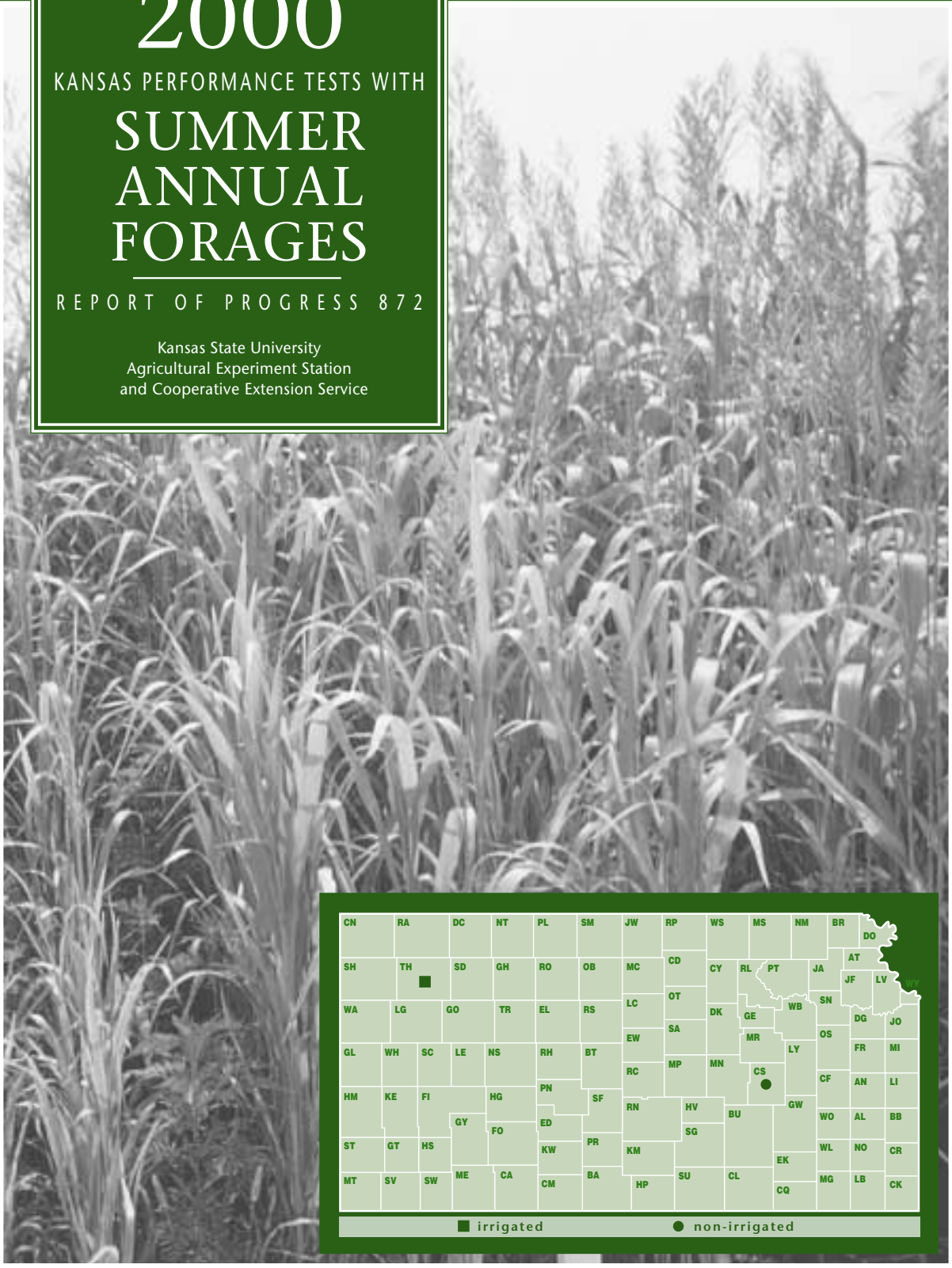
2000

KANSAS PERFORMANCE TESTS WITH

SUMMER ANNUAL FORAGES

REPORT OF PROGRESS 872

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service



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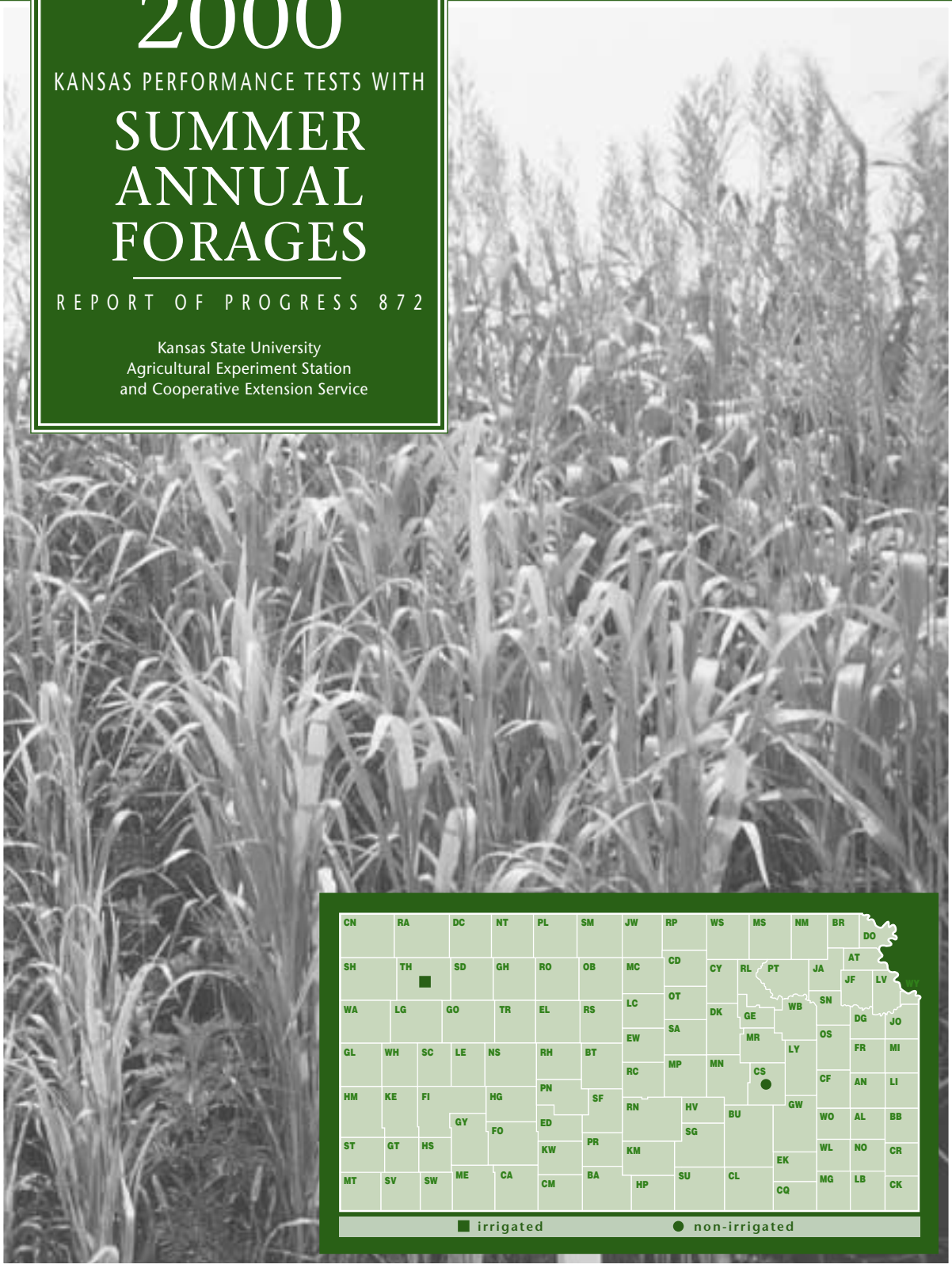

