Texas Panhandle Sorghum Hay Trial – 2008

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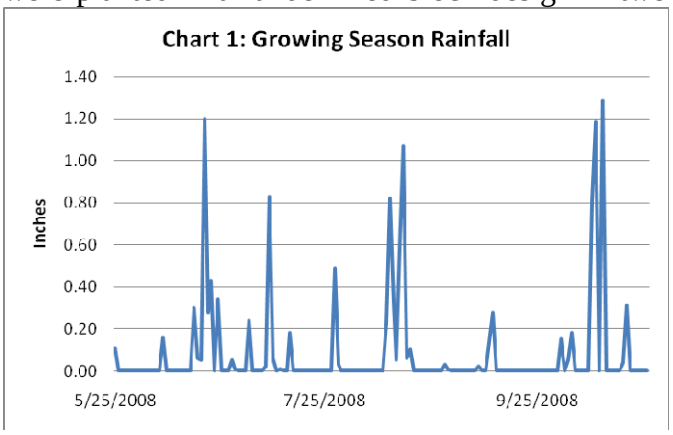
Introduction

This was the second year for conducting a forage sorghum hay trial. The trial consisted of 29 entries of sorghum/sudangrass, sudangrass, forage sorghum, and millet. Entries also included hybrids with the brown midrib (BMR) and photoperiod sensitive (PS) traits. The trial was irrigated once just prior to planting, and again immediately after the first cutting. A total of two cuttings were made, with the first cutting occurring 64 days after planting. We planned to make the second cutting when each hybrid was 50% headed, however, several of the hybrids never headed as a result of late season drought and a lack of heat units. Samples from each harvest were tested for nutrient and mineral composition.

Methods and Materials

The trial was made up of 29 hybrids provided by seed companies on a per fee basis. The hybrids were planted in a randomized block design in two 25-ft row plots, on 30-inch raised beds. In order to obtain a uniform stand, planting was achieved with John Deere Max-Emerge II 30-inch row spaced planter. Irrigation was applied by furrow and the three replications (blocks) were stacked with the first replication being closest to the gated pipe, followed by the second and third replications. Plots were irrigated prior to planting with 4.4 inches of water and again immediately after the first cutting with 3.5 inches. Rainfall totaled 12.6 inches during the growing season (May 27 – Oct. 20) (Chart 1). However, there was a dry period from August 18 to Oct 10 that stressed the sorghum preventing several hybrids from heading. All hybrids were harvested with a sickle mower on July 30th, 64 days after planting. A subsample was collected from each yield sample, air dried, and sent to Dairy One Laboratory, Ithaca, NY for analyses. A second subsample was weighed, oven dried, and weighed again to determine moisture percent at harvest. In order to maximize tonnage, the second cutting was made when each hybrid was approximately 50% headed. Harvest dates ranged from Sep 9th to Oct 20th. PS hybrids as well as those hybrids that did not head due to moisture stress and lack of heat units were harvested on Oct 20th. The second cutting was achieved by hand harvesting 10-ft of one row of each plot. A



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subsample of 4 whole plants were collected, chopped, weighed and dried to determine moisture percent at harvest. A second sample was collected for nutrient analysis as described earlier.

Other cultural practices and study information are listed below:

Trial Location:	Bush farm located one mile north of Bushland, TX
Cooperator:	Texas AgriLife Research
Previous Crop:	Fallow
Soil Type:	Pullman Clay Loam, pH = 7.4
Plot Size:	Two, 30 inch rows by 25 ft
Replications:	3
Study Design:	Randomized complete block
Planting Date:	May 27, 2008
Planting Rate:	120,000 seed/acre
Seed Method:	John Deere Max-Emerge Planter
Fertilizer:	Applied 85 lb/acre N and 45 lb/acre P_2O_5 based on soil test results.
Herbicide:	One lb/acre atrazine applied three days after planting
Irrigation:	Pre-irrigation – 4.4 inches. After first cutting on July 31st – 3.5 inches

Nutrient analyses:

