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Sorghum Hybrid Performance Trials in Eastern Colorado, 2010

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SORGHUM HYBRID PERFORMANCE TRIALS IN COLORADO, 2010
K.J. Larson, J.J. Johnson and D.L. Thompson \1

The 2010 Colorado grain sorghum crop was estimated at 5.60 million bushels, 17 percent below the 2009 sorghum crop of 6.75 million bushels. For Colorado, the 5.60 million bushels is the fourth highest in 10 years. The decrease in sorghum production this year was primarily due to a 5 bu/a reduction in per acre yields compared to last year, 40 bu/a for 2010 and 45 bu/a for 2009. Nonetheless, the 40 bu/a is the third highest per acre yield in the last 10 years. The harvested acreage in 2010 was 140,000 acres, which is 10,000 acres less than last year. Sorghum silage statistics are not published during the current year; however, Colorado sorghum silage statistics are available for last year. In 2009, 98,00 tons of sorghum silage was produced. The average yield was 14 tons/a from 7,000 harvested acres. (National Agricultural Statistics Service, Colorado Field Office, 2010).

This publication is a progress report of the sorghum hybrid performance trials conducted by the Department of Soil and Crop Sciences at Colorado State University, Colorado Agricultural Experiment Station, and Colorado State University Extension. The sorghum trials were conducted at three sites in eastern Colorado: Akron, Brandon, and Walsh. This year, all three sites were dryland.

Tests are partially funded by entry fees paid by commercial firms. Commercial seed representatives interested in entering sorghum hybrids in any of the trials should contact Jerry Johnson, Dept. of Soil and Crop Sciences, C12 Plant Science, Fort Collins, Colorado 80523, phone (970) 491-1454, email Jerry.Johnson@colostate.edu; or Kevin Larson, Plainsman Research Center, Box 477, Walsh, Colorado 81090, phone (719) 324-5643, email Kevin.Larson@colostate.edu for further details. Names and addresses of firms submitting entries in 2010 are shown in Table 1. Each firm selected entries for testing and furnished seed for the trials. AES researchers selected an open-pedigree hybrid as a standard of comparison.

Summary tables for weather data (CoAgMet and NOAA, 2010), soil analysis, fertilization (Soil, Plant and Water Testing Laboratory, Colorado State University), and available soil water graphs derived from gypsum block readings are provided for each trial location. Other information, where available, was included: site description, emergence date, irrigation, pest control, field history, and pertinent comments.

\1 Superintendent, Plainsman Research Center, Walsh;
Extension Crop Specialist, Dept. of Soil and Crop Sciences;
Technician III, Plainsman Research Center, Walsh.

Table 1.--Entrants in the 2010 Colorado Sorghum Performance Trials.

Brand	Entered by
AERC	AERC Inc., 34, Colonnade Road, Suite 200, Ottawa, ON K2E 7J6 Canada
ASGROW	Monsanto, 7159 N. 247 W., P.O. Box 7, Mt. Hope, KS 67108
DEKALB	Monsanto, 7159 N. 247 W., P.O. Box 7, Mt. Hope, KS 67108
MYCOGEN	Mycogen Seeds, 9330 Zionville Road, Indianapolis, IN 46268
PIONEER	Pioneer Hi-Bred International, Inc., 390 Union Blvd., Suite 500A, Lakewood, CO 80228
SORGHUM PARTNERS	Sorghum Partners, Inc., P.O. Box 189, New Deal, TX 79350
TRIUMPH	Triumph Seed Co., Inc., P.O. Box 1050, Hwy. 62 Bypass, Ralls, TX 79357

AES researchers entered the following as a check: grain sorghum, TXms399 X TXR2737 (399 X 2737).

Growing Degree Days for sorghum were calculated from planting through first freeze using a maximum of 111°F and a minimum of 50°F for threshold temperatures (Peacock and Heinrich, 1984). They are calculated by averaging daily high and low temperatures and subtracting the base temperature of 50°F from the average. When daily temperatures are less than 50°F, 50°F is used, when temperatures are above 111°F a maximum temperature of 111°F is used:

$$\frac{(\text{Daily Minimum Temp.} + \text{Daily Maximum Temp.})}{2} - 50^{\circ}\text{F}$$

Experimental Methods and Evaluations

Trials were planted with a four-row cone planter and harvested with a modified, self-propelled John Deere 4420 combine equipped with a four-row row-crop head to enhance harvest of lodged tillers. Sorghum forage was cut and chopped with a single row John Deere 8 silage cutter.

