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Research Center

2014 Sorghum Hybrid Performance
Trials in Eastern Colorado

K. J. Larson, Superintendent and Research Scientist II, Plainsman Research Center

J. J. Johnson, Associate Professor and Extension Specialist, Dept. of Soil and Crop Sciences

M. E. Bartolo, Manager and Senior Research Scientist, Arkansas Valley Research Center

S. M. Sauer, Research Associate, Dept. of Soil and Crop Sciences

B. T. Pettinger, Research Associate, Plainsman Research Center

K. J. Tanabe, Research Associate III, Arkansas Valley Research Center

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2014 SORGHUM HYBRID PERFORMANCE TRIALS IN EASTERN COLORADO

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K.J. Larson, J.J. Johnson, M.E. Bartolo, S.M. Sauer, B.T. Pettinger, K.J. Tanabe \1

The 2014 Colorado grain sorghum crop was estimated at 7.50 million bushels, 30 percent larger than the 2013 sorghum crop of 5.76 million bushels. For Colorado, the 2014 grain sorghum crop of 7.50 million bushels was the second largest in the last 10 years. The increase in sorghum production this year was due to the highest harvested acres (250,000) for the last 10 years. The grain yield this year was estimated at 30.0 bu/acre, which was 6 bu/acre more than last year, but 1.8 bu/acre less than the 10 year average. As the production and yield levels indicate, conditions in Eastern Colorado for 2014 were more normal with most areas experiencing drought relief and improvements in precipitation. Sorghum silage statistics are not published during the current year; however, Colorado sorghum silage statistics are available for last year. In 2013, 390,000 tons of sorghum silage was produced. The average yield was 13 tons/acre from 30,000 harvested acres. (USDA and National Agricultural Statistics Service, Colorado Field Office, 2014).

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 (AES), and Colorado State University Extension. The grain sorghum trials were conducted at three sites in eastern Colorado: Akron, Brandon, and Walsh. Forage sorghum trials were conducted at Rocky Ford (irrigated) and at Walsh (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, phone (970) 491-1454, email Jerry.Johnson@colostate.edu; or Kevin Larson, phone (719) 324-5643, email Kevin.Larson@colostate.edu for further details. Names and addresses of firms submitting entries in 2014 are shown in Table 1. Each firm selected entries for testing and furnished seed for the trials. AES researchers selected closed-pedigree hybrids as standards of comparison.

Summary tables for weather data (CoAgMet and NOAA, 2014), soil analysis (Soil, Plant and Water Testing Laboratory, Colorado State University), fertilization, and available soil water graphs derived from gypsum block readings are provided for certain trial locations. Other information, where available, was included: site description, irrigation, pest control, field history, and pertinent comments.

\1 Superintendent and Research Scientist II, Plainsman Research Center, Walsh;
Associate Professor and Extension Specialist, Dept. of Soil and Crop Sciences;
Manager and Senior Research Scientist, Arkansas Valley Research Center, Rocky Ford;
Research Associate, Dept. of Soil and Crop Sciences;
Research Associate, Plainsman Research Center, Walsh;
Research Associate, Arkansas Valley Research Center

Table 1.--Entrants in the 2014 Colorado Sorghum Performance Trials.

Brand	Entered by
ALTA	Advanta US, 2001 E. 1 st St., P.O. Box 2420, Hereford, TX 79045
DEKALB	Monsanto Company, 800 N. Lindbergh Blvd., St. Louis, MO 63167
DYNA-GRO SEED	Agrium, 3005 Rocky Mountain Ave. Loveland, CO 80538
GAYLAND WARD SEED	Gayland Ward Seed Co. Inc., 4395 US Hwy 60, Hereford, TX 79045
MYCOGEN SEEDS	Mycogen Seeds, 9330 Zionsville Rd., Indianapolis, IN 46268
RICHARDSON SEEDS	Richardson Seeds, Ltd., P.O. Box 60, 3095 CR 26, Vega, TX 79092
SORGHUM PARTNERS	Sorghum Partners, LLC, P.O. Box 189, 403 South Monroe, New Deal, TX 79350

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 adjusted 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 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 (Brix), 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 or biweekly. 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 type.

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 $\alpha = 0.05$ and 0.20 for all trials. 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 Colorado Sorghum Producers to support these performance trials. We are also appreciative to the staffs at the Central Great Plains Research Station at Akron, Arkansas Valley Research Center at Rocky Ford, and Plainsman Research Center at Walsh for their assistance in conducting these trials. We would like to extend a special thank you to Burl Scherler, grower-cooperator, for his assistance with the Brandon trial.

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Dryland Grain Sorghum Performance Trial at Akron, 2014

COOPERATOR: USDA-ARS Central Great Plains Research Station.

PURPOSE: To identify high yielding hybrids under dryland conditions with 2800 sorghum heat units in a silt loam soil.

PLOT: Four rows with 30 in. row spacing, 35 ft. long. **SEEDING DENSITY:** 43,600 seed/ac. **PLANTED:** May 19. **HARVESTED:** November 21.

PEST CONTROL: Preemergence Herbicides: Lumax and Glyphosate. Cultivation: None. Insecticides: None.

SOIL: Rago silt loam.
FERTILIZER: Nitrogen 60 lb/ac.

FIELD HISTORY: Last Crop: Wheat.

FIELD PREPARATION: No-till.

Summary: Growing Season Precipitation and Temperature \1 Akron, Washington County.					
Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
May	2.19	201	0	0	12
June	3.29	492	3	0	42
July	2.42	714	15	1	73
August	4.77	664	6	0	104
September	3.44	469	2	0	134
October	0.23	280	0	0	161
Total	16.34	2820	26	1	161

\1 Growing season from May 19 (planting) to October 27 (first freeze, 28F).
\2 GDD: Growing Degree Days for sorghum.
\3 DAP: Days After Planting.

COMMENTS: Planted into good soil moisture and received 1.5 inches of rain the week following planting. Trial had consistent stands and very good emergence. Weed control was good throughout the season. Temperatures were mild and the trial received well above-average precipitation during the growing season. Rain events were well-timed, which resulted in high yields.