2000 KANSAS SUMMER ANNUAL FORAGE PERFORMANCE TESTS[1]

Kraig Roozeboom and Pat Evans[2]

SUMMARY

This report presents results of tests to compare hybrids of corn, forage sorghum, and sorghum-sudan. Various characteristics of forage production and quality were measured at Colby and Strong City, Kansas.

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[1]Contribution no. 01-284-S from the Kansas Agricultural Experiment Station.

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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 1999, Kansas farms produced nearly 3.7 million tons of corn and sorghum silage (2000 Farm Facts, Kansas Agricultural Statistics Service). Additional roughage was obtained from other summer annual forages such as sorghum-sudan. This publication presents the results of tests designed to compare forage production and quality of corn, sorghum, and sorghum-sudan hybrids.

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 two locations in 2000, Colby and Strong City. Six companies entered a total of 4 corn hybrids, 9 forage sorghum hybrids, and 10 sorghum-sudan hybrids.

Three plots (replications) of each hybrid were grown at each location in a randomized complete block design. Each plot consisted of four rows trimmed to a length of 20 or 30 feet, depending on location. Forage and grain yield estimates and samples for moisture and quality analysis were obtained from the center two rows. Entries were arranged so that statistical comparisons could be made among hybrids of the same species and between hybrids of different species.

Each species was harvested as close as possible to the stage of maturity that would optimize yield and quality of forage. The corn hybrids were harvested at 60% - 75% milk line, the forage sorghum hybrids at mid-dough, and the sorghum-sudan hybrids at boot stage. The sorghum-sudan hybrids were harvested twice at both locations.

Samples from each harvest were collected to determine moisture content and for laboratory analysis of forage quality, including crude protein, acid detergent fiber (ADF), and neutral detergent fiber (NDF). Crude protein is calculated by multiplying the nitrogen content of the forage by 6.25, the average proportion of elemental nitrogen to plant protein. While not all of the crude protein in a forage is available to the animal as true protein, a forage with a higher level of crude protein generally requires less supplemental protein in the ration. The acid detergent fiber (ADF) estimates total cellulose, lignin, and pectin and is often used to predict the energy content of forage. Forages with lower ADF values are desirable because of their higher energy content. The neutral detergent fiber (NDF) estimates total fiber consisting of cellulose, hemicellulose, and lignin and is often related to intake. Forages with lower NDF values are desirable because the animal can consume more of the forage, requiring fewer ration supplements.

RESULTS

Test results are presented in Tables 1 - 6. Forage yield is presented as pounds of dry matter per acre to facilitate comparisons between species. Yields were relatively low because of stress caused by lack of moisture and high temperatures. Even the irrigated location suffered to some extent because of the hot, dry winds in August.

Forage yield and quality patterns among species were similar at both locations. The average forage yields for corn, forage sorghum, and the first cutting of sorghum-sudan were similar. The second cutting of sorghum-sudan added roughly a ton of additional dry matter. Forage moisture was lowest for the corn, highest for the sorghum-sudan, and intermediate for the forage sorghum. Forage protein tended to be lowest for the forage sorghum and highest for the sorghum-sudan. The ADF was lowest for corn and highest for sorghum-sudan. The NDF rankings among species were not consistent across locations. Grain yields tended to vary widely among the corn hybrids but were more consistent among sorghum hybrids. Hybrids within each species differed for most yield and quality parameters.

Table 1. Eastern Kansas Summer Annual Forage Production, Strong City, 2000.

		Yield (lb DM/a)			Moisture (%)	
BRAND	NAME	Total	Cut 1	Cut 2	Cut 1	Cut 2
CORN						
CHECK	MIDLAND 798	5,224	--	--	59	--
LFY	MBS3811xLFY497L	5,180	--	--	60	--
LFY	MBS3811xLFY554L	5,002	--	--	62	--
CHECK	PIONEER 31B13	5,001	--	--	56	--
LFY	FR1064xLFY419L	3,829	--	--	57	--
	AVERAGE	4,847	--	--	59	--
	CV (%)	6	--	--	4	--
	LSD (0.05)	436	--	--	3	--
FORAGE SORGHUM						
BUFFALO	CANEX II	5,531	--	--	67	--
SG	SG 100BMR	5,242	--	--	68	--
CHECK	EARLY SUMAC	5,141	--	--	69	--
MMR	335/27	4,973	--	--	75	--
BUFFALO	CANEX	4,829	--	--	66	--
SG	SG 101BMR	4,825	--	--	69	--
BUFFALO	CANEX BMR208	4,768	--	--	63	--
MMR	327/23	4,513	--	--	68	--
	AVERAGE	4,978	--	--	68	--
	CV (%)	5	--	--	1	--
	LSD (0.05)	351	--	--	1	--
SORGHUM SUDAN						
BUFFALO	GRAZEX IIW	7,745	5,487	2,258	79	77
BUFFALO	GRAZEX BMR737	7,377	5,945	1,432	77	74
MMR	327/BMR	7,079	5,533	1,546	79	76
CHECK	NB280S	6,703	4,876	1,827	80	77
BUFFALO	GRAZEX II	6,649	4,508	2,141	80	77
SG	SG 301BMR	6,357	4,555	1,802	83	77
CHECK	PIPER	6,208	4,071	2,137	76	73
SG	SG 302BMR	6,105	4,224	1,881	81	76
	AVERAGE	6,778	4,900	1,878	79	76
	CV (%)	6	7	11	1	2
	LSD (0.05)	620	510	301	2	2
OVERALL AVERAGE		5,632	--	--	70	--
OVERALL LSD (0.05)		697	--	--	2	--