Crude Protein:	6.25 * % total nitrogen
TDN:	Estimate of total digestible nutrients
NDF:	Neutral Detergent Fiber; cell wall fraction of the forage
ADF:	Acid Detergent Fiber; constituent of the cell wall includes cellulose and lignin; inversely related to energy availability
NEl:	Estimate of Net Energy for lactation
NEm:	Estimate of Net Energy for maintenance
NEg:	Estimate of Net Energy for gain
IVTD:	In Vitro True Digestibility; positively related to energy availability
NDFD:	Neutral Detergent Fiber Digestibility, digestible NDF, %: This is a measure of fiber digestibility that is determined from the IVTD analysis.
RFV:	Relative Feed Value is an index for comparing forages based on digestibility and intake potential. RFV is calculated from ADF and NDF. An RFV of 100 is considered the average score and represents alfalfa hay containing 41% ADF and 53% NDF on a dry matter digestibility.
RFQ:	Relative Forage Quality is an index for comparing forages. RFQ is calculated from CP, ADF, NDF, fat, ash and NDF digestibility measured at 48 hours. It should be more reflective of the feeding value of the forage. RFQ is based on the same scoring system as RFV with an average score of 100. The higher the RFQ, the better the quality.
Milk lbs/ton:	A projection of potential milk yield per ton of forage dry matter.

Results and Discussion

A summary of yield and nutrient composition for the first cutting are reported in Table 1. Entries were grouped by BMR and PS type. The first cutting was made on July 30th, 64 days after planting. At the time of harvest, average moisture content was 71.6%. Variability in yield at the first cutting was high (CV=27.9) making it difficult to detect significant differences. Average yield was 1.59 ton/acre. Yield ranged from 1.12 to 2.78 ton/acre. The two millets in the trial tended to have the highest crude protein averaging 23.3% compared to a test average of 16.8%. Digestibility as measured by % IVTD was similar with all sorghum types.

Harvest dates for the second cutting ranged from Sep 9th to Oct 20th (Table 2). The goal was to harvest the forage when each hybrid was 50% headed. However, due to a late season drought and relatively mild temperatures after the first cutting, which resulted in delay in sorghum maturity, many of the entries never reached the 50% headed stage. Difference between sorghum types was more pronounced in the second cutting. The nonBMR types had the highest average yield at 3.12 ton/acre. In contrast, the BMR types averaged 2.5 ton/acre. The nonBMR-PS hybrids averaged 2.32 ton/acre and the BMR-PS hybrids 2.01 ton/acre. The two millet entries averaged 2.0 ton/acre, and, like the first cutting, had the highest % crude protein and also the highest digestibility (% IVTD).

Total yield for both cuttings ranged from 2.7 to 5.4 ton/acre (Chart 2). Five hybrids that yielded over 5 ton/acre were Sweeter N Honey BMR, BMR Gold II, Grazex BMR x801, Sordan 79, and Trudan 8.

Table 1. Forage sorghum hay trial, 1st cutting 64 days after emergence.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	Plants/ Ac	% Moisture	DM Yield, Ton/Ac	% Crude Protein	% ADF	% NDF	% TDN
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	64,469	71.6 ab	1.56 ab	19.2 bc	33.6	56.5 a	48.3
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	74,342	70.7 ab	1.13 b	16.5 bcd	34.5	57.1 a	53.7