Days to Emergence. Seedling emergence was determined as the number of days after planting until approximately half of the seedlings become visible down a planted row.

50% Bloom. Number of days after planting until half of the main heads had pollinating florets. Number of days to half bloom provides a good measure of relative maturity between hybrids.

50% Maturity. Number of days after planting until half of the kernels in half of the main heads reached physiological maturity, i.e., the black layer becomes visible at the base of the kernel.

Plant Height. Plant height was measured in inches from the soil to the tip of the main head.

Lodging. The percentage of tillers with broken basal stems or broken peduncles or were leaning more than a 45 degree angle were considered lodged. Since the combine was equipped with a row crop head, most of the leaning tillers were harvested.

Harvest Density. Plant population in plants per acre was counted prior to harvest.

Test Weight. Test weight was determined using a hand-held bushel weight tester. A low test weight indicates that a hybrid did not fully mature prior to the first freeze or that it suffered environmental stress, such as a water deficiency.

Grain Yield. The grain yield in bushels per acre was corrected to 14 percent moisture content.

Yield as a % of Test Average. Yield as a percentage of test average provides a comparison between yields within a trial and allows easy comparisons among years, irrespective of annual growing conditions.

Forage Dry Matter Analysis. Whole plant samples were taken at boot for each hybrid and sent to Ward Laboratories, Inc., Kearney, Nebraska for forage feed quality using NIR analysis.

Forage Yield. Forage yield in tons per acre was adjusted to 70% moisture content. A representative sample of fresh silage was oven-dried at 167°F (75°C) until there was no more weight loss, and then yields were adjusted to 70% moisture content.

Stem Sugar. The sugar content, expressed as a percent, in the stem of forage sorghums at harvest was measured with a hand refractometer.

Available Soil Water

Available soil water was measured by placing gypsum blocks at 6, 18, 30, and 42 inches below the soil surface. Electrical resistance readings were made weekly. Resistance readings vary with the amount of soil water present. Using resistance readings, available soil water was determined by extrapolating from soil water depletion curves for each particular soil.

Statistical Method

Trials were planted in a randomized complete block design with four replications. No less than three replications were harvested. Analysis of variance was applied to the results and the least significant difference (LSD) was computed at $\alpha = 0.20$ for all trials, except the Akron trial where $\alpha = 0.30$ and 0.005 were used. Analysis of variance and regression were performed with CoStat Statistical Software a product of Cohort Software, Berkeley, California.

Acknowledgements

We are sincerely grateful to the National Sorghum Producers for providing funding through the Sorghum Checkoff Program to support these performance trials, and to Burl Scherler, the grower-cooperator for the Brandon trial for his assistance.

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Dryland Grain Sorghum Hybrid Performance Trial at Akron, 2010

COOPERATORS: USDA-ARS, Central Great Plains Research Station, Akron, Colorado, and Jerry Johnson, Extension Crop Specialist, Colorado State University.

PURPOSE: To identify high yielding hybrids under dryland conditions with 2900 sorghum heat units in a Silty Loam soil.

HARVEST PLOT SIZE: Two 30" rows, 30' long. **REPLICATIONS:** Four.
PLANTED: May 27, 2010.
HARVESTED: October 27, 2010.

PEST CONTROL: Roundup, Loomax.
CULTIVATION: None.
INSECTICIDES: None.

FIELD HISTORY: Last Crop: Millet.
FIELD PREPARATION: No-till.

SOIL: Rago Silty Loam. **FERTILIZER:** 40 lb N/a.

Summary: Growing Season Precipitation and Temperature \1
 Akron, Washington County.