Table 2. Eastern Kansas Summer Annual Forage Quality, Strong City, 2000.

		Protein (%)		ADF (%)		NDF (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
CORN							
CHECK	MIDLAND 798	8.3	--	33.8	--	59.6	--
LFY	FR1064xLFY419L	7.1	--	34.1	--	61.3	--
CHECK	PIONEER 31B13	6.7	--	32.9	--	60.4	--
LFY	MBS3811xLFY497L	6.7	--	36.0	--	64.7	--
LFY	MBS3811xLFY554L	6.5	--	32.3	--	61.0	--
	AVERAGE	7.1	--	33.8	--	61.4	--
	CV (%)	0.6	--	2.7	--	2.0	--
	LSD (0.05)	0.1	--	1.9	--	2.6	--
FORAGE SORGHUM							
CHECK	EARLY SUMAC	5.9	--	33.9	--	58.8	--
SG	SG 100BMR	5.7	--	36.3	--	57.8	--
MMR	327/23	5.6	--	34.0	--	54.1	--
BUFFALO	CANEX BMR208	5.5	--	34.2	--	56.3	--
MMR	335/27	5.3	--	38.3	--	61.6	--
BUFFALO	CANEX	5.2	--	30.5	--	51.8	--
SG	SG 101BMR	4.8	--	37.6	--	60.9	--
BUFFALO	CANEX II	4.7	--	30.8	--	52.8	--
	AVERAGE	5.3	--	34.4	--	56.8	--
	CV (%)	2.3	--	3.1	--	2.4	--
	LSD (0.05)	0.2	--	2.0	--	2.6	--
SORGHUM SUDAN							
CHECK	PIPER	12.3	9.4	32.8	38.8	55.2	64.4
MMR	327/BMR	11.9	8.1	33.3	37.4	54.2	60.9
BUFFALO	GRAZEX IIW	11.6	8.1	38.0	39.3	58.6	64.2
SG	SG 302BMR	11.5	9.4	35.3	35.3	54.9	60.3
BUFFALO	GRAZEX II	11.1	9.2	34.9	37.2	55.4	61.0
BUFFALO	GRAZEX BMR737	10.9	8.6	34.1	38.2	55.0	61.3
CHECK	NB280S	10.6	10.5	34.9	36.9	55.6	61.3
SG	SG 301BMR	8.7	9.1	35.3	38.4	54.6	61.6
	AVERAGE	11.1	9.0	34.8	37.7	55.4	61.9
	CV (%)	7.2	0.4	5.7	4.0	2.0	1.4
	LSD (0.05)	1.5	0.1	NS	NS	2.1	1.7
OVERALL AVERAGE		7.9	--	34.4	--	57.4	--
OVERALL LSD (0.05)		1.1	--	4.1	--	3.0	--

Table 3. Eastern Kansas Summer Annual Forage Grain Yield, Maturity, Plant Height, Lodging, and Stand, Strong City, 2000.

		Grain Yield (bu/a)	Days to Bloom	Julian Bloom Date	Plant Height (in)	Lodge (%)	Stand (%)
CORN							
CHECK	PIONEER 31B13	81	67	192	88	--	92
CHECK	MIDLAND 798	70	69	194	88	--	78
LFY	MBS3811xLFY554L	56	72	197	96	--	71
LFY	MBS3811xLFY497L	53	71	196	103	--	93
LFY	FR1064xLFY419L	31	71	196	100	--	88
	AVERAGE	58	70	195	95	--	84
	CV (%)	10	2	1	2	--	12
	LSD (0.05)	9	2	2	3	--	NS
FORAGE SORGHUM							
BUFFALO	CANEX BMR208	66	72	197	88	0	77
BUFFALO	CANEX II	63	72	197	94	0	83
SG	SG 100BMR	59	77	202	96	57	76
MMR	327/23	51	80	205	99	0	77
SG	SG 101BMR	47	75	200	97	47	74
BUFFALO	CANEX	47	72	197	86	0	76
CHECK	EARLY SUMAC	45	72	197	82	0	94
MMR	335/27	--	--	--	98	0	79
	AVERAGE	54	74	199	93	13	80
	CV (%)	9	3	1	3	88	13
	LSD (0.05)	7	4	4	4	16	NS
SORGHUM SUDAN							
BUFFALO	GRAZEX IIW	--	--	--	69	--	--
BUFFALO	GRAZEX BMR737	--	--	--	67	--	--
CHECK	NB280S	--	--	--	65	--	--
MMR	327/BMR	--	--	--	64	--	--
BUFFALO	GRAZEX II	--	--	--	64	--	--
CHECK	PIPER	--	--	--	62	--	--
SG	SG 301BMR	--	--	--	59	--	--
SG	SG 302BMR	--	--	--	52	--	--
	AVERAGE	--	--	--	63	--	--
	CV (%)	--	--	--	8	--	--
	LSD (0.05)	--	--	--	7	--	--
OVERALL AVERAGE		56	72	197	82	13	81
OVERALL LSD (0.05)		11	NS	4	8	15	NS

Table 4. Western Kansas Irrigated Summer Annual Forage Production, Colby, 2000.