Sweeter 'N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	66,792	72.2 ab	1.62 ab	15.0 cd	34.2	57.7 a	57.0
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	68,534	73.5 ab	1.55 ab	14.5 cd	33.6	56.5 a	61.7
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	70,277	68.3 b	2.07 ab	14.8 cd	33.1	58.8 a	59.7
NonBMR AVG						**68,883**	**71.3**	**1.58**	**16.0**	**33.8**	**57.3**	**56.1**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	79,570	71.7 ab	1.25 b	16.3 bcd	33.5	55.8 a	55.0
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	77,827	70.4 ab	2.78 a	17.9 bcd	31.7	55.0 a	59.0
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	87,701	72.5 ab	1.34 b	15.6 bcd	35.1	56.8 a	55.0
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	82,764	67.6 b	1.53 ab	15.4 bcd	34.1	58.2 a	58.0
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	83,635	73.9 ab	1.37 b	15.0 cd	32.0	56.5 a	61.0
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	68,534	73.1 ab	2.12 ab	17.1 bcd	34.4	56.6 a	54.3
Sweeter 'N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	52,853	74.9 ab	1.08 b	17.0 bcd	33.2	57.8 a	56.3
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	88,282	69.7 b	1.77 ab	16.6 bcd	33.4	57.8 a	55.3
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	81,893	69.6 b	1.27 b	18.7 bcd	30.7	56.7 a	58.7
Grazex BMR x801	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	60,403	71.3 ab	1.77 ab	15.3 bcd	33.6	55.8 a	57.7
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	98,155	75.3 ab	1.12 b	16.6 bcd	32.3	56.1 a	59.3
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	77,827	70.5 ab	1.67 ab	15.2 cd	34.9	56.8 a	60.0
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	77,246	76.1 ab	1.03 b	17.4 bcd	32.0	56.0 a	57.0
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	69,696	67.9 b	2.03 ab	13.8 d	34.7	57.2 a	53.0
BMR AVG						**77,599**	**71.8**	**1.58**	**16.3**	**33.3**	**56.6**	**57.1**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		76,085	69.9 b	1.51 ab	15.6 bcd	32.3	58.5 a	54.3
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	94,090	68.7 b	1.58 ab	15.6 bcd	33.3	55.7 a	59.3
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	81,893	71.6 ab	1.77 ab	16.4 bcd	32.3	57.6 a	59.0
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	79,570	66.9 b	2.10 ab	17.5 bcd	31.0	56.2 a	60.0
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	65,050	71.1 ab	1.77 ab	17.0 bcd	32.9	59.0 a	57.3
NonBMR-PS AVG						**79,337**	**69.7**	**1.74**	**16.4**	**32.3**	**57.4**	**58.0**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	88,282	70.2 ab	1.38 b	18.5 bcd	31.4	57.9 a	58.0
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	70,858	72.2 ab	1.32 b	16.3 bcd	32.4	58.3 a	58.3
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	92,347	72.1 ab	1.67 ab	17.0 bcd	32.2	55.6 a	57.7
BMR-PS AVG						**83829**	**71.5**	**1.46**	**17.3**	**32.0**	**57.3**	**58.0**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	61,565	79.5 a	1.38 b	26.4 a	31.9	49.8 b	48.0
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	80,731	73.7 ab	1.69 ab	20.2 b	32.1	56.8 a	49.7
BMR Millet AVG						**71148**	**76.6**	**1.54**	**23.3**	**32.0**	**53.3**	**48.9**
Test AVG						**76,596**	**71.6**	**1.59**	**16.8**	**33.0**	**56.7**	**56.6**
LSD (P=.05)						ns	5.0421	0.7259	2.645	ns	3.199	ns
CV						20.4	4.3	27.9	9.6	6.6	3.5	10.4
Treatment Prob(F)						0.1231	0.0031	0.0078	0.0001	0.616	0.0055	0.400

