



1963 SORGHUM PERFORMANCE TRIALS IN MISSOURI

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INTRODUCTION

Performance trials for grain sorghum hybrids have been conducted for the six-year period 1958-1963. Four testing sites were used in 1963. These were located near Spickard (northwest), Palmyra (northeast), Columbia (central), and Mt. Vernon (southwest). Due to excessive dry weather at planting time, poor stands were received at Columbia and Palmyra. The first planting at Columbia was abandoned and replanted three weeks later. Excessive rains soon after planting resulted in excessive grassy and broad leaf growth at Spickard which eventually smothered the crop.

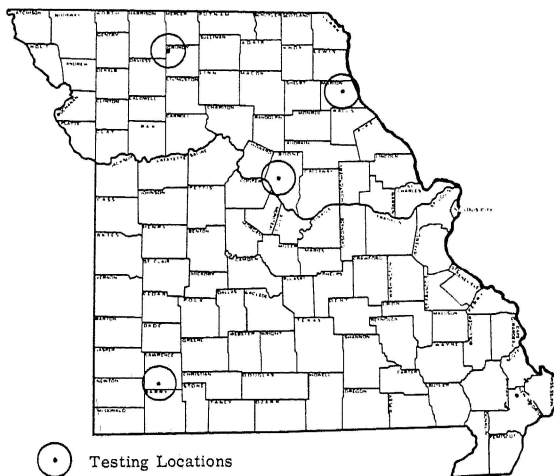


Figure 1. Outline map of Missouri showing the testing locations for 1962 grain sorghum tests.

The 1963 estimate of harvested acres of grain sorghum was 172 percent of the 1962 acreage and 93 percent of the 10-year average. The estimated average yield of 50 bushels per acre was 11 bushels less than the estimated corn yield. The 1963 estimate of 50 bushel yield compares to 44 to 47 bushel yield during the past 5 years. Data were obtained from the Missouri Farm Census Reports.

Comparisons between the yields of corn and grain sorghum at 2 of the testing sites can be made since these tests were located either in the same field or in close proximity (Table 2). These comparisons are only suggestive since planting dates and cultural factors were not the same for the 2 tests.

ENVIRONMENTAL CONDITIONS

The rainfall and temperature records for May 1 to September 15 at each location are reported in Tables 4 and 5. Temperatures for 1963 were slightly below normal at Columbia and above at Spickard. Total rainfall was sufficient to provide adequate moisture except that the rainfall was not well distributed at some locations and especially at Mt. Vernon where the crop failed to get full benefit of the rainfall. Environmental conditions at the 2 locations of Palmyra and Spickard which resulted in poor stands and excessive weed growth caused the abandonment of these 2 tests. The test at Columbia was planted June 3, and dry weather prevented getting a good stand. It was planted a second time on June 20.

EXPERIMENTAL METHODS

Seed Source

All producers and distributors of grain sorghum seed were eligible to enter the tests in 1963. No limit was placed on the number of hybrids any one company could enter.

Field Design

Entries were planted in 4 plots at each location. Individual plots consisted of 2 rows. The length of the harvested rows was 15 feet at both locations. Distance between rows was 38 inches at Columbia and 40 inches at Mt. Vernon. Plots were located at random over the testing area to minimize soil and cultural differences.

Yield

The heads from each plot were harvested by hand and weighed. Acre yields were computed on the basis of threshed grain.

Threshing Percent

Threshing percent data were determined for all plots at Columbia. All threshing percentages were obtained after the sorghum heads had been air-dried to a uniform moisture content. The mean threshing percent from the Columbia location was also used for computing yields at Mt. Vernon.

Date of Blooming

The number of days from planting to 50 percent blooming was recorded for each replication at Columbia.

Plant Height

The average height of the plants, in inches, was determined for each entry.

Head Compactness and Exsertion

Compactness was graded from 1 to 5. (1 for the most compact or tight head, and 5 for the most lax, or loose head)

Exsertion is the relative distance that the head protrudes above the top leaf blade. Grade 1 indicates the least exsertion and grade 5 the greatest.

Off-Type Heads, Tall Plants, and Lodged Plants

Off-type heads, tall plants, and lodged plants were counted prior to harvest. Very little lodging occurred at Columbia and relatively small amount at Mt. Vernon.

Test Weight

Test weights were determined at Columbia for all entries.

RESULTS

Results of the individual tests are reported in Tables 6 and 7. The summary, Table 8, summarizes results for both locations.

Acre yields were high at Columbia and low at Mt. Vernon.