Table 2. 2014 Dryland Grain Sorghum Hybrid Performance Trial at Akron

Brand	Hybrid	Grain	Yield	Test	Moisture	Plant	Lodging	Maturity	Grain Color
		Yield ^a		Weight		Height		Class ^b	
		bu/ac	% of average	lb/bu	percent	inches	score (0-9) ^c		
Dyna-Gro Seed	722B	103.8	132	57.9	12.2	34	1	E	Bronze
Mycogen	1G557	93.3	118	57.9	11.8	31	0	E	Bronze
Dyna-Gro Seed	M71GB01	91.0	115	59.4	12.2	37	1	E	Bronze/Red
Richardson Seeds	11043	89.8	114	59.3	12.6	36	1	ME	Red
Dekalb	DK28E	87.9	112	59.6	12.2	34	1	E	Bronze
Dyna-Gro Seed	GX13501	87.2	111	58.6	13.4	39	1	ME	Bronze/Red
Sorghum Partners	K35-Y5	87.2	111	58.8	12.1	38	0	ME	Cream
Dekalb	DKS29-28	77.8	99	58.6	12.0	34	0	E	Bronze
Mycogen	1G588	76.7	97	58.5	12.9	39	1	E	Bronze
Richardson Seeds	99773	76.2	97	59.9	12.3	37	1	E	Red
Richardson Seeds	91743	71.6	91	59.7	14.9	38	0	E	Red
Sorghum Partners	SP3425	66.7	85	59.3	12.5	33	1	ME	Bronze
Dyna-Gro Seed	M72GW14	62.5	79	57.4	13.2	42	0	E	White
Sorghum Partners	251	56.9	72	60.0	12.2	31	0	E	Red
Sorghum Partners	KS310	53.1	67	59.0	12.3	35	1	ME	Bronze
Average		78.8		58.9	12.6	36	0		

^dLSD (P<0.30) 14.4

^aYields corrected to 14% moisture.

^bMaturity class: E=early; ME=medium-early.

^cLodging scores: a score of 0 equals no lodging and 9 equals severe lodging.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% (at P<0.30) chance the difference is statistically significant.

Dryland Grain Sorghum Hybrid Performance Trial at Brandon, 2014

COOPERATOR: Burl Scherler, Sand Creek, Inc., Brandon, Colorado.

PURPOSE: To identify high yielding hybrids under dryland conditions with 2730 sorghum heat units in loam soil.

PLOT: Four rows with 30 in. row spacing, 50 ft. long. SEEDING DENSITY: 43,600 seed/a. PLANTED: June 2. HARVESTED: November 14.

PEST CONTROL: Preemergence
Herbicides: Post Emergence
Herbicides: Huskie 16 oz/a, Atrazine 0.75 lb/a. Cultivation: None.
Insecticides: None.

FIELD HISTORY: Previous Crop: Sorghum. FIELD PREPARATION: No-till.

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	1.88	640	14	2	28
July	2.45	784	18	10	59
August	2.48	751	19	0	90
September	1.13	524	7	1	120
October	0.00	29	0	0	123
Total	7.94	2728	58	13	123

\1 Growing season from June 2 (planting) to October 3 (first freeze, 30 F).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

COMMENTS: Planted in marginal soil moisture, but it rained shortly after planting. Weed control was poor with volunteer sorghum and kochia predominating (the crop emerged rapidly, which prevented preemergence herbicide application) . Precipitation for the growing season was about one inch below the average of the past 28 years. June was dry, but the rest of the monthly precipitation totals for the growing season were near their long term averages. No greenbug infestation. Yields and test weights were fair, especially considering the lack of early season precipitation and heavy weed pressure.

SOIL: Loam for 0-8" and 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	0.4	1.5	8	5.0	462	0.5	2.2
8"-24"				8				
Comment	Alka	VLo	Mod	Mod	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	0	0
Applied	50	20	0	0

Yield Goal: 30 bu/a.

Actual Yield: 18 bu/a.