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 1. Forage sorghum hay trial, 1st cutting 64 days after emergence.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	% Lignin	% IVTD NIR	% NDFD	NEL Mcal/lb	NEM Mcal/lb	NEG Mcal/lb	% Ca	% P
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	1.27	76.0	57.3	0.46	0.37	0.13	0.41	0.25 ab
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	1.40	78.0	61.7	0.50	0.45	0.21	0.42	0.21 b
Sweeter 'N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	2.27	79.7	64.7	0.53	0.51	0.26	0.51	0.25 ab
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	2.37	81.0	65.3	0.58	0.58	0.32	0.42	0.28 ab
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	2.73	79.3	65.0	0.55	0.55	0.29	0.41	0.24 ab
NonBMR AVG						**2.0**	**78.8**	**62.8**	**0.52**	**0.49**	**0.24**	**0.43**	**0.24**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	2.27	82.3	68.7	0.52	0.48	0.23	0.45	0.26 ab
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	1.60	79.3	62.3	0.56	0.54	0.29	0.44	0.27 ab
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	1.63	78.7	62.7	0.52	0.49	0.24	0.37	0.22 ab
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	1.60	78.5	63.5	0.54	0.53	0.28	0.31	0.24 ab
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	2.37	81.0	66.0	0.57	0.57	0.31	0.43	0.27 ab
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	1.60	78.3	61.3	0.51	0.46	0.21	0.49	0.24 ab
Sweeter 'N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	1.87	79.7	65.7	0.52	0.49	0.24	0.42	0.22 b
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	1.13	79.0	63.0	0.51	0.49	0.23	0.31	0.22 ab
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	1.57	81.3	66.7	0.55	0.53	0.28	0.46	0.26 ab
Grazex BMR x801	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	1.30	77.7	60.3	0.55	0.52	0.27	0.29	0.25 ab
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	1.43	80.0	64.0	0.56	0.55	0.30	0.37	0.27 ab
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	1.47	81.3	66.7	0.57	0.56	0.30	0.33	0.28 ab
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	1.30	80.7	66.0	0.54	0.51	0.25	0.49	0.25 ab
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	1.80	75.3	56.7	0.50	0.45	0.20	0.31	0.24 ab
BMR AVG						**1.64**	**79.5**	**63.8**	**0.54**	**0.51**	**0.26**	**0.39**	**0.25**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		1.27	77.7	61.7	0.50	0.47	0.21	0.46	0.27 ab
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	2.00	79.3	62.3	0.56	0.55	0.29	0.42	0.26 ab
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	1.90	82.0	68.3	0.55	0.54	0.28	0.41	0.25 ab
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	2.13	80.0	64.7	0.56	0.55	0.30	0.45	0.28 ab
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	1.90	79.3	64.0	0.52	0.51	0.26	0.44	0.28 ab
NonBMR-PS AVG						**1.84**	**79.7**	**64.2**	**0.54**	**0.52**	**0.27**	**0.44**	**0.27**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	1.57	78.7	63.3	0.53	0.52	0.26	0.37	0.31 ab
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	1.97	79.0	64.0	0.54	0.53	0.28	0.46	0.28 ab
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	2.00	79.0	62.0	0.55	0.52	0.27	0.41	0.27 ab
BMR-PS AVG						**1.85**	**78.9**	**63.1**	**0.54**	**0.53**	**0.27**	**0.41**	**0.29**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	3.43	78.3	56.0	0.47	0.37	0.14	0.46	0.33 a
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	1.97	78.7	63.3	0.46	0.39	0.15	0.45	0.25 ab
BMR Millet AVG						**2.70**	**78.5**	**59.7**	**0.46**	**0.38**	**0.15**	**0.45**	**0.29**
Test AVG						**1.83**	**79.3**	**63.4**	**0.53**	**0.50**	**0.25**	**0.41**	**0.26**
LSD (P=.05)						ns	ns	ns	ns	ns	ns	ns	0.06
CV						45.2	4.5	10.5	10.7	18.3	33.6	22.0	13.6
Treatment Prob(F)						0.3731	0.922	0.902	0.5215	0.3928	0.4546	0.241	0.0432