		Yield (lb DM/a)			Moisture (%)	
BRAND	NAME	Total	Cut 1	Cut 2	Cut 1	Cut 2
CORN						
CHECK	PIONEER 31B13	8,209	--	--	64	--
TRIUMPH	1866Bt	7,806	--	--	69	--
LFY	MBS3811xLFY497L	7,795	--	--	65	--
CHECK	MIDLAND 798	7,688	--	--	68	--
LFY	MBS3811xLFY554L	5,975	--	--	72	--
LFY	FR1064xLFY419L	5,553	--	--	63	--
	AVERAGE	7,171	--	--	67	--
	CV (%)	9	--	--	5	--
	LSD (0.05)	1,008	--	--	5	--
FORAGE SORGHUM						
CHECK	EARLY SUMAC	9,276	--	--	75	--
BUFFALO	CANEX BMR208	7,866	--	--	73	--
MMR	327/23	7,856	--	--	77	--
BUFFALO	CANEX II	7,840	--	--	74	--
CHECK	ATLAS	7,678	--	--	77	--
KAYSTAR	MILLENIUM	7,180	--	--	74	--
SG	SG 100BMR	6,673	--	--	78	--
BUFFALO	CANEX	6,649	--	--	73	--
KAYSTAR	4EVERGREEN	6,349	--	--	82	--
MMR	335/27	4,355	--	--	81	--
	AVERAGE	7,172	--	--	76	--
	CV (%)	9	--	--	2	--
	LSD (0.05)	913	--	--	2	--
SORGHUM SUDAN						
BUFFALO	GRAZEX IIW	11,513	8,528	2,985	82	76
CHECK	PIPER	10,904	7,004	3,900	82	75
TRIUMPH	SUPERSWEET 10	10,638	7,794	2,843	85	78
BUFFALO	GRAZEX II	10,552	8,065	2,487	83	77
MMR	327/BMR	9,504	7,855	1,649	83	75
TRIUMPH	SOONERSWEET	9,495	7,001	2,494	84	77
KAYSTAR	MEGAGREEN	9,229	7,874	1,356	84	74
BUFFALO	GRAZEX BMR737	8,906	7,184	1,722	83	74
SG	SG 201BMR	8,891	6,708	2,182	84	75
SG	SG 301BMR	8,849	7,146	1,704	87	78
CHECK	NB280S	8,830	6,998	1,831	82	76
SG	SG 302BMR	7,762	6,125	1,637	85	77
	AVERAGE	9,589	7,357	2,233	84	76
	CV (%)	8	7	13	2	2
	LSD (0.05)	1,040	739	410	2	2
OVERALL AVERAGE		8,208	--	--	78	--
OVERALL LSD (0.05)		1,195	--	--	3	--

Table 5. Western Kansas Irrigated Summer Annual Forage Quality, Colby, 2000.

		Protein (%)		ADF (%)		NDF (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
CORN							
LFY	FR1064xLFY419L	6.8	--	29.1	--	51.8	--
TRIUMPH	1866Bt	6.6	--	30.1	--	51.5	--
LFY	MBS3811xLFY554L	6.5	--	30.3	--	54.3	--
LFY	MBS3811xLFY497L	6.5	--	31.5	--	56.7	--
CHECK	PIONEER 31B13	6.4	--	28.3	--	50.0	--
CHECK	MIDLAND 798	5.5	--	30.7	--	48.5	--
	AVERAGE	6.4	--	30.0	--	52.1	--
	CV (%)	4.0	--	3.8	--	3.0	--
	LSD (0.05)	0.5	--	NS	--	3.2	--
FORAGE SORGHUM							
CHECK	EARLY SUMAC	6.3	--	37.2	--	55.1	--
CHECK	ATLAS	6.1	--	32.8	--	56.0	--
SG	SG 100BMR	6.1	--	38.6	--	57.7	--
MMR	335/27	6.1	--	41.9	--	62.0	--
KAYSTAR	MILLENIUM	5.8	--	38.3	--	59.5	--
KAYSTAR	4EVERGREEN	5.7	--	44.1	--	63.7	--
BUFFALO	CANEX II	5.7	--	36.9	--	53.3	--
MMR	327/23	5.4	--	39.7	--	60.0	--
BUFFALO	CANEX	5.4	--	31.4	--	49.6	--
BUFFALO	CANEX BMR208	5.3	--	37.4	--	58.1	--
	AVERAGE	5.8	--	37.8	--	57.5	--
	CV (%)	4.4	--	7.1	--	3.4	--
	LSD (0.05)	0.5	--	4.9	--	3.5	--
SORGHUM SUDAN							
SG	SG 302BMR	8.8	9.2	37.2	36.8	58.8	63.8
SG	SG 301BMR	8.5	9.6	41.6	38.2	60.8	65.0
SG	SG 201BMR	8.4	7.7	33.9	38.1	58.7	64.8
KAYSTAR	MEGAGREEN	8.4	9.7	41.3	37.4	62.1	64.7
CHECK	PIPER	8.1	10.2	43.8	38.3	67.0	65.2
BUFFALO	GRAZEX II	8.0	8.8	46.7	38.9	64.3	64.6
BUFFALO	GRAZEX BMR737	8.0	8.9	37.7	39.5	59.8	65.6
TRIUMPH	SUPERSWEET 10	7.8	8.6	42.6	37.7	63.1	63.7
BUFFALO	GRAZEX IIW	7.7	7.7	43.1	38.2	63.9	64.4
CHECK	NB280S	7.6	8.8	41.8	39.1	62.8	63.7
TRIUMPH	SOONERSWEET	7.5	7.8	41.8	38.3	62.9	64.2
MMR	327/BMR	6.9	9.4	33.9	39.3	59.4	64.1
	AVERAGE	8.0	8.9	40.4	38.3	62.0	64.5
	CV (%)	4.5	2.0	4.2	3.2	4.4	1.2
	LSD (0.05)	0.7	0.3	3.0	NS	NS	NS
OVERALL AVERAGE		6.8	--	37.3	--	58.3	--
OVERALL LSD (0.05)		0.7	--	4.0	--	4.7	--

Table 6. Western Kansas Irrigated Summer Annual Forage Grain Yield, Maturity, Plant Height, Lodging, and Stand, Colby, 2000.

