

[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 14. Nitrogen fertilizer rate guidelines for selected rice varieties.

Varieties	Clay soils[1]		Silt loam soils[2]	
	Preflood	Midseason	Preflood	Midseason
	lb/A	*lb/A*	*lb/A*	*lb/A*
Bowman	120–150	30–60	90–120	30–60
Cheniere	120–150	30–60	90–120	30–60
CL111	120	45	90–120	45
CL142-AR	120	45	90–120	45
CL151[3]	90–135	0–45	90	45
CL152[4]	120–150	45	120	45
Cocodrie	120–150	30–60	90–120	30–60
Mermentau[5]	120–150	30–60	90–120	30–60
Rex	120–150	45	120	45
Sabine	120–150	30–60	90–120	30–60

[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]CL151 is highly prone to lodging.
[4]Two years and only three site years for clay and two site years for silt loam. Recommendations are subject to change with further locations.
[5]Only two site years of data for clay and four site years of data for silt loam.

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George M. Hopper, Director

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