Grain Sorghum
Hybrid Tests in Tennessee

2004

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2004 PERFORMANCE OF GRAIN SORGHUM HYBRIDS IN TENNESSEE EXPERIMENT STATION & 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 Knoxville, Highland Rim, and Milan Experiment Stations, and at Ames Plantation. The trial contained 17 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 **Experiment Station Test** data for 2004. Tables 4 and 5 contain the two-year data, Tables 6 and 7 contain the three-year data. The **County Standard Test** data on 10 hybrids from four counties are reported in Table 8. Table 9 contains the data on the grain sorghum hybrids that were common in the County and Experiment Station tests and Table 10 contains the phenotypic trait data for the grain sorghum hybrids tested in 2004.

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.

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 2004 season was characterized by very favorable temperatures and rainfall for grain sorghum production. High grain sorghum yields were achieved throughout the State for a second year in a row. The state average from 17,000 acres of production in 2004 was 90 bushels per acre. That ties the record yield set in 1996. Adequate amounts and very timely distribution of rain, compared to normal, resulted in an exceptionally good growing season for grain sorghum.

Table 1. Location information from experiment stations where the grain sorghum hybrid tests were conducted in 2004.

Experiment Station	Location	Planting Date	Harvest Date	Plant Population	Soil Type
Knoxville	Knoxville	May 10, 2004	October 24, 2004	87,600	Sequatchie Silt Loam
Highland Rim	Springfield	June 21, 2004	November 29, 2004	87,600	Sango Silt Loam
Milan (non-irrigated)	Milan	June 2, 2004	November 10, 2004	87,600	Memphis, Loring, Henry Silt Loam
Ames Plantation	Grand Junction	May 5, 2004	November 11, 2004	87,600	Lexington Silt Loam

Table 2. Mean yields of 17 grain sorghum hybrids evaluated in four environments in Tennessee during 2004.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=4)	Avg. Yield† ± Std. Err. (n=4)	Knoxville	Springfield	Milan	Ames
		bu/a	lbs/a				
Pioneer	83G66	145 ± 3	7997 ± 214	8910	6465	7822	8790
Pioneer	83G15	139 ± 3	7643 ± 216	8776	6898	8176	6722
Pioneer	84G62	137 ± 2	7552 ± 215	8531	5961	8202	7512
Dyna-Gro	780B	136 ± 2	7486 ± 228	9379	5398	6968	8198
Dekalb	DKS54-00	134 ± 2	7370 ± 215	8493	5448	7436	8101
Sorghum Partners	NK 8416	134 ± 2	7369 ± 215	8847	6569	7084	6977
Monsanto	X-304	133 ± 2	7310 ± 216	7706	5797	8007	7730
FFR	322	133 ± 2	7292 ± 216	8960	5123	7389	7696
Golden Harvest	H-502	133 ± 2	7292 ± 215	8473	5311	7340	8043
Dekalb	DKS 53-11	132 ± 2	7287 ± 216	9118	5204	7617	7208
Dyna-Gro	751B	132 ± 2	7238 ± 215	9014	4704	7285	7949
Monsanto	X-303	130 ± 2	7169 ± 216	8832	5790	7717	6337
FFR	318	129 ± 2	7118 ± 215	7436	5683	7334	8021
Dekalb	DK-52	129 ± 2	7084 ± 216	8791	4824	7690	7029
Triumph	TR 82-G	127 ± 2	7010 ± 215	8263	5297	6820	7661
Asgrow	A459	124 ± 2	6810 ± 228	8648	4328	6982	7282
FFR	319W	118 ± 2	6484 ± 216	7474	4657	7381	6424
Avg. (lbs/a)		**132**	**7253**	**8527**	**5527**	**7445**	**7486**
L.S.D..05 (lbs/a)		**11**	**579**	**987**	**1169**	**877**	**1640**
C.V. (%)		**9.8**	**9.8**	**6.9**	**12.5**	**7.1**	**12.9**