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 1. Forage sorghum hay trial, 1st cutting 64 days after emergence.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	% Mg	% K	% S	% Cl	Relative Feed Value	Relative Feed Quality	Milk lbs/Ton
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	0.34 abc	2.57 bcd	0.21	0.25 b	104 b	91	1,190
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	0.31 abc	2.40 cd	0.20	0.42 b	101 b	93	1,596
Sweeter 'N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	0.37 abc	2.45 bcd	0.21	0.55 b	101 b	99	1,844
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	0.31 abc	2.39 cd	0.20	0.49 b	103 b	120	2,229
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	0.32 abc	2.18 d	0.18	0.35 b	100 b	111	2,035
NonBMR AVG						**0.33**	**2.40**	**0.20**	**0.41**	**102**	**103**	**1,779**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	0.33 abc	2.77 bcd	0.19	0.52 b	105 b	103	1,731
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	0.37 abc	2.80 bcd	0.23	0.60 b	109 b	121	1,980
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.34 abc	2.49 bcd	0.19	0.43 b	101 b	88	1,665
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.34 abc	2.51 bcd	0.20	0.44 b	100 b	100	1,886
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.37 abc	2.68 bcd	0.23	0.57 b	106 b	116	2,146
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	0.33 abc	2.74 bcd	0.20	0.77 b	103 b	94	1,598
Sweeter 'N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	0.37 abc	2.51 bcd	0.19	0.46 b	101 b	107	1,728
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	0.29 bc	2.30 cd	0.21	0.36 b	101 b	95	1,674
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	0.30 abc	2.68 bcd	0.22	0.53 b	107 b	124	1,992
Grazex BMR x801	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	0.33 abc	2.58 bcd	0.22	0.57 b	105 b	106	1,924
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	0.33 abc	2.76 bcd	0.26	0.62 b	106 b	117	2,034
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	0.34 abc	2.69 bcd	0.22	0.52 b	101 b	103	1,997
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	0.38 abc	2.61 bcd	0.19	0.33 b	107 b	114	1,878
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	0.34 abc	2.25 cd	0.19	0.46 b	101 b	93	1,686
BMR AVG						**0.34**	**2.60**	**0.21**	**0.51**	**104**	**106**	**1,851**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		0.40 ab	2.55 bcd	0.18	0.52 b	101 b	97	1,629
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	0.36 abc	2.47 bcd	0.22	0.51 b	106 b	108	2,037
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	0.33 abc	2.49 bcd	0.21	0.49 b	103 b	121	2,053
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	0.36 abc	2.77 bcd	0.24	0.39 b	108 b	121	2,077
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	0.35 abc	2.58 bcd	0.22	0.48 b	100 b	109	1,843
NonBMR-PS AVG						**0.36**	**2.57**	**0.21**	**0.48**	**104**	**111**	**1928**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	0.27 c	2.89 bc	0.21	0.73 b	104 b	107	1,835
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	0.37 abc	2.65 bcd	0.21	0.57 b	102 b	108	1,942
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	0.36 abc	2.75 bcd	0.23	0.55 b	107 b	113	1,931
BMR-PS AVG						**0.34**	**2.76**	**0.22**	**0.61**	**104**	**110**	**1903**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	0.41 a	3.72 a	0.31	0.73 b	120 a	93	1,019
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	0.37 abc	3.14 b	0.22	1.21 a	105 b	99	1,246
BMR Millet AVG						**0.39**	**3.43**	**0.26**	**0.97**	**113**	**96**	**1132**
Test AVG						**0.34**	**2.63**	**0.21**	**0.53**	**104**	**106**	**1,808**
LSD (P=.05)						0.06	0.379959	ns	0.3269	8	ns	ns
CV						11.2	8.8	17.7	37.7	4.7	20.8	25.7
Treatment Prob(F)						0.0186	0.0001	0.16	0.0038	0.0121	0.8504	0.3595

