MISSISSIPPI GRAIN SORGHUM

HYBRID TRIALS, 2019

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MISSISSIPPI'S OFFICIAL VARIETY TRIALS

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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 1414 at locations shown on the map on the second page. It is intended for colleagues, cooperators, and sponsors. The interpretation of data presented in this report may change after additional experimentation. Information included is not to be construed as a recommendation for use or as an endorsement of a specific 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 organizations listed on page 2 is gratefully acknowledged.

Trade names of commercial products used in this report are included only for clarity and understanding. All available names (i.e., trade names, chemical names, etc.) of products used in this research project are listed on page 2.

Mississippi Grain Sorghum Hybrid Trials, 2019

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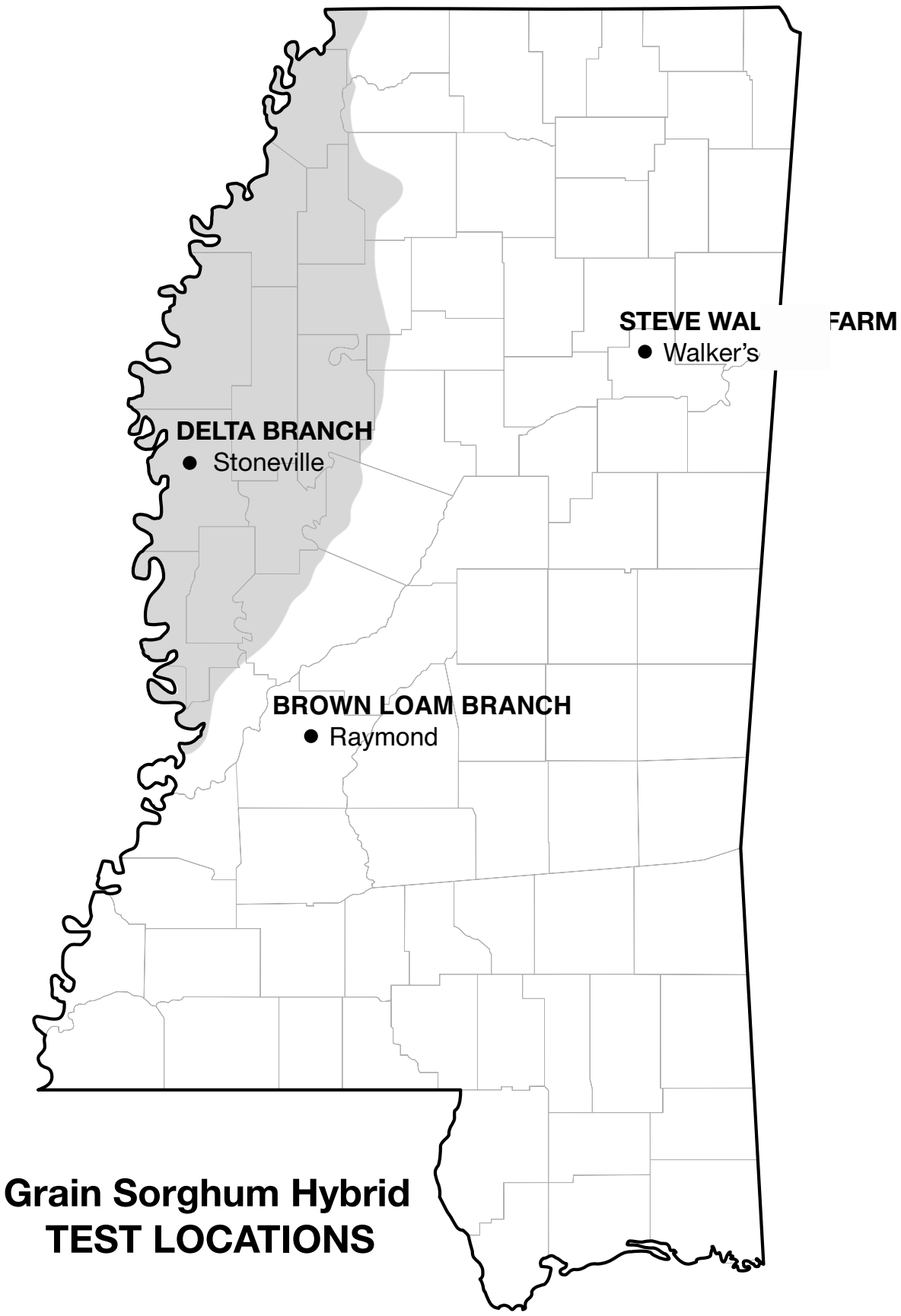
Our website address is ***mafes.msstate.edu/variety-trials***.



