

2003

KANSAS PERFORMANCE TESTS WITH

SUMMER ANNUAL FORAGES

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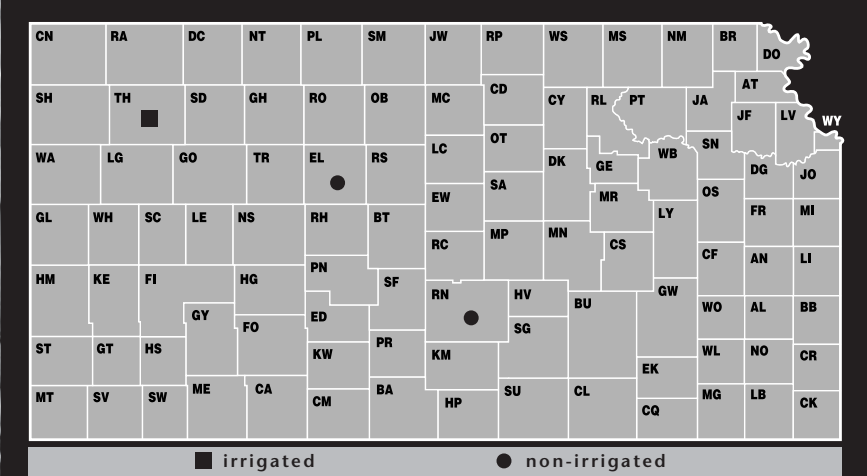


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INTRODUCTION

Kansas is a top producer of meat and animal products. An important input for the beef and dairy industries is the fodder or roughage that forms a key element in ruminant diets. In 2003, Kansas farms produced 3.6 million tons of corn and sorghum silage (January 12 Crops Report, Kansas Agricultural Statistics Service). Additional roughage was obtained from other summer annual forages such as sorghum-sudan, sudan, and millet. This publication presents the results of tests designed to compare forage production and quality of corn, sorghum, and sorghum-sudan hybrids under typical Kansas growing conditions.

PROCEDURES

Crop performance tests in Kansas are a cooperative effort of K-State Research and Extension and the private seed industry. Entry fees from private seed companies help finance the tests. Seed companies receive test announcements and entry forms in late January; deadlines for receipt of completed entry forms and seed are in early March. Because entry selection and location are voluntary, not all hybrids grown in the state are included in tests, and hybrids are not grown uniformly at all test locations.

Seed companies were offered the opportunity to participate in summer annual forage tests at five locations in 2003: Parsons, Hutchinson, St. John, Hays, and Colby. Ten companies entered a total of 21 forage sorghum hybrids and 22 hay types (sorghum-sudan hybrids, sudan, or millet). So few entries were submitted at Parsons and St. John that the tests were dropped.

Three plots (replications) of each hybrid were grown at each location in a randomized complete block design. Each forage sorghum plot consisted of four rows trimmed to a length of 20 to 30 feet, depending on location. Forage and grain yield estimates and samples for moisture and quality analysis were obtained from the center two rows. Hay-type entries were planted in narrow rows at high populations.

Each species was harvested as close as possible to the stage of maturity that would optimize yield and quality of forage – forage sorghum hybrids at mid-dough and sorghum-sudan hybrids at boot stage. The hay-type hybrids were harvested twice (Cut 1 and Cut 2). At Hays, the plots were split, with half the plot harvested once (1Cut) to maximize forage yield.

Samples from each harvest were collected to determine moisture content and for laboratory analysis of forage quality: crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and acid detergent lignin (ADL). Crude protein was calculated by multiplying the nitrogen content by 6.25, the average proportion of elemental nitrogen to plant protein.

Near infrared reflectance (NIR) technology was used to predict forage quality parameters. Calibration equations were based on a subset of samples from the current year that were analyzed with wet chemistry. The R^2 for the ADF calibration was quite good at 0.98. The R^2 for CP, NDF, and ADL were somewhat less at 0.93, 0.90, and 0.92.

Although not all of the crude protein in a forage is available to the animal as true protein, a forage with more crude protein generally requires less supplemental protein in the ration. Neutral detergent fiber (NDF) estimates total fiber consisting of cellulose, hemicellulose, and lignin and is often related to intake. Forages with lesser NDF values are desirable because the animal can consume more of the forage, requiring fewer ration supplements. Acid detergent fiber (ADF) estimates total cellulose, lignin, and pectin and often is used to predict the energy content of forage. Forages with lesser ADF values are desirable because of their greater energy content and higher digestibility. Acid detergent lignin (ADL) estimates the lignin fraction, an indigestible fiber with no nutritive value. Lesser ADL values are associated with greater forage digestibility.

RESULTS

Individual test results are presented in Tables 1 - 7. Average values for hybrids in all 3 tests grown in 2003 are listed in Tables 8 and 9. Hybrid rankings followed similar trends when grown in more than one location or in more than one year. Some hybrids, however, were more consistent than others.

Species yield differences depended on test location. There was essentially no difference between species at Hutchinson. First-cutting yields for the hay types were quite poor because of dry conditions in July and August. At Hays, the hay types yielded more over the entire season, largely because of late-season growth in response to late August rainfall. Forage sorghums yielded more in the irrigated test at Colby, in which low second-cutting yields added less to the total yield of the hay types than at other locations.

In the 2003 tests, forage sorghum hybrids tended to have less crude protein than the hay types. The hay types at Hutchinson had much more crude protein, likely because of the drought stress at that location. The various fiber components (NDF, ADF, ADL) showed inconsistent species patterns. At Hutchinson, the hay types had much less fiber than the forage sorghums. There was little difference between species at Hays. Some fiber components were less in the forage sorghums at Colby. Differences in the severe heat and drought stress between the test locations, and the resulting differential delays in bloom dates (see days to bloom in tables), likely contributed to the inconsistent forage-quality patterns. Harvest management and hybrid selection both play an important role in obtaining high yields of quality forage.

Table 1. Hutchinson Summer Annual Forage Test, 2003.