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
June	2.34	666	7	0	35
July	1.87	729	16	1	66
August	1.70	728	14	0	97
September	0.17	521	4	0	127
October	0.67	258	0	0	154
Total	6.75	2902	41	0	154

\1 Growing season from May 27 (planting) to October 27 (harvest).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

COMMENTS: Some variability in the trial due to drought and high temperatures during flowering and grain fill stages (about 56 days in duration). During these stages, there were 18 days where the temperature was above 90 degrees and 49 days with no measurable rainfall. Yields were good, but test weights were low, particularly with later maturing hybrids.

Table 2.--Dryland Grain Sorghum Hybrid Performance Trial at Akron, 2010.

Brand	Hybrid	50% Flowering	Plant Height	Plant Lodging	Test Weight	Grain Yield
		DAP	in	score (0-10)	lb/bu	bu/a
SORGHUM PARTNERS	KS310	74	36	1	51	53
DEKALB	DKS29-28	70	32	1	52	52
DEKALB	DKS28-05	65	36	2	49	51
TRIUMPH	TR424	70	34	1	52	50
PIONEER	88P68	69	35	3	55	45
SORGHUM PARTNERS	251	65	30	3	53	44
ASGROW	Pulsar	73	34	2	50	43
DEKALB	DKS37-07	78	35	1	49	43
SORGHUM PARTNERS	SP3303	75	34	1	54	42
AERC	CGSH-8	66	36	4	48	38
TRIUMPH	TR420	68	33	3	54	37
SORGHUM PARTNERS	NK5418	81	33	1	48	36
SORGHUM PARTNERS	K35-Y5	76	33	1	49	34
Average		72	34	2	51	44
LSD 0.30						6.4
LSD 0.05						12.4

Planted: May 27; Harvested: October 27, 2010.

50% Flowering: minimum date on which a hybrid flowers on half of its population.

DAP: days after planting.

Yields are adjusted to 14.0% seed moisture content.

Table 3.--Summary: Dryland Grain Sorghum Hybrid Performance Trials at Akron, 2008-2010.

Brand	Hybrid	Grain Yield					Yield as % of Test Average				
		2008	2009	2010	2-Year Avg	3-Year Avg	2008	2009	2010	2-Year Avg	3-Year Avg
		-----bu/a-----					-----%-----				
AERC	CGSH-8	--	79	38	59	--	--	95	86	91	--
DEKALB	DKS37-07	--	68	43	56	--	--	81	99	90	--
DEKALB	DKS29-28	--	99	69	84	--	--	118	103	111	--
SORGHUM PARTNERS	KS310	--	88	53	71	--	--	104	122	113	--
SORGHUM PARTNERS	251	--	94	44	69	--	--	112	100	106	--
SORGHUM PARTNERS	NK5418	--	64	36	50	--	--	77	83	80	--
SORGHUM PARTNERS	K35-Y5	--	81	34	58	--	--	97	78	88	--
SORGHUM PARTNERS	SP3303	--	59	42	51	--	--	70	96	83	--
TRUIMPH	TR420	--	83	37	60	--	--	98	86	92	--
Average		--	84	44	64	--					

Grain Yields were adjusted to 14.0% seed moisture content.

Dryland Grain Sorghum Hybrid Performance Trial at Brandon, 2010

COOPERATORS: Burl Scherler, Sand Creek, Inc., Brandon, Colorado, and Kevin Larson, Superintendent, Plainsman Research Center, Walsh, Colorado.

PURPOSE: To identify high yielding hybrids under dryland conditions with 3000 sorghum heat units in Silty Loam soil.

PLOT: Four rows with 30" row spacing, 50' long. **SEEDING DENSITY:** 43,600 seed/a. **PLANTED:** June 4. **HARVESTED:** October 28.

EMERGENCE DATE: 12 days after planting. **SOIL TEMP:** 74 F.

PEST CONTROL: Preemergence Herbicides: Glyphosate 32 oz/a, Atrazine 0.9 lb/a, Dual 21 oz/a. Post Emergence Herbicides: 2,4-D amine (with drops). **CULTIVATION:** None. **INSECTICIDES:** None.

Summary: Growing Season Precipitation and Temperature \1 Chivington, Kiowa County.