Grain Sorghum Hybrid TEST LOCATIONS

Mississippi Grain Sorghum Hybrid Trials, 2019

PROCEDURES

Trials were conducted on Experiment Station land and on grower-cooperator fields in two geographical areas in Mississippi: Area I, located in the hill region of Mississippi; and Area II, located in the Delta region of Mississippi (see map). Commercial seed companies were given the opportunity to enter hybrids in the trial.

Plots consisted of various row patterns, depending on the location. Plot sizes were one of the following: (1) two 38-inch-wide, 16-foot-long rows; or (2) three 19-inch-wide, 18-foot-long rows. These planting patterns were used to accommodate the producer at each location.

Weeds were controlled by cultivation and/or herbicides. Only herbicides currently registered for use on grain sorghum were used in these studies, with strict adherence to all label instructions.

Experimental design was a randomized complete block with four replications at each location.

Seed of all entries were supplied by participating companies. All seed were packaged for planting at seeding rates suggested by the participating company and planted with a cone planter. Fertilizer was applied according to soil test recommendations.

Grain Sorghum Performance Measurements

Yield: An Almaco plot combine was used to harvest the total area of each plot. Harvested grain was weighed, moisture was determined, and yields were converted to bushels per acre at 14% moisture.

Head Exertion: This measurement is the average distance in inches from the flag leaf to the base of the panicle.

Grain Moisture: This measurement is expressed as a percent moisture of grain at harvest.

Plant Height: This measurement is the average height in inches from the soil surface to the top of the grain head.

Head Compactness: This variable was measured on a 1–5 scale: 1 = head short and oval; 2 = head long and slender; 3 = head elongated and oval; 4 = head elongated and rectangular; and 5 = head elongated and open.

USE OF DATA TABLES AND SUMMARY STATISTICS

The yield potential of a given hybrid cannot be measured with complete accuracy. Consequently, replicate plots of all hybrids are evaluated for yield, and the yield of a given hybrid is estimated as the mean of all replicate plots of that hybrid. Yields vary somewhat from one replicate plot to another, which introduces a certain degree of error to the value. As a result, although the mean yields of some hybrids are numerically different, the two hybrids may not be significantly different from each other within the range of natural variation. That is, the ability to measure yield is not precise enough to determine what the small differences are, other than what might be observed purely by chance.

The least significant difference (LSD) is an estimate of the smallest difference between two hybrids that can be declared to be the result of something other than random variation in a particular trial. Consider the following example for a given trial:

Hybrid	Yield
A	90 bu/A
B	85 bu/A
C	81 bu/A
LSD	7 bu/A

The difference between hybrid A and hybrid B is 5 bu/A (i.e., 90 - 85 = 5). This difference is smaller than the LSD (7 bu/A). Consequently, we would conclude that hybrid A and hybrid B have the same yield potential, since we are unable to say that the observed difference did not occur purely due to chance. However, the difference between hybrid A and hybrid C is 9 bu/A (i.e., 90 - 81 = 9), which is larger than the LSD (7 bu/A). We would therefore conclude that the yield potential of hybrid A is superior to that of hybrid C.

The coefficient of variation (CV) is a measure of the relative precision of a given trial and is used to compare the relative precision of different trials. The CV is generally considered an estimate of the amount of unexplained variation in a given trial. This unexplained variation can be the result of variation between plots with respect to soil type, fertility, insects, diseases, moisture stress, etc. Overall, as the CV increases, the precision of a given trial decreases.

The coefficient of determination (R^2) is another measure of the level of precision in a trial and is also used to compare the relative precision of different trials. The R^2 is a measure of the amount of variation that is explained, or accounted for, in a given trial. For example, an R^2 value of 90 percent indicates that 90 percent of the observed variation in the trial has been accounted for in the trial, with the remaining 10 percent being unaccounted for. The higher the R^2 value, the more precise the trial. The R^2 is generally considered a better measure of precision than the CV for comparison of different trials.

Table 1. 2019 grain sorghum hybrid trial location summary.

Location	Irrigation	Soil type	Planting date	Harvest date	Row spacing
Raymond, Brown Loam Branch	Not Irrigated	Loring silt loam	5/3, replanted on 5/22	9/16	19”
Stoneville, Delta Branch	Not Irrigated	Bosket very fine sandy loam	5/8, replanted on 5/30	9/19	19”
Walker’s Gin, Steve Walker Farm	Not Irrigated	Mathiston silt loam	5/20	9/17	38”

Table 2. Hybrids entered in the Mississippi grain sorghum hybrid trials, 2019.