		Grain Yield (bu/a)	Days to Bloom	Julian Bloom Date	Plant Height (in)	Lodge (%)	Stand (%)
CORN							
CHECK	PIONEER 31B13	84	79	202	86	0	88
TRIUMPH	1866Bt	83	82	205	88	2	89
CHECK	MIDLAND 798	48	83	206	86	0	97
LFY	MBS3811xLFY497L	48	82	205	93	0	99
LFY	FR1064xLFY419L	42	80	203	90	15	84
LFY	MBS3811xLFY554L	24	83	206	96	0	91
	AVERAGE	55	82	205	90	3	91
	CV (%)	12	2	1	3	221	7
	LSD (0.05)	10	NS	NS	5	NS	NS
FORAGE SORGHUM							
KAYSTAR	MILLENIUM	54	81	223	96	23	81
BUFFALO	CANEX II	49	77	219	104	3	88
SG	SG 100BMR	47	83	225	98	45	77
MMR	327/23	44	79	221	101	10	85
BUFFALO	CANEX BMR208	44	77	219	97	8	90
CHECK	EARLY SUMAC	44	76	218	91	7	66
BUFFALO	CANEX	41	75	217	96	0	67
CHECK	ATLAS	30	85	227	100	0	60
KAYSTAR	4EVERGREEN	--	--	--	99	0	81
MMR	335/27	--	--	--	96	0	86
	AVERAGE	44	79	221	98	10	78
	CV (%)	8	1	0	4	145	12
	LSD (0.05)	5	1	1	5	20	14
SORGHUM SUDAN							
CHECK	PIPER	--	--	--	93	--	--
BUFFALO	GRAZEX IIW	--	--	--	84	--	--
CHECK	NB280S	--	--	--	83	--	--
MMR	327/BMR	--	--	--	78	--	--
BUFFALO	GRAZEX II	--	--	--	77	--	--
TRIUMPH	SOONERSWEET	--	--	--	77	--	--
TRIUMPH	SUPERSWEET 10	--	--	--	73	--	--
BUFFALO	GRAZEX BMR737	--	--	--	73	--	--
SG	SG 301BMR	--	--	--	73	--	--
SG	SG 302BMR	--	--	--	69	--	--
KAYSTAR	MEGAGREEN	--	--	--	68	--	--
SG	SG 201BMR	--	--	--	67	--	--
	AVERAGE	--	--	--	76	--	--
	CV (%)	--	--	--	8	--	--
	LSD (0.05)	--	--	--	9	--	--
OVERALL AVERAGE		49	80	214	87	7	83
OVERALL LSD (0.05)		8	NS	2	9	14	15

Appendix: Entrants and their entries in the Kansas summer annual forage tests, 2000.

Company	Corn	Forage Sorghum	Sorghum-Sudan
Kaystar Seed PO Box 947 40329 us Hwy 14 E Huron, SD 57350 (605)352-8791 kaystarseed@basec.net		4EVERGREEN MILLENIUM[1]	MEGAGREEN
Lfy, L.L.C. 1281 Fourth Street Monterey, CA 93940 (831)657-9002 110341.175@compuserve.com	FR1064xLFY419L MBS3811xLFY497L MBS3811xLFY554L		
MMR Genetics L.L.C. PO Box 60 Vega, TX 79092 (806)267-2379		MMR 327/23[1] MMR 335/27[2]	MMR 327/BMR[1]
Garrison & Townsend, Inc. PO Drawer 2420 Hereford, TX 79045 (800)333-9048 bill@gtseed.com		SG 100BMR[1] SG 101BMR[1]	SG 201BMR[1] SG 301BMR[1 2] SG 302BMR[1 2]
Sharp Brothers Seed PO Box 140 Healy, KS 67880 (316)398-2231 sharpseed.com		CANEX BMR208[1] CANEX CANEX II	GRAZEX BMR[1] GRAZEX II GRAZEX IIW
Triumph Seed Co., Inc. PO Box 1050 Hwy 62 Bypass Ralls, TX 79357 (806)253-2584 sales@triumphseed.com	1866Bt		SOONERSWEET SUPERSWEET 10
Checks entered by K-State	PIONEER 31B13 MIDLAND 798	ATLAS EARLY SUMAC	NB280S PIPER (SUDAN)

[1] Possesses brown midrib trait.

[2] Photoperiod sensitive, flowers in response to shorter days.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan 66506

SRP 872 January 2001

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This report presents results of tests to compare hybrids of corn, forage sorghum, and sorghum-sudan. Various characteristics of forage production and quality were measured at Colby and Strong City, Kansas.

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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 1999, Kansas farms produced nearly 3.7 million tons of corn and sorghum silage (2000 Farm Facts, Kansas Agricultural Statistics Service). Additional roughage was obtained from other summer annual forages such as sorghum-sudan. This publication presents the results of tests designed to compare forage production and quality of corn, sorghum, and sorghum-sudan hybrids.

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 two locations in 2000, Colby and Strong City. Six companies entered a total of 4 corn hybrids, 9 forage sorghum hybrids, and 10 sorghum-sudan hybrids.

Three plots (replications) of each hybrid were grown at each location in a randomized complete block design. Each plot consisted of four rows trimmed to a length of 20 or 30 feet, depending on location. Forage and grain yield estimates and samples for moisture and quality analysis were obtained from the center two rows. Entries were arranged so that statistical comparisons could be made among hybrids of the same species and between hybrids of different species.

Each species was harvested as close as possible to the stage of maturity that would optimize yield and quality of forage. The corn hybrids were harvested at 60% - 75% milk line, the forage sorghum hybrids at mid-dough, and the sorghum-sudan hybrids at boot stage. The sorghum-sudan hybrids were harvested twice at both locations.

Samples from each harvest were collected to determine moisture content and for laboratory analysis of forage quality, including crude protein, acid detergent fiber (ADF), and neutral detergent fiber (NDF). Crude protein is calculated by multiplying the nitrogen content of the forage by 6.25, the average proportion of elemental nitrogen to plant protein. While not all of the crude protein in a forage is available to the animal as true protein, a forage with a higher level of crude protein generally requires less supplemental protein in the ration. The acid detergent fiber (ADF) estimates total cellulose, lignin, and pectin and is often used to predict the energy content of forage. Forages with lower ADF values are desirable because of their higher energy content. The neutral detergent fiber (NDF) estimates total fiber consisting of cellulose, hemicellulose, and lignin and is often related to intake. Forages with lower NDF values are desirable because the animal can consume more of the forage, requiring fewer ration supplements.