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
June	0.81	643	16	4	26
July	5.60	828	22	4	57
August	1.90	785	23	0	88
September	0.61	589	12	0	118
October	0.06	181	0	0	132
Total	8.98	3026	73	4	132

\1 Growing season from June 4 (planting) to October 14 (first freeze, 29 F).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

FIELD HISTORY: Last Crop: Sunflower. **FIELD PREPARATION:** No-till.

COMMENTS: Planted in fair soil moisture. Weed control was very good. Near normal precipitation for the growing season, however, July was wet and June and September were dry. No greenbug infestation. Five hybrids had greater than 40% lodging. Yields and test weights were good.

SOIL: Silty Loam for 0-8" and Silty Loam 8"-24" depths from soil analysis.

Summary: Soil Analysis of Plant Available Nutrients.

Depth	pH	Salts	OM	N	P	K	Zn	Fe
		mmhos/cm	%	-----ppm-----				
0-8"	7.7	0.8	1.9	10	4.0	355	0.8	2.9
8"-24"				11				
Comment	Alka	VLo	Hi	Hi	Lo	VHi	Lo	Lo

Manganese and Copper levels were adequate.

Summary: Fertilization.

Fertilizer	N	P ₂ O ₅	Zn	Fe
	-----lb/a-----			
Recommended	0	20	2	0
Applied	90	20	0	0

Yield Goal: 50 bu/a.

Actual Yield: 66 bu/a.

