Grain Sorghum
Hybrid Tests in Tennessee

2009

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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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2009 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 eight 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 2009. 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 2009. 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 2009 growing season was characterized by cooler and wetter than normal conditions overall. Wet and relatively warm conditions in September through November delayed harvest and in some cases resulted in grain that was moldy and sprouted prior to harvest.

Table 1. Location information from Research and Education Centers where the grain sorghum hybrid tests were conducted in 2009.

Research & Education Center	Location	Planting Date	Harvest Date	Seeding Rate	Soil Type
East Tennessee	Knoxville	May 14, 2009	October 6, 2009	87,600	Stasser Silt Loam
Highland Rim	Springfield	May 20, 2009	October 22, 2009	87,600	Hamblen Silt Loam
Milan	Milan	May 19, 2009	October 8, 2009	87,600	Memphis, Loring Silt Loam
Ames	Grand Junction	April 28, 2009	September 30, 2009	87,600	Lexington Silt Loam

Table 2. Mean yields of eight grain sorghum hybrids evaluated in four environments in Tennessee during 2009.

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	143 ± 3	7866 ± 189	10646	6749	9942	4128
Pioneer	84G62	139 ± 4	7664 ± 202	10283	6793	8976	4602
DeKalb	DKS44-20	136 ± 3	7456 ± 189	10438	6151	9346	3888
DeKalb	DKS54-03	135 ± 3	7410 ± 189	9891	6868	9869	3013
Sorghum Partners	NK 7829	133 ± 3	7340 ± 189	10355	6911	8348	3747
Dekalb	DKS53-67	131 ± 3	7215 ± 189	9421	6717	8914	3810
Asgrow	A571	128 ± 3	7034 ± 189	9994	6321	8290	3531
Sorghum Partners	NK 6638	123 ± 3	6748 ± 189	9411	6500	7654	3426
Avg. (lbs/a)		**133**	**7324**	**10054**	**6626**	**8913**	**3768**
L.S.D..05 (lbs/a)		**10**	**538**	**947**	**1040**	**1232**	**1363**
C.V. (%)		**8.9**	**8.9**	**5.4**	**8.9**	**7.6**	**20.7**

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

‡ Due to extensive bird damage on this entry, missing plot value was calculated at this location.

Table 3. Overall mean yields and agronomic characteristics of eight grain sorghum hybrids evaluated in four environments in Tennessee during 2009.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=4)	Moisture at Harvest (n=4)	Test Weight (n=1)	Pollen Shed (n=1)	Height (n=3)	Lodging‡ (n=2)	Bird Damage§ (n=2)	Head Type ¶ (n=2)	Grain Mold † (n=1)	Sprouting * (n=2)
		bu/a	%	lbs/bu	DAP	in.	score	score	score	score	score
DeKalb	DKS54-00	143 ± 3	16.2	53.7	74	59	1.0	1.2	2.8	2.8	3.4
Pioneer	84G62	139 ± 4	15.9	56.5	74	52	1.0	1.1	3.8	2.0	2.3
DeKalb	DKS44-20	136 ± 3	16.1	54.9	74	56	1.0	1.1	3.1	2.5	3.1
DeKalb	DKS54-03	135 ± 3	16.5	53.3	76	57	1.0	1.1	3.6	2.5	3.2
Sorghum Partners	NK 7829	133 ± 3	17.2	55.0	76	57	1.0	1.1	1.9	2.3	2.5
Dekalb	DKS53-67	131 ± 3	16.3	56.7	76	55	1.0	1.1	2.3	2.2	2.8
Asgrow	A571	128 ± 3	15.7	51.8	75	56	1.0	1.1	3.0	2.8	2.6
Sorghum Partners	NK 6638	123 ± 3	15.7	50.6	74	55	1.0	1.1	3.3	2.5	3.8
	Average	**133**	**16.2**	**54.1**	**75**	**56**	**1.0**	**1.1**	**3.0**	**2.5**	**2.9**

Bushel weight of No. 2 sorghum equals 55 lbs.

DAP = days after planting

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

‡ 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.

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

Table 4. Mean yields of six grain sorghum hybrids evaluated in three environments for two years (2008-2009) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=6)	Avg. Yield† ± Std. Err. (n=6)	Knoxville	Springfield	Milan
		bu/a	---------- lbs/a----------			
DeKalb	DKS54-00	140 ± 3	7691 ± 170	9384	5458	8231
Pioneer	84G62	138 ± 4	7588 ± 197	9357	5775	7630
DeKalb	DKS44-20	135 ± 3	7438 ± 163	9246	5221	7847
Dekalb	DKS53-67	133 ± 3	7336 ± 163	8743	5468	7798
DeKalb	DKS54-03	133 ± 3	7302 ± 163	8860	5107	7939
Asgrow	A571	131 ± 3	7227 ± 163	9208	5557	6916
Avg. (lbs/a)		**135**	**7430**	**9133**	**5431**	**7727**
L.S.D..05 (lbs/a)		**11**	**608**	**1587**	**831**	**949**
C.V. (%)		**9.9**	**9.9**	**10.0**	**10.7**	**8.8**

