

Grain Sorghum Hybrid Tests in Tennessee 2006

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County Standard Grain Sorghum Tests

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2006 PERFORMANCE OF GRAIN SORGHUM HYBRIDS IN TENNESSEE RESEARCH AND EDUCATION CENTERS & COUNTY STANDARD TESTS

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; Middle Tennessee, Spring Hill; Highland Rim, Springfield; and Milan Research and Education Centers (REC). The trial contained 13 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 2006. Tables 4 and 5 contain the two-year data, Tables 6 and 7 contain the three-year data. The **County Standard Test** data on nine hybrids from six counties are reported in Table 8. Table 9 contains the data on the grain sorghum hybrids that were common in the County and REC tests and Table 10 contains the phenotypic trait data for the grain sorghum hybrids tested in 2006.

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 2006 season was characterized by hot, dry conditions through most of the growing period. Several rainfall events during later portions of the growing season benefited later maturity hybrids in some regions of the state but hampered timely harvest. Daytime temperatures were high (several 90+ F days) during flowering and seed fill periods at all locations.

Table 1. Location information from Research and Education Centers where the grain sorghum hybrid tests were conducted in 2006.

Research & Education Center	Location	Planting Date	Harvest Date	Seeding Rate	Soil Type
East Tennessee	Knoxville	May 10, 2006	October 10, 2006	87,600	Sequatchie Silt Loam
Middle Tennessee	Spring Hill	May 19, 2006	October 13, 2006	87,600	Maury Silt Loam
Highland Rim	Springfield	June 5, 2006	November 21, 2006	87,600	Dickson Silt Loam
Milan	Milan	May 18, 2006	October 11, 2006	87,600	Grenada Silt Loam

Table 2. Mean yields of 13 grain sorghum hybrids evaluated in four environments in Tennessee during 2006.

Brand	Hybrid	Avg. Yield†		Avg. Yield†		Spring		Springfield	Milan
		± Std. Err.	(n=4)	± Std. Err.	(n=4)	Knoxville	Hill		
		bu/a		lbs/a		-----			
Pioneer	84G62	107 ± 4		5894 ± 220		9343	5791	2682	5760
NC+	7B51	102 ± 4		5634 ± 220		8425	5853	3021	5237
Monsanto	MSD 477	101 ± 4		5566 ± 220		8238	5224	3088	5712
DeKalb	DKS54-00	97 ± 4		5337 ± 220		8757	5084	2021	5488
DeKalb	DKS37-07	97 ± 4		5328 ± 220		7666	3870	3928	5848
Dyna-Gro	751B	95 ± 4		5204 ± 220		8399	4716	2740	4959
Dyna-Gro	780B	92 ± 4		5077 ± 220		8518	3293	3014	5480
Monsanto	MSD 472	88 ± 4		4852 ± 220		7364	4110	3043	4889
Monsanto	MSC 432	88 ± 4		4839 ± 220		9043	3413	1249	5649
Asgrow	A571	86 ± 4		4730 ± 220		8157	2940	2759	5065
Dyna-Gro	X1759	82 ± 4		4524 ± 220		7462	3837	1655	5143
Golden Harvest	H-511	79 ± 5		4363 ± 285		7953	2332	2471	4697
Golden Harvest	H-502	78 ± 4		4299 ± 220		8503	2652	2061	3980
Avg. (lbs/a)		93		5118		8383	4133	2552	5258
L.S.D..05 (lbs/a)		11		625		678	2064	1346	725
C.V. (%)		14.9		14.9		4.8	29.2	29.3	8.2

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

Table 3. Overall mean yields and agronomic characteristics of 13 grain sorghum hybrids evaluated in four environments in Tennessee during 2006.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=4)	Moisture at Harvest (n=4)	Test Weight (n=3)	Head Blast [†] (n=1)	Height (n=4)	Lodging [‡] (n=3)	Bird Damages [§] (n=2)	Head Type [¶] (n=2)
		bu/a	%	lbs/bu	score	in.	score	score	score
Pioneer	84G62	107 ± 4	15.1	57.7	1.3	49	1.0	1.8	2.3
NC+	7B51	102 ± 4	14.8	53.6	1.2	49	1.0	1.8	2.3
Monsanto	MSD 477	101 ± 4	15.0	57.1	1.0	55	1.0	1.6	2.6
DeKalb	DKS54-00	97 ± 4	14.9	55.3	1.7	53	1.0	1.9	3.3
DeKalb	DKS37-07	97 ± 4	15.2	57.5	1.7	49	1.0	2.1	2.0
Dyna-Gro	751B	95 ± 4	15.1	56.3	1.2	52	1.0	2.0	3.0
Dyna-Gro	780B	92 ± 4	15.4	57.8	1.0	54	1.0	2.0	2.7
Monsanto	MSD 472	88 ± 4	14.4	53.6	1.3	46	1.0	2.0	2.8
Monsanto	MSC 432	88 ± 4	15.4	54.6	1.2	57	1.0	2.3	3.3
Asgrow	A571	86 ± 4	14.5	55.6	1.3	50	1.0	2.2	1.9
Dyna-Gro	X1759	82 ± 4	16.2	55.4	1.2	52	1.0	1.9	3.5
Golden Harvest	H-511	79 ± 5	15.6	56.4	1.3	53	1.0	2.9	3.3
Golden Harvest	H-502	78 ± 4	15.3	57.0	1.3	52	1.0	2.5	2.7
Average		93	15.1	56.0	1.3	52	1.0	2.1	2.7