Available Soil Water

Dryland Grain Sorghum, Brandon, 2010

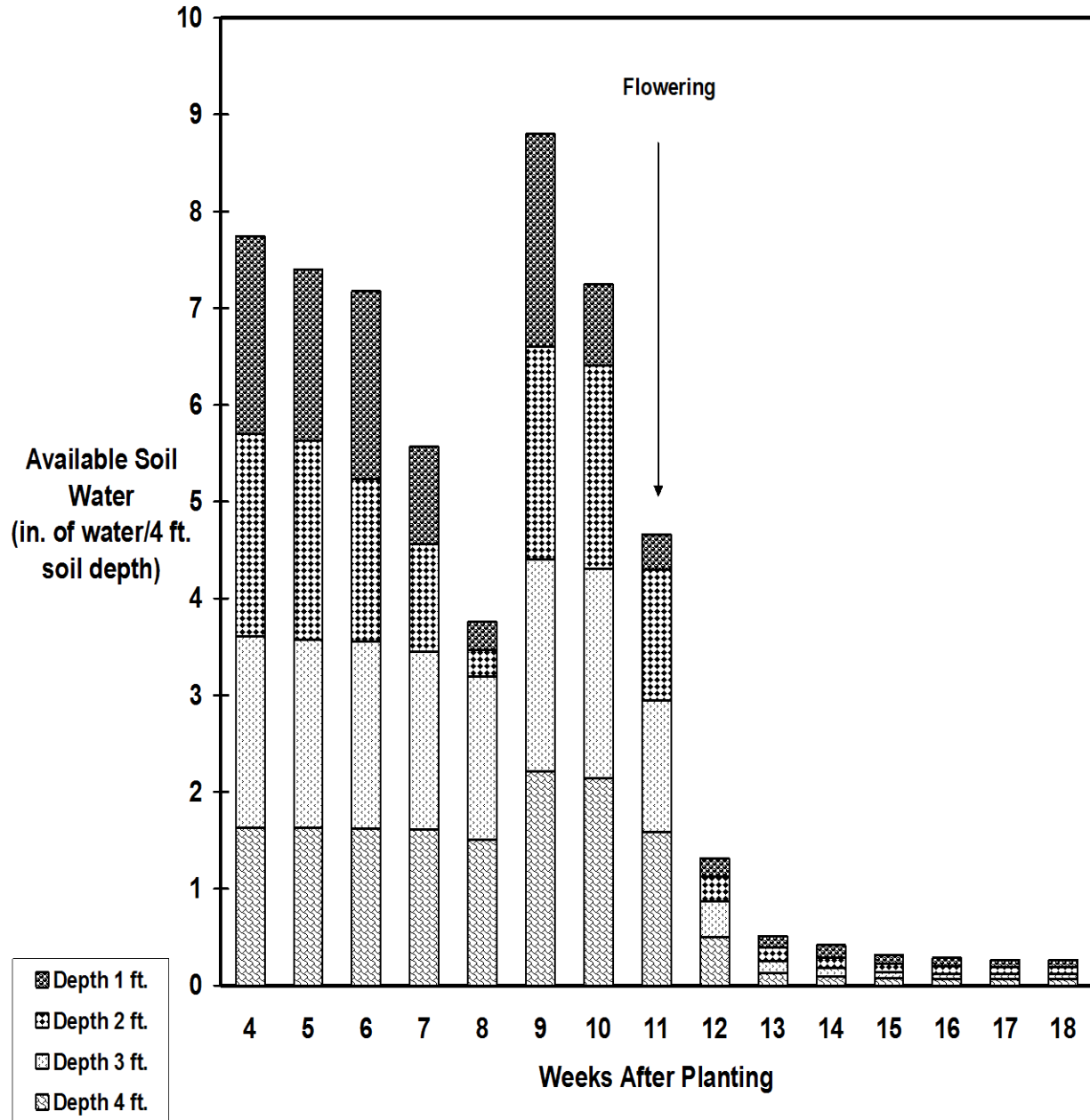


Fig. 1. Available soil water in dryland grain sorghum at Brandon. Gypsum block measurements taken to 4 ft. with 1 ft. increments. Total rainfall at Brandon from planting to first freeze was 8.98 in. Any increase in available soil water between weeks is from rain.

Table 4.--Dryland Grain Sorghum Hybrid Performance Trial at Brandon, 2010. \1

Brand	Hybrid	Days to Emerge	<u>50% Bloom</u>		<u>50% Mature</u>		Plant Ht.	Harvest Density	Plants Lodged	Test Wt.	Grain Yield	Yield % of Test Average
			DAP	GDD	DAP	Group						
MYCOGEN	1G557	13	67	1746	111	E	40	24.7	30	57	78	116
TRIUMPH	TR424	10	64	1659	108	E	39	24.1	44	58	76	114
DEKALB	DKS28-05	12	63	1632	107	E	48	25.1	44	55	70	105
DEKALB	DKS29-28	13	66	1720	110	E	39	28.9	38	58	69	103
SORGHUM PARTNERS	SP3303	13	66	1720	109	E	40	23.7	50	58	60	89
SORGHUM PARTNERS	251	10	59	1527	102	E	38	26.1	6	60	55	81
SORGHUM PARTNERS	KS310	13	70	1827	112	ME	45	29.3	31	55	79	118
SORGHUM PARTNERS	K35-Y5	13	71	1851	115	ME	42	22.3	43	55	72	108
ASGROW	Pulsar	11	69	1804	113	ME	46	20.2	25	55	70	104
TRIUMPH	TR452	10	73	1893	116	M	47	31.7	28	57	66	98
DEKALB	DKS37-07	13	72	1870	117	M	46	29.6	34	57	61	91
SORGHUM PARTNERS	NK5418	13	73	1893	116	M	42	31.4	61	55	60	90
MYCOGEN	M3838	10	74	1915	120	M	42	18.1	33	58	48	71
Average		12	68	1774	112	ME	43	25.8	36	57	66	
LSD 0.20									23.4		15.2	

\1 Planted: June 4; Harvested: October 28, 2010.

Yields are adjusted to 14.0% seed moisture content.

DAP: Days After Planting or maturation of seed at first freeze.

Seed Maturation: EM, early milk; MM, mid milk; LM, late milk; ED, early dough; SD, soft dough; HD, hard dough; mature (DAP).

GDD: Growing Degree Days for sorghum.

Maturity Group: E, early; ME, medium early; M, medium; ML, medium late; L, late.

Table 5.--Summary: Dryland Grain Sorghum Hybrid Performance Trials at Brandon, 2008-2010.