PERIOD-OF-YEARS RESULTS

The best basis for selecting a grain sorghum hybrid is on its performance record over several years. In the event it is necessary to make a selection on the performance record for a single year, it is better to use the averages from several locations, such as those found in Table 8.

Table 1. The Average Number of Acres, Total Production, Average Acre Yield for Grain Sorghum and the Average Acre Yield for Corn during the Ten-Year Period 1954-1963.

Year	Grain Sorghum			Average Corn Yield Bu.
	Acreage	Total Production Bu.	Average Acre Yield Bu.	
1954	66,000	1,056,000	16	20
1955	93,000	2,325,000	25	40
1956	187,000	5,610,000	28	48
1957	590,000	25,960,000	40	44
1958	688,000	35,088,000	44	54
1959	507,000	25,350,000	45	53
1960	452,000	20,340,000	45	52
1961	208,000	9,776,000	47	62
1962	177,000	7,965,000	45	58
1963	304,000*	15,200,000*	50*	61*
1954-63 Average	327,200	14,867,000	38	49

* Estimated as of December 1, 1963.

Table 2. Comparative Acre Yields of Grain Sorghum and Corn at Testing Locations in Missouri in 1963.

Testing Location	Grain Sorghum			Corn		
	Average Yield Bu.	High Yield Bu.	Low Yield Bu.	Average Yield Bu.	High Yield Bu.	Low Yield Bu.
Columbia	104.0	129.3	76.8	64.1	80.6	48.8
Mt. Vernon	38.0	47.6	21.6	122.3	142.0	106.6
Palmyra	Abandoned					
Spickard	Abandoned			131.5	148.0	115.1

Table 3. Seed Source and Names of Entries Tested in 1963.

Entries	Seed Source	Address
Advance Exp. 76E, 14	Advance Seed Co.	Phoenix 5, Arizona
Asgrow Raider B, Triple T, Ranger A	Asgrow Seed Co.	San Antonio, Texas
DeKalb F63	DeKalb Agri. Assoc., Inc.	Lubbock, Texas
Frontier 23X, 67X, 400C, 410E	Frontier Hybrids, Inc.	Scott City, Kansas
Northrup King 210, 222, 227, 310	Northrup King & Co.	Minneapolis, Minnesota
Paymaster Apache, Kiowa, Ute	Paymaster Seed Farms	Plainview, Texas
Pioneer 820, 846, 848, 861	Garst & Thomas Hybrid Corn Co.	Coon Rapids, Iowa
Rudy Patrick 220, 288	Rudy Patrick Seed Co.	Ames, Iowa
Taylor-Evans 66, 77, 88	Taylor-Evans Seed Co.	Tulia, Texas
RS608, RS681, Martin, RS619, RS624, RS640	Agri. Expt. Station	Lincoln, Nebraska
RS610, RS625, RS626, RS630	Texas Agri. Expt. Station	College Station, Texas
RS650, Kan 701	Agri. Expt. Station	Manhattan, Kansas
OK612, OK613, OK632	Okla. State Univ. Expt. Station	Stillwater, Oklahoma

Table 4. Total Rainfall, Number of Days with Rain, and Dry Periods from May 1 to September 15, 1963, at Each of the Testing Locations Harvested.

Testing Location	Total Rainfall Inches	Days with Rain					Sept. 15	Total	Dry Periods**
		May	June	July	Aug.				
Columbia	17.92	12	8	7	7	8	42	(5/26-6/14)	
Mt. Vernon	20.93	13	7	6	6	4	36		
Spickard	22.35	8	9	7	5	5	34	(8/6-8/23)	

** A dry period must have at least 15 consecutive days with less than 0.25 inch of precipitation

Table 5. Average Temperature, Departure from Normal, and the Number of Days with Temperatures of 90° F or more, and 100° F or more, at Each of the Testing Locations from May 1, to September 15, 1963.