BRAND	NAME	Forage				Grain Days		Ht. Lodg (in)	Std (%)	
		Yield (pounds DM/acre)		Moist. (%)		yield (bu/a)	to blm			
		Total	Cut 1	Cut 2	Cut 1	Cut 2				
FORAGE SORGHUM										
SORG. PARTNERS	1990	9,638	--	--	63	--	0	--	89	--
DEKALB	FS-5	8,676	--	--	58	--	12	92	69	--
SORG. PARTNERS	SS 405	7,935	--	--	60	--	3	128	110	--
MIDLAND	MX-003	7,830	--	--	62	--	10	92	72	--
MIDLAND	MX-001BMR	7,703	--	--	62	--	3	107	72	--
STAR	MAGNUM ULTRA BMR	7,180	--	--	63	--	2	115	71	--
MATURITY CHECK	ATLAS	6,791	--	--	61	--	6	116	84	--
DEKALB	DKS59-09	6,393	--	--	64	--	9	101	52	--
MATURITY CHECK	EARLY SUMAC	4,304	--	--	59	--	10	66	61	--
	AVERAGES	7,383	--	--	61	--	6	102	76	--
	CV(%)	9	--	--	3	--	50	9	5	--
	LSD(0.05)*	926	--	--	3	--	4	13	6	--
HAY TYPES**										
MIDLAND	MX-115 (SS)	10,279	2,566	7,713	61	66	--	Ht1 30	Ht2 66	5 87
MIDLAND	MX-103BMR (SS)	9,959	2,144	7,814	68	63	--	28	60	5 82
SORG. PARTNERS	SORDAN HEADLESS (SS)	9,651	1,997	7,654	69	66	--	29	66	5 82
MATURITY CHECK	NB280S (SS)	9,643	2,514	7,129	70	53	--	38	67	3 92
VALLEY PREMIUM	SWEET CHIEF X-TRA (SS)	8,262	2,143	6,119	76	62	--	35	65	7 92
CAL/WEST	CW 1-61-10 (SS)	7,469	2,075	5,394	70	65	--	34	52	5 90
STAR	NUTRI PLUS BMR (SS)	7,182	2,397	4,786	68	68	--	30	55	5 77
CAL/WEST	CW 1-63-4 (SS)	7,060	2,291	4,769	68	65	--	36	54	5 88
CAL/WEST	CW 1-63-9 (SS)	6,523	2,213	4,310	65	64	--	30	56	3 80
CAL/WEST	CW 1-61-4 (SS)	6,370	1,858	4,511	69	67	--	34	57	5 80
CAL/WEST	CW 1-61-1 (SS)	5,997	1,775	4,222	72	66	--	33	57	8 83
MATURITY CHECK	PIPER (SU)	5,911	1,560	4,352	72	50	--	35	59	10 80
CAL/WEST	CW 1-63-1 (SS)	5,756	1,605	4,151	70	65	--	34	52	7 85
VALLEY PREMIUM	SW. CHIEF X-TRABMR (SS)	5,041	1,829	3,212	74	65	--	33	53	5 88
CHECK	GREENLEAF (SU)	4,542	1,604	2,938	72	58	--	31	49	12 73
	AVERAGES	7,310	2,038	5,272	70	63	--	33	58	6 84
	CV(%)	15	22	16	6	5	--	8	5	38 8
	LSD(0.05)*	1,506	621	1,209	6	4	--	4	4	3 9
TEST, OVERALL	AVERAGES	7,337	--	--	67	--	--	49	--	--
2-year Averages										
FORAGE SORGHUM										
SORG. PARTNERS	1990	9,049	--	--	69	--	0	98	81	--
MATURITY CHECK	ATLAS	6,529	--	--	64	--	24	104	73	--
MATURITY CHECK	EARLY SUMAC	5,132	--	--	62	--	22	77	57	--
	AVERAGES	7,011	--	--	64	--	18	98	68	--
HAY TYPES**										
SORG. PARTNERS	SORDAN HEADLESS (SS)	7,348	2,547	4,801	73	72	--	--	38	--
MATURITY CHECK	NB280S (SS)	7,101	2,555	4,546	75	63	--	--	49	--
VALLEY PREMIUM	SWEET CHIEF X-TRA (SS)	6,831	2,837	3,994	76	69	--	--	44	--
MATURITY CHECK	PIPER (SU)	5,658	2,283	3,375	73	59	--	--	53	--
VALLEY PREMIUM	SW. CHIEF X-TRABMR (SS)	4,986	2,431	2,555	76	71	--	--	41	--
	AVERAGES	6,107	2,524	3,583	73	69	--	--	44	--
TEST, OVERALL	AVERAGES	6,554	--	--	69	--	--	--	53	--

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Table 2. Hutchinson Summer Annual Forage Test, 2003.

