GRAIN SORGHUM PERFORMANCE TRIALS IN OKLAHOMA, 2011

PRODUCTION TECHNOLOGY CROPS

OKLAHOMA COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF PLANT AND SOIL SCIENCES
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TRIAL OBJECTIVES AND PROCEDURES

Each year performance trials for hybrid grain sorghum are conducted by the Oklahoma Cooperative Extension Service. These trials provide producers, extension educators, industry representatives, and researchers with information for hybrid grain sorghums marketed in Oklahoma.

Performance trials are conducted at ten locations in Oklahoma: Apache, Alva, Blackwell, Cherokee, Enid, Goodwell, Homestead, Keyes, Gate, and Tipton. Dry-land trials are conducted at all locations, with an additional limited irrigation trial at Goodwell. The Cherokee, Homestead, and Gate locations are uniquely designed trials to evaluate certain hybrids (generally early and medium maturity) for planting in late April. In 2011 trials were continued at Enid and Alva to evaluate hybrids for use as a double crop.

Highlights

The highlight in 2011 or lowlight depending on how you look at it was drought and high temperatures. All trials in the body of the state were planted and emerged except for Tipton. Only the Homestead location was harvested. The highest yield obtain was 26 bu/ac with a 48 lb test weight, therefore not reported. Rainfed trials in the panhandle never received enough moisture to plant. Therefore, the only trial reported in 2011 is limited irrigation trial at

Grain sorghum hybrids entered (Table 1) were assigned by companies to their respective maturity groups (early, medium, and late) and trial locations; therefore, all hybrids were not entered at all locations. Hybrids tested at the Cherokee, Homestead, Enid, Alva, and Slapout locations were determined by Oklahoma State University. Companies submitted all hybrid characteristics presented in Table 1. This information was not determined or verified by Oklahoma State University. Company participation was voluntary, and some hybrids marketed in Oklahoma were not included in the test. Each maturity group was tested in a randomized complete block design with four replications. Plots were two 30-inch rows by 25 feet. Plots were trimmed to 20 feet prior to harvest. Tractor powered cone planters were used to plant all trials with seeding rates adjusted for trial location. Trials were harvested with a Kincaid model, 8XP plot combine.

Target populations, cooperating producers, fertilization, cultural practices, soil series, and herbicide use on all trials are listed individually in the results tables. Rainfall data from the nearest Mesonet site are also listed. Some trials are long distances from the nearest Mesonet site; therefore rainfall could be greater or less than reported.

GROWING CONDITIONS

Soil moisture conditions for planting at the April planted trials was a mixed bag. Apache and Blackwell had adequate soil moisture, while Cherokee, Homestead, and Gate were dusted in. Tipton was in one of the driest portions of the state and was never planted. The double crop trials were planted into adequate moisture, but never received rainfall after emergence. For much of the April planted grain sorghum temperatures affected yield as much or more than lack of moisture. Many of the sorghum heads emerged, but negatively affected by high temperatures. For instance, the earliest generally begins flowering around June 20, and daytime temperatures were above100 F° at Apache for 28 of the next 31 days and 24 days at Cherokee. The highest temperature recorded during this period was 110 and 112 degrees at Apache and Cherokee, respectively. With the high daytime temperature and low relative humidity which ranged from 9 to 25% during the period, flowering was almost impossible. This accounted for the low test weights (highest was 47 lb/bu) at the Homestead location, the only trial in the body of the state that was harvested.

RESULTS

Grain yields for the limited irrigated trial were outstanding in 2011 (Table 2).

Grain yields are reported bushel per acre of threshed grain, adjusted to a moisture content of 14.0% (Table 2). Test weight, plant population, and the number of heads per acre at harvest are reported.

Bird damage and lodging are also reported when present at a location. Different plant populations at each location prevent accurate comparison between locations. Also comparisons across maturity groups were not conducted. Producers should note that late maturing hybrids will generally yield more than early and medium maturity hybrids. However, the availability of moisture at critical crop development periods often influences yield more than the yield differences associated with maturity groups.

When choosing a maturity group, the type of cropping system, planting date, planting rate and potential moisture should be taken into consideration. For more information consult **Fact Sheet No. 2034** Grain Sorghum Planting Rates and Dates, and **Fact Sheet No. 2113** Grain Sorghum Production Calendar.

Least Significant Difference (L.S.D.) is a statistical test of yield differences and is shown at the bottom of each table. Unless two hybrids differ by at least the L.S.D. shown, little confidence can be placed in one hybrid being superior to another and the difference is probably not real.