Location	Cooperator	Average Fahrenheit Temperature	Departure From Normal	No. days with Temp. 90° F or more 1963	Avg.	No. days with Temp. 100° F or more 1963
Columbia	Missouri Agri. Exp. Station	71.7	-0.6	43	39	1
Mt. Vernon	Univ. of Mo. Southwest Center	74.9	+2.5	59	25	4
Palmyra	Earl Page	73.5	+0.7	40	42	1
Spickard	Univ. of Mo. North Mo. Center	74.6	-0.9	47	42	1

Table 6. 1963 Performance Record for the Sorghum Test Conducted in Boone County, near Columbia, Missouri. Planted June 20, 1963. Harvested October 31, 1963. (Exp. S70)

Entry	Acre Yield Bu.	Thresh- ing %	Lodged Plants %	Plants per 32 ft. Row No.	Head		Per 32 ft. Row			Planting to 50% Blooming Days	
					Compact- ness 1-5	Exser- tion 1-5	Off- Type Heads No.	Tall Plants No.	Plant Height Ins.		Test Weight Lbs.
Taylor-Evans T-E 88	129.3	77.7	0.0	146	2.5	3.0	0.8	1.8	52	56.3	74
RS650	122.0	74.8	0.0	146	2.3	3.0	0.8	0.0	53	55.0	71
Asgrow Ranger A	116.5	74.0	6.9	191	2.3	3.5	0.0	0.0	55	56.5	71
Pioneer 820	116.1	75.9	1.1	162	2.8	3.0	0.3	0.3	54	54.9	73
Pioneer 846	115.4	73.8	0.7	177	3.0	3.0	0.3	0.3	49	55.0	72
RS610	114.6	73.1	0.0	110	2.3	3.0	0.0	0.3	51	55.3	69
Northrup King NK310	113.2	69.2	0.0	161	2.3	2.0	1.3	0.3	54	53.8	80
Taylor-Evans T-E 77	112.7	74.4	0.9	171	2.0	3.3	0.0	0.3	53	54.5	75
RS630	112.5	72.1	0.3	160	2.5	2.5	0.3	0.0	56	55.8	71
Advance Exp. 76E	109.1	73.9	0.3	157	2.5	2.5	0.0	0.8	50	55.6	73
Paymaster Apache	108.6	74.0	0.2	132	2.0	3.3	0.0	0.3	52	53.8	75
Taylor-Evans T-E 66	108.0	72.6	0.8	119	3.0	2.8	0.3	0.3	45	53.9	69
Northrup King NK210	107.7	74.7	1.1	154	2.5	3.0	0.5	0.8	52	55.9	68
Kan 701	106.7	73.3	0.3	162	2.0	3.0	0.0	0.3	57	55.4	76
OK632	106.5	75.7	2.0	148	3.5	3.3	0.0	0.0	59	56.3	74
OK613	106.4	72.0	1.5	153	3.8	3.5	0.5	0.5	53	56.3	71
Advance 14	106.4	71.3	0.4	175	4.0	3.3	0.3	0.5	55	54.3	73
Frontier 400C	105.7	74.5	1.4	146	2.3	2.8	3.3	0.0	52	56.8	71
Pioneer 861	105.5	73.0	1.8	168	3.8	3.0	0.0	0.3	50	54.9	68
Asgrow Raider B	105.4	72.9	5.5	186	3.0	3.0	0.0	0.0	49	54.9	69
RS640	104.8	72.9	0.0	141	3.3	2.5	0.0	0.0	45	54.1	69
DeKalb F63	103.9	71.1	0.5	146	2.8	2.8	0.0	0.3	54	53.6	74
Frontier 410E	103.7	73.1	0.2	141	2.8	2.8	0.0	0.0	46	55.0	70
Frontier 67X	103.6	72.5	1.6	142	3.8	2.0	46.2	0.5	48	54.9	67
OK612	103.4	73.2	0.6	131	3.8	3.5	0.0	0.3	50	54.9	71
Northrup King NK227	103.3	74.4	3.1	167	3.0	2.8	0.0	0.5	50	52.6	68
RS624	101.8	72.4	0.0	131	2.0	2.5	0.0	0.0	48	56.3	72
RS626	101.7	72.0	2.9	164	3.0	2.3	0.8	0.8	52	54.1	69
Frontier 23X	101.5	74.3	0.9	139	3.3	2.8	3.8	1.3	49	55.5	72
Rudy Patrick RP220	98.8	74.0	1.1	137	3.3	2.5	10.3	1.0	50	51.6	69
Paymaster Kiowa	98.3	76.0	10.7	150	3.0	2.8	0.3	0.0	51	57.0	71
RS619	97.2	74.8	0.2	155	3.5	2.3	0.0	0.0	46	56.6	70
Northrup King NK222	97.1	73.2	0.4	197	4.8	2.5	0.0	0.8	47	57.6	67
RS681	97.1	74.2	0.2	115	3.5	3.0	0.0	0.3	51	56.0	71
Asgrow Triple T	96.1	73.2	1.9	202	2.0	2.0	0.0	0.0	54	55.5	74
RS625	95.0	72.2	0.0	177	3.5	2.8	0.0	0.3	47	54.0	68
RS608	92.7	73.3	0.3	150	3.0	3.0	0.0	0.0	49	56.0	70
Pioneer 848	92.7	73.0	0.7	174	3.8	2.8	0.0	0.3	50	57.4	72
Rudy Patrick RP288	87.1	72.7	0.0	121	3.0	2.5	1.5	0.8	47	53.8	71
Paymaster Ute	79.2	74.4	0.2	150	2.5	2.3	0.0	0.0	47	58.4	70
Martin	76.8	71.9	1.3	180	3.8	3.0	0.0	0.5	49	55.3	73
Mean	104.0	73.5	1.3	154	2.9	2.8	1.8	0.4	51	55.3	71

