Grain Sorghum
Hybrid Tests in Tennessee

2010

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Variety test results are posted on UT's website at:

http://varietytrials.tennessee.edu/
and
www.utcrops.com

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Table of Contents

2010 PERFORMANCE OF GRAIN SORGHUM HYBRIDS IN TENNESSEE

RESEARCH AND EDUCATION CENTERS

Experimental Procedures:

The grain sorghum variety trial was conducted in each of the physiographic regions of the state. The trial was conducted at the East Tennessee (Knoxville); Highland Rim (Springfield); Milan (Milan) and Ames Plantation (Grand Junction) Research and Education Centers (REC). The trial contained five hybrids at each location. The tests were fertilized with 90 pounds of nitrogen per acre. A portion of the nitrogen was applied prior to seeding and the remainder was applied as a side-dress. The plot size was two rows, 30 feet in length with 30 inch row spacing. Plots were replicated three times at each location in a randomized complete block design. Plots were seeded at the rate of approximately 87,600 seed per acre (approx. 7 lbs/a). Table 1 contains the test location information on planting and harvest dates and soil types. Tables 2 and 3 contain the **Research and Education Center Test** data for 2010. Tables 4 and 5 contain the two-year data, Tables 6 and 7 contain the three-year data. Table 8 contains the phenotypic trait data for the grain sorghum hybrids tested in 2010. The contact information for sorghum seed companies is listed in Table 9.

Interpretation of Data:

The tables on the following pages have been prepared with the entries listed in order of performance, the highest-yielding entry being listed first. **All yields presented have been adjusted to 14% moisture.** At the bottom of the tables, **LSD** values stand for **Least Significant Difference**. The mean yields of any two varieties being compared must differ by at least the amount shown in order to be considered different in yielding ability at the 5% level of probability of significance. For example, given that the LSD for a test is 850 lbs/a and the mean yield of Hybrid A was 4200 lbs/a and the mean yield of Hybrid B was 5000 lbs/a, then the two hybrids are not statistically different in yield because the difference of 800 lbs/a is less than the minimum of 850 lbs/a required for them to be significant. Similarly, if the average yield of Hybrid C was 5900 lbs/a then it is significantly higher yielding than both Hybrid B and Hybrid A, because the difference between B and C (900 lbs) and the difference between A and C (1700 lbs) exceeds the LSD value of 850 lbs.

Also, the **coefficient of variation (C.V.)** values are shown at the bottom of each table. This value is a measure of the error variability found within each experiment. It is the percentage that the square root of error mean square is of the overall test mean yield at that location. For example, a C.V. of 10% indicates that the size of the error variation is about 10% of the size of the test mean. Similarly, a C.V. of 30% indicates that the size of the error variation is nearly one-third as large as the test mean. A goal in conducting each yield test is to keep the C.V. as low as possible, preferably below 20%.

Growing Season: The 2010 growing season was characterized by a wet spring resulting in some flooded fields followed by hotter and dryer than normal conditions. Hot dry conditions in August and September advanced harvest by approximately two weeks ahead of the normal pace.

Table 1. Location information from Research and Education Centers where the grain sorghum hybrid tests were conducted in 2010.

Research & Education Center	Location	Planting Date	Harvest Date	Seeding Rate	Soil Type
East Tennessee	Knoxville	May 7, 2010	October 1, 2010	87,600	Sequatchie Silt Loam
Highland Rim	Springfield	May 14, 2010	September 16, 2010	87,600	Mountview Silt Loam
Milan	Milan	May 13, 2010	September 13, 2010	87,600	Loring Silt Loam
Ames	Grand Junction	April 28, 2010	October 12, 2010	87,600	Lexington Silt Loam

Table 2. Mean yields of five grain sorghum hybrids evaluated in four environments in Tennessee during 2010.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=4)	Avg. Yield† ± Std. Err. (n=4)	Knoxville	Spring Hill	Milan	Ames
		bu/a	---------- lbs/a----------				
DeKalb	DKS54-00	109 ± 2	5991 ± 130	6935	6490	6548	3990
Dekalb	DKS53-67	107 ± 2	5899 ± 130	7520	6867	5416	3793
DeKalb	DKS44-20	107 ± 3	5875 ± 139	6924	6857	5339	4380
Garst	5464	106 ± 2	5822 ± 130	7028	6799	5947	3513
DeKalb	DKS49-45	99 ± 3	5449 ± 139	6946	5789	4972	4087
Avg. (lbs/a)		**106**	**5831**	**6937**	**6540**	**5593**	**4058**
L.S.D..05 (lbs/a)		**7**	**377**	**713**	**1019**	**706**	**877**
C.V. (%)		**7.7**	**7.7**	**5.7**	**8.6**	**6.9**	**10.6**