Brand	Hybrid	Planting rate (x1000)	Days to maturity
Dekalb	DKS45-23	90	114
Dekalb	DKS47-07	90	112
Dekalb	DKS53-53	90	114
Dekalb	DKS51-01	90	114
Dyna-Gro	M60GB31	78	98
Dyna-Gro	M69GR88	78	113
Dyna-Gro	M73GR55	78	116
Dyna-Gro	M62GB77	78	99
Dyna-Gro	M74GB17	78	117
Dyna-Gro	M68GB18 (GX17227)	78	110
Dyna-Gro	M69GB38 (GX17968)	78	112
Dyna-Gro	M71GR04 (GX16833)	78	114
Dyna-Gro	*GX17457*	*78*	*111*
Dyna-Gro	*GX17973*	*78*	*112*
Dyna-Gro	*GX18395*	*78*	*112*
Dyna-Gro	*GX18991*	*78*	*113*
Dyna-Gro	*GX19981*	*78*	*114*
Pioneer	84P80	85	124
Pioneer	83P99	85	128
Pioneer	83P17	85	125
Sorghum Partners	SP 74C40	75	73
Sorghum Partners	SP 68M57	75	69
Sorghum Partners	SP 7715	75	73
Sorghum Partners	SP 74M21	75	73
Terral Seed	REV 9620	75	114-116
Terral Seed	REV 9782	75	116-118

Italics = Exp. Variety

Table 3. 2019 yield summary of grain sorghum hybrid trials in Mississippi.

Brand	Hybrid	Raymond hills (loam)	Stoneville delta (loam)	Walker's Gin hills (loam)	Overall avg.
		bu/A	*bu/A*	*bu/A*	*bu/A*
Dekalb	DKS45-23	117.9	146.4	105.8	123.3
Dekalb	DKS47-07	117.6	135.7	94.5	115.9
Dekalb	DKS51-01	81.5	158.5	94.8	111.6
Dekalb	DKS53-53	125.0	125.8	102.5	117.7
Dyna-Gro	GX17457	106.8	98.2	102.2	102.4
Dyna-Gro	GX17973	114.6	133.9	102.8	117.1
Dyna-Gro	GX18395	99.4	124.0	76.7	100.0
Dyna-Gro	GX18991	100.1	144.5	85.9	110.1
Dyna-Gro	GX19981	117.3	159.4	94.0	123.5
Dyna-Gro	M60GB31	94.0	99.8	107.0	100.3
Dyna-Gro	M62GB77	111.5	121.5	77.3	103.4
Dyna-Gro	M68GB18	95.3	164.9	95.4	118.6
Dyna-Gro	M69GB38	104.4	114.5	110.3	109.7
Dyna-Gro	M69GR88	72.6	80.0	87.8	80.1
Dyna-Gro	M71GR04	124.4	162.5	120.1	135.7
Dyna-Gro	M73GR55	100.6	154.4	86.5	113.8
Dyna-Gro	M74GB17	106.8	142.3	71.5	106.9
Pioneer	83P17	101.8	165.8	95.8	121.1
Pioneer	83P99	122.9	109.0	120.0	117.3
Pioneer	84P80	117.0	128.0	102.8	115.9
Sorghum Partners	SP 68M57	126.5	143.6	66.8	112.3
Sorghum Partners	SP 74C40	84.5	115.6	71.5	90.5
Sorghum Partners	SP 74M21	95.1	120.3	70.2	95.2
Sorghum Partners	SP7715	121.0	142.0	88.2	117.1
Terral Seed	REV 9620	73.7	107.8	97.5	93.0
Terral Seed	REV 9782	107.4	148.2	103.6	119.7
Mean		105.4	132.6	93.5	110.5
CV		17.1	10.9	14.6	
R^2		50.2	77.0	64.4	
LSD(0.05)		25.5	20.3	19.2	
Error df		75	75	75	