Brand	Hybrid	Grain Yield					Yield as % of Test Average				
		2008	2009	2010	2-Year Avg	3-Year Avg	2008	2009	2010	2-Year Avg	3-Year Avg
		-----bu/a-----					-----%-----				
ASGROW	Pulsar	--	58	70	64	--	--	102	104	103	--
DEKALB	DKS37-07	--	66	61	64	--	--	117	91	104	--
DEKALB	DKS29-28	--	64	69	67	--	--	114	103	109	--
DEKALB	DKS28-05	--	61	80	71	--	--	115	89	102	--
MYCOGEN	1G557	--	67	78	73	--	--	118	116	117	--
MYCOGEN	M3838	--	49	48	49	--	--	87	71	79	--
SORGHUM PARTNERS	KS310	--	62	79	71	--	--	110	118	114	--
SORGHUM PARTNERS	251	--	60	55	58	--	--	106	81	94	--
SORGHUM PARTNERS	NK5418	--	55	60	58	--	--	97	90	94	--
SORGHUM PARTNERS	K35-Y5	--	53	72	63	--	--	94	108	101	--
SORGHUM PARTNERS	SP3303	--	47	60	54	--	--	84	89	87	--
TRUIMPH	TR452	--	54	66	60	--	--	96	98	97	--
Average		--	57	66	62	--					

Grain Yields were adjusted to 14.0% seed moisture content.

Dryland Grain Sorghum Hybrid Performance Trial at Walsh, 2010

COOPERATORS: Plainsman Agri-Search Foundation, and Kevin Larson, Superintendent, Plainsman Research Center, Walsh, Colorado.

PURPOSE: To identify high yielding hybrids under dryland conditions with 3700 sorghum heat units in a Silty Loam soil.

PLOT: Four rows with 30" row spacing, 50' long. **SEEDING DENSITY:** 43,600 seed/a. **PLANTED:** June 2. **HARVESTED:** November 1.

EMERGENCE DATE: 7 days after planting. **SOIL TEMP:** 72 F.

PEST CONTROL: Preemergence Herbicides: Glyphosate, 24 oz/a; 2,4-D, 0.5 lb/a, Banvel 3 oz/a, Sharpen 3.0 oz/a. Post Emergence Herbicides: Banvel 4.0 oz/a, Atrazine 1.0 lb/a, COC 32 oz/a. **CULTIVATION:** None. **INSECTICIDES:** None.

Summary: Growing Season Precipitation and Temperature \1
Walsh, Baca County.

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
June	2.00	741	15	4	28
July	3.65	856	21	4	59
August	4.09	811	19	2	90
September	1.79	646	14	0	120
October	0.23	321	0	0	147
Total	11.76	3696	69	10	147

\1 Growing season from June 2 (planting) to October 27 (first freeze, 27 F).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

FIELD HISTORY: Last Crop: Wheat. **FIELD PREPARATION:** No-till.

COMMENTS: Planted in good soil moisture. Weed control was very good. Above normal precipitation for the growing season with wet July and August. No greenbug infestation. No lodging. Late freeze date. Yields and test weights were excellent.

SOIL: Silty Loam for 0-8" and Silty Loam 8"-24" depths from soil analysis.

Summary: Soil Analysis of Plant Available Nutrients.								
Depth	pH	Salts	OM	N	P	K	Zn	Fe
		mmhos/cm	%	-----ppm-----				
0-8"	7.8	0.7	1.9	10	5.3	389	0.8	3.3
8"-24"				9				
Comment	Alka	Vlo	Hi	Mod	Lo	VHi	Lo	Marg
Manganese and Copper levels were adequate.								

Summary: Fertilization.				
Fertilizer	N	P ₂ O ₅	Zn	Fe
	-----lb/a-----			
Recommended	0	20	0	0
Applied	50	20	0	0
Yield Goal: 50 bu/a.				
Actual Yield: 89 bu/a.				