BRAND	NAME	Forage Quality (dry matter basis)							
		Protein (%)		NDF (%)		ADF (%)		ADL (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
FORAGE SORGHUM									
STAR	MAGNUM ULTRA BMR	9.3	--	58.5	--	34.2	--	6.3	--
DEKALB	FS-5	8.2	--	63.4	--	35.8	--	6.0	--
DEKALB	DKS59-09	8.1	--	61.3	--	36.4	--	7.0	--
MATURITY CHECK	EARLY SUMAC	8.0	--	58.8	--	34.1	--	6.0	--
MIDLAND	MX-001BMR	7.8	--	60.2	--	33.8	--	5.1	--
SORG. PARTNERS	1990	7.6	--	64.6	--	37.6	--	6.0	--
MATURITY CHECK	ATLAS	7.3	--	58.8	--	34.2	--	6.2	--
MIDLAND	MX-003	7.2	--	63.0	--	37.4	--	6.8	--
SORG. PARTNERS	SS 405	5.6	--	59.6	--	34.8	--	6.1	--
	AVERAGES	7.7	--	60.9	--	35.4	--	6.2	--
	CV(%)	6.3	--	3.4	--	5.9	--	7.4	--
	LSD(0.05)*	1.1	--	NS	--	NS	--	1.0	--
HAY TYPES**									
CAL/WEST	CW 1-61-1 (SS)	15.9	13.8	54.7	64.3	25.1	36.0	3.3	5.7
STAR	NUTRI PLUS BMR (SS)	14.9	13.1	57.0	63.3	27.4	36.3	4.0	6.2
MIDLAND	MX-115 (SS)	14.7	12.4	56.4	64.3	26.7	35.3	3.9	5.7
CAL/WEST	CW 1-63-4 (SS)	14.6	13.1	57.0	63.6	27.5	36.9	3.5	5.9
SORG. PARTNERS	SORDAN HEADLESS (SS)	14.4	12.7	56.8	65.4	27.9	36.4	4.1	5.7
CAL/WEST	CW 1-61-4 (SS)	14.3	12.3	55.6	64.2	27.3	37.3	3.6	6.1
CAL/WEST	CW 1-63-1 (SS)	14.2	12.6	55.4	63.6	27.1	37.6	3.6	6.1
CAL/WEST	CW 1-63-9 (SS)	14.2	14.3	56.8	63.5	28.1	36.4	3.4	5.7
VALLEY PREMIUM	SWEET CHIEF X-TRA (SS)	14.1	13.9	56.9	65.0	28.5	36.6	4.4	6.3
CAL/WEST	CW 1-61-10 (SS)	14.1	12.5	56.4	63.7	28.0	36.5	3.8	6.0
MIDLAND	MX-103BMR (SS)	14.1	13.9	57.3	63.9	28.1	35.7	3.6	5.8
CHECK	GREENLEAF (SU)	13.8	14.5	56.0	64.1	26.0	35.4	3.8	6.5
VALLEY PREMIUM	SW. CHIEF X-TRABMR (SS)	13.7	11.6	58.0	62.8	30.9	36.9	4.8	6.5
MATURITY CHECK	PIPER (SU)	13.4	12.9	57.6	67.2	28.8	38.0	4.0	6.4
MATURITY CHECK	NB280S (SS)	13.2	11.8	58.1	66.6	29.0	37.0	4.0	5.9
	AVERAGES	14.2	13.0	56.7	64.4	27.7	36.6	3.9	6.0
	CV(%)	5.2	9.3	2.3	1.3	4.7	2.4	15.2	6.1
	LSD(0.05)*	NS	NS	NS	1.8	2.8	NS	NS	NS
TEST, OVERALL	AVERAGES	11.8	--	58.3	--	30.6	--	4.7	--
2-year Averages									
FORAGE SORGHUM									
SORG. PARTNERS	1990	7.5	--	63.8	--	37.8	--	7.3	--
MATURITY CHECK	EARLY SUMAC	7.2	--	57.1	--	34.1	--	7.8	--
MATURITY CHECK	ATLAS	6.9	--	56.7	--	34.7	--	7.1	--
	AVERAGES	6.7	--	59.7	--	36.1	--	8.0	--
HAY TYPES**									
VALLEY PREMIUM	SW. CHIEF X-TRABMR (SS)	12.4	10.9	56.5	59.9	29.7	34.6	4.5	6.1
SORG. PARTNERS	SORDAN HEADLESS (SS)	12.3	11.5	56.7	61.9	29.1	34.5	4.7	5.2
VALLEY PREMIUM	SWEET CHIEF X-TRA (SS)	12.0	11.9	56.5	61.5	29.1	35.0	4.8	6.0
MATURITY CHECK	NB280S (SS)	11.9	10.5	56.9	62.9	29.4	35.7	4.7	5.9
MATURITY CHECK	PIPER (SU)	11.6	10.3	57.5	64.0	30.0	37.5	4.9	7.0
	AVERAGES	12.3	11.4	56.3	61.4	28.9	35.0	4.5	5.8
TEST, OVERALL	AVERAGES	9.9	--	57.7	--	32.0	--	6.1	--

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Table 3. Hays Summer Annual Forage Test, 2003.

BRAND	NAME	Forage							Ht. (in)	Days		
		Yield (pounds DM/acre)			Moist. (%)			to		Lodg		
		Total	Cut 1	Cut 2	1Cut	Cut 1	Cut 2	1Cut	blm	(%)		
FORAGE SORGHUM												
SEED RESOURCE	FS-575	8,372	--	--	--	74	--	--	62	145	23	
SORG. PARTNERS	SS 405	8,066	--	--	--	72	--	--	62	133	37	
DEKALB	FS-5	7,533	--	--	--	70	--	--	56	127	10	
SORG. PARTNERS	NK 300	7,462	--	--	--	70	--	--	45	127	0	
GARST	333	7,246	--	--	--	71	--	--	43	137	33	
SEED RESOURCE	FS-515HQ	6,977	--	--	--	73	--	--	49	137	3	
SORG. PARTNERS	1990	6,787	--	--	--	75	--	--	47	--	8	
SEED RESOURCE	FS-555	6,529	--	--	--	76	--	--	52	--	10	
MATURITY CHECK	ATLAS	6,198	--	--	--	73	--	--	56	142	33	
MATURITY CHECK	EARLY SUMAC	5,762	--	--	--	70	--	--	53	123	23	
DEKALB	DKS59-09	5,734	--	--	--	69	--	--	46	117	33	
SEED RESOURCE	FAME	5,536	--	--	--	66	--	--	44	117	47	
GARST	344BMR	5,273	--	--	--	73	--	--	49	120	57	
SEED RESOURCE	BMR100	5,217	--	--	--	73	--	--	55	125	50	
SEED RESOURCE	BMR106	5,190	--	--	--	66	--	--	48	117	63	
STAR	MAGNUM ULTRA BMR	4,728	--	--	--	74	--	--	52	133	70	
GARST	348BMR	4,213	--	--	--	68	--	--	51	117	57	
	AVERAGES	6,284	--	--	--	71	--	--	51	128	33	
	CV(%)	13	--	--	--	2	--	--	8	6	60	
	LSD(0.05)*	1,111	--	--	--	2	--	--	6	10	27	
HAY TYPES**												
									Ht. Cut	Ht. 1Cut		
MATURITY CHECK	NB280S (SS)	11,596	6,818	4,778	6,609	59	71	66	44	33	47	0
SORG. PARTNERS	TRUDAN 8 (SU)	11,420	7,430	3,990	6,770	57	73	71	44	23	43	30
SORG. PARTNERS	SORDAN 79 (SS)	11,150	7,375	3,775	7,208	62	79	69	41	28	41	13
SEED RESOURCE	ATT-A-GRAZE (SS)	10,667	7,033	3,634	8,613	57	76	68	40	30	51	3
SORG. PARTNERS	SORDAN HEADLESS (SS)	10,541	6,606	3,935	8,821	58	71	76	34	26	51	0
GARST	N765BMR (SS)	9,406	6,335	3,071	9,235	60	77	75	36	26	47	3
GARST	GRAZE-N-BALE+ (SS)	9,405	6,604	2,801	11,160	56	79	75	35	30	48	0
SEED RESOURCE	SS200BMR (SS)	9,357	5,532	3,825	6,646	60	71	69	39	33	44	0
SEED RESOURCE	PS210BMR (SS)	9,248	5,548	3,700	8,208	63	73	79	36	28	45	0
STAR	NUTRI PLUS BMR (SS)	8,631	5,426	3,205	6,027	61	73	73	35	24	39	7
GARST	750BMR (SS)	8,295	5,284	3,011	6,788	60	74	65	43	31	44	3
MATURITY CHECK	PIPER (SU)	6,492	4,700	1,792	4,052	54	75	65	46	29	47	33
CHECK	GREENLEAF (SU)	6,451	4,480	1,971	4,712	54	74	65	41	27	33	20
	AVERAGES	9,435	6,090	3,345	7,296	59	74	70	40	28	45	9
	CV(%)	18	17	29	19	7	7	4	6	16	9	91
	LSD(0.05)*	2,210	1,354	1,315	1,848	6	7	4	3	6	6	11
TEST, OVERALL												
	AVERAGES	7,649	--	--	--	66	--	--	46			22