Table 4. Two-year summary of grain sorghum hybrid trials in Mississippi.					
Brand	**Variety**	**Raymond**	**Stoneville**	**Walker's Gin**	**Overall avg.**
		bu/A	*bu/A*	*bu/A*	*bu/A*
DeKalb	DKS51-01	103.6	128.6	86.5	106.2
DeKalb	DKS53-53	127.6	115.4	81.9	108.3
Dyna-Gro	M60GB31	104.8	92.0	75.4	90.7
Dyna-Gro	M68GB18	108.3	132.2	83.3	107.9
Dyna-Gro	M69GR88	96.4	83.9	98.3	92.9
Dyna-Gro	M71GR04	121.2	124.8	91.6	112.5
Dyna-Gro	M73GR55	112.0	126.3	87.3	108.5
Dyna-Gro	M74GB17	106.6	109.2	76.6	97.5
Dyna-Gro	M69GB38	126.7	103.0	109.4	113.0
Pioneer	83P17	116.0	131.7	91.5	113.0
Pioneer	84P80	130.6	111.2	91.9	111.2
Pioneer	83P99	122.0	98.0	113.0	111.0
Sorghum Partners	SP 68M57	123.1	115.9	50.3	96.5
Sorghum Partners	SP 74C40	97.0	100.1	64.2	87.1
Sorghum Partners	SP7715	127.5	108.2	82.3	106.0
Terral Seed	REV 9782	121.5	126.7	75.5	107.9
Overall mean		115.3	113.0	84.9	104.4

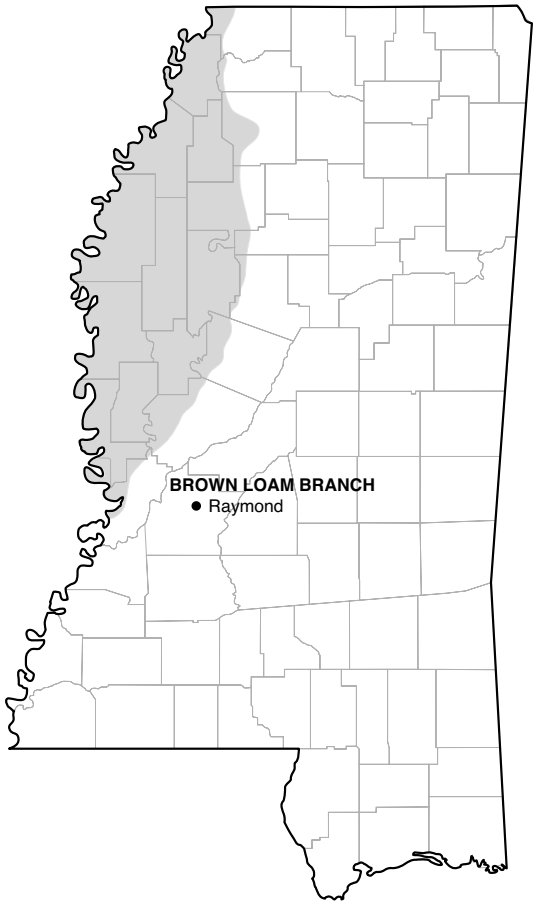
Table 5. Three-year average of grain sorghum hybrid trials in Mississippi.				
Brand	**Hybrid**	**Stoneville**	**Walker's Gin**	**Overall avg.**
		bu/A	*bu/A*	*bu/A*
DeKalb	DKS51-01	129.4	90.5	109.9
DeKalb	DKS53-53	120.1	88.9	104.5
Dyna-Gro	M60GB31	95.9	85.1	90.5
Dyna-Gro	M73GR55	128.9	92.0	110.5
Dyna-Gro	M74GB17	112.2	83.7	98.0
Pioneer	83P17	127.3	89.5	108.4
Pioneer	84P80	114.3	96.7	105.5
Pioneer	83P99	102.9	105.8	104.4
Sorghum Partners	SP7715	105.4	86.2	95.8
Terral Seed	REV 9782	125.8	82.5	104.2
Overall mean		116.2	90.1	103.2