Available Soil Water

Dryland Grain Sorghum, Walsh, 2010

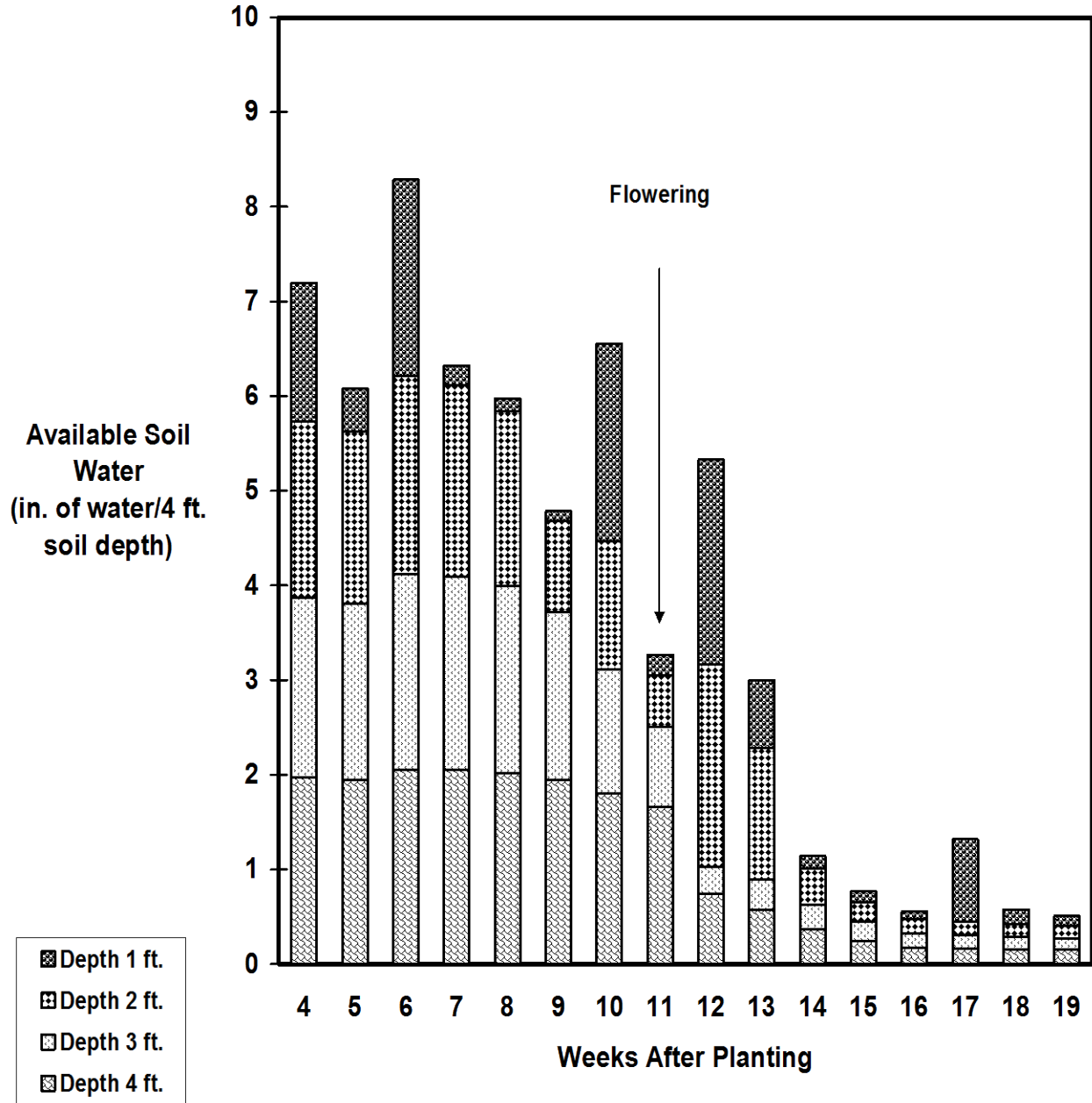


Fig. 2. Available soil water in dryland grain sorghum at Walsh. Gypsum block measurements taken to 4 ft. with 1 ft. increments. Total rainfall at Walsh from planting to first freeze was 11.76 in. Any increase in available soil water between weeks is from rain.