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 2. Forage sorghum hay trial, 2nd cutting.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	Harv. Date	% Moisture	DM Yield, Ton/Ac	% Crude Protein	% ADF	% NDF	% TDN
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	29-Sep	71.3 bc	3.03 a-e	12.1 b-e	30.8 a-e	52.4 a-d	69.0 b-g
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	9-Sep	78.8 a	2.28 b-f	12.7 b-e	31.3 a-e	49.7 a-e	70.7 a-e
Sweeter N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	20-Oct	77.5 a	3.27 a-d	10.3 cde	33.5 abc	53.2 abc	66.3 fg
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	29-Sep	70.7 bc	3.78 a	9.6 de	31.7 a-e	50.0 a-e	68.0 c-g
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	29-Sep	68.0 cd	3.24 a-d	10.1 cde	29.2 def	47.4 def	69.3 b-g
NonBMR AVG							**73.3**	**3.12**	**11.0**	**31.3**	**50.5**	**68.7**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	10-Oct	69.8 bcd	2.17 c-f	12.2 b-e	29.9 c-f	50.6 a-e	71.3 a-d
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	20-Oct	78.6 **a**	2.14 c-f	11.8 b-e	32.3 a-e	52.3 a-d	68.3 b-g
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	10-Oct	72.4 b	2.12 c-f	12.6 b-e	29.9 c-f	49.7 a-e	71.7 abc
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	29-Sep	70.0 bcd	2.06 c-f	13.7 bc	31.0 a-e	50.3 a-e	72.5 ab
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	29-Sep	69.9 bcd	2.36 b-f	11.8 b-e	30.3 b-e	51.0 a-e	71.0 a-d
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	29-Sep	72.5 b	3.32 abc	12.1 b-e	28.7 def	46.5 ef	72.3 ab
Sweeter N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	20-Oct	77.4 a	1.90 def	12.1 b-e	31.4 a-e	51.2 a-e	69.0 b-g
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	10-Oct	71.2 bc	3.57 ab	9.9 cde	31.5 a-e	50.5 a-e	69.0 b-g
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	29-Sep	70.8 bc	2.80 a-f	12.6 b-e	28.4 ef	46.2 ef	71.0 a-d
Grazex BMR x8101	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	29-Sep	71.0 bc	3.57 ab	10.4 cde	28.9 def	47.6 c-f	71.0 a-d
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	20-Oct	76.9 a	1.94 c-f	12.7 b-e	29.2 def	46.5 ef	71.3 a-d
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	29-Sep	70.2 bcd	2.54 a-f	12.1 b-e	26.6 f	43.4 f	73.7 a
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	10-Oct	73.2 b	1.66 ef	11.2 cde	29.1 def	48.0 b-f	71.0 a-d
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	29-Sep	67.0 d	2.89 a-f	9.2 e	33.4 abc	53.0 a-d	65.7 g
BMR AVG							**72.2**	**2.50**	**11.7**	**30.0**	**49.1**	**70.6**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		20-Oct	77.6 a	1.78 ef	13.3 bcd	32.6 a-d	53.2 abc	68.3 b-g
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	20-Oct	78.7 a	2.05 c-f	12.4 b-e	32.4 a-d	53.5 ab	66.7 efg
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	20-Oct	78.7 a	2.84 a-f	10.5 cde	34.1 ab	55.0 a	65.3 g
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	20-Oct	78.3 a	2.01 c-f	11.7 b-e	33.3 abc	54.2 a	66.0 fg
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	20-Oct	78.0 a	2.96 a-f	10.4 cde	33.8 abc	53.8 a	66.0 fg
NonBMR-PS AVG							**78.3**	**2.32**	**11.7**	**33.2**	**53.9**	**66.5**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	10-Oct	72.9 b	1.95 c-f	13.4 bcd	31.8 a-e	51.0 a-e	70.0 a-f
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	20-Oct	78.7 a	1.64 f	13.2 bcd	31.4 a-e	51.5 a-e	68.3 b-g
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	20-Oct	78.6 a	2.44 b-f	12.1 b-e	33.1 abc	53.1 a-d	67.3 d-g
BMR-PS AVG							**76.7**	**2.01**	**12.9**	**32.1**	**51.8**	**68.5**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	20-Oct	81.1 a	2.03 c-f	15.5 ab	34.3 a	53.9 a	66.0 fg
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	9-Sep	81.1 a	1.97 c-f	17.4 a	30.7 a-e	49.5 a-e	70.7 a-e
BMR Millet AVG							**81.1**	**2.00**	**16.4**	**32.5**	**51.7**	**68.4**
Test AVG							**74.5**	**2.49**	**12.0**	**31.2**	**50.6**	**69.2**
LSD (P=.05)							2.4148	0.7432	2.1	2.1	3.1	2.34
CV							1.98	18.3	10.9	4.2	3.8	2.1
Treatment Prob(F)							0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 2. Forage sorghum hay trial, 2nd cutting.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	% Lignin	% IVTD NIR	% NDFD	NEL Mcal/lb	NEM Mcal/lb	NEG Mcal/lb	% Ca	% P