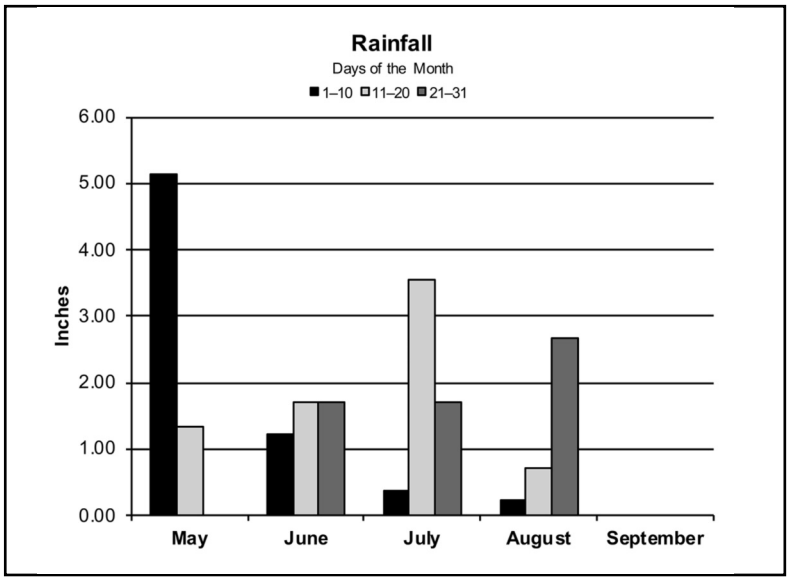
MAFES BROWN LOAM BRANCH, RAYMOND

Crop Summary

The sorghum plots were planted in early May into a raised seedbed with adequate soil moisture for germination. Heavy rains (5+ inches) occurred in the week after planting. The rains resulted in poor stands in portions of the field, which required replanting. The original plots were destroyed with herbicide and replanted on May 22. The second planting resulted in a good stand. Timely rainfall during the remainder of the growing season allowed for ample soil moisture for the crop to have good yield potential. The plots were desiccated in early September to facilitate harvest, which was completed in a timely manner.

Planting date . . . May 3, replanted on May 22
Harvest date . . . . September 16
Soil type . . . . . Loring silt loam
Soil pH 6.0
Soil fertility . . . . . .P=M, K=M
Fertilizer . . . . . .Preplant — 13-13-13 @ 150 lb/A
Topdress — N @ 55 lb/A (33-0-0-12S) on June 19; N @ 55 lb/A (33-0-0-12S) on July 10
Herbicide . . . . . .Preemergence — Lexar @ 2 qt/A and Gramoxone @ 1 qt/A on May 3; Dual II Magnum @ 16 oz/A, Atrazine @ 24 oz/A, and Roundup PowerMax @ 32 oz/A on May 22
Desiccant — Roundup PowerMax @ 32 oz/A on September 5
Insecticide . . . . . .Prevathon @ 14 oz/A & Sivanto @ 6 oz/A on August 2
Previous crop . . .Peanut





Rainfall Summary

	Inches
May	6.47
June	4.64
July	5.65
August	3.62
September	0.00
Total	20.38

Table 6. Performance results of 26 hybrids grown at MAFES Brown Loam Branch, Raymond, 2019.

Brand	Variety	2019 yield	2-year average	3-year[1] average	Plant height	Head exertion	Head compactness
		bu/A	*bu/A*	*bu/A*	*in*	*in*	*(1-5)*
Sorghum Partners	SP 68M57	126.5	123.1	—	47	3	5
DeKalb	DKS53-53	125.0	127.6	—	55	3	2
Dyna-Gro	M71GR04	124.4	121.2	—	52	0	3
Pioneer	83P99	122.9	122.0	—	54	5	3
Sorghum Partners	SP7715	121.0	127.5	—	54	5	4
Dekalb	DKS45-23	117.9	—	—	57	2	2
Dekalb	DKS47-07	117.6	—	—	62	3	1
Dyna-Gro	GX19981	117.3	—	—	60	2	3
Pioneer	84P80	117.0	130.6	—	52	1	3
Dyna-Gro	GX17973	114.6	—	—	53	3	5
Dyna-Gro	M62GB77	111.5	—	—	52	2	5
Terral Seed	REV 9782	107.4	121.5	—	55	5	2
Dyna-Gro	M74GB17	106.8	106.6	—	54	3	2
Dyna-Gro	GX17457	106.8	—	—	49	1	2
Dyna-Gro	M69GB38	104.4	126.7	—	53	3	4
Pioneer	83P17	101.8	116.0	—	56	2	3
Dyna-Gro	M73GR55	100.6	112.0	—	54	0	2
Dyna-Gro	GX18991	100.1	—	—	57	4	5
Dyna-Gro	GX18395	99.4	—	—	53	5	5
Dyna-Gro	M68GB18	95.3	108.3	—	64	4	2
Sorghum Partners	SP 74M21	95.1	—	—	53	2	5
Dyna-Gro	M60GB31	94.0	104.8	—	59	3	5
Sorghum Partners	SP 74C40	84.5	97.0	—	57	2	5
DeKalb	DKS51-01	81.5	103.6	—	51	3	2
Terral Seed	REV 9620	73.7	—	—	56	2	2
Dyna-Gro	M69GR88	72.6	96.4	—	49	2	3
Mean		105.4					
CV		17.1					
R^2		50.2					
LSD (0.05)		25.5					
Error df		75					