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Hay type plots were divided in two, representing different management systems. Cut 1, July 31, and Cut 2, September 22, maximized forage quality. Cut 1 and Cut 2 are summed to calculate Total. The 1Cut system, September 22, maximized forage yield and represented the entire season's growth to that point.

Table 4. Hays Summer Annual Forage Test, 2003.

BRAND	NAME	Forage Quality (dry matter basis)							
		Protein (%)		NDF (%)		ADF (%)		ADL (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
FORAGE SORGHUM									
DEKALB	DKS59-09	10.7	--	55.9	--	32.1	--	6.7	--
SEED RESOURCE	FS-555	10.5	--	59.3	--	34.3	--	6.4	--
SEED RESOURCE	FS-515HQ	10.0	--	59.3	--	34.4	--	6.9	--
SORG. PARTNERS	NK 300	9.7	--	60.5	--	34.8	--	6.9	--
SORG. PARTNERS	1990	9.6	--	61.7	--	36.3	--	6.5	--
STAR	MAGNUM ULTRA BMR	9.5	--	56.3	--	32.9	--	7.0	--
SEED RESOURCE	BMR100	9.3	--	56.7	--	32.2	--	6.8	--
SEED RESOURCE	FS-575	9.3	--	58.0	--	32.3	--	6.0	--
GARST	344BMR	9.3	--	55.5	--	32.4	--	7.2	--
SEED RESOURCE	FAME	9.0	--	57.6	--	34.6	--	7.7	--
MATURITY CHECK	EARLY SUMAC	8.8	--	56.5	--	33.0	--	7.4	--
SEED RESOURCE	BMR106	8.8	--	56.5	--	32.5	--	6.6	--
SORG. PARTNERS	SS 405	8.5	--	58.5	--	33.7	--	6.7	--
GARST	333	8.3	--	59.6	--	35.1	--	7.2	--
GARST	348BMR	8.1	--	56.2	--	34.0	--	7.1	--
MATURITY CHECK	ATLAS	7.7	--	57.1	--	34.0	--	7.2	--
DEKALB	FS-5	7.6	--	57.7	--	33.0	--	6.4	--
	AVERAGES	9.0	--	57.8	--	33.7	--	6.9	--
	CV(%)	9.3	--	1.3	--	2.5	--	6.2	--
	LSD(0.05)*	1.8	--	1.5	--	1.8	--	0.9	--
HAY TYPES**									
GARST	750BMR (SS)	11.4	11.1	57.0	59.1	31.7	38.9	6.3	8.7
STAR	NUTRI PLUS BMR (SS)	10.7	11.6	57.3	58.3	32.2	37.3	6.4	8.9
SORG. PARTNERS	SORDAN HEADLESS (SS)	10.6	10.7	57.6	60.6	31.8	38.8	6.5	9.0
GARST	GRAZE-N-BALE+ (SS)	10.2	12.5	58.7	60.3	33.0	37.4	6.6	7.8
SORG. PARTNERS	SORDAN 79 (SS)	10.0	10.9	58.4	60.0	33.4	38.4	6.7	8.5
SORG. PARTNERS	TRUDAN 8 (SU)	9.8	10.4	59.3	60.1	32.1	36.8	5.9	8.2
SEED RESOURCE	PS210BMR (SS)	9.8	12.0	58.5	60.0	33.1	39.8	6.4	9.4
GARST	N765BMR (SS)	9.8	12.5	57.4	60.8	31.8	38.9	6.0	8.2
CHECK	GREENLEAF (SU)	9.8	12.6	58.0	58.6	31.2	35.6	6.2	8.1
SEED RESOURCE	SS200BMR (SS)	9.6	10.8	57.0	59.0	32.6	37.9	6.9	8.3
SEED RESOURCE	ATT-A-GRAZE (SS)	9.3	11.7	57.0	59.3	31.7	36.7	6.2	7.9
MATURITY CHECK	NB280S (SS)	9.2	11.5	58.0	59.6	32.6	36.8	6.6	8.3
MATURITY CHECK	PIPER (SU)	8.8	11.3	58.4	59.8	32.8	37.1	6.9	8.5
	AVERAGES	10.2	11.7	58.0	59.5	32.2	37.7	6.3	8.6
	CV(%)	5.7	4.9	1.7	1.7	3.6	6.3	10.1	12.4
	LSD(0.05)*	1.3	1.2	NS	NS	NS	NS	NS	NS
TEST, OVERALL									
	AVERAGES	9.4	--	57.8	--	33.0	--	6.7	--

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Table 5. Hays Summer Annual Forage Test, 2-year Averages.

