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Forage Report 2015

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Forage Report 2015

Cover Page Footnote

This work was funded in part by the Kansas Agricultural Experiment Station and seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the United States.

Authors

J. D. Holman, Jane Lingenfelser, A. Obour, A. Esser, J. L. Moyer, G. Cramer, T. Roberts, and S. Maxwell



FORAGE REPORT 2015

K-STATE
Research and Extension

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

2015 Kansas Summer Annual Forage Hay and Silage Variety Trial

J. Holman, J. Lingenfelser, A. Obour, A. Esser, J. Moyer, G. Cramer, T. Roberts, and S. Maxwell

Summary

In 2015 summer annual forage variety trials were conducted across Kansas near Garden City, Hays, Hutchinson, Mound Valley, and Scandia. All sites evaluated hay and silage entries, except Hutchinson, which only evaluated hay entries. Companies were able to enter varieties into any possible combinations of research sites, so not all sites had all varieties. Across the sites, a total of 30 hay varieties and 22 silage varieties were evaluated.

Introduction

In 2014 there was a total of 34,455,000 acres of hay and haylage harvested in the United States for a total of 95,372,000 dry matter tons of production. Yields averaged 2.77 tons of dry matter per acre. Of this total, about 13,580,000 acres were alfalfa, which averaged 3.76 dry matter tons per acre, and all other crops averaged 2.13 dry matter tons/a.

In Kansas, there were 2,420,000 acres of hay and haylage harvested, with an average yield of 2.24 dry matter tons per acre in 2014. Of this total, 650,000 acres were alfalfa with an average yield of 3.72 dry matter tons per acre, and 1,770,000 acres were crops other than alfalfa, with an average yield of 1.69 dry matter tons/a. Kansas was ranked 6th in the United States for hay and haylage production, which largely supports the state dairy (ranked 19th in the U.S. and valued at \$482,765,000), and cattle (feedlot, background, and cow/calf) industries (ranked second in the U.S. and valued at \$10,153,087,000). Dairy and beef cattle represented 58% of the total agriculture product of Kansas in 2014. Hay and grain commodities that support these two industries are critical for the state.

Study Objectives

The objectives of the Kansas Summer Annual Forage Variety Trial are to evaluate the performance of released and experimental varieties, determine where these varieties are best adapted, and increase the visibility of summer annual forages in Kansas. Breeders, marketers, and producers use data collected from the trials to make informed variety selections. The Summer Annual Forage Variety Trial is planted at locations across Kansas based on the interest of those entering varieties into the test.

Procedures

The Summer Annual Forage Variety Trial was conducted near Garden City, Hays, Hutchinson, Mound Valley, and Scandia. All of the sites evaluated hay and silage entries, except Hutchinson, which only evaluated hay entries. Companies were able to enter varieties into any possible combinations of research sites, so not all sites had all varieties. In the hay test, there were 13 entries at Garden City, 25 at Hays, 19 at Hutchinson, 15 at Mound Valley, and 16 at Scandia. In the silage test, there were 21 entries at Garden City, 17 at Hays, 10 at Hutchinson, 8 at Mound Valley, and 10 at

FORAGE REPORT 2015

Scandia. Across the sites, a total of 30 hay varieties and 22 silage varieties were evaluated (Tables 1 and 2).

Management guidelines were provided to cooperators; however, previous growing experience influenced final management decisions. All trials were planted in small research plots (approximately 225 ft²) with three replications. Cultural practices (Table 3), growing season temperature, and precipitation (Figures 1-5) are provided for each site. Emergence date was determined when plant stand was visibly apparent. Stand vigor and percent stand establishment were determined two weeks after planting using a visual assessment. Stand vigor was rated on a scale of 1 through 10, with 10 being the most vigorous and percent stand establishment was rated on a scale of 0 through 100. Lodging was determined by visual assessment. Days to heading and days to soft dough were determined when 50% of stand reached maturity. All hay entries were harvested when the earliest variety reached heading. Silage entries were harvested when they reached soft dough. Late maturing silage varieties and photoperiod sensitive varieties (PPS) were harvested at the last silage harvest. Results are listed alphabetically by seed supplier. Forage samples were dried, ground, and analyzed for nutrient contents using NIR (near infrared reflectance) by SDK Laboratories in Hutchinson, KS.

2015 Growing Conditions

Temperature and precipitation (Figures 1-5) for each site is shown. Thick black lines on the temperature graphs represent long-term average high and low temperatures (°F) for the location. The upper thin line represents actual daily high temperatures, and the lower thin line represents actual daily low temperatures. On the precipitation graph, the line labeled “normal” represents long-term average precipitation (1981-2010), and the line labeled “2015” represents actual precipitation.

In general, the 2015 growing season saw favorable moisture conditions throughout, although conditions were drier than normal at Hays. The Hutchinson site had poor establishment due to herbicide carryover.

Results and Discussion

Since all entries were not evaluated across all sites, data was analyzed by location. All locations had a control entry of Rox Orange (Waconia) and Sumac for the hay test, and a control entry of Kansas Orange for the silage test.

Hay Test

At Garden City all entries were in the top LSD (Least Significant Difference at $P \leq 0.05$) group in the first cutting, except AS6401 and AS9302 (Table 4). In the second cutting more separation occurred between entries, and AS6201, AS6501, and AS9301 were in the highest yielding LSD group. Crude protein averaged 10.4% and TDN (Total Digestible Nutrients) was 50.5%.

There was only one hay cutting at Hays due to dry conditions. In the forage sorghum test Rox Orange, Sumac, Canex, and Canex BMR 210 were in the top LSD group, and in the sorghum sudan test AS5201 was the highest yielding entry (Table 5). Forage sorghum crude protein averaged 10.11% and TDN was 52.75%, sorghum sudan crude protein averaged 10.1% and TDN was 52.9%.

FORAGE REPORT 2015

At Hutchinson, the first harvest was later than normal so there was only one hay cutting. Averaged across forage sorghum and sorghum sudan there were no significant differences in yield among the varieties (Table 6). Due to cutting later than normal, forage quality was lower, crude protein averaged 9.2%, and TDN was 60.0%.

At Mound Valley, AS5201, AS6201, AS9301, AS9302, Sweet Sioux WMR, Sweet Sioux BMR, B-52, 747, Wondergreen, and Sweet Six BMR were in the top LSD group (Table 7). The first cutting averaged 2722 lb/a, the second cutting averaged 2229 lb/a, and the third cutting averaged 2111 lb/a. Crude protein from the first cutting averaged 14.3% and TDN was 55.1%.

At Scandia, all entries were in the top LSD group, except AS6401, Canex BMR 600, and Rox Orange (Table 8). Crude protein averaged 10.6% and TDN was 54.1%.

Silage Test

At Garden City, AF8301, EJ7281, and SPX27614 were in the top LSD group for silage (Table 9). Crude protein averaged 8.0%, total starch was 9.4%, milk was 1884 (lb/ton), and IVTDMD (in vitro true dry matter digestibility) at 48 h was 71.4%.

At Hays, DS7853, EJ7281, Canex BMR525, and Canex BMR600 were in the top LSD group for silage (Table 10). Crude protein averaged 6.8%, total starch was 10.1%, milk was 1962 (lb/ton), and IVTDMD at 48 h was 73.9%.

At Mound Valley, AF7401 and AF8301 were in the top LSD group for silage (Table 11). Crude protein averaged 8.9%, total starch was 7.2%, milk was 1804 (lb/ton), and IVTDMD at 48 h was 68.3%.

At Scandia, AF7201, AF7401, and Silo Pro BMR were in the top LSD group for silage (Table 12). Crude protein averaged 8.0%, total starch was 9.6%, milk was 2092 (lb/ton), and IVTDMD at 48 h was 74.4%.

Recommendation

Inestimable differences in soil type, weather, and environmental conditions play a part in increasing experimental error; therefore, one should use more than one year of data to make an informed variety selection decision.

Acknowledgments

This work was funded in part by the Kansas Agricultural Experiment Station and seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the United States.