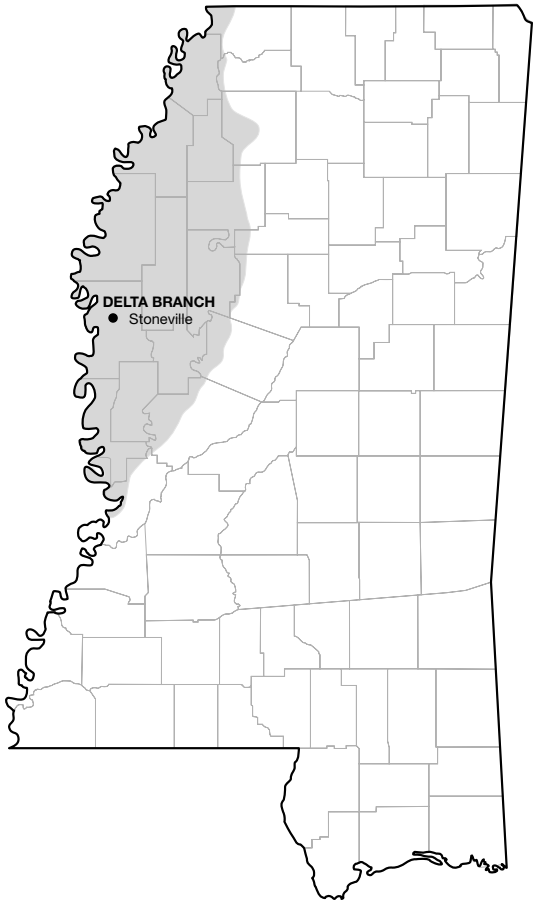
[1]No 3-year averages.

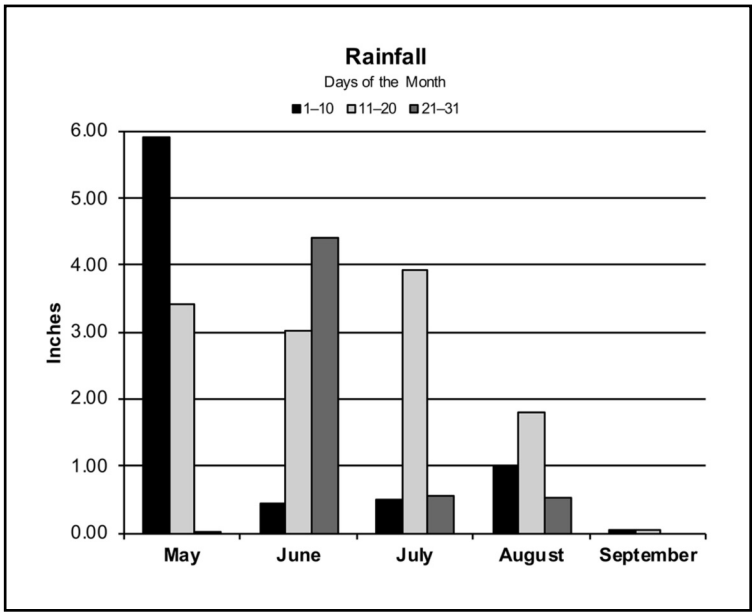
MAFES DELTA BRANCH, STONEVILLE

Crop Summary

The sorghum plots were planted on May 8 into a seedbed that had been harrowed just prior to planting. Soil moisture at planting was ideal for germination and emergence; however, heavy rains were recorded 1 day after planting. The excessive rain compacted the soil and hindered emergence of the sorghum plots. After determining the stand was not suitable, the decision was made to replant. The original plots were destroyed with an herbicide application, and all plots were replanted on May 30. Timely rains during the growing season allowed for good yield potential, despite the replanting. Harvest was completed in a timely manner.

Planting date . . .May 8, replanted on May 30
Harvest date . . . .September 19
Soil type . . . . . .Bosket very fine sandy loam
Soil pH 6.7
Soil fertility . . . . .P=H, K=H
Fertilizer . . . . . .N @ 100 lb/A (46-0-0)
Herbicide . . . . . .Preemergence — Lexar @ 2 qt/A and Roundup PowerMax @ 40 oz/A on May 8; Roundup PowerMax @ 32 oz/A on May 30
Insecticide . . . . .Karate Z @ 2 oz/A on July 9; Transform @ 2 oz/A on July 30; Karate Z @ 2.5 oz/A on August 5; and Sivanto @ 5 oz/A on August 13
Previous crop . . .Peanut





Rainfall Summary

	Inches
May	9.36
June	7.87
July	4.99
August	3.33
September	0.08
Total	25.63

Table 7. Performance results of 26 hybrids grown at MAFES Delta Branch, Stoneville, 2019.