† All yields adjusted to 14%; lbs / ac ÷ 55 = bushels per acre

Table 3. Overall mean yields and agronomic characteristics of five grain sorghum hybrids evaluated in four environments in Tennessee during 2010.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=4)	Moisture at Harvest (n=4)	Test Weight (n=1)	Head Blast † (n=1)	Height (n=3)	Lodging‡ (n=2)	Bird Damage§ (n=2)	Head Type ¶ (n=2)	Grain Mold # (n=1)
		bu/a	%	lbs/bu	score	in.	score	score	score	score
DeKalb	DKS54-00	109 ± 2	13.1	57.1	1.0	59	1.1	1.3	3.0	2.2
Dekalb	DKS53-67	107 ± 2	13.3	58.4	1.0	54	1.0	1.2	2.5	2.3
DeKalb	DKS44-20	107 ± 3	12.9	56.5	1.0	55	1.2	1.3	2.2	2.5
Garst	5464	106 ± 2	12.5	56.9	1.0	56	1.0	1.3	3.0	2.8
DeKalb	DKS49-45	99 ± 3	12.8	57.2	1.0	58	1.0	1.3	2.3	2.2
	Average	**106**	**12.9**	**57.2**	**1.0**	**56**	**1.1**	**1.3**	**2.6**	**2.4**

Bushel weight of No. 2 sorghum equals 55 lbs.

DAP = days after planting

† Head blast = 1 to 5 scale; where 1 = 95+% of florets on the head are filled with grain and no mold; 5 = 95+% of florets unfilled with grain or moldy or both.

‡ Lodging = 1 to 5 scale; where 1 = 95% of plants erect; 2.5 = ~50% of plants leaning at an angle ≥ 45°; 5 = 95+% of plants leaning at an angle ≥ 45°.

§ Bird damage = 1 to 5 scale; where 1 = no bird feeding; 5 = 95+% of grain removed by birds.

¶ Head Type - 1 to 5 scale; where 1 = compact head; 5 = open head.

Grain Mold = 1 to 5 scale; where 1 = 95+% of grain has no mold; 5 = 95+% of grain or moldy.

Table 4. Mean yields of three grain sorghum hybrids evaluated in four environments for two years (2009-2010) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=8)	Avg. Yield† ± Std. Err. (n=8)	Knoxville	Spring Hill	Milan	Ames
		bu/a	---------- lbs/a----------				
DeKalb	DKS54-00	126 ± 2	6929 ± 118	8790	6620	8245	4059
DeKalb	DKS44-20	121 ± 2	6665 ± 123	8681	6504	7343	4134
Dekalb	DKS53-67	119 ± 2	6557 ± 118	8471	6792	7165	3802
Avg.		**122**	**6717**	**8647**	**6639**	**7584**	**3998**
L.S.D..05 (lbs/a)		**8**	**441**	**759**	**908**	**918**	**1092**
C.V. (%)		**8.6**	**8.6**	**5.6**	**8.8**	**7.6**	**17.3**

† All yields adjusted to 14%; lbs / ac ÷ 55 = bushels per acre

Table 5. Overall mean yields and agronomic characteristics of three grain sorghum hybrids evaluated in four environments for two years (2009-2010) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=8)	Moisture at Harvest (n=8)	Test Weight (n=2)	Pollen Shed (n=1)	Head Blast† (n=1)	Height (n=6)	Lodging‡ (n=4)	Bird Damage§ (n=4)	Head Type ¶ (n=4)	Grain Mold # (n=2)	Sprouting * (n=2)
		bu/a	%	lbs/bu	DAP	score	in.	score	score	score	score	score
DeKalb	DKS54-00	126 ± 2	14.7	55.7	74	1.0	59	1.0	1.2	2.9	2.5	3.4
DeKalb	DKS44-20	121 ± 2	14.5	55.7	74	1.0	55	1.1	1.2	2.6	2.5	3.1
Dekalb	DKS53-67	119 ± 2	14.8	57.6	76	1.0	55	1.0	1.1	2.4	2.3	2.8
Average		**122**	**14.6**	**56.3**	**75**	**1.0**	**56**	**1.0**	**1.2**	**2.6**	**2.4**	**3.1**

Bushel weight of No. 2 sorghum equals 55 lbs.

† Head blast = 1 to 5 scale; where 1 = 95+% of florets on the head are filled with grain and no mold; 5 = 95+% of florets unfilled with grain or moldy or both.