RESULTS

Test results are presented in Tables 1 - 6. Forage yield is presented as pounds of dry matter per acre to facilitate comparisons between species. Yields were relatively low because of stress caused by lack of moisture and high temperatures. Even the irrigated location suffered to some extent because of the hot, dry winds in August.

Forage yield and quality patterns among species were similar at both locations. The average forage yields for corn, forage sorghum, and the first cutting of sorghum-sudan were similar. The second cutting of sorghum-sudan added roughly a ton of additional dry matter. Forage moisture was lowest for the corn, highest for the sorghum-sudan, and intermediate for the forage sorghum. Forage protein tended to be lowest for the forage sorghum and highest for the sorghum-sudan. The ADF was lowest for corn and highest for sorghum-sudan. The NDF rankings among species were not consistent across locations. Grain yields tended to vary widely among the corn hybrids but were more consistent among sorghum hybrids. Hybrids within each species differed for most yield and quality parameters.

Table 1. Eastern Kansas Summer Annual Forage Production, Strong City, 2000.

		Yield (lb DM/a)			Moisture (%)	
BRAND	NAME	Total	Cut 1	Cut 2	Cut 1	Cut 2
CORN						
CHECK	MIDLAND 798	5,224	--	--	59	--
LFY	MBS3811xLFY497L	5,180	--	--	60	--
LFY	MBS3811xLFY554L	5,002	--	--	62	--
CHECK	PIONEER 31B13	5,001	--	--	56	--
LFY	FR1064xLFY419L	3,829	--	--	57	--
	AVERAGE	4,847	--	--	59	--
	CV (%)	6	--	--	4	--
	LSD (0.05)	436	--	--	3	--
FORAGE SORGHUM						
BUFFALO	CANEX II	5,531	--	--	67	--
SG	SG 100BMR	5,242	--	--	68	--
CHECK	EARLY SUMAC	5,141	--	--	69	--
MMR	335/27	4,973	--	--	75	--
BUFFALO	CANEX	4,829	--	--	66	--
SG	SG 101BMR	4,825	--	--	69	--
BUFFALO	CANEX BMR208	4,768	--	--	63	--
MMR	327/23	4,513	--	--	68	--
	AVERAGE	4,978	--	--	68	--
	CV (%)	5	--	--	1	--
	LSD (0.05)	351	--	--	1	--
SORGHUM SUDAN						
BUFFALO	GRAZEX IIW	7,745	5,487	2,258	79	77
BUFFALO	GRAZEX BMR737	7,377	5,945	1,432	77	74
MMR	327/BMR	7,079	5,533	1,546	79	76
CHECK	NB280S	6,703	4,876	1,827	80	77
BUFFALO	GRAZEX II	6,649	4,508	2,141	80	77
SG	SG 301BMR	6,357	4,555	1,802	83	77
CHECK	PIPER	6,208	4,071	2,137	76	73
SG	SG 302BMR	6,105	4,224	1,881	81	76
	AVERAGE	6,778	4,900	1,878	79	76
	CV (%)	6	7	11	1	2
	LSD (0.05)	620	510	301	2	2
OVERALL AVERAGE		5,632	--	--	70	--
OVERALL LSD (0.05)		697	--	--	2	--

Table 2. Eastern Kansas Summer Annual Forage Quality, Strong City, 2000.

		Protein (%)		ADF (%)		NDF (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
CORN							
CHECK	MIDLAND 798	8.3	--	33.8	--	59.6	--
LFY	FR1064xLFY419L	7.1	--	34.1	--	61.3	--
CHECK	PIONEER 31B13	6.7	--	32.9	--	60.4	--
LFY	MBS3811xLFY497L	6.7	--	36.0	--	64.7	--
LFY	MBS3811xLFY554L	6.5	--	32.3	--	61.0	--
	AVERAGE	7.1	--	33.8	--	61.4	--
	CV (%)	0.6	--	2.7	--	2.0	--
	LSD (0.05)	0.1	--	1.9	--	2.6	--
FORAGE SORGHUM							
CHECK	EARLY SUMAC	5.9	--	33.9	--	58.8	--
SG	SG 100BMR	5.7	--	36.3	--	57.8	--
MMR	327/23	5.6	--	34.0	--	54.1	--
BUFFALO	CANEX BMR208	5.5	--	34.2	--	56.3	--
MMR	335/27	5.3	--	38.3	--	61.6	--
BUFFALO	CANEX	5.2	--	30.5	--	51.8	--
SG	SG 101BMR	4.8	--	37.6	--	60.9	--
BUFFALO	CANEX II	4.7	--	30.8	--	52.8	--
	AVERAGE	5.3	--	34.4	--	56.8	--
	CV (%)	2.3	--	3.1	--	2.4	--
	LSD (0.05)	0.2	--	2.0	--	2.6	--
SORGHUM SUDAN							
CHECK	PIPER	12.3	9.4	32.8	38.8	55.2	64.4
MMR	327/BMR	11.9	8.1	33.3	37.4	54.2	60.9
BUFFALO	GRAZEX IIW	11.6	8.1	38.0	39.3	58.6	64.2
SG	SG 302BMR	11.5	9.4	35.3	35.3	54.9	60.3
BUFFALO	GRAZEX II	11.1	9.2	34.9	37.2	55.4	61.0
BUFFALO	GRAZEX BMR737	10.9	8.6	34.1	38.2	55.0	61.3
CHECK	NB280S	10.6	10.5	34.9	36.9	55.6	61.3
SG	SG 301BMR	8.7	9.1	35.3	38.4	54.6	61.6
	AVERAGE	11.1	9.0	34.8	37.7	55.4	61.9
	CV (%)	7.2	0.4	5.7	4.0	2.0	1.4
	LSD (0.05)	1.5	0.1	NS	NS	2.1	1.7
OVERALL AVERAGE		7.9	--	34.4	--	57.4	--
OVERALL LSD (0.05)		1.1	--	4.1	--	3.0	--

Table 3. Eastern Kansas Summer Annual Forage Grain Yield, Maturity, Plant Height, Lodging, and Stand, Strong City, 2000.