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

Table 3. Overall mean yields and agronomic characteristics of 17 grain sorghum hybrids evaluated in four environments in Tennessee during 2004.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=4)	Moisture at Harvest (n=3)	Test Weight (n=4)	Heading (n=1)	Head Blast† (n=2)	Height (n=4)	Lodging‡ (n=1)	Bird Damage§ (n=1)
		bu/a	%	lbs/bu	DAP	score	in.	score	score
Pioneer	83G66	145 ± 3	15.6	56.4	65	1.0	54	1.5	1.5
Pioneer	83G15	139 ± 3	15.6	56.0	73	1.0	54	1.5	1.5
Pioneer	84G62	137 ± 2	15.8	56.9	66	1.0	51	1.5	1.5
Dyna-Gro	780B	136 ± 2	16.0	58.1	69	1.0	55	3.0	1.5
Dekalb	DKS54-00	134 ± 2	15.7	55.7	73	1.0	55	1.5	1.5
Sorghum Partners	NK 8416	134 ± 2	16.4	58.3	69	1.0	63	1.5	1.5
Monsanto	X-304	133 ± 2	15.8	56.8	73	1.0	58	1.5	1.5
FFR	322	133 ± 2	15.7	56.4	67	1.0	53	2.5	1.5
Golden Harvest	H-502	133 ± 2	15.3	57.0	64	1.0	55	3.0	1.5
Dekalb	DKS 53-11	132 ± 2	18.0	56.7	74	1.0	57	1.5	1.5
Dyna-Gro	751B	132 ± 2	15.0	56.7	64	1.0	54	3.0	1.5
Monsanto	X-303	130 ± 2	19.3	57.0	75	1.0	56	1.5	1.5
FFR	318	129 ± 2	15.1	55.4	65	1.0	55	1.5	1.5
Dekalb	DK-52	129 ± 2	15.1	56.8	64	1.0	54	1.5	1.5
Triumph	TR 82-G	127 ± 2	16.2	58.4	73	1.0	55	1.5	1.5
Asgrow	A459	124 ± 2	15.3	55.8	66	1.0	57	1.5	1.5
FFR	319W	118 ± 2	14.3	53.8	64	1.0	54	1.5	1.5

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.

Table 4. Mean yields of 12 grain sorghum hybrids evaluated in four environments for two years (2003-2004) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=8)	Avg. Yield† ± Std. Err. (n=8)	Knoxville	Springfield	Milan	Ames
		bu/a	lbs/a				
Pioneer	83G66	130 ± 2	7138 ± 137	8203	5655	7117	7578
Dyna-Gro	780B	128 ± 3	7045 ± 146	8848	5363	6593	7375
Pioneer	84G62	128 ± 3	7036 ± 138	8468	5735	6947	6993
Golden Harvest	H-502	127 ± 3	7007 ± 141	8225	5493	7181	7130
Dyna-Gro	751B	125 ± 3	6902 ± 138	8658	5184	6971	6795
FFR	322	125 ± 3	6888 ± 138	8456	5417	6620	7057
FFR	318	125 ± 3	6865 ± 141	7526	5929	6423	7580
Pioneer	83G15	123 ± 3	6750 ± 146	8361	5986	6822	5830
Triumph	TR 82-G	122 ± 3	6704 ± 146	8162	5254	6391	7008
Dekalb	DKS54-00	121 ± 3	6644 ± 142	8340	5087	6274	6875
Asgrow	A459	119 ± 3	6534 ± 141	8105	4897	6485	6650
FFR	319W	112 ± 2	6174 ± 137	7184	5317	6172	6025
Avg. (lbs/a)		**124**	**6807**	**8211**	**5443**	**6666**	**6908**
L.S.D..05 (lbs/a)		**8**	**443**	**685**	**895**	**800**	**1171**
C.V. (%)		**9.3**	**9.3**	**6.0**	**11.5**	**8.3**	**12.0**