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	3.13 a-e	80.7 d-h	62.3 def	0.67 c-g	0.69 b-f	0.42 b-g	0.43 abc	0.23 bc
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	2.43 c-g	83.7 b-f	67.7 b-e	0.70 b-e	0.72 a-d	0.45 a-d	0.53 abc	0.25 bc
Sweeter N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	3.37 abc	80.0 e-h	62.0 def	0.64 fg	0.65 ef	0.38 efg	0.46 abc	0.22 bc
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	2.83 b-g	80.7 d-h	61.7 ef	0.67 b-g	0.68 c-f	0.41 c-g	0.44 abc	0.22 bc
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	2.70 b-g	83.0 b-f	64.3 c-f	0.69 b-e	0.70 b-e	0.43 b-f	0.49 abc	0.19 c
NonBMR AVG						**2.89**	**81.6**	**63.6**	**0.67**	**0.69**	**0.42**	**0.47**	**0.22**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	2.17 efg	83.7 b-f	67.3 b-e	0.70 a-e	0.73 abc	0.45 a-d	0.35 c	0.24 bc
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	2.43 c-g	82.0 b-h	65.3 cde	0.66 c-g	0.68 c-f	0.41 c-g	0.48 abc	0.22 bc
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	2.10 efg	84.3 b-e	68.7 bcd	0.71 abc	0.73 abc	0.46 abc	0.37 bc	0.26 b
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	2.00 fg	85.5 abc	70.5 bc	0.72 abc	0.75 ab	0.48 ab	0.49 abc	0.27 b
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	2.03 fg	84.3 b-e	69.7 bc	0.70 a-e	0.73 a-d	0.46 abc	0.45 abc	0.24 bc
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	2.27 d-g	85.7 abc	69.3 bc	0.73 ab	0.75 ab	0.47 ab	0.50 abc	0.23 bc
Sweeter N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	2.40 c-g	82.7 b-g	66.0 cde	0.67 b-g	0.69 b-f	0.43 b-f	0.48 abc	0.24 bc
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	2.63 b-g	82.0 b-h	64.3 c-f	0.68 b-f	0.69 b-f	0.42 b-g	0.43 abc	0.22 bc
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	2.63 b-g	85.0 a-d	67.7 b-e	0.71 abc	0.73 a-d	0.45 a-d	0.58 ab	0.22 bc
Grazex BMR x8101	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	2.27 d-g	83.7 b-f	65.7 cde	0.70 a-d	0.72 a-d	0.45 a-d	0.47 abc	0.23 bc
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	1.83 g	84.3 b-e	66.3 cde	0.72 abc	0.73 abc	0.46 abc	0.53 abc	0.23 bc
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	1.87 g	86.3 ab	68.7 bcd	0.75 a	0.77 a	0.49 a	0.53 abc	0.24 bc
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	2.13 efg	84.0 b-e	66.7 cde	0.70 a-d	0.73 a-d	0.45 a-d	0.41 abc	0.23 bc
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	3.97 a	78.0 h	58.7 f	0.63 fg	0.64 ef	0.38 fg	0.34 c	0.19 c
BMR AVG						**2.34**	**83.7**	**66.8**	**0.70**	**0.72**	**0.45**	**0.46**	**0.23**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		3.07 a-f	80.7 d-h	64.0 c-f	0.66 c-g	0.68 c-f	0.41 c-g	0.47 abc	0.24 bc
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	3.17 a-e	81.0 d-h	64.3 c-f	0.64 efg	0.66 ef	0.39 efg	0.48 abc	0.24 bc
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	3.43 abc	78.7 gh	61.0 ef	0.62 g	0.64 f	0.37 g	0.41 abc	0.23 bc
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	3.50 ab	79.3 fgh	61.7 ef	0.63 fg	0.65 ef	0.38 efg	0.42 abc	0.23 bc
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	3.23 a-d	79.3 fgh	61.7 ef	0.63 fg	0.65 ef	0.38 efg	0.42 abc	0.22 bc
NonBMR-PS AVG						**3.3**	**79.8**	**62.5**	**0.64**	**0.65**	**0.39**	**0.44**	**0.23**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	2.13 efg	83.3 b-f	67.7 b-e	0.69 b-f	0.70 b-e	0.43 b-e	0.42 abc	0.25 bc
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	2.77 b-g	82.0 b-h	65.0 c-f	0.66 c-g	0.68 c-f	0.41 c-g	0.48 abc	0.26 b
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	2.63 b-g	81.7 c-h	65.0 c-f	0.65 d-g	0.67 def	0.40 d-g	0.41 abc	0.23 bc
BMR-PS AVG						**2.51**	**82.3**	**65.9**	**0.67**	**0.68**	**0.42**	**0.44**	**0.25**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	2.53 b-g	85.7 abc	73.0 ab	0.63 fg	0.65 ef	0.39 efg	0.42 abc	0.31 a
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	2.30 d-g	88.3 a	76.7 a	0.70 a-e	0.72 a-d	0.45 a-d	0.62 a	0.32 a
BMR Millet AVG						**2.42**	**87.0**	**74.9**	**0.67**	**0.69**	**0.42**	**0.52**	**0.32**
Test AVG						**2.62**	**82.7**	**66.0**	**0.68**	**0.70**	**0.43**	**0.46**	**0.24**
LSD (P=.05)						0.582	2.4	3.68	0.03	0.03	0.03	0.12	0.04
CV						13.6	1.8	3.4	2.9	3.0	4.4	15.6	9.1
Treatment Prob(F)						0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0041	0.0001