Available Soil Water Dryland Grain Sorghum, Brandon, 2014

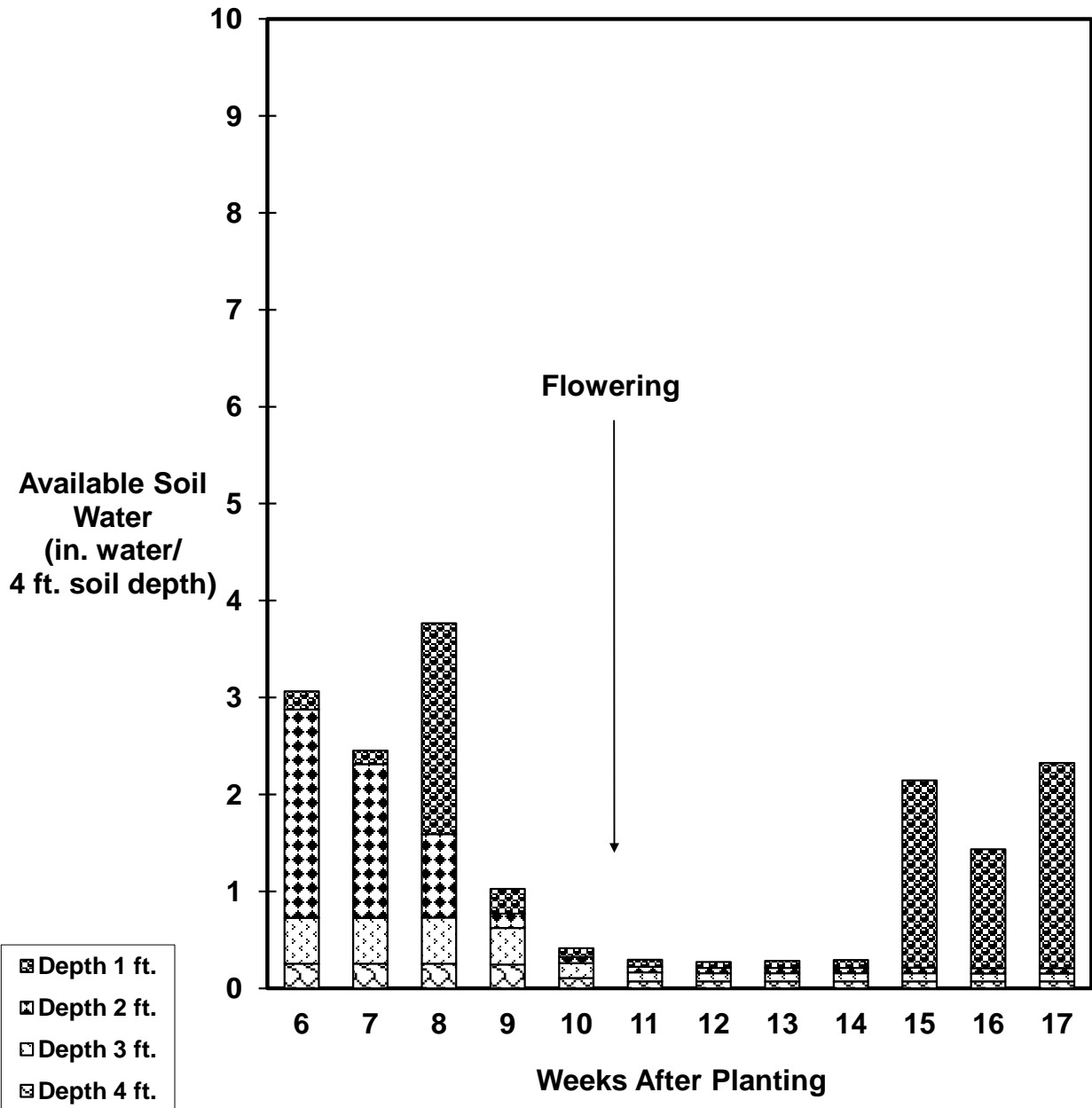


Fig. 1. Available soil water in dryland grain sorghum at Brandon. Gypsum block measurements taken to 4 ft. with 1 ft. increments. Total rainfall at Brandon from planting to first freeze was 7.94 in. Any increase in available soil water between weeks is from rain.

Table 3. 2014 Dryland Grain Sorghum Hybrid Performance Trial at Brandon

Brand	Hybrid	Grain	Yield	Test	Lodging	Harvest	Plant	Plant	50%	GDD ^b	50%	Maturity
		Yield ^a	Yield	Weight		Plant	Height	Bloom	Mature		Group ^c	
		bu/ac	% of average	lb/bu	percent	plants/ac	in	days after planting	days after planting			
Alta	AG1201	24.6	135	60	35	26,700	32	71	1701	115	E	
Dekalb	DKS28-05	22.4	123	59	49	27,700	33	71	1701	115	E	
Mycogen Seeds	1G557	17.0	93	58	48	24,800	32	67	1611	111	E	
Richardson Seeds	99773	13.3	73	57	34	29,200	31	60	1442	106	E	
Alta	AG1101	13.0	71	58	49	26,100	35	65	1562	110	E	
Dekalb	DKS29-28	12.9	71	60	69	26,900	30	69	1657	113	E	
Richardson Seeds	91743	7.5	41	59	70	25,800	30	71	1701	115	E	
Mycogen Seeds	1G588	24.2	133	60	31	27,100	43	74	1781	117	ME	
Richardson Seeds	11043	22.5	124	59	45	27,100	42	73	1756	117	ME	
Alta	AG1203	24.4	134	61	28	28,100	46	79	1917	123	M	
Average		18.2		59	46	27,000	35	70	1683	111	ME	

^eLSD (P<0.20)

7.87

20.4

^aYields adjusted to 14% moisture and hybrids ranked by yield within maturity group.

^bGDD: Growing degree-days to 50% bloom date.

^cMaturity Group: E=early; ME=medium-early; M=medium.

^dDays after planting or maturation of seed at first freeze.

^eIf the difference between two varieties yields equals or exceeds the LSD value, there is a 80% (at P<0.20) chance the difference is statistically significant.

Table 4. Summary: Dryland Grain Sorghum Hybrid Performance Trials at Brandon, 2012-2014.

Brand	Hybrid	Maturity Group ^a	Grain Yield					Yield as % of Test Average				
			2012	2013	2014	2-Year Avg	3-Year Avg	2012	2013	2014	2-Year Avg	3-Year Avg
Alta	AG1101	E	--	17	13	15	--	--	119	71	88	--
Alta	AG1201	E	--	17	25	21	--	--	114	135	124	--
Dekalb	DKS29-28	E	45	24	13	19	27	133	166	71	109	124
Dekalb	DKS28-05	E	40	12	22	17	25	118	84	123	100	112
Mycogen Seeds	1G557	E	45	18	17	18	27	131	124	93	103	121
Average			34	15	18	17	22					

^aMaturity Group: E=early.

Grain Yields were adjusted to 14.0% seed moisture content.

Dryland Grain Sorghum Hybrid Performance Trial at Walsh, 2014

COOPERATOR: Plainsman Agri-Search Foundation, Walsh, Colorado.

PURPOSE: To identify high yielding hybrids under dryland conditions with 3300 sorghum heat units in a silt loam soil.

PLOT: Four rows with 30 in. row spacing, 50 ft. long. SEEDING DENSITY: 43,600 seed/a. PLANTED: May 30. HARVESTED: November 5.

PEST CONTROL: Preemergence Herbicides: Atrazine 1lb/a, Medal 21 oz/a, Glyphosate, 32 oz/a; 2,4-D, 0.5 lb/a, Banvel 4 oz/a. Post Emergence Herbicides: Huskie 12 oz/a, 2,4-D 3.0 oz/a, Atrazine 0.75 lb/a, AMS 1 lb/a. Cultivation: None. Insecticides: None.