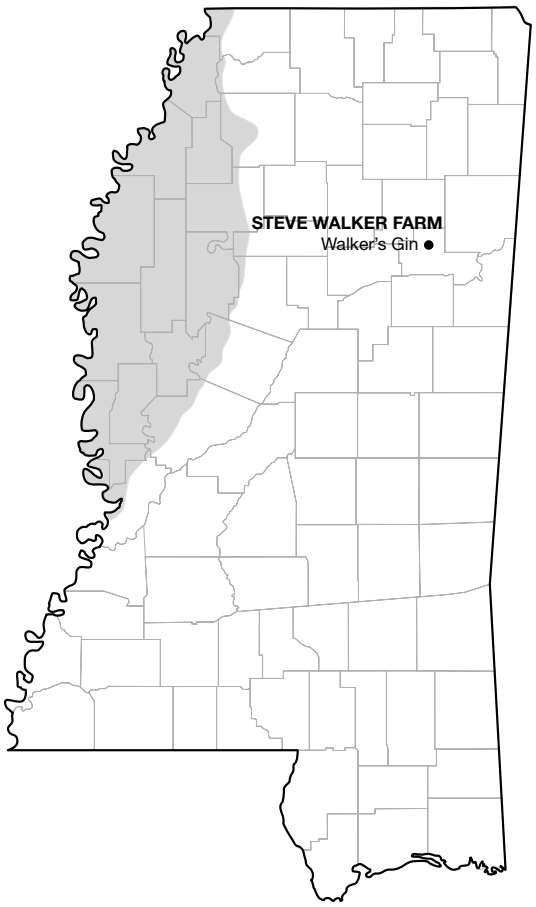
Brand	Variety	2019 yield	2-year average	3-year average	Plant height	Head exertion	Head compactness
		bu/A	*bu/A*	*bu/A*	*in*	*in*	*(1-5)*
Pioneer	83P17	165.8	131.7	127.3	61	2	2
Dyna-Gro	M68GB18	164.9	132.2	—	66	4	2
Dyna-Gro	M71GR04	162.5	124.8	—	56	2	2
Dyna-Gro	GX19981	159.4	—	—	58	2	3
DeKalb	DKS51-01	158.5	128.6	129.4	64	5	3
Dyna-Gro	M73GR55	154.4	126.3	128.9	60	4	2
Terral Seed	REV 9782	148.2	126.7	125.8	59	7	2
Dekalb	DKS45-23	146.4	—	—	66	4	2
Dyna-Gro	GX18991	144.5	—	—	63	2	2
Sorghum Partners	SP 68M57	143.6	115.9	—	54	6	2
Dyna-Gro	M74GB17	142.3	109.2	112.2	62	2	2
Sorghum Partners	SP7715	142.0	108.2	105.4	59	6	3
Dekalb	DKS47-07	135.7	—	—	66	2	3
Dyna-Gro	GX17973	133.9	—	—	59	4	5
Pioneer	84P80	128.0	111.2	114.3	52	2	5
DeKalb	DKS53-53	125.8	115.4	120.1	61	3	5
Dyna-Gro	GX18395	124.0	—	—	57	7	5
Dyna-Gro	M62GB77	121.5	—	—	60	7	2
Sorghum Partners	SP 74M21	120.3	—	—	58	4	3
Sorghum Partners	SP 74C40	115.6	100.1	—	56	5	3
Dyna-Gro	M69GB38	114.5	103.0	—	59	6	2
Pioneer	83P99	109.0	98.0	102.9	58	1	3
Terral Seed	REV 9620	107.8	—	—	61	8	5
Dyna-Gro	M60GB31	99.8	92.0	95.9	58	4	5
Dyna-Gro	GX17457	98.2	—	—	58	2	2
Dyna-Gro	M69GR88	80.0	83.9	—	53	4	5
Mean		132.6					
CV		10.9					
R^2		77.0					
LSD (0.05)		20.3					
Error df		75					