BRAND	NAME	Forage							Ht. (in)	Days to Lodg blm	Lodg (%)	
		Yield (pounds DM/acre)			Moist. (%)							
		Total	Cut 1	Cut 2	1Cut	Cut 1	Cut 2	1Cut				
FORAGE SORGHUM												
MATURITY CHECK	ATLAS	8,094	--	--	--	74	--	--	64	116	--	
SORG. PARTNERS	SS 405	7,840	--	--	--	73	--	--	73	116	--	
SORG. PARTNERS	NK 300	7,538	--	--	--	71	--	--	48	112	--	
SEED RESOURCE	BMR106	7,072	--	--	--	66	--	--	56	99	--	
SORG. PARTNERS	1990	6,996	--	--	--	75	--	--	49	--	--	
SEED RESOURCE	FAME	5,999	--	--	--	62	--	--	48	92	--	
SEED RESOURCE	BMR100	5,839	--	--	--	74	--	--	62	108	--	
MATURITY CHECK	EARLY SUMAC	5,615	--	--	--	69	--	--	58	98	--	
	AVERAGES	6,815	--	--	--	71	--	--	57	107	--	
HAY TYPES*												
SORG. PARTNERS	SORDAN 79 (SS)	9,167	7,280	--	6,375	72	--	68	51	28	56	--
MATURITY CHECK	NB280S (SS)	8,427	6,038	--	6,480	68	--	63	55	33	60	--
SORG. PARTNERS	TRUDAN 8 (SU)	8,177	6,182	--	5,644	67	--	65	56	23	52	--
SORG. PARTNERS	SORDAN HEADLESS (SS)	7,654	5,687	--	7,716	71	--	75	42	26	54	--
SEED RESOURCE	PS210BMR (SS)	7,544	5,694	--	7,700	73	--	77	44	28	54	--
SEED RESOURCE	SS200BMR (SS)	7,089	5,177	--	6,329	70	--	68	48	33	54	--
CHECK	GREENLEAF (SU)	5,494	4,509	--	4,562	66	--	64	48	27	45	--
MATURITY CHECK	PIPER (SU)	5,243	4,346	--	3,909	66	--	62	54	29	57	--
	AVERAGES	7,245	5,572	--	6,535	70	--	68	46	28	53	--
TEST, OVERALL												
	AVERAGES	6,838	--	--	--	71	--	--	51	--	--	--
Forage Quality (dry matter basis)												
BRAND	NAME	Protein (%)		NDF (%)		ADF (%)		ADL (%)				
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2			
FORAGE SORGHUM												
SORG. PARTNERS	NK 300	8.0	--	57.6	--	33.5	--	7.1	--			
SEED RESOURCE	BMR100	7.8	--	53.0	--	31.4	--	6.4	--			
SEED RESOURCE	FAME	7.5	--	49.4	--	33.3	--	6.4	--			
MATURITY CHECK	EARLY SUMAC	7.3	--	50.0	--	30.2	--	6.4	--			
SORG. PARTNERS	1990	7.3	--	60.9	--	36.3	--	7.1	--			
SEED RESOURCE	BMR106	7.0	--	52.6	--	32.4	--	6.0	--			
SORG. PARTNERS	SS 405	6.0	--	57.4	--	33.8	--	7.2	--			
MATURITY CHECK	ATLAS	6.0	--	55.4	--	33.7	--	6.9	--			
	AVERAGES	7.2	--	54.7	--	33.1	--	6.7	--			
HAY TYPES*												
SORG. PARTNERS	SORDAN HEADLESS (SS)	10.4	8.3	59.5	60.7	37.6	37.5	7.1	8.1			
CHECK	GREENLEAF (SU)	8.9	8.7	59.6	58.3	36.0	36.7	8.1	8.4			
SEED RESOURCE	SS200BMR (SS)	8.8	8.2	59.5	55.9	36.0	35.2	7.9	7.6			
SEED RESOURCE	PS210BMR (SS)	8.8	8.9	58.6	59.6	37.4	37.6	8.6	8.3			
SORG. PARTNERS	TRUDAN 8 (SU)	8.4	7.5	60.6	56.7	36.1	36.3	8.2	8.2			
MATURITY CHECK	NB280S (SS)	8.3	8.0	60.3	57.4	36.8	36.3	8.6	8.4			
MATURITY CHECK	PIPER (SU)	8.3	7.6	60.9	61.7	37.1	38.9	8.8	9.2			
SORG. PARTNERS	SORDAN 79 (SS)	7.8	7.3	60.8	57.2	37.7	36.5	8.4	8.6			
	AVERAGES	9.0	8.4	59.5	57.4	36.6	36.2	8.0	8.0			
TEST, OVERALL												
	AVERAGES	8.1	--	57.6	--	35.4	--	7.5	--			

* SS = Sorghum-sudan hybrid, SU = Sudan.

Hay type plots were divided in two, representing different management systems. Cut 1, July 31, and Cut 2, September 22, maximized forage quality. Cut 1 and Cut 2 are summed to calculate Total. The 1Cut system, September 22, maximized forage yield and represented the entire season's growth to that point.

Table 6. Colby Irrigated Summer Annual Forage Test, 2003.