FIELD HISTORY: Previous Crop: Wheat. FIELD PREPARATION: Strip-till.

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

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
May	0.49	48	1	0	2
June	2.05	690	16	1	32
July	2.14	832	19	11	63
August	1.98	832	23	2	94
September	2.10	555	6	1	124
October	1.27	347	0	0	155
Total	10.03	3304	65	15	155

\1 Growing season from May 30 (planting) to October 31 (first freeze, 29 F).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

COMMENTS: Planted in adequate soil moisture. Weed control was excellent. No greenbug infestation. The growing season precipitation was nearly average and generally well timed. Very long growing season with the first freeze date on October 31. Grain yields and test weights were very good.

SOIL: Richfield silt loam for 0-8" and silt 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"	7.9	0.6	1.5	20	7.0	395	0.7	2.7
8"-24"				17				
Comment	Alka	VLo	Mod	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	0	0
Applied	50	20	0	0

Yield Goal: 40 bu/a.

Actual Yield: 48 bu/a.

**Available Soil Water
Dryland Grain Sorghum, Walsh, 2014**

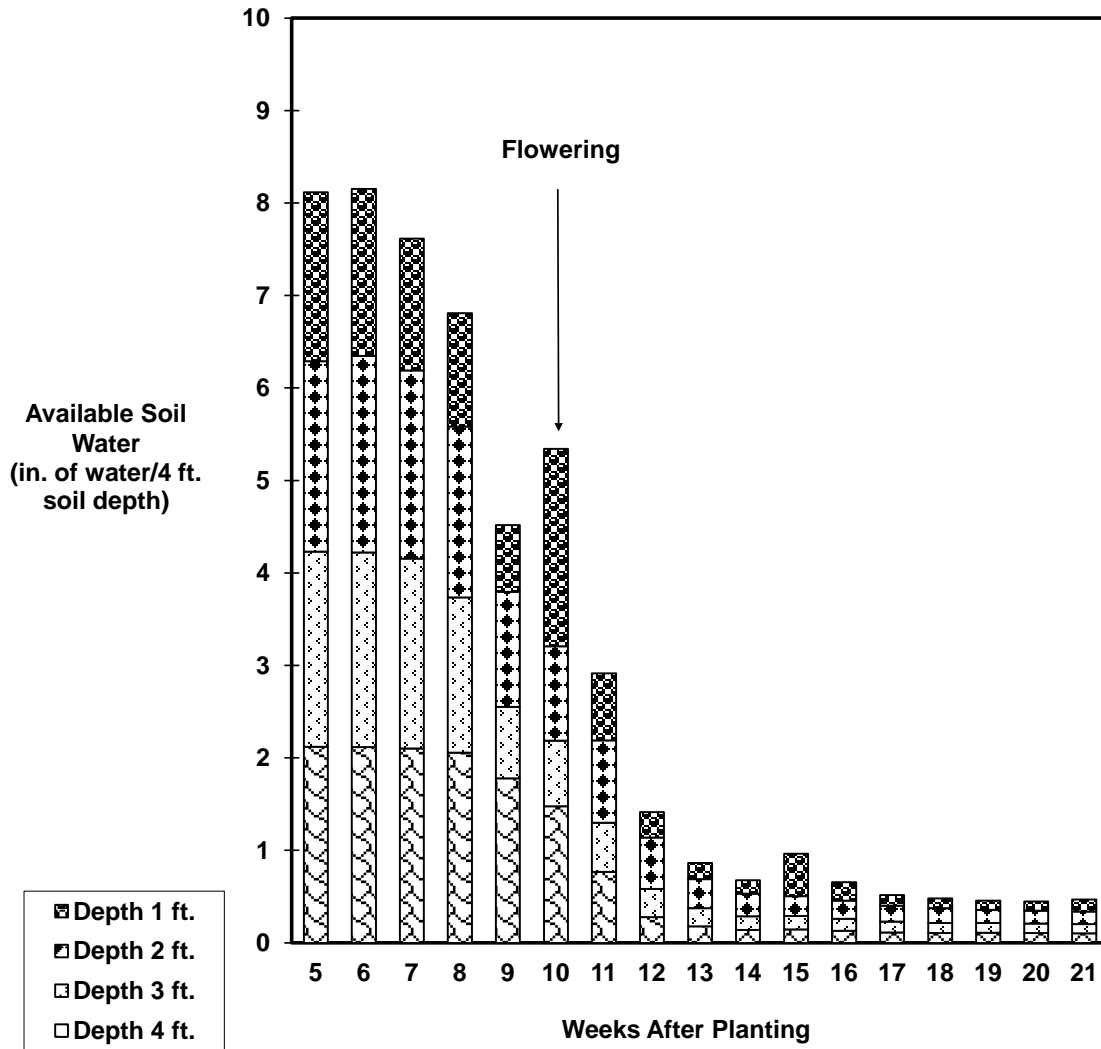


Fig. 2. Available soil water in dryland grain sorghum at Walsh. Gypsum block measurements taken to 4 ft. with 1 ft. increments. Total rainfall at Walsh from planting to first freeze was 10.03 in. Any increase in available soil water between weeks is from rain.

Table 5. 2014 Dryland Grain Sorghum Hybrid Performance Trial at Walsh.