FORAGE REPORT 2015

Table 1. 2015 Hay test entries

No.	Company	Entry	FS*	SS	S	BMR	Dwarf	Male sterile	Dry stalk	PS	Maturity**
1	Alta Seeds	AS5201	N	Y	N	N	N	N	Y	N	M
2	Alta Seeds	AS6201	N	Y	N	Y	N	N	N	N	ME
3	Alta Seeds	AS6401	N	Y	N	Y	N	N	N	N	MF
4	Alta Seeds	AS6402	N	Y	N	Y	Y	N	N	N	F
5	Alta Seeds	AS6501	N	Y	N	Y	N	N	N	Y	F
6	Alta Seeds	AS9301	N	N	Y	Y	N	N	Y	N	M
7	Alta Seeds	AS9302	N	N	Y	Y	Y	N	Y	N	M
8	Browning Seed	747	N	Y	N	N	N	N	N	N	M
9	Browning Seed	B-52	N	Y	N	N	N	N	N	Y	F
10	Browning Seed	Sweet Sioux BMR	N	Y	N	Y	N	N	N	N	M
11	Browning Seed	Sweet Sioux WMR	N	Y	N	N	N	N	Y	N	M
12	Browning Seed	Wondergreen	N	Y	N	N	N	N	N	N	ME
13	CERES, Inc.	CB7290	N	Y	N	N	N	N	N	Y	F
14	CERES, Inc.	F2P134	N	Y	N	N	N	N	N	Y	F
15	Gayland Ward Seed	GW 2120	Y	N	N	N	N	Y	N	N	M
16	Gayland Ward Seed	GW 400 BMR	Y	N	N	Y	N	Y	N	N	ME
17	Gayland Ward Seed	Nutra King BMR6	N	Y	N	Y	N	N	N	N	ME
18	Gayland Ward Seed	Super Sugar	N	Y	N	N	N	N	N	N	E
19	Gayland Ward Seed	Super Sugar (DM)	N	Y	N	N	N	N	N	N	L
20	Gayland Ward Seed	Sweet Forever BMR	N	Y	N	Y	N	N	N	Y	L
21	Gayland Ward Seed	Sweet Six BMR	N	Y	N	Y	N	N	Y	N	E
22	KSU	Kansas Orange	Y	N	N	N	N	N	N	N	M
23	KSU	Sumac	Y	N	N	N	N	N	N	N	M
24	Sharp Brothers	Canex	Y	N	N	N	N	N	N	N	ME
25	Sharp Brothers	Canex BMR 208	Y	N	N	Y	N	N	N	N	M
26	Sharp Brothers	Canex BMR 210	Y	N	N	Y	N	N	N	N	M
27	Sharp Brothers	Canex BMR 600	Y	N	N	Y	N	N	N	N	ML
28	Sharp Brothers	Grazex BMR 301	N	Y	N	Y	N	N	N	N	M
29	Sharp Brothers	Grazex BMR 715	N	Y	N	Y	N	N	N	N	M
30	Sharp Brothers	Grazex BMR 801	N	Y	N	Y	N	N	N	N	M

*Abbreviations: Forage Sorghum (FS), Sorghum Sudan (SS), Sorghum (S), Brown Mid-Rib (BMR), and Photoperiod Sensitive (PS).

** Maturity Groups: Early (E), Medium Early (ME), Medium (M), Medium Late (ML), Late (L), and Full (F).

Hybrid information was provided by seed companies.

FORAGE REPORT 2015

Table 2. 2015 Silage test entries

No.	Company	Entry	FS*	SS	BMR	Dwarf	Male sterile	Dry stalk	PS	Maturity**
1	Alta Seeds	AF7101	Y	N	Y	N	N	Y	N	E
2	Alta Seeds	AF7102	Y	N	Y	Y	N	N	N	E
3	Alta Seeds	AF7201	Y	N	Y	N	N	Y	N	ME
4	Alta Seeds	AF7202	Y	N	Y	Y	N	N	N	ME
5	Alta Seeds	AF7301	Y	N	Y	N	Y	N	N	M
6	Alta Seeds	AF7401	Y	N	Y	Y	N	N	N	F
7	Alta Seeds	AF8301	Y	N	N	N	N	N	N	M
8	Browning Seed	Avenger	Y	N	N	N	N	N	N	MF
9	CERES, Inc.	EJ7281	Y	N	N	N	N	N	N	L
10	CERES, Inc.	DS7853	N	Y	N	N	N	N	Y	F
11	Chromatin, Inc.	SPX28414	Y	N	N	N	N	N	Y	F
12	Chromatin, Inc.	SP3903BD	Y	N	Y	N	N	N	N	MF
13	Chromatin, Inc.	SPX27614	Y	N	N	N	N	N	Y	F
14	Gayland Ward Seed	Sweet Forever BMR	N	Y	Y	N	N	N	Y	L
15	Gayland Ward Seed	Silo Pro BMR	Y	N	Y	Y	N	N	N	M
16	Gayland Ward Seed	GW 600 BMR	Y	N	Y	N	N	Y	N	M
17	KSU	Rox Orange	Y	N	N	N	N	N	N	M
18	Sharp Brothers	Canex BMR 210	Y	N	Y	N	N	N	N	M
19	Sharp Brothers	Canex BMR 525	Y	N	Y	Y	N	N	N	ML
20	Sharp Brothers	Canex BMR 600	Y	N	Y	N	N	N	N	ML
21	Sharp Brothers	Canex BMR 555	Y	N	Y	Y	N	N	N	ML
22	Sharp Brothers	Canex BMR 550	Y	N	Y	Y	N	N	N	ML

*Abbreviations: Forage Sorghum (FS), Sorghum Sudan (SS), Brown Mid-Rib (BMR), and Photoperiod Sensitive (PS).

** Maturity Groups: Early (E), Medium Early (ME), Medium (M), Medium Late (ML), Late (L), and Full (F).

Hybrid information was provided by seed companies.

FORAGE REPORT 2015

Table 3. Irrigation, planting, harvesting, and fertilizing details for hay and silage variety tests near Garden City, Hays, Hutchinson, Mound Valley, and Scandia, KS, in 2015

Location	Irrigation	Planting date	1st harvest date	2nd harvest date	3rd harvest date	Seeding rate	Harvest area	Fertilizer	
								N/a	P ₂ O ₅ /a
	in.						ft ²	----- lb -----	
Hay Test									
Garden City	10.03	16-Jun	17-Aug	26-Oct	-*	15 (lb/a)	90	160	0
Hays	-	11-Jun	10-Aug	-	-	15 (lb/a)	90	50	30
Hutchinson	-	14-Jul	27-Oct	-	-	20 (lb/a)	42	50	0
Mound Valley	-	5-Jun	26-Jul	27-Aug	16-Oct	20 (lb/a)	80	150	60
Scandia	-	24-Jun	1-Sep	-	-	20 (lb/a)	60	50	0
Silage Test									
Garden City	10.03	17-Jun	-**	-	-	60,000 (seeds/a)	202.5	160	0
Hays	-	11-Jun	-	-	-	50,000 (seeds/a)	12.5	50	30
Hutchinson***	-	-	-	-	-	-	-	-	-
Mound Valley	-	5-Jun	-	-	-	100,000 (seeds/a)	100	150	60
Scandia	-	25-Jun	-	-	-	92,400 (seeds/a)	12.5	50	0

*Based on growing conditions and plant regrowth, some sites were cut more than others.

**Silage entries harvested at soft dough or end of season for varieties that did not reach soft dough.

***Hutchinson did not have a silage test.

FORAGE REPORT 2015

Table 4. Hay performance test near Garden City

Brand	Name	Yield 1	Yield 2	Total yield	Height
		-----	lb DM/a -----		in.
			Sorghum sudan		
Alta Seeds	AS5201	9,167	2,334	11,501	108
Alta Seeds	AS6201	8,537	3,822	12,359	114
Alta Seeds	AS6401	6,986	3,189	10,175	101
Alta Seeds	AS6402	8,489	2,955	11,444	92
Alta Seeds	AS6501	8,046	3,193	11,239	123
Alta Seeds	AS9301	8,431	3,573	12,004	105
Alta Seeds	AS9302	7,746	2,104	9,850	93
CERES, Inc.	CB7290	9,417	1,574	10,991	117
CERES, Inc.	F2P134	9,422	1,482	10,904	120
Gayland Ward Seed	Sweet Forever BMR	9,289	1,317	10,606	122
Gayland Ward Seed	Sweet Six BMR	9,293	2,001	11,294	118
			Forage sorghum		
KSU	Rox Orange	8,455	1,607	10,063	93
KSU	Sumac	8,550	1,575	10,125	100
	Average	8,602	2,363	10,966	108
	LSD (0.05)	1,204	629		

continued

Plant date: 6/16/2015

*Days to harvest: Yield 1 = *65; Yield 2 = 70

Table 4. Hay performance test near Garden City, continued

Brand	Name	Forage quality												
		ADF	aNDF	IVTDMD @48	Lignin	NDFD @48	NDFn	NEG	NEL	NEM	NFC	Protein crude	RFQ	TDN
Sorghum sudan														
Alta Seeds	AS5201	42.39	62.29	69.23	4.31	52.33	57.93	0.20	0.50	0.53	18.58	8.89	83.84	50.19
Alta Seeds	AS6201	39.30	59.11	73.97	3.55	58.53	54.97	0.23	0.53	0.56	17.76	11.17	97.46	52.50
Alta Seeds	AS6401	40.66	59.84	75.20	3.33	58.60	55.65	0.22	0.52	0.55	16.31	11.64	92.42	51.59
Alta Seeds	AS6402	39.87	60.37	76.50	2.86	60.78	56.14	0.23	0.53	0.56	15.42	12.19	96.01	52.35
Alta Seeds	AS6501	39.81	59.27	77.40	2.83	62.60	55.12	0.24	0.53	0.56	16.40	11.41	97.54	52.81
Alta Seeds	AS9301	40.55	59.92	72.20	3.71	56.40	55.73	0.22	0.52	0.55	18.05	10.47	92.41	51.61
Alta Seeds	AS9302	40.92	59.95	75.48	3.05	59.65	55.76	0.23	0.53	0.56	17.16	11.05	93.93	52.19
CERES, Inc.	CB7290	41.60	62.52	71.30	3.29	54.73	58.15	0.14	0.37	0.39	16.48	9.65	84.74	36.95
CERES, Inc.	F2P134	43.44	64.22	69.27	4.05	52.33	59.73	0.17	0.48	0.50	15.81	8.98	75.97	47.85
Gayland Ward Seed	Sweet Forever BMR	41.01	63.93	74.30	3.24	58.53	59.45	0.21	0.51	0.53	14.42	10.18	88.12	50.40
Gayland Ward Seed	Sweet Six BMR	41.69	60.73	72.07	3.86	55.40	56.48	0.23	0.53	0.56	19.58	9.51	91.04	52.17
Forage sorghum														
KSU	Rox Orange	38.47	58.63	75.13	2.65	59.18	54.52	0.25	0.54	0.58	20.07	10.94	102.90	53.84
KSU	Sumac	41.24	60.56	72.27	3.62	55.53	56.32	0.23	0.53	0.56	20.62	8.81	92.44	52.50
	Average	40.84	60.87	73.41	3.41	57.28	56.61	0.22	0.51	0.54	17.44	10.38	91.45	50.54
	LSD (0.05)													