The coefficient of variation (C.V.) is provided as an estimate of the precision of the data with respect to the mean for that location and maturity group. To provide some indication of yield stability, 2-year and 3-year means for yield and test weight are provided where trials have been conducted for more than one year with more than three entries per maturity group. Producers interested in comparing hybrids for consistency of yield in a specific area should consult these tables.

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Table 1. Seed source and hybrid characteristics of grain sorghums in the Oklahoma Grain Sorghum Performance Trials, 2010. All hybrids are susceptible to birds and are single cross.

Company Brand Name	Hybrid	Seed Color	Endo-sperm	Days to Mid-bloom	Greenbug Resistance	Trial Location
Early 60 days or less to mid-bloom						
Johnston Seed Co.	JS 207	Bz	Hy	58	C	1
Sorghum Partners, LLC	SP3303	Y	Y	59	C	2
Johnston Seed Co.	JS 275X	Bz	Hy	58	-----	1
DeKalb	DKS 28-05	Bz	HY	58	-----	1
DeKalb	DKS 37-07	Bz	HY	60	C,E,I	1
Medium 61 to 69 days to mid-bloom						
DeKalb	DKS 44-20	BZ	HY	67	NA	1
Sorghum Partners, LLC	KS585	Bz	HY	67	C, E	1
Sorghum Partners, LLC	NK4420	Bz	HY	65	C,E	2
Sorghum Partners, LLC	NK5418	Bz	HY	67	C,E	1
Triumph Seed	TR457	Bz	Hy	65	C,E	1
Triumph Seed	TRX03473	Bz	Hy	65		1
Pioneer Hi-Bred Int.	85G01	R	W	69	-----	1
Pioneer Hi-Bred Int.	85G03	R	W	69	-----	1
Pioneer Hi-Bred Int.	86G32	R	W	65	-----	1
Johnston Seed Co.	JS 10007X	R	W	67	-----	1
Johnston Seed Co.	JS 222	Bz	Hy	68	C, E	1
Johnston Seed Co.	JS 219	R	W	69	-----	1
Johnston Seed Co.	JS-012	W	HY	63	C	1
Johnston Seed Co.	JS - 056	R	N	65	C	1
Johnston Seed Co.	JS - 524	R	N	65	C	1
Pioneer Hi-Bred Int.	87P06	R	W	63	-----	1
Gayland Ward Seed Co.	GW 9417	R	Hy	69	C,E	3
Gayland Ward Seed Co.	GW 1160	Bz	Hy	66	C	3
Full 70 days or greater to mid-bloom						
Pioneer Hi-Bred Int.	84P80	R	W	70	-----	4
DeKalb	DKS 49-45	Bz	Hy	70	E,I	1
Johnston Seed Co.	JS 133X	R	W	72	-----	1
Sorghum Partners, LLC	NK7633	Bz	HY	72	C	1
DEKALB	DKS 53-67	Bz	HY	71	C,E,I	4
Pioneer Hi-Bred Int.	84G62	Bz	Y	72	-----	4
Pioneer Hi-Bred Int.	85Y40	W	Y	70	-----	1
Sorghum Partners, LLC	NK6638	Bz	HY	70	C	1
Pioneer Hi-Bred Int.	84P74	R	W	70	-----	4
Triumph Seed	TRX85131	R	Hy	72	-----	1

Trial locations: 1 – all; 2 – panhandle only; 3 – (Altus, Tipton, Blackwell); 4 – irrigated only (OPREC)
Seed Color: Br – Brown; W – White; Y – Yellow; Bz – Bronze; R – Red; C – Cream
Endosperm: HW – heterowaxy; W – waxy; HY – Heteroyellow; Y – Yellow; N – Non-waxy
Greenbug Resistance: Biotype hybrid is resistance too

Table 2. Results from OPREC limited irrigation grain sorghum performance trial, 2011.

Company Brand Name	Hybrid	Grain Yield bu/ac		Test weight lb/bu		Harvest Moisture	Plant Population plants/ac	Head Population heads/plant
		2011	2-year	2011	2-year			
				Early				
DeKalb	DKS 37-07	165	163	58	59	14.2	49,000	1.30
DeKalb	DKS 28-05	159	151	58	57	10.3	56,200	1.45
Johnston Seed Co.	JS 207	136	137	56	56	11.7	44,500	1.36
Sorghum Partners, LLC	SP3303	117	117	58	58	11.6	38,200	1.24
Johnston Seed Co.	JS 275X	91	-----	54	-----	12.6	43,200	1.32
	Mean	133	142	57	58	12.1	46,200	1.33
	CV %	6.4	6.3	1.3	1.6	8.4	8.8	11.7
	L.S.D.	13	9	1	1	1.6	6,300	NS