Differences in yield between any two entries of less than 19.4 bushels per acre are not considered significant.

Table 7. 1963 Performance Record for Sorghum Test Conducted in Lawrence County, near Mt. Vernon, Missouri.
Planted May 15, 1963. Harvested October 8, 1963. (Exp. S71)

Entry	Acre Yield Bu.	Thresh- ing %	Lodged Plants %	Plants per 40 ft. Row No.	Head		Per 40ft Row		
					Compact- ness 1-5	Exser- tion 1-5	Type Heads No.	Tall Plants No.	Plant Height Ins.
Advance Exp. 76E	47.6	73.9	1.0	171	2.3	1.5	0.0	0.5	34
Pioneer 861	47.1	73.0	7.8	189	2.8	3.0	0.0	0.5	40
Asgrow Raider B	47.1	72.9	4.3	164	2.3	1.8	0.0	0.0	39
Asgrow Triple T	45.7	73.2	3.2	162	2.0	1.8	0.0	0.0	39
Kan 701	44.3	73.3	0.9	170	1.8	1.8	0.0	0.3	39
Asgrow Ranger A	43.8	74.0	9.3	191	2.0	1.8	0.0	0.0	38
Paymaster Apache	42.6	74.0	0.4	183	2.0	1.8	0.3	0.0	38
RS619	41.9	74.8	19.8	168	3.3	2.3	0.0	0.0	38
Paymaster Ute	41.8	74.4	11.8	170	2.8	1.8	0.0	0.0	35
Pioneer 848	41.6	73.0	3.6	179	3.5	2.3	0.0	0.0	35
Advance 14	41.1	71.3	1.0	196	3.3	1.8	0.0	0.0	37
Taylor-Evans T-E 66	40.2	72.6	4.9	138	3.0	1.5	0.0	0.0	37
Pioneer 846	40.1	73.8	4.4	148	3.0	2.0	0.0	0.0	38
Frontier 23X	40.0	74.3	1.4	163	1.8	1.8	0.0	0.3	35
RS681	39.7	74.2	7.4	149	2.8	1.8	0.0	0.0	37
Northrup King NK222	39.4	73.2	4.4	170	3.5	2.8	0.0	0.0	39
Pioneer 820	39.4	75.9	2.3	177	2.3	2.3	0.0	0.0	37
RS624	39.3	72.4	9.1	146	2.0	1.8	0.0	0.0	37
Frontier 410E	39.2	73.1	2.4	155	2.0	1.5	0.0	0.3	32
OK612	39.2	73.2	0.5	159	2.3	2.0	0.0	0.5	34
Frontier 67X	38.9	72.5	7.5	150	3.5	2.3	15.8	0.5	38
RS630	38.8	72.1	9.2	163	2.0	2.5	0.8	0.5	45
RS650	38.7	74.8	16.3	178	1.5	1.5	0.3	0.0	38
RS608	38.4	73.3	19.7	180	3.8	2.5	0.0	0.0	36
Taylor-Evans T-E 88	38.2	77.7	4.8	157	2.0	1.8	0.5	0.3	36
Frontier 400C	37.8	74.5	18.7	146	2.5	2.0	0.3	0.0	39
RS625	37.5	72.2	13.1	197	3.8	2.0	0.0	0.0	36
OK632	37.0	75.7	1.4	143	2.0	1.8	0.0	0.0	39
OK613	36.3	72.0	0.0	155	2.3	2.0	0.0	0.0	35
RS640	36.2	72.9	8.3	139	2.0	1.5	0.0	0.0	33
RS626	36.1	72.0	12.3	179	2.8	2.3	0.0	0.5	42
Martin	35.7	71.9	12.1	182	2.5	2.0	0.0	0.3	37
Rudy Patrick RP220	33.5	74.0	19.8	140	2.5	2.0	3.0	0.3	36
Northrup King NK210	33.0	74.7	15.4	149	1.8	2.5	0.5	0.0	40
RS610	32.8	73.1	10.4	110	1.8	2.0	0.0	0.0	38
Northrup King NK310	31.4	69.2	0.3	167	1.8	1.5	0.0	0.0	36
Taylor-Evans T-E 77	30.5	74.4	4.3	168	2.0	1.8	0.0	0.0	33
Paymaster Kiowa	30.2	76.0	29.6	159	2.5	1.8	1.0	0.3	36
Northrup King NK227	29.5	74.4	26.3	156	2.5	2.3	0.0	0.0	39
Rudy Patrick RP288	27.3	72.7	0.0	130	2.5	1.5	0.0	0.3	31
DeKalb F63	21.6	71.1	0.2	120	2.0	1.8	0.0	0.0	33
Mean	38.0	73.5	8.0	161	2.5	2.0	0.6	0.1	37