Source	Hybrid	Grain	Yield	Test	Harvest	Plant	Plant	50%	GDD ^b	50%	Maturity
		Yield ^a		Weight	Plant						
		bu/ac	% of average	lb/bu	plants/ac	in	days after planting	days after planting ^d			
Richardson Seeds	11043	55.0	114	61	29,000	42	69	1724	112	E	
Alta	AG1201	54.8	114	61	25,600	36	68	1696	112	E	
Richardson Seeds	91743	48.7	101	61	27,300	46	67	1668	109	E	
Sorghum Partners	SP3425	46.0	95	62	31,600	36	69	1724	114	E	
Alta	AG1101	43.7	91	60	27,500	36	65	1615	108	E	
Dyna-Gro Seed	M71GB01	36.1	75	59	31,800	39	62	1539	103	E	
Richardson Seeds	99773	33.8	70	60	30,000	37	61	1522	101	E	
Sorghum Partners	251	28.0	58	60	26,300	34	64	1589	104	E	
Dekalb	DKS38-88	68.3	142	63	30,600	45	75	1883	121	ME	
Dyna-Gro Seed	GX13501	55.7	116	61	23,400	44	71	1779	115	ME	
Dyna-Gro Seed	722B	50.5	105	60	26,500	33	73	1825	118	ME	
Sorghum Partners	SP3303	45.8	95	63	25,900	40	72	1802	118	ME	
Sorghum Partners	KS310	39.4	82	63	27,500	38	72	1802	117	ME	
Dekalb	DKS44-20	63.6	132	62	28,900	41	80	2032	125	M	
Alta	AG1203	53.5	111	62	28,900	42	79	2001	122	M	
Dyna-Gro Seed	GX13231	52.6	109	62	25,600	39	79	2001	123	M	
Dyna-Gro Seed	766B	51.3	106	53	25,200	41	78	1968	122	M	
Dyna-Gro Seed	M72GW14	40.7	84	60	25,200	43	81	2063	128	M	

(continued on the next page)

Table 5. 2014 Dryland Grain Sorghum Hybrid Performance Trial at Walsh. (Continued)

Source	Hybrid	Grain	Yield	Test	Harvest	Plant	Plant	50%	GDD ^b	50%	Maturity
		Yield ^a		Weight	Plant						
		bu/ac	% of average	lb/bu	plants/ac	in	days after planting	days after planting ^d			
Average		48.2		61	27,600	40	71	1791	115	ME	

^eLSD (P<0.20)

9.48

^aYields adjusted to 14% moisture and hybrids ranked by yield within maturity group.

^bGDD: Growing degree-days to 50% bloom date or plant development.

^cMaturity Group: E=early; ME=medium-early; M=medium.

^dDays after planting or maturation of seed at first freeze.

^eIf the difference between two varieties yields equals or exceeds the LSD value, there is a 80% (at P<0.20) chance the difference is statistically significant.

Table 6. Summary: Dryland Grain Sorghum Hybrid Performance Trials at Walsh, 2012-2014.

Brand	Hybrid	Maturity Group ^a	Grain Yield					Yield as % of Test Average				
			2012	2013	2014	2-Year Avg	3-Year Avg	2012	2013	2014	2-Year Avg	3-Year Avg
Alta	AG1101	E	--	3	44	24	--	--	71	91	87	--
Alta	AG1201	E	--	5	55	30	--	--	100	114	111	--
Dekalb	DKS44-20	ME	36	4	64	34	35	143	88	132	126	133
Dekalb	DKS38-88	ME	--	4	68	36	--	--	77	142	133	--
Sorghum Partners	KS310	ME	24	4	39	22	22	98	88	82	80	86
Sorghum Partners	251	E	18	6	28	17	17	74	119	58	63	67
Sorghum Partners	SP3303	E	--	5	46	26	--	--	94	95	94	--
Average			25	5	48	27	26					

^aMaturity Group: E=early; ME=medium early.

Grain Yields were adjusted to 14.0% seed moisture content.

Dryland Forage Sorghum Performance Trial at Walsh, 2014

COOPERATOR: Plainsman Agri-Search Foundation, Walsh, Colorado.

PURPOSE: To identify high yielding hybrids under dryland conditions with 3100 sorghum heat units in a silt loam soil.

PLOT: Four rows with 30 in. row spacing, 50 ft. long. SEEDING DENSITY: 69,700 seed/a. PLANTED: May 30. HARVESTED: October 15.

PEST CONTROL: Preemergence Herbicides: Atrazine 1 lb/a, Glyphosate 32 oz/a, 2,4-D 0.5 lb/a, Dicamba 4 oz/a. Post Emergence Herbicides: Huskie 12 oz/a, 2,4-D 3.0 oz/a, Atrazine 0.75 lb/a, AMS 1 lb/a. Cultivation: None. Insecticides: None.

FIELD HISTORY: Previous Crop: Wheat. FIELD PREPARATION: Strip-till.

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

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
May	0.49	48	1	0	2
June	2.05	690	16	1	32
July	2.14	832	19	11	63
August	1.98	832	23	2	94
September	2.10	555	6	1	124
October	1.27	155	0	0	139
Total	10.03	3112	65	15	139

\1 Growing season from May 30 (planting) to October 15 (harvest).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

COMMENTS: Planted in adequate soil moisture. Weed control was excellent. No greenbug infestation. The growing season precipitation was nearly average and generally well timed. Very long growing season with the first freeze date on October 31. Forage yields were very good.

SOIL: Richfield silt loam for 0-8" and silt 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"	7.9	0.6	1.5	20	7.0	395	0.7	2.7
8"-24"				17				
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	0	0
Applied	50	20	0	0

Yield Goal: 8 tons/a.

Actual Yield: 13.2 tons/a.