Cooperator: OPREC
Strip-till following wheat in 2010
Herbicide: Cinch ATZ Lite 2 qts/ac (Preemergence)
Fertilizer: N: 150 lbs N and 40 lbs P_2O_5 with strip-till + 5 gal/ac 10-34-0 with planter
Seeding rate 64,500 plants/ac
Planting Date: June 10, 2011

Soil Series: Richfield Clay Loam
Soil Test: N: 57 P: 44 K: 1,118 pH: 7.8
Target Population: 50,000 plants/ac
Harvest Date: October 31, 2011

Monthly Rainfall (in.)	May	June	July	Aug.	Sep.	**Total**
2011:	0.51	0.53	0.17	2.05	1.67	**4.93**
Long term mean:	3.25	2.86	2.58	2.28	1.77	**12.74**

------- Irrigation (in.) -------

Jun.	Jul.	Aug.	Sept.	Oct
3.3	2.2	3.3	1.1	0

plus 2.2 inches in May as pre-irrigation

Table 2. Continued

Company Brand Name	Hybrid	Grain Yield bu/ac			Test weight lb/bu			Harvest Moisture	Plant Population plants/ac	Head Population heads/plant
		2011	2-year	3-year	2011	2-year	3-year			
Medium										
Sorghum Partners, LLC	KS585	175	160	164	58	50	59	13.0	44,000	1.46
DeKalb	DKS 44-20	175	166	162	59	60	60	13.2	41,600	1.60
Johnston Seed Co.	JS 222	162	159	158	58	59	59	13.3	42,300	1.56
Sorghum Partners, LLC	NK5418	182	162	157	58	58	58	13.0	45,100	1.57
Johnston Seed Co.	JS - 056	162	151	154	58	58	59	13.8	45,500	1.42
Pioneer Hi-Bred Int.	86G32	141	139	147	56	57	57	10.5	40,000	1.66
Johnston Seed Co.	JS - 524	130	132	141	54	56	56	19.4	36,000	1.52
Johnston Seed Co.	JS-012	139	135	137	58	58	58	11.1	41,600	1.50
Pioneer Hi-Bred Int.	87P06	127	124	129	57	57	58	10.9	45,400	1.57
Pioneer Hi-Bred Int.	85G01	179	160	-----	58	59	-----	14.8	49,900	1.23
Sorghum Partners, LLC	NK4420	157	148	-----	57	58	-----	14.6	42,800	1.40
Pioneer Hi-Bred Int.	85G03	156	-----	-----	59	-----	-----	13.0	46,000	1.42
Johnston Seed Co.	JS 219	153	-----	-----	57	-----	-----	23.1	46,900	1.29
Triumph Seed	TR457	149	-----	-----	55	-----	-----	24.6	44,100	1.41
Triumph Seed	TRX03473	148	-----	-----	57	-----	-----	12.2	45,500	1.29
Johnston Seed Co.	JS 10007X	143	-----	-----	57	-----	-----	12.3	46,200	1.27
	Mean	155	149	150	57	58	58	14.6	43,900	1.44
	CV %	6.5	7.5	8.2	1.2	1.3	2.1	8.9	11.1	13.60
	L.S.D.	14	11	10	1	1	1	1.8	6,900	NS

Table 2. Continued

Company Brand Name	Hybrid	Grain Yield bu/ac			Test weight lb/bu			Harvest Moisture	Plant Population plants/ac	Head Population heads/plant
		2011	2-year	3-year	2011	2-year	3-year			
				Full						
Pioneer Hi-Bred Int.	84G62	170	164	161	56	57	58	16.7	40,400	1.44
DEKALB	DKS 53-67	166	157	156	56	57	58	17.4	46,500	1.30
Pioneer Hi-Bred Int.	84P74	186	160	154	57	58	58	16.3	46,400	1.36
Sorghum Partners, LLC	NK6638	149	143	141	58	58	58	11.8	44,200	1.30
DeKalb	DKS 49-45	169	160	-----	54	56	-----	17.8	53,600	1.33
Sorghum Partners, LLC	NK7633	161	153	-----	57	57	-----	14.3	45,400	1.36
Pioneer Hi-Bred Int.	84P80	180	-----	-----	57	-----	-----	15.5	42,400	1.40
Pioneer Hi-Bred Int.	85Y40	167	-----	-----	59	-----	-----	14.7	46,400	1.39
Triumph Seed	TRX85131	160	-----	-----	56	-----	-----	13.7	43,600	1.32
Johnston Seed Co.	JS 133X	149	-----	-----	55	-----	-----	23.3	45,200	1.37
	Mean	166	156	153	56	57	58	16.2	45,400	1.36
	CV %	5.5	7.2	8.2	1.2	1.6	2.0	7.3	8.6	8.7
	L.S.D.	13	11	10	2	1	1	1	5,600	NS