‡ Lodging = 1 to 5 scale; where 1 = 95% of plants erect; 2.5 = ~50% of plants leaning at an angle ≥ 45°; 5 = 95+% of plants leaning at an angle ≥ 45°.

§ Bird damage = 1 to 5 scale; where 1 = no bird feeding; 5 = 95+% of grain removed by birds.

¶ Head type = 1 to 5 scale; where 1 = compact head; 5 = open head.

Grain Mold = 1 to 5 scale; where 1 = 95+% of grain has no mold; 5 = 95+% of grain or moldy.

* Sprouting = 1 to 5 scale; where 1 = 95+% of grain has no sprouting; 5 = 95+% of grain has sprouted.

Table 6. Mean yields of three grain sorghum hybrids evaluated in three environments for three years (2008-2010) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=9)	Avg. Yield† ± Std. Err. (n=9)	Knoxville	Springfield	Milan
		bu/ac	---------- lbs/a----------			
DeKalb	DKS54-00	134 ± 2	7346 ± 128	8567	5802	7670
Dekalb	DKS53-67	129 ± 2	7091 ± 124	8335	5934	7004
DeKalb	DKS44-20	129 ± 2	7083 ± 124	8472	5767	7011
Avg.		**130**	**7174**	**8458**	**5834**	**7228**
L.S.D..05 (lbs/a)		**10**	**565**	**1372**	**828**	**879**
C.V. (%)		**9.4**	**9.4**	**9.5**	**10.1**	**8.6**

† All yields adjusted to 14%; lbs / ac ÷ 55 = bushels per acre

Table 7. Overall mean yields and agronomic characteristics of three grain sorghum hybrids evaluated in three environments for three years (2008-2010) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=9)	Moisture at Harvest (n=9)	Test Weight (n=3)	Pollen Shed (n=2)	Head Blast† (n=3)	Height (n=9)	Lodging‡ (n=6)	Bird Damage§ (n=6)	Head Type ¶ (n=5)	Grain Mold # (n=2)	Sprouting * (n=1)
		bu/a	%	lbs/bu	DAP	score	in.	score	score	score	score	score
DeKalb	DKS54-00	134 ± 2	15.7	56.3	73	1.0	58	1.0	1.5	2.9	2.5	2.8
Dekalb	DKS53-67	129 ± 2	15.8	58.5	73	1.0	54	1.0	1.5	2.7	2.3	2.0
DeKalb	DKS44-20	129 ± 2	15.4	56.6	71	1.0	54	1.1	1.5	2.8	2.5	2.2
	Average	**130**	**15.6**	**57.1**	**72**	**1.0**	**56**	**1.0**	**1.5**	**2.8**	**2.4**	**2.3**

Bushel weight of No. 2 sorghum equals 55 lbs.

† Head blast = 1 to 5 scale; where 1 = 95+% of florets on the head are filled with grain and no mold; 5 = 95+% of florets unfilled with grain or moldy or both.

‡ Lodging = 1 to 5 scale; where 1 = 95% of plants erect; 2.5 = ~50% of plants leaning at an angle ≥ 45°; 5 = 95+% of plants leaning at an angle ≥ 45°.

§ Bird damage = 1 to 5 scale; where 1 = no bird feeding; 5 = 95+% of grain removed by birds.

¶ Head type = 1 to 5 scale; where 1 = compact head; 5 = open head.

Grain Mold = 1 to 5 scale; where 1 = 95+% of grain has no mold; 5 = 95+% of grain or moldy.

* Sprouting = 1 to 5 scale; where 1 = 95+% of grain has no sprouting; 5 = 95+% of grain has sprouted.

Table 8. Characteristics of grain sorghum hybrids evaluated in yield tests in Tennessee during 2010 provided by participating seed companies.

Brand	Hybrid	Grain Color	Maturity	Head Type	Green Bug Resistance	Released or Experimental	Comments
DeKalb	DKS44-20	Bronze	Med	---	---	R	---
DeKalb	DKS49-45	Bronze	Med	---	---	R	---
Dekalb	DKS53-67	Bronze	Med-Late	---	---	R	---
DeKalb	DKS54-00	Bronze	110	Semi-Compact	C,E,I	R	For high yield environments, residue proven
Garst	5464	Bronze	Med-Late	Semi-Compact	---	R	---

Table 9. Contact information for grain sorghum seed companies participating in yield tests in Tennessee during 2010.

Company	Contact	Phone	Email	Web site	Address
Monsanto (Asgrow, Dekalb)		800-335-2676		www.asgrowanddekalb.com	
Garst	Steve Sick	402-616-6534	steve.sick@syngenta.com	www.garstseed.com	