FORAGE REPORT 2015

Table 5. Hay performance test near Hays

Brand	Name	Yield	Height
		lb DM/a	in.
Forage sorghum			
Gayland Ward Seed	GW 2120	6,384	69
Gayland Ward Seed	GW 400 BMR	6,745	76
KSU	Rox Orange	7,091	75
KSU	Sumac	8,533	70
Sharp Bros	Canex	7,529	76
Sharp Bros	Canex BMR 208	5,780	79
Sharp Bros	Canex BMR 210	6,864	78
Sharp Bros	Canex BMR 600	6,573	67
	Average	6,937	74
	LSD (0.05)	1,705	5
Sorghum sudan			
Alta Seeds	AS5201	9,368	81
Alta Seeds	AS6201	6,962	82
Alta Seeds	AS6401	7,137	82
Alta Seeds	AS6402	7,316	66
Alta Seeds	AS6501	6,653	86
Alta Seeds	AS9301	7,643	73
Alta Seeds	AS9302	7,464	64
CERES, Inc.	CB7290	6,882	83
CERES, Inc.	F2P134	6,755	80
Sharp Bros	Grazex BMR 301	7,353	80
Sharp Bros	Grazex BMR 715	6,827	88
Sharp Bros	Grazex BMR 801	7,197	90
Gayland Ward Seed	Sweet Forever BMR	7,227	80
Gayland Ward Seed	Sweet Six BMR	7,870	81
Gayland Ward Seed	Nutra King BMR6	7,298	80
Gayland Ward Seed	Super Sugar	8,144	83
Gayland Ward Seed	Sugar Sugar (DM)	8,001	88
	Average	7,418	80
	LSD (0.05)	1,192	9

continued

Plant Date: 6/11/2015

*Days to harvest: *57

Table 5. Hay performance test near Hays, continued

Brand	Name	Forage quality													
		ADF	IVTDMD			NDFD			NEG	NEL	NEM	NFC	Protein crude	RFQ	TDN
			aNDF	@48	Lignin	@48	NDFn								
Forage sorghum															
Gayland Ward Seed	GW 2120	39.02	60.66	72.65	2.91	56.90	56.41	0.22	0.52	0.55	17.28	10.19	95.04	51.84	
Gayland Ward Seed	GW 400 BMR	40.42	60.81	75.17	3.01	60.23	56.55	0.23	0.53	0.56	16.03	10.81	94.62	52.19	
KSU	Rox Orange	40.42	61.18	73.65	3.19	59.35	56.90	0.24	0.54	0.57	19.26	9.11	95.38	53.03	
KSU	Sumac	39.46	61.08	76.00	2.24	60.87	56.81	0.25	0.54	0.57	18.03	9.98	99.56	53.62	
Sharp Bros	Canex	40.91	62.04	74.03	2.71	58.63	57.69	0.23	0.53	0.56	18.29	9.03	92.31	52.33	
Sharp Bros	Canex BMR 208	39.55	61.51	77.07	2.19	60.90	57.21	0.24	0.54	0.57	16.45	10.94	99.36	53.13	
Sharp Bros	Canex BMR 210	39.47	62.21	76.60	2.23	60.75	57.85	0.24	0.53	0.56	16.54	10.45	97.78	52.73	
Sharp Bros	Canex BMR 600	39.85	61.49	78.27	2.27	63.43	57.18	0.24	0.54	0.57	15.60	10.42	98.29	53.12	
	Average	39.89	61.37	75.43	2.59	60.13	57.08	0.24	0.53	0.56	17.18	10.11	96.54	52.75	
	LSD (0.05)														
Sorghum sudan															
Alta Seeds	AS5201	40.59	62.44	71.07	3.21	55.87	58.07	0.22	0.52	0.55	17.74	9.31	91.26	51.63	
Alta Seeds	AS6201	39.58	60.12	76.10	2.29	62.53	55.91	0.25	0.54	0.58	19.39	8.66	98.12	53.87	
Alta Seeds	AS6401	41.17	61.18	77.90	2.43	64.50	56.89	0.24	0.53	0.56	15.69	10.09	95.46	52.86	
Alta Seeds	AS6402	39.62	61.50	77.10	2.48	61.60	57.19	0.25	0.54	0.57	16.32	11.02	100.24	53.39	
Alta Seeds	AS6501	41.81	61.44	77.25	2.63	63.85	57.13	0.22	0.52	0.55	14.96	10.02	91.13	51.87	
Alta Seeds	AS9301	38.50	59.30	75.00	2.40	60.20	55.15	0.25	0.54	0.58	19.20	9.81	101.05	53.78	
Alta Seeds	AS9302	38.61	61.35	75.85	2.56	61.30	57.06	0.26	0.55	0.58	16.80	11.23	104.74	54.29	
CERES, Inc.	CB7290	41.87	62.45	75.05	2.77	61.80	58.07	0.22	0.52	0.55	15.69	9.61	90.44	51.82	
CERES, Inc.	F2P134	39.30	60.31	75.50	2.52	60.47	56.09	0.24	0.54	0.57	18.05	10.24	99.54	53.30	
Sharp Bros	Grazex BMR 301	39.17	60.71	75.73	2.56	61.20	56.46	0.24	0.54	0.57	17.02	10.81	100.44	53.37	
Sharp Bros	Grazex BMR 715	39.74	61.56	74.97	2.42	59.47	57.25	0.24	0.53	0.56	17.31	9.93	96.73	52.77	
Sharp Bros	Grazex BMR 801	39.35	61.49	75.03	2.31	59.37	57.19	0.23	0.53	0.56	16.83	10.41	97.10	52.63	
Gayland Ward Seed	Sweet Forever BMR	38.91	60.58	77.33	2.35	62.37	56.34	0.25	0.54	0.57	16.29	11.06	101.34	53.51	
Gayland Ward Seed	Sweet Six BMR	39.86	61.14	75.10	2.85	61.27	56.86	0.25	0.54	0.58	18.17	9.63	98.86	53.74	
Gayland Ward Seed	Nutra King BMR6	40.57	62.34	76.10	2.48	62.03	57.97	0.24	0.53	0.57	16.89	9.47	95.51	52.94	
Gayland Ward Seed	Super Sugar	42.98	62.87	73.67	3.32	59.50	58.47	0.21	0.51	0.54	15.38	9.67	85.28	50.76	
Gayland Ward Seed	Sugar Sugar (DM)	38.73	60.55	74.43	2.18	59.37	56.31	0.24	0.54	0.57	18.44	10.26	99.44	53.34	
	Average	40.02	61.25	75.48	2.57	60.98	56.97	0.24	0.53	0.57	17.07	10.07	96.86	52.93	
	LSD (0.05)														

FORAGE REPORT 2015

Table 6. Hay performance test near Hutchinson

Brand	Name	Yield
		lb DM/a
	Forage sorghum	
KSU	Rox Orange	10,968
KSU	Sumac	12,016
Sharp Bros	Canex	13,835
Sharp Bros	Canex BMR 208	12,821
Sharp Bros	Canex BMR 210	14,257
Sharp Bros	Canex BMR 600	13,451
	Sorghum sudan	
Alta Seeds	AS5201	12,007
Alta Seeds	AS6201	12,504
Alta Seeds	AS6401	10,711
Alta Seeds	AS6402	11,584
Alta Seeds	AS6501	12,287
Alta Seeds	AS9301	10,744
Alta Seeds	AS9302	12,226
Gayland Ward Seed	Super Sugar	12,149
Gayland Ward Seed	Super Sugar (DM)	14,433
Gayland Ward Seed	Sweet Six BMR	12,232
Sharp Brothers	Grazex BMR 301	11,551
Sharp Brothers	Grazex BMR 715	11,857
Sharp Brothers	Grazex BMR 801	13,092
	Average	12,354
	LSD (0.05)	4,363
<i>continued</i>		