Differences in yield between any two entries of less than 12 bushels per acre are not considered significant.

Table 8. 1963 Summary of the Grain Sorghum Tests Conducted near Columbia and Mt. Vernon, Missouri. (Exps. S70 and S71)

Entry	Acre Yield Bu.	Thresh- ing %	Lodged Plants %	Head		Plant Height Ins.
				Compact- ness 1-5	Exser- tion 1-5	
Taylor-Evans T-E 88	83.8	77.7	2.4	2.3	2.4	44
RS650	80.4	74.8	8.2	1.9	2.3	46
Asgrow Ranger A	80.1	74.0	8.1	2.2	2.7	46
Advance Exp. 76E	78.3	73.9	0.7	2.4	2.0	42
Pioneer 820	77.7	75.9	1.7	2.6	2.7	45
Pioneer 846	77.7	73.8	2.6	3.0	2.5	43
Pioneer 861	76.3	73.0	4.8	3.3	3.0	45
Asgrow Raider B	76.2	72.9	4.9	2.7	2.4	44
RS630	75.7	72.1	4.8	2.3	2.5	51
Paymaster Apache	75.6	74.0	0.3	2.0	2.6	45
Kan 701	75.5	73.3	0.6	1.9	2.4	48
Taylor-Evan T-E 66	74.1	72.6	2.9	3.0	2.2	41
Advance 14	73.7	71.3	0.7	3.7	2.6	46
RS610	73.7	73.1	5.2	2.1	2.5	44
Northrup King NK310	72.3	69.2	0.2	2.1	1.8	45
Frontier 400C	71.8	74.5	10.1	2.4	2.4	45
OK632	71.7	75.7	1.7	2.8	2.6	49
Taylor-Evans T-E 77	71.6	74.4	2.6	2.0	2.6	43
Frontier 410E	71.5	73.1	1.3	2.4	2.2	39
OK613	71.3	72.0	0.8	3.1	2.8	44
OK612	71.3	73.2	0.6	3.1	2.8	42
Frontier 67X	71.3	72.5	4.6	0.0	2.2	43
Asgrow Triple T	70.9	73.2	2.6	2.0	1.9	46
Frontier 23X	70.7	74.3	1.2	2.6	2.3	42
RS624	70.6	72.4	4.6	2.0	2.2	43
RS640	70.5	72.9	4.2	2.7	2.0	39
Northrup King NK210	70.3	74.7	8.3	2.2	2.8	46
RS619	69.6	74.8	10.0	3.4	2.3	42
RS626	68.9	72.0	7.6	2.9	2.3	47
RS681	68.4	74.2	3.8	3.2	2.4	44
Northrup King NK222	68.3	73.2	2.4	4.2	2.7	43
Pioneer 848	67.1	73.0	2.2	3.7	2.6	42
Northrup King NK227	66.4	74.4	14.7	2.8	2.6	45
RS625	66.3	72.2	6.6	3.7	2.4	41
Rudy Patrick RP220	66.2	74.0	10.5	2.9	2.3	43
RS608	65.5	73.3	10.0	3.4	2.8	43
Paymaster Kiowa	64.2	76.0	20.2	2.8	2.3	43
DeKalb F63	62.8	71.1	0.4	2.4	2.3	44
Paymaster Ute	60.5	74.4	6.0	2.7	2.1	41
Rudy Patrick RP288	57.2	72.7	0.0	2.8	2.0	39
Martin	<u>56.3</u>	<u>71.9</u>	<u>6.7</u>	<u>3.2</u>	<u>2.5</u>	<u>43</u>
Mean	71.0	73.5	4.7	2.7	2.4	44