**Available Soil Water
Dryland Grain Sorghum, Walsh, 2014**

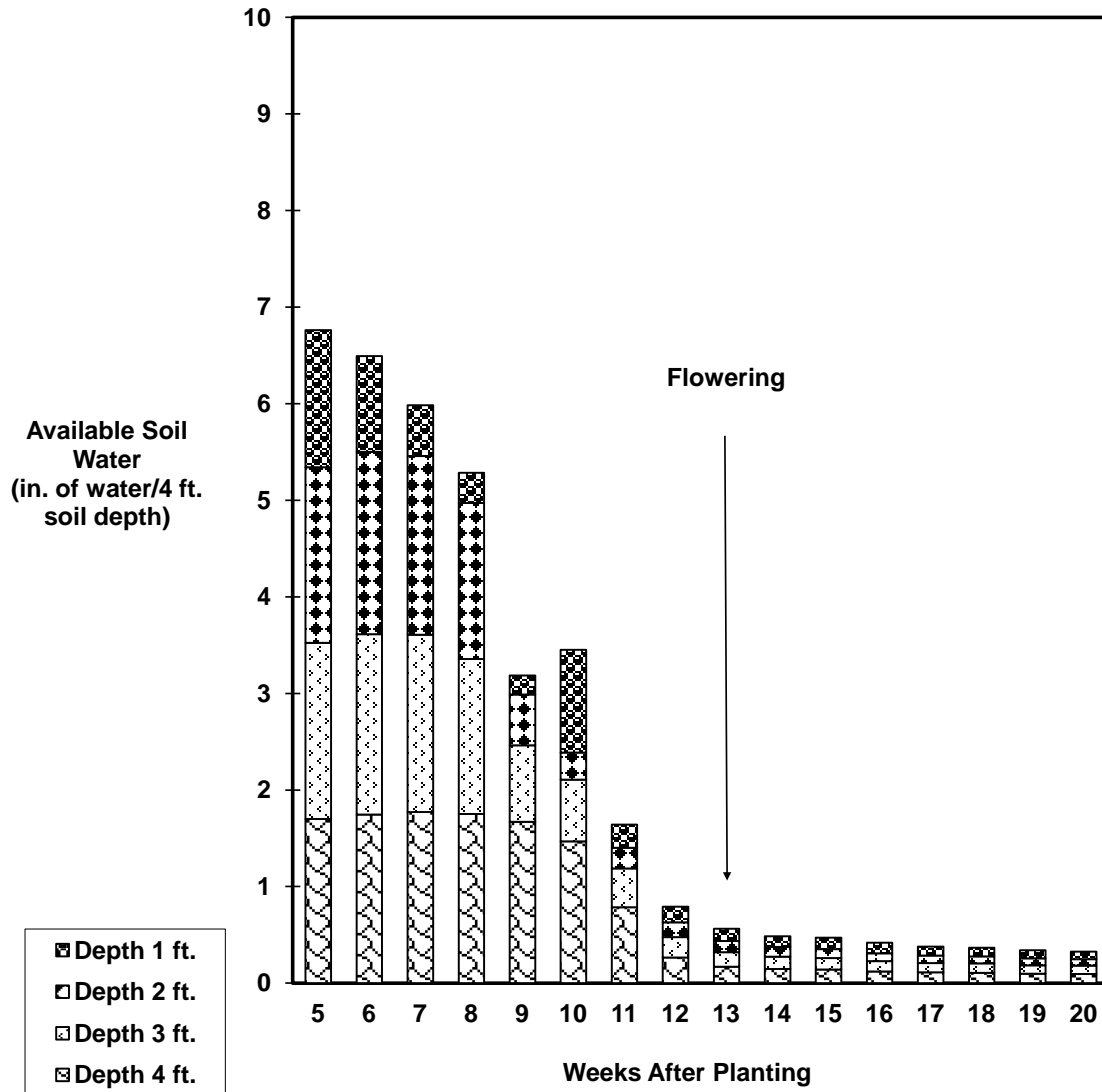


Fig. 3. Available soil water in dryland forage sorghum at Walsh. Gypsum block measurements taken to 4 ft. with 1 ft. increments. Total rainfall at Walsh from planting to harvest was 10.03 in. Any increase in available soil water between weeks is from rain.

Table 7. 2014 Dryland Forage Variety Performance Trial at Walsh.

Source	Variety	Forage Yield ^a	Brix (Stem Sugar)	Days to 50% Bloom	Harvest Density	Plant Height	Plant Lodging	Maturity Group ^b	Forage Type ^c
		tons/ac	percent		plants/ac	in	percent		
Sorghum Partners	SPX28313	18.1	6.5	113	41,600	70	25	M	FS
Gayland Ward Seed	GW 400 BMR	16.8	17.3	77	42,200	64	0	E	FS
Sorghum Partners	NK300	15.9	10.6	86	45,700	51	0	ME	FS
Sorghum Partners	SDH2942BMR	15.7	12.7	131	44,900	80	0	L	SS
Sorghum Partners	SPX902	15.6	15.5	Veg	39,700	66	0	PS	FS
Sorghum Partners	SPX904	15.5	11.6	Veg	42,000	65	0	PS	FS
Sorghum Partners	X942	15.3	11.4	Veg	40,100	69	0	PS	SS
Sorghum Partners	1990	14.7	13.2	Veg	36,000	63	0	PS	FS
Sorghum Partners	Sordan Headless	14.4	16.7	132	46,500	73	0	L	SS
Sorghum Partners	SD1741BMR	14.1	16.2	79	39,300	83	0	E	SS
Sorghum Partners	SPX901	13.8	15.1	Veg	42,400	73	0	PS	FS
Gayland Ward Seed	Super Sugar (sterile)	13.2	19.3	69	43,400	77	0	E	SS
Gayland Ward Seed	GW 300 BMR	12.8	11.9	78	37,800	70	0	E	SS
Sorghum Partners	Trudan Headless	12.8	13.3	Veg	41,400	65	0	PS	SS
Mycogen Seeds	2Y767	12.5	16.4	75	23,600	54	0	ME	Corn
Gayland Ward Seed	Sweet Forever BMR	12.3	10.3	85	40,300	71	0	ME	SS
Gayland Ward Seed	Super Sugar	12.1	18.7	90	35,600	77	0	ME	SS
Gayland Ward Seed	GW 600 BMR	11.9	12.9	78	38,100	65	0	E	FS
Sorghum Partners	SPX3903	11.5	17.2	112	41,400	66	0	M	FS
Sorghum Partners	SPX903	11.2	10.4	Veg	45,500	66	0	PS	FS
Sorghum Partners	SPX3952	11.0	13.7	79	45,700	61	0	E	SS
Sorghum Partners	SS405	10.9	8.9	96	39,700	86	30	M	FS

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Table 7. 2014 Dryland Forage Variety Performance Trial at Walsh. (Continued)

Source	Variety	Forage Yield ^a tons/ac	Brix (Stem Sugar) percent	Days to 50% Bloom	Harvest Density plants/ac	Plant Height in	Plant Lodging percent	Maturity Group ^b	Forage Type ^c
Gayland Ward Seed	Dwarf BMR 6	9.7	17.6	88	33,700	37	0	M	FS
Sorghum Partners	SPX3902	9.5	21.7	86	37,000	45	0	M	FS
Gayland Ward Seed	Sweet Six BMR	9.1	14.3	71	40,300	74	0	E	SS
Average		9.4	17.9	90	40,200	67	2	M	FS

^dLSD (P<0.20)

3.06

^aYields are adjusted to 70% moisture content based on oven-dried samples.