Plant Date: 7/14/2015

*Days to harvest: *105

Table 6. Hay performance test near Hutchinson, continued

Brand	Name	Forage quality												
		ADF	aNDF	IVTDMD @48	Lignin	NDFD @48	NDFn	NEG	NEL	NEM	NFC	Protein crude	RFQ	TDN
Forage sorghum														
KSU	Rox Orange	32.42	51.56	76.33	1.33	59.27	47.95	0.37	0.64	0.69	34.34	7.84	131.25	62.53
KSU	Sumac	32.88	52.85	77.83	1.48	59.30	49.15	0.34	0.62	0.67	30.00	9.36	129.70	60.69
Sharp Bros	Canex	34.19	53.68	76.60	1.51	59.47	49.93	0.33	0.61	0.66	30.60	8.14	121.41	60.20
Sharp Bros	Canex BMR 208	33.89	54.29	77.37	1.24	60.63	50.49	0.35	0.63	0.67	31.08	7.90	125.32	61.18
Sharp Bros	Canex BMR 210	32.20	54.21	78.37	0.99	60.20	50.42	0.36	0.63	0.68	30.94	8.89	133.72	61.84
Sharp Bros	Canex BMR 600	33.37	54.62	79.27	1.30	62.13	50.80	0.35	0.63	0.68	29.29	9.14	133.37	61.44
Sorghum sudan														
Alta Seeds	AS5201	35.58	55.85	73.13	1.50	54.83	51.94	0.33	0.61	0.66	29.77	8.75	122.29	59.74
Alta Seeds	AS6201	33.66	54.27	75.43	1.89	57.43	50.47	0.33	0.61	0.65	28.83	9.48	125.77	59.61
Alta Seeds	AS6401	33.92	55.24	76.70	1.53	60.60	51.38	0.32	0.61	0.65	25.42	11.06	129.20	59.42
Alta Seeds	AS6402	34.44	55.93	77.10	1.83	59.80	52.02	0.34	0.62	0.66	27.47	9.84	129.39	60.28
Alta Seeds	AS6501	32.62	53.94	77.70	1.62	60.37	50.16	0.33	0.61	0.66	26.84	11.10	132.64	60.08
Alta Seeds	AS9301	34.18	54.85	74.87	1.73	58.13	51.01	0.32	0.61	0.65	28.42	9.29	124.23	59.41
Alta Seeds	AS9302	35.83	58.13	73.33	2.33	56.37	54.06	0.30	0.59	0.63	25.39	9.09	115.79	57.69
Gayland Ward Seed	Super Sugar	33.89	54.57	74.53	1.34	56.93	50.75	0.32	0.61	0.65	28.85	8.91	122.71	59.35
Gayland Ward Seed	Super Sugar (DM)	34.04	55.10	74.43	1.75	56.50	51.24	0.33	0.61	0.66	30.14	8.57	123.70	60.01
Gayland Ward Seed	Sweet Six BMR	34.09	54.87	74.07	2.12	56.03	51.03	0.31	0.60	0.64	28.77	8.95	119.45	58.57
Sharp Brothers	Grazex BMR 301	32.41	53.65	75.50	0.72	56.33	49.90	0.34	0.62	0.67	30.09	10.02	131.92	60.69
Sharp Brothers	Grazex BMR 715	33.33	55.24	75.63	1.69	57.40	51.37	0.33	0.61	0.65	29.38	8.55	122.46	59.60
Sharp Brothers	Grazex BMR 801	33.16	56.73	73.90	1.66	54.87	52.76	0.31	0.60	0.64	28.00	9.10	119.17	58.63
	Average	33.69	54.71	75.90	1.56	58.24	50.88	0.33	0.61	0.66	29.14	9.16	125.97	60.05
	LSD (0.05)													

FORAGE REPORT 2015

Table 7. Hay performance test near Mound Valley

Brand	Name	Yield 1	Yield 2	Yield 3	Total	Rust*
----- lb DM/a -----						0-10
Sorghum sudan						
Alta Seeds	AS5201	3,388	2,815	3,469	9,672	1.3
Alta Seeds	AS6201	3,038	2,124	1,952	7,114	2.3
Alta Seeds	AS6401	2,321	1,993	3,273	7,587	3.0
Alta Seeds	AS6402	2,478	1,856	1,965	6,299	1.7
Alta Seeds	AS6501	2,333	2,104	1,109	5,546	4.7
Alta Seeds	AS9301	2,915	2,544	2,456	7,915	2.0
Alta Seeds	AS9302	3,115	2,288	3,520	8,923	2.0
Browning Seed	Sweet Sioux WMR	2,585	2,947	3,678	9,210	3.3
Browning Seed	Sweet Sioux BMR	2,762	2,597	1,393	6,752	3.7
Browning Seed	B-52	2,929	2,180	2,311	7,420	1.3
Browning Seed	747	3,494	2,124	2,379	7,996	3.0
Browning Seed	Wondergreen	3,035	2,348	950	6,333	4.0
Gayland Ward Seed	Sweet Six BMR	3,213	2,119	2,497	8,528	2.0
KSU	Kansas Orange	2,504	2,349	865	5,718	6.0
Forage sorghum						
KSU	Rox Orange	1,511	1,560	1090	4161	4.7
KSU	Sumac	1,933	1,714	870	4517	5.3
	Average	2,722	2,229	2111	7106	3.1
	LSD (0.05)	986				

continued

Plant date: 6/5/2015

Days to harvest: Yield 1 = *41; Yield 2 = 32; Yield 3 = 50

*Visual scale: 0= no rust observed; 10= all plants/plot exhibit rust

Table 7. Hay performance test near Mound Valley, continued

[illegible]

FORAGE REPORT 2015

Table 8. Hay performance test near Scandia

Brand	Name	Yield
		lb DM/a
	Sorghum sudan	
Alta Seeds	AS5201	7,742
Alta Seeds	AS6201	7,240
Alta Seeds	AS6401	5,932
Alta Seeds	AS6402	7,340
Alta Seeds	AS6501	8,078
Alta Seeds	AS9301	6,588
Alta Seeds	AS9302	6,892
Gayland Ward Seed	Nutra King BMR6	7,448
Gayland Ward Seed	Sugar Sugar (DM)	6,600
Gayland Ward Seed	Sweet Six BMR	6,634
Sharp Bros	Grazex BMR 715	6,954
Sharp Bros	Grazex BMR 801	7,774
	Forage sorghum	
Sharp Bros	Canex BMR 210	6,091
Sharp Bros	Canex BMR 600	4,919
KSU	Rox Orange	6,061
KSU	Sumac	6,914
	Average	6,825
	LSD (0.05)	1,566
<i>continued</i>		

Plant date: 6/24/2015

*Days to harvest: 62

Table 8. Hay performance test near Scandia, continued

Brand	Name	Forage quality											RFQ	TDN
		ADF	aNDF	IVTDMD @48	Lignin	NDFD @48	NDFn	NEG	NEL	NEM	NFC	Protein crude		
Sorghum sudan														
Alta Seeds	AS5201	42.09	61.17	72.40	3.72	57.50	56.89	0.24	0.53	0.56	18.62	9.39	92.81	52.78
Alta Seeds	AS6201	39.93	59.56	77.33	2.82	63.60	55.39	0.27	0.56	0.59	17.92	11.12	105.82	55.12
Alta Seeds	AS6401	41.31	60.52	76.33	3.25	63.00	56.28	0.25	0.55	0.58	16.62	11.10	98.11	54.06
Alta Seeds	AS6402	38.02	58.78	80.37	2.03	65.43	54.67	0.28	0.57	0.61	15.29	14.75	109.54	56.26
Alta Seeds	AS6501	41.32	60.04	76.80	2.86	63.17	55.84	0.25	0.54	0.57	16.51	11.19	97.83	53.63
Alta Seeds	AS9301	40.27	60.41	76.17	2.92	61.77	56.18	0.26	0.55	0.59	17.37	11.26	102.15	54.46
Alta Seeds	AS9302	40.53	60.38	76.83	3.14	63.83	56.15	0.27	0.56	0.60	18.78	9.77	104.23	55.43
Gayland Ward Seed	Nutra King BMR6	39.90	59.35	77.13	2.91	62.90	55.20	0.26	0.55	0.59	17.10	11.96	103.66	54.56
Gayland Ward Seed	Sugar Sugar (DM)	41.39	62.03	75.90	2.93	62.47	57.69	0.25	0.54	0.57	17.33	9.23	95.67	53.55
Gayland Ward Seed	Sweet Six BMR	40.01	60.41	75.60	3.16	60.73	56.18	0.27	0.56	0.60	19.74	10.46	105.63	55.38
Sharp Bros	Grazex BMR 715	41.46	62.29	74.80	3.23	60.17	57.93	0.24	0.54	0.57	17.50	9.55	95.76	53.40
Sharp Bros	Grazex BMR 801	43.70	64.38	73.13	3.46	59.53	59.88	0.21	0.51	0.54	14.93	8.79	84.41	51.09
Forage sorghum														
Sharp Bros	Canex BMR 210	39.55	60.08	77.83	2.55	64.50	55.87	0.27	0.56	0.59	18.54	9.79	104.73	55.04
Sharp Bros	Canex BMR 600	41.48	60.66	74.23	3.31	60.17	56.41	0.24	0.54	0.57	17.98	9.91	96.24	53.36
KSU	Rox Orange	39.22	59.35	77.07	3.18	63.53	55.20	0.27	0.56	0.60	18.03	11.09	107.22	55.39
KSU	Sumac	41.63	60.91	72.60	3.84	59.53	56.65	0.24	0.53	0.56	17.68	9.54	93.38	52.73
	Average	40.74	60.72	76.06	3.02	62.06	56.47	0.25	0.55	0.58	17.44	10.59	99.76	54.15
	LSD (0.05)													