BRAND	NAME	Forage				Grain Days		Ht. Lodg (in)	Std (%)	Std (%)	
		Yield (pounds DM/acre)		Moist. (%)		yield	to				
		Total	Cut 1	Cut 2	Cut 1	Cut 2	(bu/a)	blm			
FORAGE SORGHUM											
SEED RESOURCE	FS-555	16,361	--	--	67	--	0	--	99	0	78
SORG. PARTNERS	NK 300	15,520	--	--	62	--	41	82	67	0	84
DEKALB	FS-5	15,103	--	--	66	--	47	83	94	0	100
MOSS SEED	4EVER GREEN BMR	14,526	--	--	66	--	0	--	103	0	69
SEED RESOURCE	BMR100	14,407	--	--	65	--	18	81	93	73	90
SEED RESOURCE	FS-515HQ	14,075	--	--	66	--	28	87	69	0	72
SEED RESOURCE	FS-575	13,861	--	--	70	--	0	107	113	0	65
SORG. PARTNERS	1990	13,790	--	--	69	--	0	--	102	0	86
GARST	333	13,751	--	--	64	--	6	91	86	0	95
DSS	DIVIDEND BMR	13,181	--	--	68	--	17	86	90	58	91
DEKALB	DKS59-09	12,723	--	--	67	--	60	76	71	10	108
MOSS SEED	4EVER GREEN	12,715	--	--	74	--	0	--	94	0	93
MATURITY CHECK	EARLY SUMAC	12,634	--	--	69	--	41	76	95	10	80
SEED RESOURCE	FAME	12,401	--	--	63	--	52	75	85	10	102
STAR	MAGNUM ULTRA BMR	11,889	--	--	72	--	18	84	90	17	68
SEED RESOURCE	BMR106	11,622	--	--	67	--	47	79	88	50	71
MATURITY CHECK	ATLAS	11,258	--	--	70	--	30	83	97	0	49
MOSS SEED	MILLENIUM BMR	11,170	--	--	68	--	42	82	98	17	70
GARST	348BMR	10,984	--	--	70	--	50	81	96	0	77
	AVERAGES	13,262	--	--	68	--	26	84	91	13	82
	CV(%)	6	--	--	5	--	20	1	6	119	16
	LSD(0.05)*	1,323	--	--	6	--	9	2	8	25	22
HAY TYPES**											
								Ht1	Ht2		
MOSS SEED	MEGA GREEN (SS)	12,615	9,642	2,974	77	27	--	75	12	0	--
DSS	BONUS-R BMR (SS)	12,550	10,401	2,150	77	31	--	77	13	0	--
SEED RESOURCE	PS210BMR (SS)	12,463	9,200	3,263	79	26	--	79	13	0	--
MATURITY CHECK	NB280S (SS)	11,814	8,708	3,106	70	40	--	99	16	0	--
SORG. PARTNERS	SORDAN HEADLESS (SS)	11,406	8,735	2,671	79	32	--	75	16	0	--
SEED RESOURCE	ATT-A-GRAZE (SS)	10,981	8,974	2,007	71	31	--	87	14	0	--
SEED RESOURCE	SS200BMR (SS)	10,788	8,165	2,623	72	27	--	79	15	0	--
MATURITY CHECK	PIPER (SU)	10,245	7,705	2,540	64	36	--	97	15	0	--
STAR	NUTRI PLUS BMR (SS)	9,676	7,432	2,245	78	31	--	86	14	25	--
CHECK	GREENLEAF (SU)	8,196	6,500	1,696	73	38	--	91	14	0	--
	AVERAGES	11,074	8,546	2,527	74	32	--	85	14	3	--
	CV(%)	11	12	24	3	15	--	5	18	548	--
	LSD(0.05)*	1,733	1,748	NS	3	7	--	7	NS	23	--
TEST, OVERALL	AVERAGES	12,507	--	--	70	--	--	89	--	9	--
2-year Averages											
FORAGE SORGHUM											
SORG. PARTNERS	NK 300	14,768	--	--	65	--	43	83	69	--	--
SORG. PARTNERS	1990	13,189	--	--	72	--	0	--	92	--	--
MOSS SEED	4EVER GREEN	12,584	--	--	74	--	0	--	87	--	--
SEED RESOURCE	BMR100	11,904	--	--	70	--	26	78	88	--	--
SEED RESOURCE	FAME	11,343	--	--	65	--	44	70	76	--	--
SEED RESOURCE	BMR106	10,651	--	--	67	--	48	76	81	--	--
MATURITY CHECK	EARLY SUMAC	10,321	--	--	71	--	31	72	88	--	--
MOSS SEED	MILLENIUM BMR	9,802	--	--	71	--	35	79	88	--	--
MATURITY CHECK	ATLAS	9,683	--	--	72	--	24	83	91	--	--
	AVERAGES	11,842	--	--	70	--	25	80	85	--	--
HAY TYPES**											
MATURITY CHECK	NB280S (SS)	13,827	9,129	4,699	70	45	--	72	93	--	--
MATURITY CHECK	PIPER (SU)	12,522	8,277	4,244	66	41	--	73	91	--	--
SORG. PARTNERS	SORDAN HEADLESS (SS)	11,935	8,484	3,451	78	45	--	--	78	--	--
MOSS SEED	MEGA GREEN (SS)	11,846	8,250	3,596	77	39	--	--	76	--	--
SEED RESOURCE	PS210BMR (SS)	11,235	7,604	3,631	80	40	--	--	79	--	--
SEED RESOURCE	SS200BMR (SS)	10,955	7,455	3,501	74	38	--	78	79	--	--
	AVERAGES	11,507	7,989	3,517	75	40	--	75	81	--	--
TEST, OVERALL	AVERAGES	11,824	--	--	72	--	--	79	84	--	--

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Table 7. Colby Irrigated Summer Annual Forage Test, 2003.