^bRelative Maturity: E=early; ME=medium early; M=medium; ML=medium late; L=late; PS=photoperiod sensitive.

^cForage Type: FS=forage sorghum; SS=sorghum sudangrass.

^dIf the difference between two varieties yields equals or exceeds the LSD value, there is a 80% (at P<0.20) chance that the difference is statistically significant.

Table 8. 2014 Dryland Forage Variety Performance Trial at Walsh.

Source	Variety	Forage Type ^a	Days to Boot	RFV	CP	TDN	ADF	NDF	Net Energy		
									Maint.	Gain	Lact.
									-----MCal/lb-----		
									-----percent-----		
Sorghum Partners	Trudan Headless	SS	Veg	118	9.6	68.7	29.7	52.0	0.72	0.45	0.71
Sorghum Partners	SDH2942BMR	SS	122	115	10.6	69.0	29.4	53.4	0.73	0.45	0.71
Gayland Ward Seed	Sweet Six BMR	SS	64	114	14.7	71.2	27.5	54.8	0.76	0.48	0.74
Gayland Ward Seed	Dwarf BMR 6	FS	83	111	15.4	71.1	27.6	56.4	0.76	0.48	0.74
Gayland Ward Seed	GW 400 BMR	FS	69	111	13.4	69.2	29.3	55.2	0.73	0.46	0.72
Sorghum Partners	X942	SS	Veg	111	11.0	67.3	30.9	54.5	0.70	0.43	0.70
Sorghum Partners	Sordan Headless	SS	123	110	11.2	69.5	29.0	55.9	0.74	0.46	0.72
Sorghum Partners	SPX3903	FS	112	108	17.1	70.5	28.1	58.0	0.75	0.47	0.73
Sorghum Partners	SPX3902	FS	79	107	14.6	68.4	29.9	57.1	0.72	0.45	0.71
Gayland Ward Seed	GW 600 BMR	FS	71	104	15.4	69.1	29.3	58.9	0.73	0.46	0.72
Sorghum Partners	SS405	FS	87	104	15.4	69.1	29.4	58.8	0.73	0.46	0.72
Sorghum Partners	SPX904	FS	Veg	104	10.5	68.6	29.8	58.9	0.72	0.45	0.71
Sorghum Partners	SPX902	FS	Veg	104	9.7	68.6	29.8	58.7	0.72	0.45	0.71
Sorghum Partners	SPX28313	FS	97	103	15.4	68.9	29.5	59.5	0.73	0.45	0.71
Sorghum Partners	1990	FS	Veg	103	11.4	68.3	30.0	59.2	0.72	0.45	0.71
Sorghum Partners	SPX3952	SS	72	101	15.8	68.3	30.0	60.4	0.72	0.45	0.71
Sorghum Partners	SD1741BMR	SS	70	101	14.8	67.9	30.4	60.3	0.71	0.44	0.70
Gayland Ward Seed	Sweet Forever BMR	SS	77	101	14.3	67.9	30.4	59.8	0.71	0.44	0.70
Gayland Ward Seed	Super Sugar (sterile)	SS	65	100	13.4	68.0	30.3	60.7	0.71	0.44	0.70
Sorghum Partners	SPX903	FS	Veg	100	9.8	66.6	31.5	60.0	0.69	0.42	0.69
Gayland Ward Seed	Super Sugar	SS	78	99	15.1	67.3	31.0	61.0	0.70	0.43	0.69
Sorghum Partners	SPX901	FS	Veg	99	9.4	66.6	31.5	60.4	0.69	0.42	0.69

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Table 8. 2014 Dryland Forage Variety Performance Trial at Walsh (Continued).

Source	Variety	Forage Type ^a	Days to Boot	Net Energy							
				RFV	CP	TDN	ADF	NDF	Maint.	Gain	Lact.
				-----percent-----					-----MCal/lb-----		
Mycogen Seeds	2Y767	Corn	71	97	15.9	66.8	31.3	61.5	0.70	0.43	0.70
Gayland Ward Seed	GW 300 BMR	SS	71	96	14.7	66.2	31.9	62.1	0.69	0.42	0.68
Sorghum Partners	NK300	FS	81	96	13.9	66.2	31.9	62.2	0.69	0.42	0.68
Average				105	13.3	68.4	30.0	58.4	0.72	0.45	0.69

^aForage Type: FS=forage sorghum; SS=sorghum sudangrass.

RFV=Relative Feed Value; CP=Crude Protein; TDN=Total Digestible Nutrients; ADF=Acid Detergent Fiber;

NDF=Neutral Detergent Fiber.

Net Energy: Maintenance, Gain, Lactation.

Irrigated Forage Sorghum Hybrid Performance Trial at Rocky Ford, 2014

COOPERATOR: Arkansas Valley Research Center.

PURPOSE: To identify high yielding hybrids under irrigated conditions with 2150 sorghum heat units in a silty clay loam soil.

PLOT: Four rows with 30 in. row spacing, 35 ft. long. SEEDING DENSITY: 113,250 seed/a. PLANTED: May 30; replanted: June 27. HARVESTED: September 9.

IRRIGATION: Two furrow irrigations.

PEST CONTROL: Preemergence Herbicides: None. Post Emergence Herbicides: None. Cultivation: Once. Insecticides: None.

SOIL: Rocky Ford silty clay loam. FERTILIZER: Manure at 20 tons/ac.