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Table 2. Forage sorghum hay trial, 2nd cutting.

Hybrid	Company	Sorghum Type	Maturity	Brown MidRib	Male Sterile	% Mg	% K	% S	% Cl	Relative Feed Value	Relative Feed Quality	Milk lbs/Ton
849F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	M	N	N	0.25 b	1.76 bcd	0.13 c-f	0.49 b	116 c-f	157 b-f	2,818 b-j
979	Pioneer Hi-Bred Int., Inc	Sorghum/Sudan	M	N	Y	0.22 b	2.02 bcd	0.14 c-f	0.70 b	121 b-f	162 a-f	2,890 b-i
Sweeter N Honey II	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	N	N	0.24 b	1.72 bcd	0.17 c-f	0.68 b	110 ef	140 def	2,639 ijk
Sordan 79	Sorghum Partners Inc.	Sorghum/Sudan	M	N	N	0.18 b	1.76 bcd	0.10 f	0.47 b	120 b-f	148 c-f	2,805 b-k
Trudan 8	Sorghum Partners Inc.	Sudan	E	N	N	0.17 b	1.52 cd	0.09 f	0.52 b	130 bcd	153 b-f	2,891 b-i
NonBMR AVG						**0.21**	**1.76**	**0.13**	**0.57**	**119**	**152**	**2,808**
23431	Advanta US Inc	Sorghum/Sudan	L	Y	N	0.17 b	1.87 bcd	0.13 c-f	0.56 b	121 b-f	163 a-f	2,913 b-h
22050	Advanta US Inc	Sorghum/Sudan	L	Y	N	0.22 b	1.77 bcd	0.18 c-f	0.63 b	114 def	146 c-f	2,696 e-k
Exp 2017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.21 b	1.85 bcd	0.17 c-f	0.60 b	123 b-f	166 a-e	2,947 b-f
Exp 2017DWx	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.21 b	2.11 bc	0.19 c-f	0.74 b	120 b-f	168 a-d	2,959 b-e
Exp 3017x	Coffey Forage Seeds Inc.	Sorghum/Sudan	ML	Y	N	0.20 b	1.82 bcd	0.14 c-f	0.57 b	119 b-f	164 a-f	2,925 b-g
Sweeter 'N Honey BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	M	Y	N	0.20 b	1.87 bcd	0.13 c-f	0.62 b	133 abc	170 abc	3,050 ab
Sweeter N Honey II BMR	Richardson Seeds, Ltd.	Sorghum/Sudan	ML	Y	N	0.23 b	1.95 bcd	0.20 c-f	0.56 b	117 b-f	152 b-f	2,767 c-k
BMR Gold II	Scott Seed Co.	Sorghum/Sudan	M	Y	N	0.19 b	1.86 bcd	0.12 def	0.49 b	119 b-f	150 b-f	2,827 b-j
Grazex BMR 718	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	0.20 b	1.74 bcd	0.12 ef	0.51 b	135 ab	167 a-e	2,982 bcd
Grazex BMR x8101	Sharp Bros Seed Co.	Sorghum/Sudan	ME	Y	N	0.21 b	1.85 bcd	0.12 ef	0.43 b	130 bcd	158 a-f	2,948 b-f
Red Top Plus	Production Plus	Forage Sorghum	ML	Y	N	0.25 b	1.63 bcd	0.17 c-f	0.58 b	133 abc	165 a-e	2,945 b-f
Nutri Plus	Production Plus	Sorghum/Sudan	ML	Y	N	0.22 b	1.86 bcd	0.12 def	0.55 b	146 a	184 a	3,185 a
GW Exp 8051	Gayland Ward	Sorghum/Sudan	ML	Y	N	0.20 b	1.79 bcd	0.15 c-f	0.52 b	128 b-e	162 a-f	2,945 b-f
GW Exp 8071	Gayland Ward	Sorghum/Sudan	M	Y	N	0.17 b	1.50 d	0.09 f	0.57 b	110 ef	139 def	2,677 g-k
BMR AVG						**0.21**	**1.82**	**0.14**	**0.57**	**125**	**161**	**2,912**
811F	Pioneer Hi-Bred Int., Inc	Forage Sorghum	PS	N		0.25 b	2.06 bcd	0.18 c-f	0.69 b	111 def	151 b-f	2,725 d-k
Sugar Graze Ultra	Coffey Forage Seeds Inc.	Sorghum/Sudan	PS	N	Y	0.26 b	2.02 bcd	0.20 c-f	0.71 b	111 def	144 c-f	2,630 ijk
Premium Stock LS	Scott Seed Co.	Sorghum/Sudan	PS	N	N	0.20 b	1.90 bcd	0.18 c-f	0.48 b	106 f	135 f	2,557 k
Sordan Headless	Sorghum Partners Inc.	Sorghum/Sudan	PS	N	N	0.24 b	1.89 bcd	0.18 c-f	0.66 b	108 f	141 c-f	2,606 jk
Trudan Headless	Sorghum Partners Inc.	Sudan	PS	N	N	0.21 b	1.93 bcd	0.19 c-f	0.60 b	109 f	139 ef	2,610 jk
NonBMR-PS AVG						**0.23**	**1.96**	**0.18**	**0.63**	**109**	**142**	**2,626**
Bonus-R-BMR	Drussel Seed & Supply, Inc.	Sorghum/Sudan	PS	Y	N	0.20 b	2.04 bcd	0.24 abc	0.68 b	117 b-f	156 b-f	2,799 b-k
Sordan BMR	Sorghum Partners Inc.	Sorghum/Sudan	PS	Y	N	0.23 b	2.15 b	0.23 a-d	0.69 b	148 c-f	148 c-f	2,689 f-k
Trudan BMR	Sorghum Partners Inc.	Sudan	PS	Y	N	0.21 b	1.97 bcd	0.21 b-e	0.61 b	111 ef	145 c-f	2,662 h-k
BMR-PS AVG						**0.22**	**2.05**	**0.23**	**0.66**	**125**	**150**	**2,717**
MMR PM 508/5	MMR Genetics Ltd.	Millet	L	Y	N	0.34 a	2.67 a	0.29 ab	1.15 a	108 f	152 b-f	2,674 g-k
MMR PM 508/13	MMR Genetics Ltd.	Millet	ME	Y	Y	0.28 b	2.55 a	0.30 a	1.13 a	122 b-f	177 ab	3,030 abc
BMR Millet AVG						**0.31**	**2.61**	**0.29**	**1.14**	**115**	**164**	**2,852**
Test AVG						**0.22**	**1.91**	**0.17**	**0.63**	**120**	**155**	**2,820**
LSD (P=.05)						0.06	0.32	0.06	0.2144	10	16	147
CV						18.0	10.4	21.2	20.9	5.2	6.2	3.2
Treatment Prob(F)						0.0022	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Note: Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Chart 2. Yield contribution of each cutting to total ton/Ac.