BRAND	NAME	Forage Quality (dry matter basis)							
		Protein (%)		NDF (%)		ADF (%)		ADL (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
FORAGE SORGHUM									
MOSS SEED	4EVER GREEN	7.4	--	58.6	--	37.7	--	7.7	--
MOSS SEED	4EVER GREEN BMR	7.3	--	57.8	--	36.8	--	8.4	--
SORG. PARTNERS	1990	7.3	--	59.0	--	37.4	--	8.4	--
SEED RESOURCE	BMR100	7.2	--	55.1	--	37.2	--	10.2	--
DSS	DIVIDEND BMR	7.2	--	55.5	--	36.5	--	8.9	--
SEED RESOURCE	FS-515HQ	7.0	--	54.5	--	33.6	--	7.8	--
GARST	333	7.0	--	58.7	--	37.5	--	8.4	--
SORG. PARTNERS	NK 300	6.8	--	59.7	--	40.1	--	9.7	--
MOSS SEED	MILLENIU BMR	6.7	--	56.0	--	37.1	--	8.8	--
STAR	MAGNUM ULTRA BMR	6.7	--	53.2	--	34.9	--	8.4	--
SEED RESOURCE	BMR106	6.5	--	56.3	--	38.2	--	9.9	--
SEED RESOURCE	FAME	6.5	--	58.3	--	39.1	--	9.5	--
GARST	348BMR	6.3	--	52.9	--	34.1	--	8.0	--
SEED RESOURCE	FS-555	6.3	--	56.3	--	37.2	--	9.4	--
DEKALB	DKS59-09	6.0	--	58.2	--	39.5	--	9.5	--
DEKALB	FS-5	6.0	--	55.3	--	36.1	--	8.5	--
SEED RESOURCE	FS-575	5.9	--	54.5	--	35.6	--	9.0	--
MATURITY CHECK	ATLAS	5.8	--	53.7	--	34.7	--	7.8	--
MATURITY CHECK	EARLY SUMAC	5.4	--	52.7	--	35.4	--	9.3	--
	AVERAGES	6.6	--	56.1	--	36.8	--	8.8	--
	CV(%)	7.6	--	2.9	--	3.8	--	7.0	--
	LSD(0.05)*	1.1	--	3.4	--	3.0	--	1.3	--
HAY TYPES**									
SEED RESOURCE	PS210BMR (SS)	11.2	9.7	61.7	61.7	39.0	42.7	7.2	12.1
SEED RESOURCE	SS200BMR (SS)	10.7	9.7	58.9	61.9	36.8	40.4	7.7	10.7
MOSS SEED	MEGA GREEN (SS)	10.2	9.5	62.0	63.7	39.7	42.2	8.5	11.0
SORG. PARTNERS	SORDAN HEADLESS (SS)	10.1	9.5	61.8	61.5	40.1	41.2	8.5	11.8
DSS	BONUS-R BMR (SS)	10.1	11.2	60.1	61.9	38.7	40.8	9.5	11.0
CHECK	GREENLEAF (SU)	9.7	12.8	60.7	61.3	38.0	37.4	8.2	10.4
STAR	NUTRI PLUS BMR (SS)	9.3	11.0	58.6	61.8	36.7	40.1	7.5	10.9
SEED RESOURCE	ATT-A-GRAZE (SS)	8.6	9.9	58.7	61.6	37.4	39.6	8.6	10.4
MATURITY CHECK	PIPER (SU)	8.3	8.8	61.8	63.6	38.6	41.0	8.4	10.8
MATURITY CHECK	NB280S (SS)	8.1	9.7	60.7	62.7	36.9	39.3	7.3	10.1
	AVERAGES	9.6	10.2	60.5	62.2	38.2	40.5	8.1	10.9
	CV(%)	8.3	7.1	2.0	1.2	2.5	1.9	11.4	3.4
	LSD(0.05)*	1.8	1.6	2.7	1.7	2.2	1.7	NS	0.8
TEST, OVERALL	AVERAGES	7.6	--	57.6	--	37.3	--	8.6	--
2-year Averages									
FORAGE SORGHUM									
MOSS SEED	4EVER GREEN	7.0	--	59.7	--	38.8	--	8.8	--
SORG. PARTNERS	1990	7.0	--	61.8	--	38.6	--	8.4	--
SEED RESOURCE	BMR100	6.2	--	55.3	--	36.4	--	9.4	--
SORG. PARTNERS	NK 300	6.0	--	58.8	--	39.5	--	9.6	--
SEED RESOURCE	BMR106	6.0	--	55.2	--	37.4	--	9.4	--
SEED RESOURCE	FAME	5.9	--	56.8	--	39.1	--	9.6	--
MATURITY CHECK	ATLAS	5.9	--	54.4	--	34.6	--	7.6	--
MOSS SEED	MILLENIU BMR	5.5	--	56.5	--	37.9	--	8.8	--
MATURITY CHECK	EARLY SUMAC	5.3	--	51.9	--	34.6	--	8.8	--
	AVERAGES	6.1	--	56.7	--	37.3	--	8.9	--
HAY TYPES**									
SEED RESOURCE	PS210BMR (SS)	9.1	--	61.4	--	40.0	--	8.2	--
SEED RESOURCE	SS200BMR (SS)	9.0	--	59.0	--	37.0	--	7.8	--
SORG. PARTNERS	SORDAN HEADLESS (SS)	8.6	--	62.4	--	40.9	--	9.0	--
MOSS SEED	MEGA GREEN (SS)	8.4	--	62.2	--	40.3	--	8.4	--
MATURITY CHECK	NB280S (SS)	7.0	--	61.0	--	38.7	--	8.6	--
MATURITY CHECK	PIPER (SU)	7.0	--	62.1	--	40.1	--	8.6	--
	AVERAGES	8.2	--	61.0	--	39.2	--	8.5	--
TEST, OVERALL	AVERAGES	6.9	--	58.5	--	38.1	--	8.7	--

* Unless two varieties differ by more than the L.S.D., little confidence can be placed in one being superior to the other.

** SS = Sorghum-sudan hybrid, SU = Sudan.

Table 8. 2003, Summer Annual Forages, 3-location Averages.

BRAND	NAME	Forage					Grain Days		Ht. (in)	Lodg (%)	Stnd (%)
		Yield (pounds DM/acre)		Moist. (%)		yield (bu/a)	to blm				
		Total	Cut 1	Cut 2	Cut 1			Cut 2			
FORAGE SORGHUM											
DEKALB	FS-5	10,437	--	--	64	--	29	100	73	5	--
SORG. PARTNERS	1990	10,072	--	--	69	--	0	--	80	4	--
DEKALB	DKS59-09	8,283	--	--	67	--	34	98	56	22	--
MATURITY CHECK	ATLAS	8,082	--	--	68	--	18	114	79	17	--
STAR	MAGNUM ULTRA BMR	7,933	--	--	70	--	10	111	71	43	--
MATURITY CHECK	EARLY SUMAC	7,567	--	--	66	--	26	88	70	17	--
	AVERAGES	8,976	--	--	67	--	16	104	73	23	--
HAY TYPES*											
MATURITY CHECK	NB280S (SS)	11,018	6,013	5,004	66	54	--	71	60	1	--
SORG. PARTNERS	SORDAN HEADLESS (SS)	10,533	5,779	4,753	68	56	--	--	46	2	--
STAR	NUTRI PLUS BMR (SS)	8,497	5,085	3,412	69	57	--	75	51	12	--
MATURITY CHECK	PIPER (SU)	7,550	4,655	2,894	63	54	--	71	59	14	--
CHECK	GREENLEAF (SU)	6,396	4,195	2,202	66	57	--	72	54	11	--
	AVERAGES	9,273	5,558	3,715	67	56	--	74	52	6	--
TEST, OVERALL											
	AVERAGES	9,165	--	--	67	--	--	81	61	16	--

Table 9. 2003, Summer Annual Forages, 3-location Averages.