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

Table 5. Overall mean yields and agronomic characteristics of 12 grain sorghum hybrids evaluated in four environments for two years (2003-2004) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=8)	Moisture at Harvest (n=6)	Test Weight (n=8)	Heading (n=3)	Head Blast† (n=1)	Height (n=8)	Lodging‡ (n=1)	Bird Damage§ (n=3)	Headtype¶ (n=1)
		bu/a	%	lbs/bu	DAP	score	in.	score	score	score
Pioneer	83G66	130 ± 2	17.6	56.7	67	1.3	56	1.5	1.3	3.0
Dyna-Gro	780B	128 ± 3	17.3	58.4	68	1.3	57	3.0	1.3	2.0
Pioneer	84G62	128 ± 3	17.0	57.7	67	3.3	53	1.5	1.3	4.0
Golden Harvest	H-502	127 ± 3	16.7	57.6	65	2.7	56	3.0	1.3	3.0
Dyna-Gro	751B	125 ± 3	16.4	57.6	66	2.7	56	3.0	1.3	3.0
FFR	322	125 ± 3	17.4	57.2	67	2.3	55	2.5	1.3	2.0
FFR	318	125 ± 3	16.2	56.1	64	2.3	57	1.5	1.3	2.0
Pioneer	83G15	123 ± 3	17.3	56.3	71	3.3	55	1.5	1.3	3.0
Triumph	TR 82-G	122 ± 3	17.5	58.6	70	1.0	57	1.5	1.3	4.0
Dekalb	DKS54-00	121 ± 3	18.1	55.9	69	2.0	57	1.5	1.3	3.0
Asgrow	A459	119 ± 3	15.8	56.7	67	3.0	58	1.5	1.3	3.0
FFR	319W	112 ± 2	15.7	55.1	64	3.0	56	1.5	1.3	4.0

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 errect; 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 nine grain sorghum hybrids evaluated in three environments for three years (2002-2004) in Tennessee.

Brand	Hybrid	Avg. Yield† ± Std. Err. (n=12)	Avg. Yield† ± Std. Err. (n=12)	Knoxville	Springfield	Milan	Ames
		bu/ac	---------- lbs/a----------				
Pioneer	84G62	120 ± 2	6575 ± 115	8163	5056	6143	6939
Pioneer	83G66	119 ± 2	6544 ± 112	7966	4852	6323	7035
Dyna-Gro	751B	117 ± 2	6415 ± 113	8500	4569	5973	6619
Dyna-Gro	780B	114 ± 2	6252 ± 117	8275	4683	5377	6673
FFR	322	113 ± 2	6216 ± 113	7747	4460	5787	6871
FFR	318	112 ± 2	6180 ± 115	7201	5024	5566	6930
Dekalb	DKS54-00	109 ± 2	5981 ± 115	8111	4649	4810	6354
Asgrow	A459	107 ± 2	5892 ± 117	7842	4362	5286	6078
FFR	319W	102 ± 2	5603 ± 115	6775	4714	5064	5861
Avg. (lbs/a)		**112**	**6184**	**7842**	**4708**	**5592**	**6595**
L.S.D..05 (lbs/a)		**8**	**426**	**813**	**798**	**795**	**1033**
C.V. (%)		**10.3**	**10.3**	**7.8**	**12.2**	**10.2**	**11.8**

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

Table 7. Overall mean yields and agronomic characteristics of nine grain sorghum hybrids evaluated in three environments for three years (2002-2004) in Tennessee.

Brand	Hybrid	Avg. Yield ± Std. Err. (n=12)	Moisture at Harvest (n=10)	Test Weight (n=9)	Heading (n=3)	Head Blast† (n=4)	Height (n=12)	Bird Damage§ (n=4)	Panicle Exertion (n=1)	Headtype¶ (n=3)
		bu/a	%	lbs/bu	DAP	score	in.	score	in.	score
Pioneer	84G62	120 ± 2	16.2	58.0	67	2.1	52	1.3	8	3.3
Pioneer	83G66	119 ± 2	16.9	57.0	67	1.5	54	1.3	10	2.4
Dyna-Gro	751B	117 ± 2	16.2	57.9	66	1.9	54	1.3	9	2.4
Dyna-Gro	780B	114 ± 2	16.4	58.6	68	1.8	54	1.3	9	2.1
FFR	322	113 ± 2	16.9	57.6	67	1.6	54	1.3	9	1.9
FFR	318	112 ± 2	15.8	56.5	64	2.0	55	1.3	11	2.1
Dekalb	DKS54-00	109 ± 2	17.2	56.4	69	2.3	56	1.3	10	2.6
Asgrow	A459	107 ± 2	15.4	57.1	67	2.1	55	1.3	8	2.6
FFR	319W	102 ± 2	15.4	55.7	64	2.1	54	1.3	8	3.1