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 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 4. Mean yields of five grain sorghum hybrids evaluated in three environments for two years (2005-2006) in Tennessee.

Brand	Hybrid	Avg. Yield†		Avg. Yield†		Spring	
		± Std. Err.	(n=8)	± Std. Err.	(n=8)	Hill	Milan
		bu/a		lbs/a			
Pioneer	84G62	116 ± 3	6357 ± 157	9327	6102	3555	6443
DeKalb	DKS54-00	107 ± 3	5885 ± 187	8979	5827	2368	6366
Dyna-Gro	751B	105 ± 3	5750 ± 157	8415	5517	3385	5682
Dyna-Gro	780B	101 ± 3	5556 ± 163	8285	4469	3746	5725
Golden Harvest	H-502	96 ± 3	5292 ± 157	8617	4458	3060	5031
Avg. (lbs/a)		105	5768	8725	5275	3223	5850
L.S.D..05 (lbs/a)		11	606	790	1816	1229	808
C.V. (%)		13.6	13.6	5.7	21.9	22.5	8.9

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

Table 5. Overall mean yields and agronomic characteristics of five grain sorghum hybrids evaluated in three environments for two years (2005-2006) in Tennessee.

Brand	Hybrid	Avg. Yield		Moisture at Harvest	Test Weight	Head		Height	Lodging†	Bird	
		± Std. Err.	(n=8)	(n=8)	(n=6)	Blast†	(n=2)	(n=8)	(n=6)	Damages§	Headtype¶ (n=4)
		bu/a		%	lbs/bu	score	in.	score	score	score	score
Pioneer	84G62	116 ± 3	14.7	58.6	1.4	52	1.8	2.5			
DeKalb	DKS54-00	107 ± 3	14.7	56.9	1.5	54	1.9	2.8			
Dyna-Gro	751B	105 ± 3	14.7	57.7	1.4	54	2.0	3.1			
Dyna-Gro	780B	101 ± 3	14.9	58.6	1.2	55	2.0	3.1			
Golden Harvest	H-502	96 ± 3	14.8	58.0	1.3	53	2.5	2.9			
Average		105	14.8	57.9	1.4	53	2.1	2.9			

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.

Table 6. Mean yields of five grain sorghum hybrids evaluated in three environments for three years (2004-2006) in Tennessee.

Brand	Hybrid	Avg. Yield†		Avg. Yield†	
		± Std. Err.	(n=9)	± Std. Err.	(n=9)
		bu/ac		lbs/a	
Pioneer	84G62	124 ± 2	6816 ± 116	9062	4357
Dyna-Gro	780B	116 ± 2	6362 ± 119	8650	4296
DeKalb	DKS54-00	115 ± 2	6312 ± 134	8817	3395
Dyna-Gro	751B	113 ± 2	6219 ± 116	8615	3825
Golden Harvest	H-502	110 ± 2	6060 ± 115	8569	3810
Avg. (lbs/a)		116	6354	8742	3937
L.S.D..05 (lbs/a)		9	506	801	1112
C.V. (%)		9.3	9.3	6.2	17.1
				17.1	8.1

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

Table 7. Overall mean yields and agronomic characteristics of five grain sorghum hybrids evaluated in three environments for three years (2004-2006) in Tennessee.

Brand	Hybrid	Avg. Yield	Moisture	Test	Heading	Head	Height	Lodging‡	Damages	Headtype¶
		± Std. Err.	at Harvest	Weight	(n=1)	(n=6)	(n=9)	(n=5)	(n=1)	(n=4)
		(n=9)	(n=9)	(n=9)	(n=1)	(n=6)	(n=9)	(n=5)	(n=1)	(n=4)
		bu/a	%	lbs/bu	DAP	score	in.	score	score	score
Pioneer	84G62	124 ± 2	15.1	58.5	66	1.0	52	1.0	1.7	2.5
Dyna-Gro	780B	116 ± 2	15.0	58.8	69	1.0	55	1.0	1.5	3.1
DeKalb	DKS54-00	115 ± 2	15.0	56.9	73	1.0	55	1.0	1.8	2.8
Dyna-Gro	751B	113 ± 2	14.6	57.9	64	1.0	54	1.0	1.7	3.1
Golden Harvest	H-502	110 ± 2	14.6	58.2	64	1.0	54	1.0	1.5	2.9
Average		116	14.9	58.1	67	1.0	54	1.0	1.6	2.9

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.