BRAND	NAME	Forage Quality (dry matter basis)							
		Protein (%)		NDF (%)		ADF (%)		ADL (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
FORAGE SORGHUM									
STAR	MAGNUM ULTRA BMR	8.5	--	56.0	--	34.0	--	7.2	--
DEKALB	DKS59-09	8.3	--	58.5	--	36.0	--	7.7	--
SORG. PARTNERS	1990	8.1	--	61.8	--	37.1	--	7.0	--
MATURITY CHECK	EARLY SUMAC	7.4	--	56.0	--	34.2	--	7.6	--
DEKALB	FS-5	7.3	--	58.8	--	35.0	--	7.0	--
MATURITY CHECK	ATLAS	6.9	--	56.6	--	34.3	--	7.1	--
	AVERAGES	7.7	--	58.3	--	35.3	--	7.3	--
HAY TYPES*									
SORG. PARTNERS	SORDAN HEADLESS (SS)	11.7	11.0	58.7	62.5	33.3	38.8	6.4	8.8
STAR	NUTRI PLUS BMR (SS)	11.6	11.9	57.6	61.2	32.1	37.9	6.0	8.6
CHECK	GREENLEAF (SU)	11.1	13.3	58.2	61.3	31.8	36.1	6.1	8.3
MATURITY CHECK	NB280S (SS)	10.2	11.0	58.9	63.0	32.8	37.7	6.0	8.1
MATURITY CHECK	PIPER (SU)	10.2	11.0	59.3	63.5	33.4	38.7	6.4	8.6
	AVERAGES	11.3	11.6	58.4	62.0	32.7	38.3	6.1	8.5
TEST, OVERALL									
	AVERAGES	9.6	--	57.9	--	33.6	--	6.7	--

* SS = Sorghum-sudan hybrid, SU = Sudan.

Table 10. Entrants in the 2003 Kansas Summer Annual Forage Performance Tests.

Brand/Company/Address			Brand/Company/Address		
Crop - Hybrid	Traits	Maturity	Crop - Hybrid	Traits	Maturity
CAL/WEST			MOSS SEED		
Cal/West Seeds Rt. 1 Box 70 West Salem, WI 54669 608-786-1554			Walter Moss Seed Co. P.O. Box 21114 Waco, TX 76702-1114 254-840-4774		
SS - CW 1-61-1	BMR	M	FS - 4EVER GREEN	PS	PS
SS - CW 1-61-10	BMR	M	FS - 4EVER GREEN BMR	BMR,PS	PS
SS - CW 1-61-4	BMR	M	FS - MILLENIUM BMR	BMR	L
SS - CW 1-63-1	BMR	M	SS - MEGA GREEN	PS	M
SS - CW 1-63-4	BMR	M			
SS - CW 1-63-9	BMR	M			
DEKALB			SEED RESOURCE		
Monsanto Seed 7159 N. 247th West P.O. Box 7 Mount Hope, KS 67108 620-445-2290 farmsource.com			Seed Resource P.O. Box 326 505 East Service Rd. Tulia, TX 79088 806-995-3882		
FS - DKS59-09	--	M	FS - BMR100	BMR	M
FS - FS-5	--	M	FS - BMR106	BMR	M
			FS - FAME	--	E
			FS - FS-515HQ	--	--
			FS - FS-555	--	L
			FS - FS-575	--	L
			SS - ATT-A-GRAZE	--	--
			SS - PS210BMR	BMR	PS
			SS - SS200BMR	BMR	E
DSS			SORG. PARTNERS		
Drussel Seed, Inc. 2197 West Parallel Rd. Garden City, KS 67846 620-275-2359			Sorghum Partners, Inc. Box 189, 403 S Monroe New Deal, TX 79350 806-746-5566 sorghum-partners.com		
FS - DIVIDEND BMR	BMR	ML	FS - 1990	--	PS
SS - BONUS-R BMR	BMR	PS	FS - NK 300	--	M
			FS - SS 405	--	L
			SS - SORDAN 79	--	M
			SS - SORDAN HEADLESS	--	PS
			SU - TRUDAN 8	--	M
GARST			STAR		
Garst Seed Co. 219 E. Garfield Greensburg, KS 67054 620-723-2454 garstseed.com			Star Seed, Inc. 101 Industrial Ave. Osborne, KS 67473 785-346-5447 gostarseed.com		
FS - 333	--	L	FS - MAGNUM ULTRA BMR	BMR	M
FS - 344BMR	BMR	L	SS - NUTRI PLUS BMR	BMR	M
FS - 348BMR	BMR	M			
SS - 750BMR	BMR	L			
SS - GRAZE-N-BALE+	PS	ML			
SS - N765BMR	BMR,PS	ML			
MIDLAND			VALLEY PREMIUM		
Kauffman Seeds 7508 S. Mayfield Rd. Haven, KS 67543 800-634-2836			Valley Feed & Seed, Inc. 11916 S. Highway 17 Hutchinson, KS 67501 316-942-2278		
FS - MX-001BMR	BMR	L	SS - SW. CHIEF X-TRABMR	BMR	ME
FS - MX-003	--	L	SS - SWEET CHIEF X-TRA	--	ME
SS - MX-103BMR	BMR	PS			
SS - MX-115	--	PS			

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The URL is <http://www.ksu.edu/kscept>.

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