Summary: Growing Season Precipitation and Temperature \1 Rocky Ford, Otero County.

Month	Rainfall	GDD \2	>90 F	>100 F	DAP \3
	In		-----no. of days-----		
May	0.21	45	0	0	2
June	1.97	675	15	0	32
July	5.07	600	17	3	63
August	1.12	660	17	0	94
September	0.01	163	4	1	103
Total	8.38	2143	53	4	103

\1 Growing season from May 30 (planting) to September 9 (harvest).

\2 GDD: Growing Degree Days for sorghum.

\3 DAP: Days After Planting.

FIELD HISTORY: Previous Crop: Corn. FIELD PREPARATION: Disked and plowed.

COMMENTS: Planted in adequate soil moisture for seed germination and stand establishment. Weed control was good. The growing season precipitation was above average, July was very wet. The forage yields were excellent.

Table 9. 2014 Irrigated Forage Sorghum Variety Performance Trial at Rocky Ford

Brand	Hybrid	Forage Yield ^a	Stem Yield	Stem Sugar	Harvest Density	Plant Height	Days to Boot	Relative Maturity ^b	Forage Type ^c
		tons/ac	% of avg.	%	plants/ac (1000 x)	in	days after planting		
Gayland Ward Seed	Sweet Forever BMR	34.5	123	9.9	98.0	124	82	PS	SS
Gayland Ward Seed	Super Sugar	32.5	116	10.7	139.4	127	81	L	SS
Gayland Ward Seed	Sweet Six BMR	32.3	115	8.8	121.4	128	69	E	SS
Alta	AS6401	31.1	111	10.4	123.1	122	82	ML	SS
Alta	AF7201	30.7	109	10.8	94.2	112	73	ME	FS
Alta	AS6501	30.5	109	10.0	116.0	121	79	PS	SS
Gayland Ward Seed	GW 600 BMR	30.1	107	12.2	105.1	119	71	M	FS
Alta	AF7101	29.9	107	9.0	106.2	111	73	E	FS
Gayland Ward Seed	GW 400 BMR	29.8	106	12.1	91.5	117	69	ME	FS
Gayland Ward Seed	Super Sugar (sterile)	29.2	104	8.3	157.4	110	68	ME	SS
Gayland Ward Seed	GW 300 BMR	28.4	101	8.9	93.1	120	74	ME	SS
Alta	AF7202	27.0	96	6.7	109.4	87	72	M	FS
Alta	AF7102	24.4	87	7.3	93.1	84	71	M	FS
Alta	AS6402	23.0	82	10.1	105.6	99	82	L	SS
Alta	AF7401	20.1	72	9.6	112.7	75	86	L	FS
Gayland Ward Seed	Dwarf BMR 6	15.9	57	10.4	85.5	83	81	M	FS
Average		28.1		9.7	109.5	109	76		

^dLSD (P<0.20)

3.2

^aYields are adjusted to 70% moisture content based on oven-dried samples.

^bRelative Maturity: E=early; ME=medium-early; M=medium; ML=medium-late, L=late, PS=photoperiod sensitive.

^cForage Type: SS=sorghum sudangrass and FS=forage sorghum

^dIf the difference between two varieties yields equals or exceeds the LSD value, there is a 80% (at P<0.20) chance that the difference is statistically significant.

Table 10. 2014 Irrigated Forage Dry Matter Analysis at Rocky Ford

Brand	Hybrid	Forage Type ^a	Days to Boot	RFV	CP	TDN	ADF	NDF	Net Energy		
									Main.	Gain	Lact.
									-----MCal/lb-----		
									-----percent-----		
Alta	AF7102	FS	71	120	8.9	67.8	30.5	50.6	0.71	0.44	0.70
Alta	AF7201	FS	73	112	8.3	66.5	31.7	53.2	0.69	0.42	0.69
Alta	AF7202	FS	72	111	9.2	65.6	32.4	53.3	0.68	0.41	0.68
Gayland Ward Seed	GW 400 BMR	FS	69	102	9.6	63.2	34.5	56.8	0.64	0.38	0.65
Gayland Ward Seed	Super Sugar (sterile)	SS	68	101	9.0	61.3	36.2	56.1	0.61	0.35	0.63
Alta	AF7101	FS	73	97	8.6	62.1	35.5	58.9	0.63	0.36	0.64
Gayland Ward Seed	Dwarf BMR 6	FS	81	97	14.0	65.2	32.8	60.6	0.67	0.40	0.67
Gayland Ward Seed	GW 600 BMR	FS	71	97	10.1	62.6	35.0	59.1	0.63	0.37	0.64
Gayland Ward Seed	Sweet Six BMR	SS	69	96	8.0	60.9	36.5	58.8	0.61	0.35	0.62
Gayland Ward Seed	GW 300 BMR	SS	74	87	8.7	60.0	37.3	63.7	0.59	0.33	0.61
Alta	AF7401	FS	86	86	12.8	58.4	38.7	63.6	0.57	0.31	0.60
Alta	AS6401	SS	82	83	13.1	57.7	39.3	65.1	0.56	0.30	0.59
Alta	AS6402	SS	82	78	12.1	55.6	41.2	67.6	0.53	0.27	0.56
Gayland Ward Seed	Super Sugar	SS	81	78	9.1	55.1	41.6	67.0	0.52	0.27	0.56
Alta	AS6501	SS	79	77	11.9	54.5	42.1	68.2	0.51	0.26	0.55
Gayland Ward Seed	Sweet Forever BMR	SS	82	76	9.6	57.4	39.6	70.8	0.56	0.30	0.58
Average			76	94	10.2	60.9	36.6	60.8	0.61	0.35	0.62

^aForage Type: SS=sorghum sudangrass and FS=forage sorghum

RFV=Relative Feed Value, CP=Crude Protein, TDN=Total Digestible Nutrients, ADF=Acid Detergent Fiber, NDF=Neutral Detergent Fiber.

Net Energy: Main.=Maintenance, Gain, Lact.=Lactation.