Table 6.--Dryland Grain Sorghum Hybrid Performance Trial at Walsh, 2010. \1

Brand	Hybrid	Days to Emerge	50% Bloom		50% Mature		Plant Ht.	Harvest Density	Test Wt.	Grain Yield	Yield % of Test Average	
			DAP	GDD	DAP	Group						
								in	plants/a (1000 X)	lb/bu	bu/a	%
DEKALB	DKS28-05	8	63	1719	109	E	41	27.9	59	87	97	
TRIUMPH	TR424	7	62	1687	107	E	39	30.6	61	83	93	
DEKALB	DKS29-28	8	62	1687	107	E	38	30.6	61	80	89	
SORGHUM PARTNERS	SP3303	9	64	1744	113	E	40	27.5	60	64	72	
SORGHUM PARTNERS	251	7	58	1565	102	E	36	27.9	60	57	63	
TRIUMPH	TR438	7	65	1768	111	ME	44	31.0	60	100	112	
MYCOGEN	627	9	71	1939	118	ME	44	28.7	60	97	109	
SORGHUM PARTNERS	K35-Y5	7	66	1794	112	ME	40	22.9	62	95	107	
DEKALB	DKS37-07	7	70	1909	118	ME	48	31.4	61	91	102	
ASGROW	Pulsar	8	65	1768	117	ME	42	22.9	60	88	98	
SORGHUM PARTNERS	KS310	6	66	1794	112	ME	42	29.4	61	79	89	
SORGHUM PARTNERS	NK5418	6	72	1969	118	M	43	29.8	61	112	126	
TRIUMPH	TR452	8	72	1969	119	M	46	24.4	61	108	121	
MYCOGEN	1G600	7	73	1996	123	M	45	29.4	59	95	106	
TRIUMPH	TR448	7	72	1969	122	M	43	29.4	61	93	104	
TRIUMPH	TRX84732	8	72	1969	120	M	47	19.4	61	89	100	
MYCOGEN	M3838	8	72	1969	122	M	43	24.8	60	88	99	
(Check)	399 X 2737	7	83	2255	131	ML	42	21.3	59	101	113	
Average		7	68	1859	116	ME	42	27.2	60	89		
LSD 0.20										6.5		

\1 Planted: June 2; Harvested: November 1, 2010.

Yields are adjusted to 14.0% seed moisture content.

DAP: Days After Planting or maturation of seed at first freeze.

Seed Maturation: EM, early milk; MM, mid milk; LM, late milk; ED, early dough; SD, soft dough; HD, hard dough; mature (DAP

GDD: Growing Degree Days for sorghum.

Maturity Group: E, early; ME, medium early; M, medium; ML, medium late; L, late.

Table 7.--Summary: Dryland Grain Sorghum Hybrid Performance Trials at Walsh, 2008-2010.

Brand	Hybrid	Grain Yield					Yield as % of Test Average				
		2008	2009	2010	2-Year Avg	3-Year Avg	2008	2009	2010	2-Year Avg	3-Year Avg
		-----bu/a-----					-----%-----				
ASGROW	Pulsar	75	56	88	72	73	112	104	98	101	105
DEKALB	DKS37-07	75	65	91	78	77	112	121	102	112	112
DEKALB	DKS36-16	73	67	--	70	--	110	125	--	118	--
DEKALB	DKS29-28	65	60	80	70	68	98	130	89	110	106
DEKALB	DKS28-05	--	61	80	71	--	--	115	89	102	--
DEKALB	DK39Y	63	51	--	57	--	95	96	--	96	--
SORGHUM PARTNERS	KS310	63	72	79	76	71	95	135	89	112	106
SORGHUM PARTNERS	251	49	45	57	51	50	74	83	63	73	73
SORGHUM PARTNERS	NK5418	77	65	112	89	85	116	122	126	124	121
SORGHUM PARTNERS	K35-Y5	--	55	95	75	--	--	103	107	105	--
SORGHUM PARTNERS	SP3303	--	46	64	55	--	--	86	72	79	--
TRUIMPH	TR438	--	62	100	81	--	--	116	112	114	--
TRUIMPH	TR448	--	64	93	79	--	--	119	104	112	--
TRUIMPH	TR452	--	62	108	85	--	--	116	121	119	--
TRUIMPH	TRX84732	--	63	89	76	--	--	117	100	109	--
(Check)	399 X 2737	58	38	101	70	66	87	72	113	93	91
Average		66	53	89	71	69					

Grain Yields were adjusted to 14.0% seed moisture content.

The site was pre-irrigated with furrow irrigation in 2008.