Table 9. Silage performance test near Garden City

Brand	Variety	Yield	Stand	Vigor	Flowering date	Days to soft dough	Days to harvest	Height	Lodging	1000 seed wt
		lb DM/a	%					ft	%	
Alta Seeds	AF7101	13,892	55	3	8/21/15	102	106	9	0	37
Alta Seeds	AF7102	10,892	62	3	8/21/15	102	106	7	50	25
Alta Seeds	AF7201	13,851	43	3	8/28/15	102	106	9	0	31
Alta Seeds	AF7202	11,624	71	4	8/28/15	102	106	7	100	23
Alta Seeds	AF7301	14,659	58	4	9/4/15	102	106	8	0	33
Alta Seeds	AF7401	14,623	58	3	9/18/15	119	123	8	0	26
Alta Seeds	AF8301	19,428	65	4	9/8/15	119	123	9	0	32
Browning Seeds	Avenger	13,935	49	4	9/18/15	127	131	8	0	29
CERES, Inc.	DS7853	14,395	68	4	--	--	106	10	0	40
CERES, Inc.	EJ7281	17,260	71	4	9/18/15	102	106	11	50	28
Chromatin	SP3903BD	13,070	53	4	9/18/15	127	131	7	0	28
Chromatin	SPX27614	19,782	59	4	9/18/15	102	106	12	0	28
Chromatin	SPX28414	15,382	55	3	--	--	106	11	0	28
KSU	Kansas Orange	13,952	42	2	9/8/15	122	126	12	0	18
Sharp Brothers	Canex BMR210	11,069	42	3	9/8/15	102	106	9	67	20
Sharp Brothers	Canex BMR525	15,387	54	3	9/11/15	127	131	8	0	26
Sharp Brothers	Canex BMR550	13,120	32	3	9/11/15	127	131	9	0	33
Sharp Brothers	Canex BMR555	13,422	45	3	9/18/15	127	131	7	0	30
Ward Seed	GW600BMR	15,222	71	3	8/17/15	102	106	9	0	34
Ward Seed	Silo Pro BMR	14,617	63	4	9/14/15	119	123	9	0	34
Ward Seed	Sweet Forever BMR	13,801	71	4	--	--	106	10	0	29
	Average	14,447	57	3	9/7/15	113	115	9	13	29
	LSD (0.05)	3,911								

continued

Planting Date: 6/17/15

Emergence Date: 6/22/15

Table 9. Silage performance test near Garden City, continued

		Forage quality												
Brand	Variety	IVTDMD				NDFD					Protein crude	RFQ	TDN	Total starch
		ADF	aNDF	@48	Lignin	Milk	@48	NDFn	NEL	NFC				
		-----	%	-----		lb/ton	-----	%	-----					
Alta Seeds	AF7101	40.70	57.58	70.77	3.55	1946.00	50.80	53.55	0.50	26.90	7.33	98.62	53.07	9.47
Alta Seeds	AF7102	40.33	55.64	72.33	4.00	1941.00	52.37	51.75	0.50	26.87	8.31	105.45	53.37	9.01
Alta Seeds	AF7201	39.85	56.64	72.60	3.20	1975.33	52.67	52.68	0.50	26.06	8.42	101.96	53.77	9.35
Alta Seeds	AF7202	38.94	54.15	74.47	3.23	2001.00	54.73	50.36	0.51	27.64	8.27	109.28	54.40	9.26
Alta Seeds	AF7301	38.34	55.31	73.87	3.44	2136.00	54.67	51.44	0.52	27.41	8.89	111.51	56.20	10.90
Alta Seeds	AF7401	37.07	52.67	75.17	3.58	1798.67	54.03	48.99	0.48	29.83	8.76	107.21	52.03	10.83
Alta Seeds	AF8301	42.90	62.77	67.13	4.59	1693.00	47.87	58.37	0.47	23.39	6.24	79.86	49.17	7.60
Browning Seeds	Avenger	39.32	57.14	72.73	3.59	2015.00	54.90	53.14	0.51	26.87	7.13	105.74	54.67	8.67
CERES, Inc.	DS7853	43.33	66.16	66.30	5.30	1458.00	50.07	61.53	0.43	17.29	8.17	73.99	46.50	5.81
CERES, Inc.	EJ7281	41.17	61.89	68.27	4.76	1877.33	51.73	57.55	0.49	22.89	7.54	90.29	52.23	9.77
Chromatin	SP3903BD	36.48	54.57	75.53	3.03	2133.33	57.33	50.75	0.53	26.24	9.21	115.40	56.63	9.52
Chromatin	SPX27614	42.74	67.35	65.00	5.49	1494.33	47.97	62.63	0.43	18.89	7.46	70.56	46.47	7.09
Chromatin	SPX28414	41.71	64.34	67.57	4.96	1631.67	50.63	59.84	0.45	20.12	8.19	80.42	48.87	8.37
KSU	Kansas Orange	40.60	60.60	66.58	4.88	1798.20	44.68	56.36	0.48	28.70	5.67	80.23	49.94	11.04
Sharp Brothers	Canex BMR210	40.58	58.88	70.70	4.55	1986.00	52.27	54.76	0.51	25.69	7.99	98.03	53.73	9.43
Sharp Brothers	Canex BMR525	35.20	52.97	75.03	3.32	1971.00	54.97	49.26	0.50	29.53	8.53	112.11	54.27	11.46
Sharp Brothers	Canex BMR550	33.58	49.26	75.63	3.12	2000.00	53.61	45.81	0.51	33.09	8.24	118.50	54.47	12.38
Sharp Brothers	Canex BMR555	36.48	53.44	75.23	3.30	2104.00	56.07	49.70	0.52	28.77	8.21	116.50	56.10	10.44
Ward Seed	GW600BMR	41.18	58.48	69.70	4.16	1608.33	49.47	54.38	0.45	26.16	7.22	86.68	48.93	9.38
Ward Seed	Silo Pro BMR	35.35	52.76	75.33	3.06	2153.00	55.53	49.07	0.53	27.82	9.57	118.05	56.57	10.50
Ward Seed	Sweet Forever BMR	41.28	62.15	69.87	5.10	1841.00	55.10	57.80	0.48	20.84	8.66	94.77	52.50	8.15
	Average	39.39	57.85	71.42	4.01	1883.91	52.45	53.80	0.49	25.76	8.00	98.82	52.57	9.45
	LSD (0.05)													

Table 10. Silage performance test near Hays

Brand	Variety	Yield lb DM/a	Yield tons/a	Flowering date	Days to soft dough	Days to harvest	Height in.	1000 seed wt
Alta Seeds	AF7101	7,358	3.7	8/17/15	98	98	83	37.28
Alta Seeds	AF7102	7,417	3.7	8/12/15	98	98	76	25.27
Alta Seeds	AF7201	7,475	3.7	8/12/15	91	91	87	31.17
Alta Seeds	AF7202	7,417	3.7	8/18/15	98	98	68	22.69
Alta Seeds	AF7301	6,720	3.4	8/12/15	91	91	88	32.69
Alta Seeds	AF7401	9,856	4.9	9/10/15	111	111	60	25.69
Alta Seeds	AF8301	9,508	4.8	8/24/15	98	98	68	31.53
CERES, Inc.	DS7853	19,672	9.8	--	141	141	90	39.56
CERES, Inc.	EJ7281	22,169	11.1	9/26/15	132	132	94	27.62
KSU	Kansas Orange	8,172	4.1	8/20/15	98	98	113	18.04
Sharp Brothers Seed Co.	Canex BMR210	7,010	3.5	8/20/15	98	98	94	20.00
Sharp Brothers Seed Co.	Canex BMR525	16,245	8.1	9/10/15	132	132	66	26.11
Sharp Brothers Seed Co.	Canex BMR555	10,030	5.0	9/18/15	132	132	64	30.15
Sharp Brothers Seed Co.	Canex BMR600	18,580	9.3	9/30/15	132	132	87	28.35
Ward Seed	Silo Pro BMR	9,101	4.6	9/18/15	132	132	64	34.10
Ward Seed	Sweet Forever BMR	13,167	6.6	9/4/15	111	111	95	28.61
	Average	11,487	5.7	8/30/15	113	113	81	28.68
	LSD (0.05)	4,717						