		Grain Yield (bu/a)	Days to Bloom	Julian Bloom Date	Plant Height (in)	Lodge (%)	Stand (%)
CORN							
CHECK	PIONEER 31B13	81	67	192	88	--	92
CHECK	MIDLAND 798	70	69	194	88	--	78
LFY	MBS3811xLFY554L	56	72	197	96	--	71
LFY	MBS3811xLFY497L	53	71	196	103	--	93
LFY	FR1064xLFY419L	31	71	196	100	--	88
	AVERAGE	58	70	195	95	--	84
	CV (%)	10	2	1	2	--	12
	LSD (0.05)	9	2	2	3	--	NS
FORAGE SORGHUM							
BUFFALO	CANEX BMR208	66	72	197	88	0	77
BUFFALO	CANEX II	63	72	197	94	0	83
SG	SG 100BMR	59	77	202	96	57	76
MMR	327/23	51	80	205	99	0	77
SG	SG 101BMR	47	75	200	97	47	74
BUFFALO	CANEX	47	72	197	86	0	76
CHECK	EARLY SUMAC	45	72	197	82	0	94
MMR	335/27	--	--	--	98	0	79
	AVERAGE	54	74	199	93	13	80
	CV (%)	9	3	1	3	88	13
	LSD (0.05)	7	4	4	4	16	NS
SORGHUM SUDAN							
BUFFALO	GRAZEX IIW	--	--	--	69	--	--
BUFFALO	GRAZEX BMR737	--	--	--	67	--	--
CHECK	NB280S	--	--	--	65	--	--
MMR	327/BMR	--	--	--	64	--	--
BUFFALO	GRAZEX II	--	--	--	64	--	--
CHECK	PIPER	--	--	--	62	--	--
SG	SG 301BMR	--	--	--	59	--	--
SG	SG 302BMR	--	--	--	52	--	--
	AVERAGE	--	--	--	63	--	--
	CV (%)	--	--	--	8	--	--
	LSD (0.05)	--	--	--	7	--	--
OVERALL AVERAGE		56	72	197	82	13	81
OVERALL LSD (0.05)		11	NS	4	8	15	NS

Table 4. Western Kansas Irrigated Summer Annual Forage Production, Colby, 2000.

		Yield (lb DM/a)			Moisture (%)	
BRAND	NAME	Total	Cut 1	Cut 2	Cut 1	Cut 2
CORN						
CHECK	PIONEER 31B13	8,209	--	--	64	--
TRIUMPH	1866Bt	7,806	--	--	69	--
LFY	MBS3811xLFY497L	7,795	--	--	65	--
CHECK	MIDLAND 798	7,688	--	--	68	--
LFY	MBS3811xLFY554L	5,975	--	--	72	--
LFY	FR1064xLFY419L	5,553	--	--	63	--
	AVERAGE	7,171	--	--	67	--
	CV (%)	9	--	--	5	--
	LSD (0.05)	1,008	--	--	5	--
FORAGE SORGHUM						
CHECK	EARLY SUMAC	9,276	--	--	75	--
BUFFALO	CANEX BMR208	7,866	--	--	73	--
MMR	327/23	7,856	--	--	77	--
BUFFALO	CANEX II	7,840	--	--	74	--
CHECK	ATLAS	7,678	--	--	77	--
KAYSTAR	MILLENIUM	7,180	--	--	74	--
SG	SG 100BMR	6,673	--	--	78	--
BUFFALO	CANEX	6,649	--	--	73	--
KAYSTAR	4EVERGREEN	6,349	--	--	82	--
MMR	335/27	4,355	--	--	81	--
	AVERAGE	7,172	--	--	76	--
	CV (%)	9	--	--	2	--
	LSD (0.05)	913	--	--	2	--
SORGHUM SUDAN						
BUFFALO	GRAZEX IIW	11,513	8,528	2,985	82	76
CHECK	PIPER	10,904	7,004	3,900	82	75
TRIUMPH	SUPERSWEET 10	10,638	7,794	2,843	85	78
BUFFALO	GRAZEX II	10,552	8,065	2,487	83	77
MMR	327/BMR	9,504	7,855	1,649	83	75
TRIUMPH	SOONERSWEET	9,495	7,001	2,494	84	77
KAYSTAR	MEGAGREEN	9,229	7,874	1,356	84	74
BUFFALO	GRAZEX BMR737	8,906	7,184	1,722	83	74
SG	SG 201BMR	8,891	6,708	2,182	84	75
SG	SG 301BMR	8,849	7,146	1,704	87	78
CHECK	NB280S	8,830	6,998	1,831	82	76
SG	SG 302BMR	7,762	6,125	1,637	85	77
	AVERAGE	9,589	7,357	2,233	84	76
	CV (%)	8	7	13	2	2
	LSD (0.05)	1,040	739	410	2	2
OVERALL AVERAGE		8,208	--	--	78	--
OVERALL LSD (0.05)		1,195	--	--	3	--

Table 5. Western Kansas Irrigated Summer Annual Forage Quality, Colby, 2000.