Table 8. Yields of nine grain sorghum hybrids in six County Standard Tests in Tennessee and Kentucky during 2006.†‡

MS	Hybrid	Avg.		Test			KY			REC @ Milan	
		Yld	Avg. Yld	Moisture	Weight		McCracken	Lake	Henry	Gibson	Obion
		bu/a	lbs/a	%	lbs/bu						
A	Pioneer 82G10	108.9	5990	15.8	53.7	5/30 §	5/29	5/17	5/23	5/18	6/10
AB	****Pioneer 84G62	107.7	5924	16.0	55.7	5396	6392	7123	5590	4125	7312
AB	Crow's 590	107.0	5885	15.1	56.0	6167	6230	7184	4109	5027	6834
AB	***Pioneer 83G66	106.8	5874	16.9	54.7	6381	6285	5982	4978	4686	6997
AB	**Golden Harvest H502	104.8	5764	16.2	55.7	6870	5943	6658	4500	4664	6619
AB	*Dyna-Gro 780B	104.1	5726	16.1	57.7	6384	6395	6524	3969	4664	6650
AB	**Dyna-Gro 751B	102.4	5632	16.3	55.0	5914	5942	6598	4337	4846	6700
AB	**Dekalb DKS53-11	101.1	5561	16.9	56.3	6080	6030	6271	3874	4670	6852
B	Dekalb DK44	98.7	5429	15.4	55.0	5600	6107	6067	5397	3960	6236
	Average	104.6	5754	16.1	55.5	6026	6163	6534	4573	4545	6680

Pounds per acre ÷ 55 = bushels per acre

MS = Hybrids that have any MS letter in common are not statistically different in yield at the 5% level of probability.

†Yields have been adjusted to 14% moisture. Each hybrid was evaluated in a large strip – plot at each location, thus each county test was considered as one replication of the test in calculating the average yield and in conducting the statistical analysis to determine significant differences (MS).

‡Data provided by Robert C. Williams, Ext. Area Specialist, Grain Crops, and extension agents in counties shown above.

§ Planting date.

Hybrids denoted with an asterisk (), (**), (***) or (****) were in the top performing group in 2005, 2004, 2003, 2002 and/or 2001.

Table 9. Overall average yields and moistures of four grain sorghum hybrids evaluated in county standard tests and Research and Education Center tests in Tennessee during 2006.†

Brand	Hybrid	County Standard Tests			Experiment Station Tests		
		Avg. Yield (n=6)	Moisture (n=6)	Test Weight (n=6)	Avg. Yield (n=4)	Moisture (n=4)	Test Weight (n=4)
		bu/a	%	lbs/bu	bu/a	%	lbs/bu
Pioneer	84G62	108	16.0	55.7	107	15.1	57.7
Golden Harvest	H-502	105	16.2	55.7	78	15.3	57.0
Dyna-Gro	780B	104	16.1	57.7	92	15.4	57.8
Dyna-Gro	751B	102	16.3	55.0	95	15.1	56.3
Average (lbs/a)		105	16.2	56.0	93	15.2	57.2

† All yields adjusted to 14%, bushel weight of No. 2 sorghum equals 55 lbs.

Table 10. Characteristics of grain sorghum hybrids evaluated in yield tests in Tennessee during 2006.†

Brand	Hybrid	Grain		Head Type	Green Bug		Released or	Comments
		Color	Maturity		Resistance	Experimental		
Asgrow	A571	Bronze	Med-Late	Open	---	R	---	---
DeKalb	DKS37-07	Bronze	Med-Early	---	---	R	---	---
DeKalb	DKS54-00	Bronze	110	Semi-Compact	C,E,I	R	---	For high yield environments, residue proven
Dyna-Gro	751B	Bronze	105	Semi-Compact	---	R	---	Very good performance on dryland clay or irrigated loam
Dyna-Gro	780B	Bronze	111	Compact	---	R	---	Very good performance on dryland clay or irrigated loam
Dyna-Gro	X1759	Bronze	105	---	---	E	---	Best performance on loam soils
Golden Harvest	H-502	Red	95	Semi-Compact	---	R	---	Well suited to high yield environments, Excellent early vigor
Golden Harvest	H-511	Red	98	---	---	R	---	---
Monsanto	MSC 432	Bronze	Med	---	---	E	---	---
Monsanto	MSD 472	Bronze	Med	---	---	E	---	---
Monsanto	MSD 477	Bronze	Med	---	---	E	---	---
NC+	7B51	Bronze	Med	---	---	R	---	---
Pioneer	84G62	Bronze	125	Open	---	R	---	---

† Information on this table provided by the respective seed companies.

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