continued

Plant Date: 6/11/2015

Table 10. Silage performance test near Hays, continued

Brand	Variety	Forage quality												
		IVTDMD				NDFD				Protein		RFQ	TDN	Total starch
		ADF	aNDF	@48	Lignin	Milk	@48	NDFn	NEL	NFC	crude			
		-----	-----	%	-----	lb/ton	-----	%	-----					
Alta Seeds	AF7101	43.27	62.98	69.80	2.97	1684.33	51.50	58.57	0.46	24.02	5.25	85.88	49.80	7.66
Alta Seeds	AF7102	40.26	56.76	74.50	2.28	1960.67	54.77	52.79	0.50	29.05	6.42	105.76	54.03	10.31
Alta Seeds	AF7201	41.79	60.84	71.70	2.53	1802.33	54.10	56.58	0.47	26.07	5.35	94.81	51.87	8.10
Alta Seeds	AF7202	37.14	50.56	75.50	1.98	2002.33	50.20	47.02	0.51	35.05	7.93	111.06	54.00	13.25
Alta Seeds	AF7301	39.46	57.92	76.50	2.04	2097.00	59.53	53.86	0.52	27.53	6.04	114.11	56.60	9.62
Alta Seeds	AF7401	33.80	51.83	77.40	2.28	2089.33	56.23	48.20	0.51	31.50	9.00	119.73	55.93	11.26
Alta Seeds	AF8301	40.93	62.68	70.83	3.58	1827.33	53.13	58.30	0.48	24.64	5.55	90.82	51.93	7.77
CERES, Inc.	DS7853	38.58	59.09	72.47	3.62	1753.67	53.50	54.95	0.47	27.80	5.43	93.76	50.80	8.52
CERES, Inc.	EJ7281	35.00	50.34	75.53	2.07	1990.00	50.47	46.82	0.51	34.87	8.01	112.86	54.00	13.69
KSU	Kansas Orange	38.10	56.20	72.20	3.07	2059.67	49.47	52.27	0.52	32.35	7.06	100.14	54.23	12.34
Sharp Brothers Seed Co.	Canex BMR210	40.27	59.47	71.97	3.05	1955.33	53.00	55.31	0.50	28.18	6.24	99.63	53.70	9.72
Sharp Brothers Seed Co.	Canex BMR525	35.09	51.65	75.53	2.86	1854.33	52.27	48.03	0.48	33.44	8.03	108.98	52.57	11.43
Sharp Brothers Seed Co.	Canex BMR555	35.38	54.29	76.40	2.19	2112.33	56.77	50.49	0.52	29.35	7.98	116.35	56.30	10.82
Sharp Brothers Seed Co.	Canex BMR600	37.32	58.54	74.73	2.88	2087.33	58.10	54.45	0.52	26.68	6.67	110.14	56.13	8.73
Ward Seed	Silo Pro BMR	38.04	59.45	73.20	2.90	2022.67	55.87	55.29	0.51	26.15	6.60	104.33	54.87	8.45
Ward Seed	Sweet Forever BMR	37.72	56.79	75.43	2.93	2100.33	57.13	52.82	0.52	28.46	7.31	112.02	56.13	9.80
	Average	38.26	56.84	73.98	2.70	1962.44	54.13	52.86	0.50	29.07	6.80	105.02	53.93	10.09
	LSD (0.05)													

Table 11. Silage performance test near Mound Valley

Brand	Variety	Yield	Stand	Flowering date	Days to harvest	Height	Lodging	1000 seed wt
		lb DM/a	%			in.	%	
Alta Seeds	AF7101	10,052	81	7/31/15	90	78	18	37.28
Alta Seeds	AF7102	8,830	85	8/3/15	90	64	27	25.27
Alta Seeds	AF7201	9,367	69	8/3/15	90	67	9	31.17
Alta Seeds	AF7202	8,064	97	8/4/15	90	63	42	22.69
Alta Seeds	AF7301	8,821	62	8/6/15	90	70	12	32.69
Alta Seeds	AF7401	14,173	75	9/5/15	112	66	1	25.69
Alta Seeds	AF8301	16,641	81	8/30/15	112	68	10	31.53
KSU	Kansas Orange	11,737	64	8/12/15	90	94	25	18.04
	Average	10,961	77	8/11/15	96	71	18	28
	LSD (0.05)	2,161						

Plant Date: 6/5/2015

Brand	Variety	Forage quality										Protein crude	RFQ	TDN	Total starch
		ADF	aNDF	IVTDMD		Milk	NDFD		NEL	NFC					
				@48	Lignin		@48	NDFn							
		-----	%	-----		lb/ton	-----	%	-----						
Alta Seeds	AF7101	39.82	61.01	68.53	4.12	1860.67	50.53	56.74	0.49	23.44	7.56	89.52	51.90	7.47	
Alta Seeds	AF7102	38.78	56.13	69.97	4.60	1899.00	49.77	52.20	0.49	25.56	9.10	96.78	52.37	7.35	
Alta Seeds	AF7201	39.16	57.93	67.43	5.83	1729.33	46.60	53.88	0.47	22.40	10.35	85.50	49.60	5.82	
Alta Seeds	AF7202	40.48	59.93	68.13	4.93	1823.67	50.53	55.74	0.48	21.84	8.53	90.28	51.43	4.76	
Alta Seeds	AF7301	38.56	58.37	69.53	4.85	1881.00	50.57	54.29	0.49	20.86	11.18	94.09	52.27	5.01	
Alta Seeds	AF7401	35.99	55.09	73.73	3.46	2125.67	53.77	51.24	0.53	28.02	9.44	109.97	55.87	11.07	
Alta Seeds	AF8301	39.98	59.88	65.17	5.58	1533.00	40.90	55.69	0.45	25.69	7.67	72.72	45.93	8.58	
KSU	Kansas Orange	41.58	63.64	64.00	5.56	1584.00	41.67	59.19	0.46	23.65	7.65	68.00	46.50	7.86	
	Average	39.29	59.00	68.31	4.87	1804.54	48.04	54.87	0.48	23.93	8.94	88.36	50.73	7.24	
	LSD (0.05)														

Table 12. Silage performance test near Scandia

Brand	Variety	Yield lb DM/a	Stand %	Vigor	Days to soft dough	Days to harvest	Height ft	1000 seed wt
Alta Seeds	AF7101	10,873	10	10	81	89	8	37.28
Alta Seeds	AF7102	11,637	7	8	88	89	5	25.27
Alta Seeds	AF7201	13,243	8	8	81	89	8	31.17
Alta Seeds	AF7202	10,918	7	7	88	89	6	22.69
Alta Seeds	AF7301	11,497	10	9	88	89	6	32.69
Alta Seeds	AF7401	14,134	7	8	109	134	5	25.69
Alta Seeds	AF8301	10,225	9	9	109	134	7	31.53
KSU	Kansas Orange	10,119	6	7	95	134	9	18.04
Ward Seed	GW 600 BMR	10,563	10	9	81	89	9	33.98
Ward Seed	Silo Pro BMR	12,738	9	8	116	134	4	34.10
	Average	11,595	8	8	94	107	7	29.24
	LSD (0.05)	2,351						

Plant Date: 6/25/15

Emergence Date: 7/1/15

Brand	Variety	Forage quality												Total starch
		ADF	IVTDMD				NDFD				Protein crude	RFQ	TDN	
			aNDF	@48	Lignin	Milk	@48	NDFn	NEL	NFC				
		----- % -----				lb/ton	----- % -----							
Alta Seeds	AF7101	41.04	59.70	73.37	3.21	1983.67	55.00	55.52	0.50	24.41	8.06	101.52	54.23	7.59
Alta Seeds	AF7102	38.20	56.48	77.33	2.91	2238.33	59.70	52.53	0.54	24.85	9.40	120.03	58.30	8.19
Alta Seeds	AF7201	40.47	57.41	73.37	2.89	2002.00	52.50	53.39	0.51	27.79	7.52	100.99	54.03	9.43
Alta Seeds	AF7202	36.20	53.04	78.03	2.67	2232.67	58.00	49.32	0.54	28.70	9.80	123.73	57.97	10.03
Alta Seeds	AF7301	37.69	56.65	76.50	2.92	2255.67	58.43	52.68	0.54	26.72	9.06	118.28	58.37	9.75
Alta Seeds	AF7401	38.78	54.02	76.03	2.83	2152.67	54.90	50.24	0.53	30.77	8.00	114.75	56.50	11.38
Alta Seeds	AF8301	42.07	61.10	69.93	4.10	1823.67	48.33	56.82	0.48	26.16	6.36	85.78	50.97	8.31
KSU	Kansas Orange	39.52	59.41	69.07	3.68	1953.33	46.17	55.25	0.50	30.03	6.61	87.85	52.17	12.30
Ward Seed	GW 600 BMR	41.51	61.12	73.33	3.82	2007.00	56.60	56.85	0.50	24.60	6.56	102.21	54.90	7.56
Ward Seed	Silo Pro BMR	35.54	54.40	77.20	2.62	2271.33	57.57	50.59	0.54	29.51	8.55	121.31	58.37	11.99
	Average	39.10	57.33	74.42	3.16	2092.03	54.72	53.32	0.52	27.35	7.99	107.64	55.58	9.65
	LSD (0.05)													