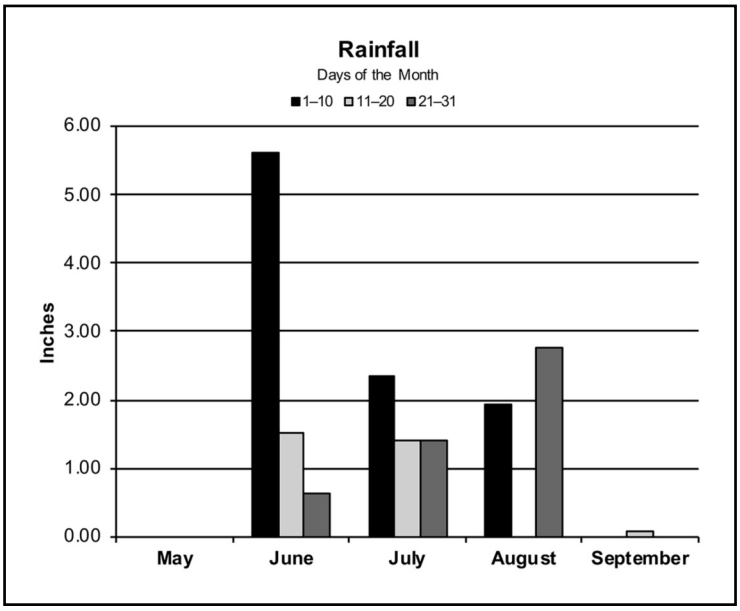
STEVE WALKER FARM, WALKER'S GIN

Crop Summary

The plots were planted no-till into the previous year's soybean stubble. Soil moisture at planting was adequate for germination. All plots emerged to a stand. Timely rainfall occurred throughout the growing season, providing sufficient soil moisture to allow for the crop to have good yield potential. All plots were harvested in a timely manner without any difficulties or delays.

Planting date . . . .May 20
Harvest date . . . .September 17
Soil type . . . . . .Mathiston silt loam
Soil pH 5.9
Soil fertility . . . . . .P=M, K=M
Fertilizer . . . . . .Topdress — 13-13-13 @ 125 lb/A on June 11
Sidedress — N @ 105 lb/A (32% UAN) on June 14
Herbicide . . . . . .Preemergence — Atrazine @ 32 oz/A, Dual II Magnum @ 32 oz/A, Callisto @ 3 oz/A, and Aim @ 1 oz/A on May 20
Insecticide . . . . .Sivanto @ 6 oz/A and Mustang Max @ 4 oz/A on July 26
Previous crop . . .Soybean





Rainfall Summary

	Inches
May	0.00
June	7.77
July	5.17
August	4.68
September	0.07
Total	17.69

Table 8. Performance results of 26 hybrids grown at Steve Walker Farm, Walker's Gin, 2019.

Brand	Variety	2019 yield	2-year average	3-year average	Plant height	Head exertion	Head compactness
		bu/A	*bu/A*	*bu/A*	*in*	*in*	*(1-5)*
Dyna-Gro	M71GR04	120.1	98.3	—	61	3	1
Pioneer	83P99	120.0	113.0	105.8	60	6	1
Dyna-Gro	M69GB38	110.3	109.4	—	61	6	1
Dyna-Gro	M60GB31	107.0	—	—	52	2	4
Dekalb	DKS45-23	105.8	91.9	96.7	57	2	1
Terral Seed	REV 9782	103.6	—	—	54	5	2
Pioneer	84P80	102.8	86.5	90.5	56	4	3
Dyna-Gro	GX17973	102.8	—	—	45	3	1
DeKalb	DKS53-53	102.5	—	—	49	2	1
Dyna-Gro	GX17457	102.2	64.2	—	53	6	1
Terral Seed	REV 9620	97.5	91.5	89.5	60	6	2
Pioneer	83P17	95.8	—	—	48	4	3
Dyna-Gro	M68GB18	95.4	83.3	—	59	4	1
DeKalb	DKS51-01	94.8	—	—	50	6	1
Dekalb	DKS47-07	94.5	113.0	105.8	58	3	1
Dyna-Gro	GX19981	94.0	75.5	82.5	53	2	1
Sorghum Partners	SP7715	88.2	—	—	53	2	4
Dyna-Gro	M69GR88	87.8	—	—	56	2	1
Dyna-Gro	M73GR55	86.5	—	—	59	2	1
Dyna-Gro	GX18991	85.9	82.3	86.2	55	5	1
Dyna-Gro	M62GB77	77.3	50.3	—	58	8	2
Dyna-Gro	GX18395	76.7	91.6	—	45	6	1
Sorghum Partners	SP 74C40	71.5	87.3	92.0	41	3	1
Dyna-Gro	M74GB17	71.5	75.4	85.1	57	4	1
Sorghum Partners	SP 74M21	70.2	—	—	54	3	1
Sorghum Partners	SP 68M57	66.8	76.6	83.7			
Mean		93.5					
CV		14.6					
R^2		64.4					
LSD (0.05)		19.2					
Error df		75					

MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

The mission of the Mississippi Agricultural and Forestry Experiment Station and the College of Agriculture and Life Sciences is to advance agriculture and natural resources through teaching and learning, research and discovery, service and engagement which will enhance economic prosperity and environmental stewardship, to build stronger communities and improve the health and well-being of families, and to serve people of the state, the region and the world.

George M. Hopper, Director **www.mafes.msstate.edu**