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 10 grain sorghum hybrids in four County Standard Tests in Tennessee and Kentucky during 2004.†‡

MS	Hybrid	Avg. Yld	Avg. Yld	Moisture	Test Weight	Hardin	Haywood	KY McCracken	Obion
		bu/a	lbs/a	%	lbs/bu	5/23 §	5/24	5/24	6/7
A	***Dekalb DKS54-00	135	7409	15.4	60.0	6196	7944	8346	7142
A	***Pioneer 84G62	133	7321	14.4	61.0	5265	9524	8597	5905
A	Dekalb DKS53-11	133	7304	16.2	60.0	4812	8525	8258	7611
AB	FFR 318	131	7216	15.2	60.0	5185	8006	8481	7184
AB	*Triumph TR 82-G	127	7007	15.5	62.0	6573	7877	8356	5227
AB	*FFR 319W	125	6870	15.4	56.0	5408	7793	7785	6503
AB	Croplan 514GS	124	6804	16.1	61.0	4863	7817	7920	6622
AB	Golden Harvest H502	123	6782	15.6	62.0	5060	7653	8346	6063
AB	Asgrow A571	122	6710	15.2	59.0	5248	7174	7830	6585
B	Asgrow A459	117	6424	14.9	61.0	5028	7941	7387	5339
	Average (lbs/a)	**127**	**6985**			**5363**	**8025**	**8129**	**6419**

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 2003, 2002, and 2001.

Table 9. Overall average yields and moistures of eight grain sorghum hybrids evaluated in county standard tests and experiment station tests in Tennessee during 2004.†

		County Standard Tests			Experiment Station Tests		
Brand	**Hybrid**	**Avg. Yield (n=4)**	**Moisture (n=4)**	**Test Weight (n=4)**	**Avg. Yield (n=4)**	**Moisture (n=4)**	**Test Weight (n=4)**
		bu/a	%	lbs/bu	bu/a	%	lbs/bu
Dekalb	DKS54-00	135	15.4	60.0	134	15.7	55.7
Pioneer	84G62	133	14.4	61.0	137	15.8	56.9
Dekalb	DKS 53-11	133	16.2	60.0	132	18.0	56.7
FFR	318	131	15.2	60.0	129	15.1	55.4
Triumph	TR 82-G	127	15.5	62.0	127	16.2	58.4
FFR	319W	125	15.4	56.0	118	14.3	53.8
Golden Harvest	H-502	123	15.6	62.0	133	15.3	57.0
Asgrow	A459	117	14.9	61.0	124	15.3	55.8
Average (lbs/a)		**128**	**15**	**60**	**129**	**16**	**56**

† 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 2004.†

Brand	Hybrid	Grain Color	Maturity	Head Type	Green Bug Resistance	Released or Experimental	Comments
Asgrow	A459	Bronze	100	Open	E	R	High top end yield, performs well under stress, residue proven
Dekalb	DK-52	Bronze	100	Semi-Open	E	R	High top end yield
Dekalb	DKS 53-11	Bronze	110	Semi-Compact	C,E,I	R	For high yield environments
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	Well suited to high yield environments
Dyna-Gro	780B	Bronze	111	Compact	---	R	Strong workhorse, handles stress
FFR	318	Bronze	113	Compact	---	R	---
FFR	322	Red	115	Compact	---	R	---
FFR	319W	Cream	113	Open	---	R	---
Golden Harvest	H-502	Red	112	Semi-Compact	---	R	Well suited to high yield environments
Monsanto	X-303	Bronze	100	---	C,E,I	E	High top end yield, performs well under stress
Monsanto	X-304	Bronze	100	---	C,E	E	High top end yield, performs well under stress
Pioneer	83G15	Bronze	124	Semi-Compact	---	R	---
Pioneer	83G66	Red	122	Semi-Compact	---	R	---
Pioneer	84G62	Bronze	125	Open	---	R	---
Sorghum Partners	NK 8416	Red	Late	Compact	---	R	Well suited to high yield environments
Triumph	TR 82-G	Red	120	Open	C,E	R	Great uniformity, resistant to greenbugs C & E