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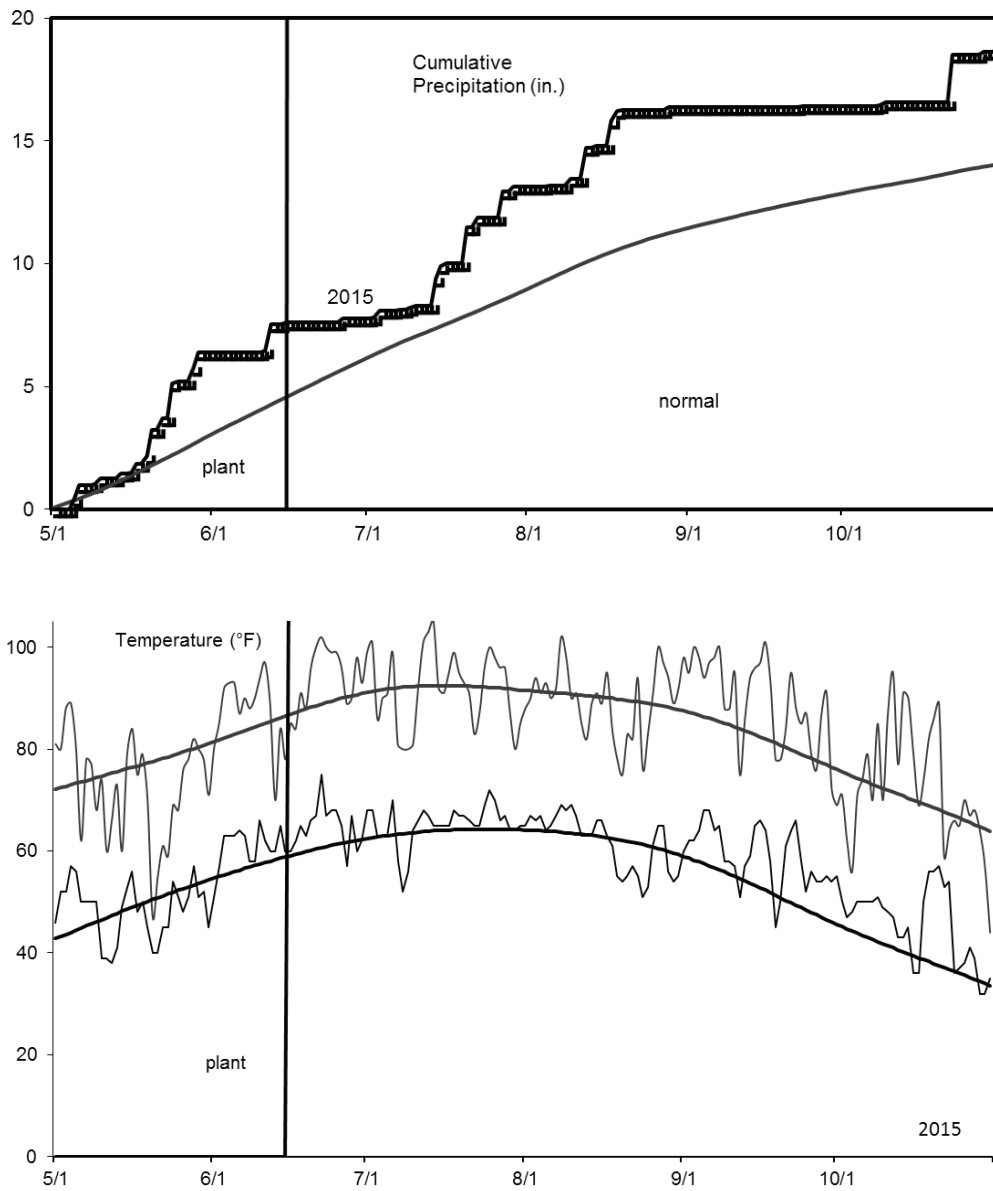


Figure 1. Precipitation and temperature during the growing season near Garden City, KS.
Top pane: daily and mean (1981 to 2010) cumulative precipitation. Bottom pane: daily and mean (1981 to 2010) high and low temperature.

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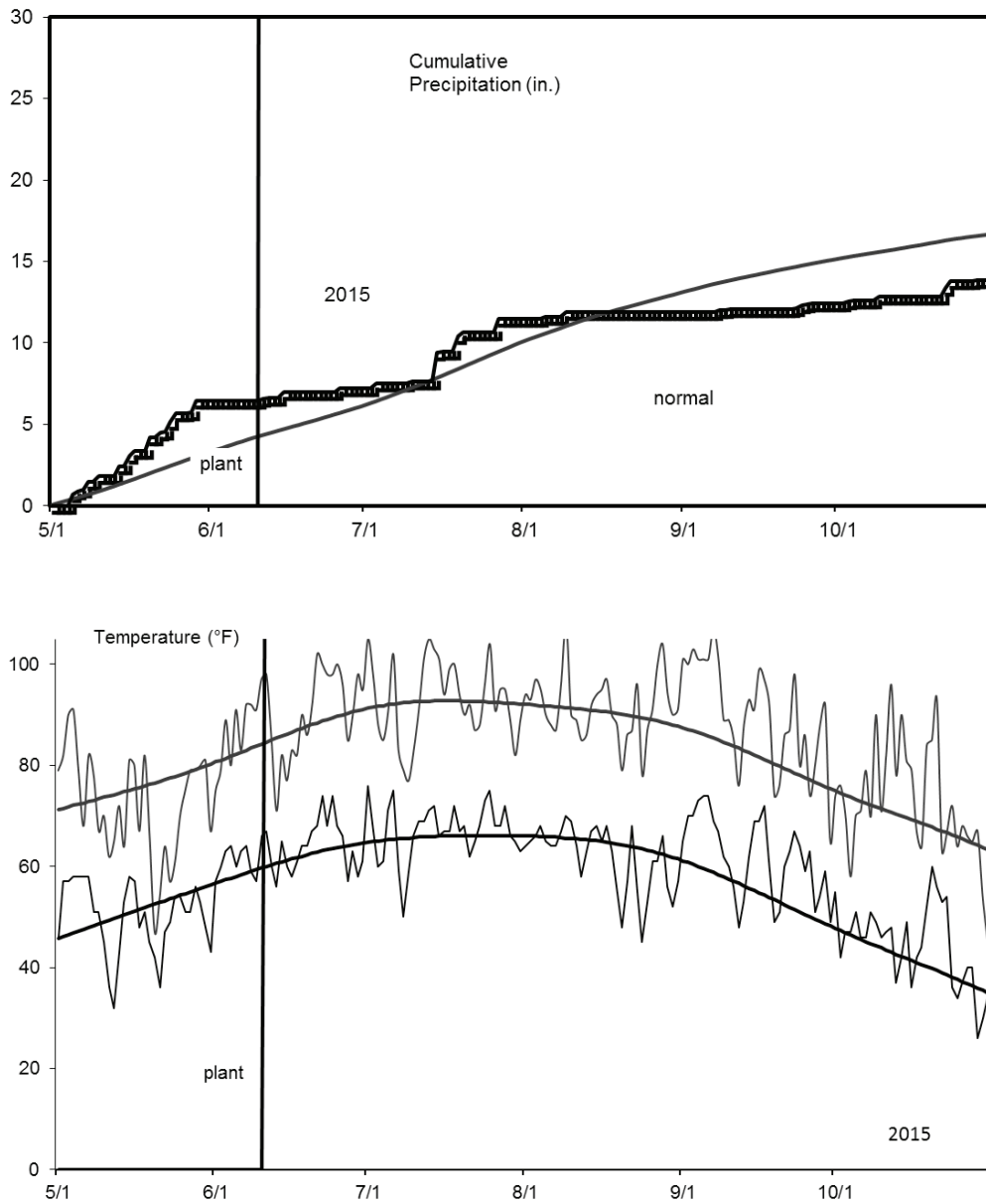


Figure 2. Precipitation and temperature during the growing season near Hays, KS. Top pane: daily and mean (1981 to 2010) cumulative precipitation. Bottom pane: daily and mean (1981 to 2010) high and low temperature.

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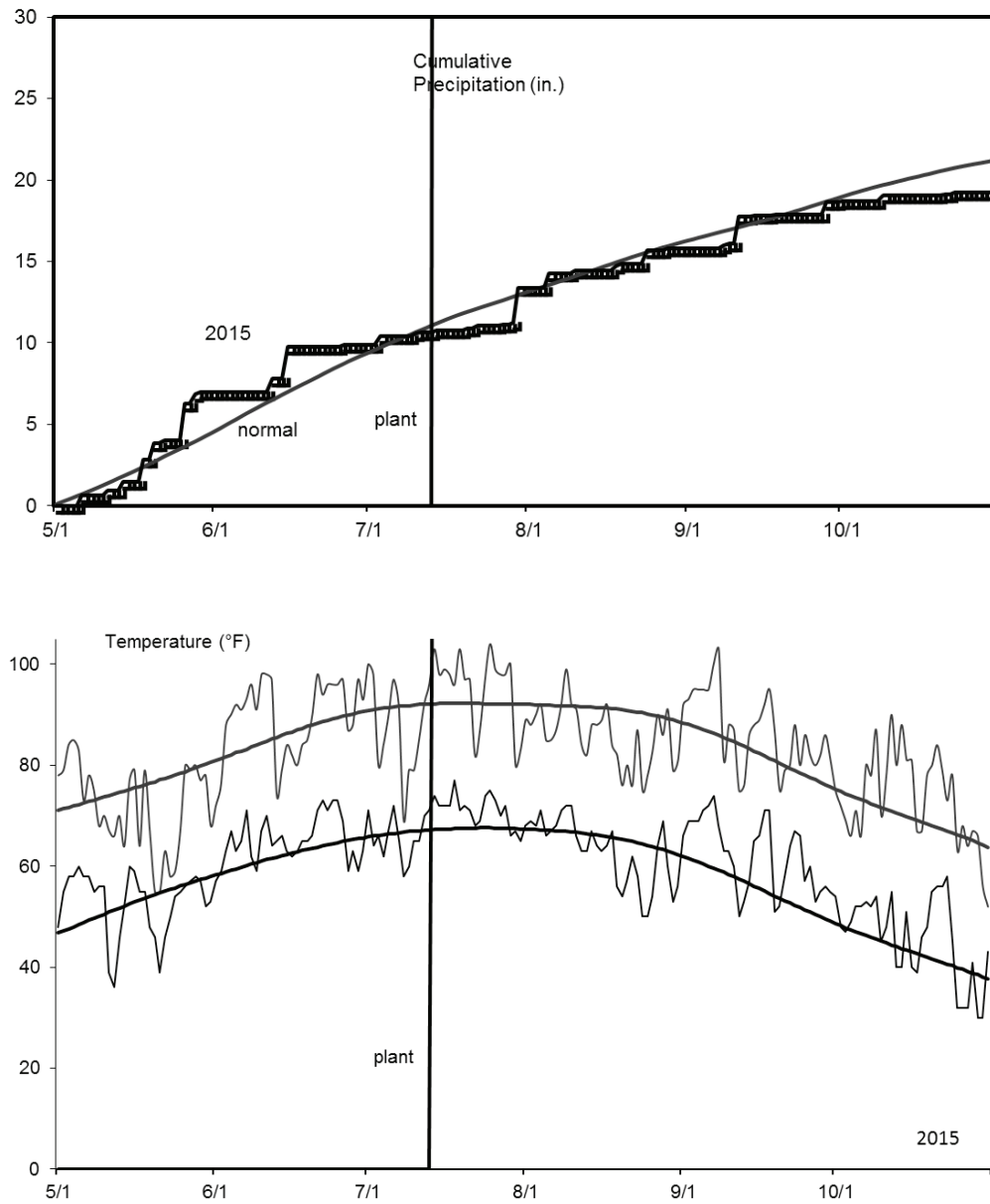


Figure 3. Precipitation and temperature during the growing season near Hutchinson, KS. Top pane: daily and mean (1981 to 2010) cumulative precipitation. Bottom pane: daily and mean (1981 to 2010) high and low temperature.