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

Table 5. Overall mean yields and agronomic characteristics of six grain sorghum hybrids evaluated in three environments for two years (2008-2009) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=6)	Moisture at Harvest (n=6)	Test Weight (n=2)	Pollen Shed (n=1)	Head Blast† (n=2)	Height (n=6)	Lodging‡ (n=4)	Bird Damage§ (n=4)	Headtype¶ (n=3)
		bu/a	%	lbs/bu	DAP	score	in.	score	score	score
DeKalb	DKS54-00	140 ± 3	16.9	55.8	73	1.0	58	1.0	1.7	2.8
Pioneer	84G62	138 ± 4	16.6	57.8	72	1.0	51	1.0	1.6	3.2
DeKalb	DKS44-20	135 ± 3	16.6	56.7	71	1.0	54	1.0	1.5	3.3
Dekalb	DKS53-67	133 ± 3	16.9	58.5	73	1.0	54	1.0	1.6	2.8
DeKalb	DKS54-03	133 ± 3	16.9	55.6	74	1.0	56	1.0	1.5	3.2
Asgrow	A571	131 ± 3	16.3	54.1	72	1.0	54	1.0	1.4	3.2
Average		**135**	**16.7**	**56.4**	**72**	**1.0**	**55**	**1.0**	**1.5**	**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.

Table 6. Mean yields of four grain sorghum hybrids evaluated in three environments for three years (2007-2009) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=9)	Avg. Yield† ± Std. Err. (n=9)	Knoxville	Springfield	Milan
		bu/ac	---------- lbs/a----------			
Pioneer	84G62	123 ± 3	6770 ± 165	8305	4915	7089
DeKalb	DKS54-00	122 ± 3	6715 ± 148	8032	4498	7616
Dekalb	DKS53-67	121 ± 3	6667 ± 144	7813	4850	7339
Asgrow	A571	117 ± 3	6420 ± 144	8057	4625	6576
Avg. (lbs/a)		**121**	**6643**	**8052**	**4722**	**7155**
L.S.D..05 (lbs/a)		**11**	**613**	**1447**	**670**	**1084**
C.V. (%)		**12.2**	**12.2**	**12.6**	**11.1**	**11.4**

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

Table 7. Overall mean yields and agronomic characteristics of four grain sorghum hybrids evaluated in three environments for three years (2007-2009) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=9)	Moisture at Harvest (n=9)	Test Weight (n=5)	Head Blast† (n=4)	Height (n=9)	Lodging‡ (n=5)	Bird Damage§ (n=7)	Headtype¶ (n=4)
		bu/a	%	lbs/bu	score	in.	score	score	score
Pioneer	84G62	123 ± 3	15.4	57.7	1.2	50	1.0	1.6	2.7
DeKalb	DKS54-00	122 ± 3	15.7	55.8	1.2	55	1.0	1.7	2.7
Dekalb	DKS53-67	121 ± 3	15.8	58.4	1.1	52	1.0	1.6	3.3
Asgrow	A571	117 ± 3	15.3	55.2	1.2	52	1.0	1.5	3.5
	Average	**121**	**15.6**	**56.8**	**1.2**	**52**	**1.0**	**1.6**	**3.0**

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.

Table 8. Characteristics of grain sorghum hybrids evaluated in yield tests in Tennessee during 2009 provided by participating seed companies.

Brand	Hybrid	Grain Color	Maturity	Head Type	Green Bug Resistance	Released or Experimental	Comments
Asgrow	A571	Bronze	Med-Late	Open	---	R	---
DeKalb	DKS44-20	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
DeKalb	DKS54-03	Bronze	Med-Late	---	---	R	---
Pioneer	84G62	Bronze	125	Open	---	R	---
Sorghum Partners	NK 6638	Bronze	Med	---	---	R	Disease Resistance & Yield
Sorghum Partners	NK 7829	Bronze	Med-Late	---	---	R	High Yield & Leaf Disease Resistance

Table 9. Contact information for grain sorghum seed companies participating in yield tests in Tennessee during 2009.

Company	Contact	Phone	Email	Web site	Address
Monsanto (Asgrow, Dekalb)		800-335-2676		www.asgrowanddekalb.com	
Sorghum Partners	Jamie Perry	731-658-3931	jperry@midsouthcoop.com	www.sorghum-partners.com	14840 Hwy 18 S., P.O. Box 447 Bolivar, TN 38008
Pioneer Hi-Bred Int.	Michael Hughes	800-331-2475	michael.hughes@pioneer.com	www.pioneer.com	700 Boulevard South, Suite 302, Huntsville, AL 35802