		Protein (%)		ADF (%)		NDF (%)	
		Cut 1	Cut 2	Cut 1	Cut 2	Cut 1	Cut 2
CORN							
LFY	FR1064xLFY419L	6.8	--	29.1	--	51.8	--
TRIUMPH	1866Bt	6.6	--	30.1	--	51.5	--
LFY	MBS3811xLFY554L	6.5	--	30.3	--	54.3	--
LFY	MBS3811xLFY497L	6.5	--	31.5	--	56.7	--
CHECK	PIONEER 31B13	6.4	--	28.3	--	50.0	--
CHECK	MIDLAND 798	5.5	--	30.7	--	48.5	--
	AVERAGE	6.4	--	30.0	--	52.1	--
	CV (%)	4.0	--	3.8	--	3.0	--
	LSD (0.05)	0.5	--	NS	--	3.2	--
FORAGE SORGHUM							
CHECK	EARLY SUMAC	6.3	--	37.2	--	55.1	--
CHECK	ATLAS	6.1	--	32.8	--	56.0	--
SG	SG 100BMR	6.1	--	38.6	--	57.7	--
MMR	335/27	6.1	--	41.9	--	62.0	--
KAYSTAR	MILLENIUM	5.8	--	38.3	--	59.5	--
KAYSTAR	4EVERGREEN	5.7	--	44.1	--	63.7	--
BUFFALO	CANEX II	5.7	--	36.9	--	53.3	--
MMR	327/23	5.4	--	39.7	--	60.0	--
BUFFALO	CANEX	5.4	--	31.4	--	49.6	--
BUFFALO	CANEX BMR208	5.3	--	37.4	--	58.1	--
	AVERAGE	5.8	--	37.8	--	57.5	--
	CV (%)	4.4	--	7.1	--	3.4	--
	LSD (0.05)	0.5	--	4.9	--	3.5	--
SORGHUM SUDAN							
SG	SG 302BMR	8.8	9.2	37.2	36.8	58.8	63.8
SG	SG 301BMR	8.5	9.6	41.6	38.2	60.8	65.0
SG	SG 201BMR	8.4	7.7	33.9	38.1	58.7	64.8
KAYSTAR	MEGAGREEN	8.4	9.7	41.3	37.4	62.1	64.7
CHECK	PIPER	8.1	10.2	43.8	38.3	67.0	65.2
BUFFALO	GRAZEX II	8.0	8.8	46.7	38.9	64.3	64.6
BUFFALO	GRAZEX BMR737	8.0	8.9	37.7	39.5	59.8	65.6
TRIUMPH	SUPERSWEET 10	7.8	8.6	42.6	37.7	63.1	63.7
BUFFALO	GRAZEX IIW	7.7	7.7	43.1	38.2	63.9	64.4
CHECK	NB280S	7.6	8.8	41.8	39.1	62.8	63.7
TRIUMPH	SOONERSWEET	7.5	7.8	41.8	38.3	62.9	64.2
MMR	327/BMR	6.9	9.4	33.9	39.3	59.4	64.1
	AVERAGE	8.0	8.9	40.4	38.3	62.0	64.5
	CV (%)	4.5	2.0	4.2	3.2	4.4	1.2
	LSD (0.05)	0.7	0.3	3.0	NS	NS	NS
OVERALL AVERAGE		6.8	--	37.3	--	58.3	--
OVERALL LSD (0.05)		0.7	--	4.0	--	4.7	--

Table 6. Western Kansas Irrigated Summer Annual Forage Grain Yield, Maturity, Plant Height, Lodging, and Stand, Colby, 2000.

		Grain Yield (bu/a)	Days to Bloom	Julian Bloom Date	Plant Height (in)	Lodge (%)	Stand (%)
CORN							
CHECK	PIONEER 31B13	84	79	202	86	0	88
TRIUMPH	1866Bt	83	82	205	88	2	89
CHECK	MIDLAND 798	48	83	206	86	0	97
LFY	MBS3811xLFY497L	48	82	205	93	0	99
LFY	FR1064xLFY419L	42	80	203	90	15	84
LFY	MBS3811xLFY554L	24	83	206	96	0	91
	AVERAGE	55	82	205	90	3	91
	CV (%)	12	2	1	3	221	7
	LSD (0.05)	10	NS	NS	5	NS	NS
FORAGE SORGHUM							
KAYSTAR	MILLENIUM	54	81	223	96	23	81
BUFFALO	CANEX II	49	77	219	104	3	88
SG	SG 100BMR	47	83	225	98	45	77
MMR	327/23	44	79	221	101	10	85
BUFFALO	CANEX BMR208	44	77	219	97	8	90
CHECK	EARLY SUMAC	44	76	218	91	7	66
BUFFALO	CANEX	41	75	217	96	0	67
CHECK	ATLAS	30	85	227	100	0	60
KAYSTAR	4EVERGREEN	--	--	--	99	0	81
MMR	335/27	--	--	--	96	0	86
	AVERAGE	44	79	221	98	10	78
	CV (%)	8	1	0	4	145	12
	LSD (0.05)	5	1	1	5	20	14
SORGHUM SUDAN							
CHECK	PIPER	--	--	--	93	--	--
BUFFALO	GRAZEX IIW	--	--	--	84	--	--
CHECK	NB280S	--	--	--	83	--	--
MMR	327/BMR	--	--	--	78	--	--
BUFFALO	GRAZEX II	--	--	--	77	--	--
TRIUMPH	SOONERSWEET	--	--	--	77	--	--
TRIUMPH	SUPERSWEET 10	--	--	--	73	--	--
BUFFALO	GRAZEX BMR737	--	--	--	73	--	--
SG	SG 301BMR	--	--	--	73	--	--
SG	SG 302BMR	--	--	--	69	--	--
KAYSTAR	MEGAGREEN	--	--	--	68	--	--
SG	SG 201BMR	--	--	--	67	--	--
	AVERAGE	--	--	--	76	--	--
	CV (%)	--	--	--	8	--	--
	LSD (0.05)	--	--	--	9	--	--
OVERALL AVERAGE		49	80	214	87	7	83
OVERALL LSD (0.05)		8	NS	2	9	14	15

Appendix: Entrants and their entries in the Kansas summer annual forage tests, 2000.

Company	Corn	Forage Sorghum	Sorghum-Sudan
Kaystar Seed PO Box 947 40329 us Hwy 14 E Huron, SD 57350 (605)352-8791 kaystarseed@basec.net		4EVERGREEN MILLENIUM[1]	MEGAGREEN
Lfy, L.L.C. 1281 Fourth Street Monterey, CA 93940 (831)657-9002 110341.175@compuserve.com	FR1064xLFY419L MBS3811xLFY497L MBS3811xLFY554L		
MMR Genetics L.L.C. PO Box 60 Vega, TX 79092 (806)267-2379		MMR 327/23[1] MMR 335/27[2]	MMR 327/BMR[1]
Garrison & Townsend, Inc. PO Drawer 2420 Hereford, TX 79045 (800)333-9048 bill@gtseed.com		SG 100BMR[1] SG 101BMR[1]	SG 201BMR[1] SG 301BMR[1 2] SG 302BMR[1 2]
Sharp Brothers Seed PO Box 140 Healy, KS 67880 (316)398-2231 sharpseed.com		CANEX BMR208[1] CANEX CANEX II	GRAZEX BMR[1] GRAZEX II GRAZEX IIW
Triumph Seed Co., Inc. PO Box 1050 Hwy 62 Bypass Ralls, TX 79357 (806)253-2584 sales@triumphseed.com	1866Bt		SOONERSWEET SUPERSWEET 10
Checks entered by K-State	PIONEER 31B13 MIDLAND 798	ATLAS EARLY SUMAC	NB280S PIPER (SUDAN)

[1] Possesses brown midrib trait.

[2] Photoperiod sensitive, flowers in response to shorter days.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan 66506

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