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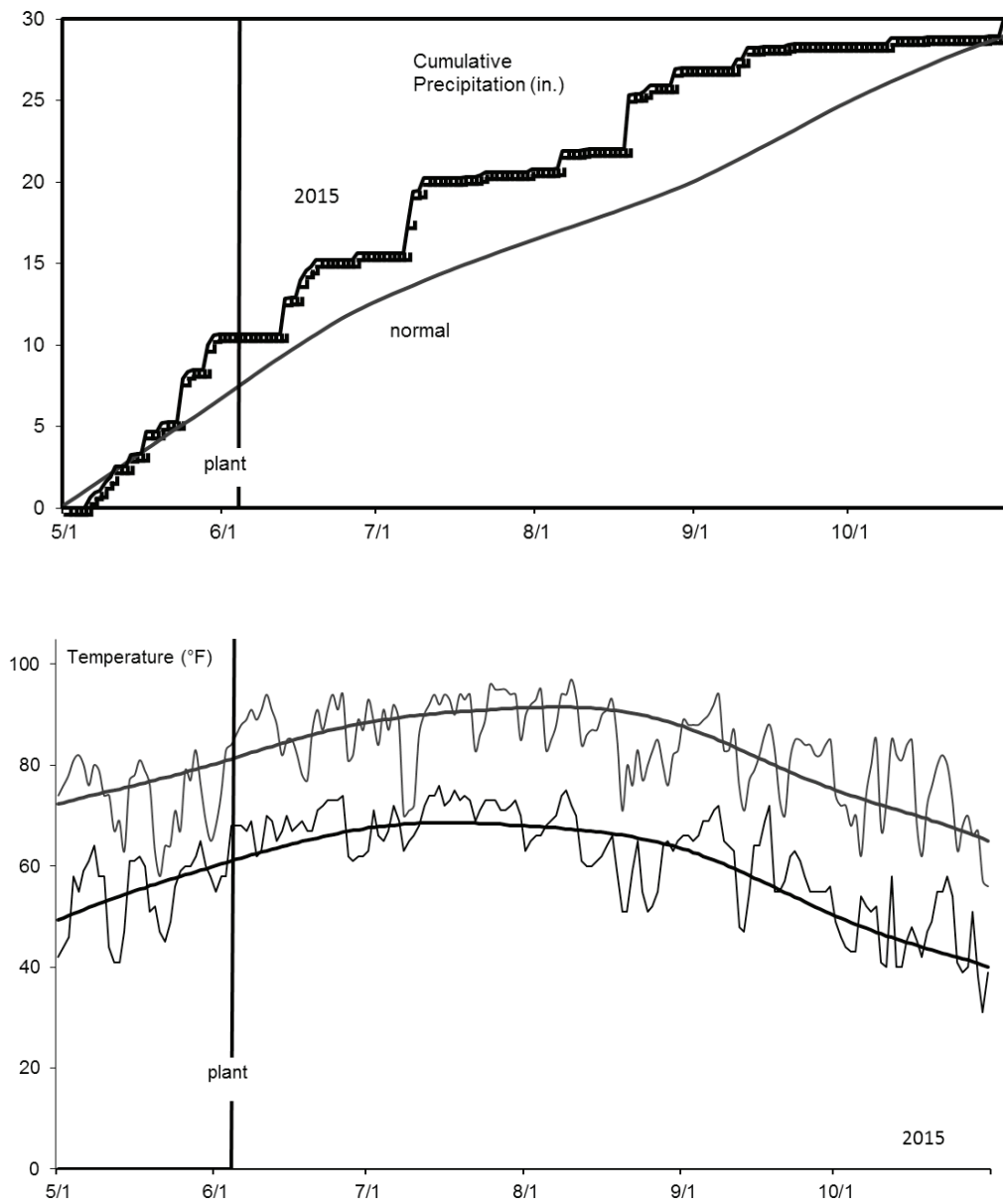


Figure 4. Precipitation and temperature during the growing season near Mound Valley, KS. Top pane: daily and mean (1981 to 2010) cumulative precipitation. Bottom pane: daily and mean (1981 to 2010) high and low temperature.

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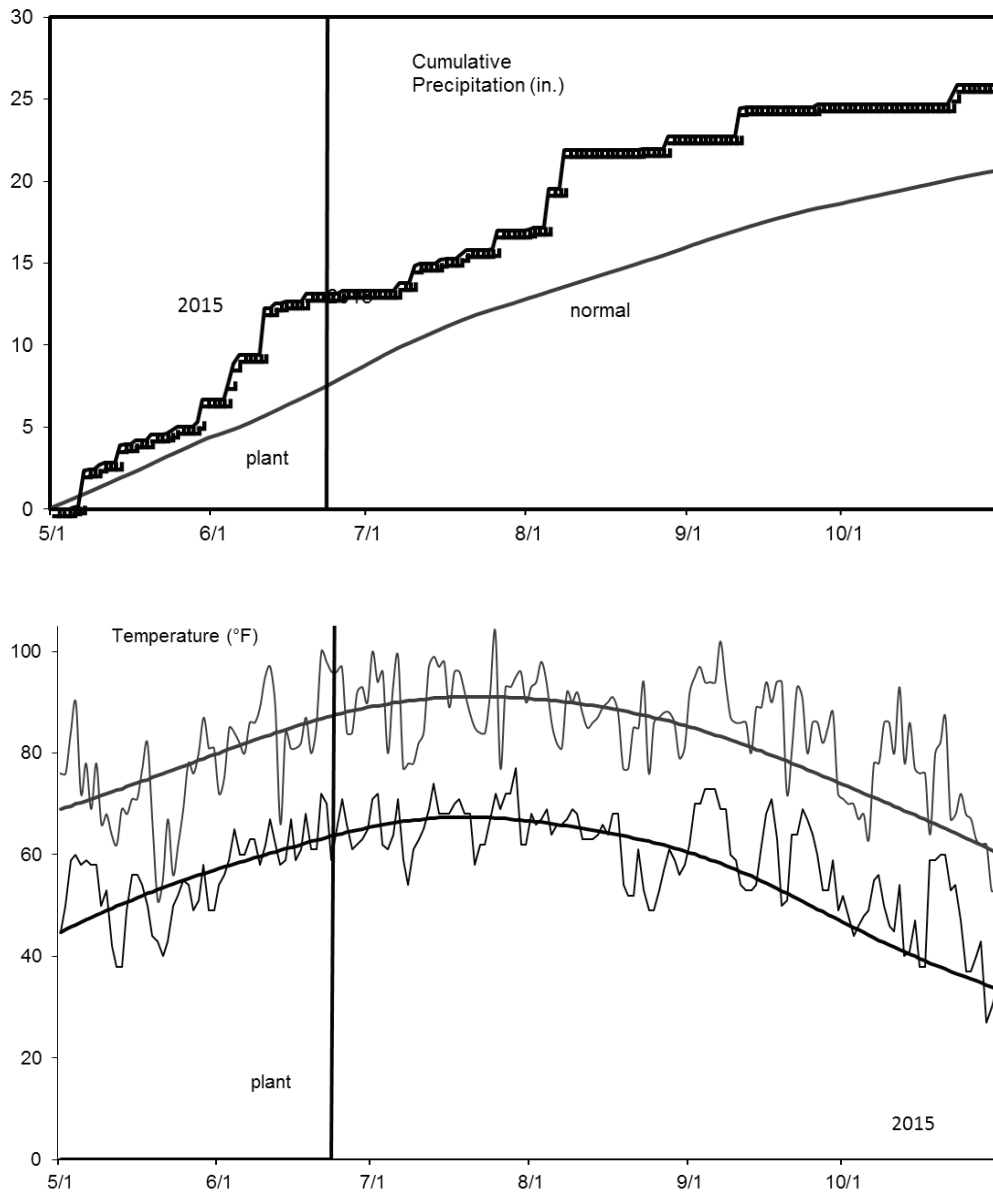


Figure 5. Precipitation and temperature during the growing season near Scandia, KS. Top pane: daily and mean (1981 to 2010) cumulative precipitation. Bottom pane: daily and mean (1981 to 2010) high and low temperature.

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