

FORAGE REPORT 2018



K-STATE
Research and Extension

2018 Kansas Summer Annual Forage Hay and Silage Variety Trial

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Summary

In 2018, summer annual forage variety trials were conducted across Kansas near Garden City, Hays, and Scandia. All sites evaluated hay and silage 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 77 hay varieties and 87 silage varieties were evaluated.

Introduction

Annually there are approximately 35,000,000 acres of hay and haylage harvested in the U.S. for a total of 96,000,000 dry matter tons of production. Yields in Kansas averaged 2.77 tons of dry matter per acre. Of this total, about 13,600,000 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 2,400,000 acres of hay and haylage harvested with an average yield of 2.24 dry matter tons per acre. 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 ranked 6th in the U.S. for hay and haylage production, which largely supports the state dairy (ranked 19th in the U.S. and valued at \$483,000,000) and cattle (feedlot, background, and cow/calf) industries (ranked second in the U.S. and valued at \$10,200,000,000). Dairy and beef cattle represented 58% of the total agricultural product of Kansas. 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 Trial is planted at locations across Kansas based on the interest of those entering varieties into the test.

Procedures

The Summer Annual Forage Variety Test was conducted near Garden City, Hays, and Scandia, KS. All of the sites evaluated hay and silage 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 23 entries at Garden City, 15 at Hays, 9 at Mound Valley, and 11 at Scandia. In the silage test, there were 33 entries at Garden City, 29 at Hays, and 25 at Scandia (Table 1). Across the sites, a total of 77 hay varieties and 87 silage varieties were evaluated. Information on the varieties is shown in Tables 2 and 3.

FORAGE REPORT 2018

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 4), growing season temperature, and precipitation (Figures 1-4) are provided for each site. 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. Nutrient contents measured were acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), lignin, % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), crude protein, relative forage quality (RFQ), total digestible nutrients (TDN), and starch (silage only).

2018 Growing Conditions

Temperature and precipitation (Figures 1-4) 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 “2018” represents actual precipitation.

In general, the 2018 growing season saw near normal temperatures, dry spring conditions, coupled with above average moisture during the remainder of the growing season. Garden City and Hays ended the growing season with twice the normal accumulative precipitation, and Scandia ended with near normal precipitation.

Results and Discussion

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

Hay Test

At Garden City, ADV S6504, AS6402, Nutrimaxx II BMR, and Super Sugar DM were in the top LSD (least significant difference at $P \leq 0.05$) group in the first cutting (Table 5). In the second cutting, more separation occurred between entries. Canex, Millex32, Nutri King BMR, Sweet Forever BMR, and Sweet Six BMR were in the highest yielding LSD group. Combined across cuttings, F75FS13, Sumac, Canex, Canex BMR 210, Millex32, ADV S6504, AS6402, SP4555 BMR, Fullgraze II BMR, Grazex BMR 801, Nutrimaxx II BMR, Nutri King BMR, Super Sugar DM, Sweet Forever BMR, and Sweet Six BMR were in the top LSD group.

At Hays, 374x66, AL374x66, F75FS13, Sumac, ADV S6504, AS6402, Lincoln, 1st Choice BMR, Cadan 99B, High Yield BMR, High Yield Conventional, Danny Boy BMR, Fullgraze II, Fullgraze II BMR, Nutrimaxx II BMR, Mega Green BMR, Nutri King BMR, Super Sugar DM, and Sweet Six BMR had the greatest yield in the top LSD

FORAGE REPORT 2018

group in the first cutting (Table 6). There was no second cutting due to little regrowth caused by soil water ponding and frost in early October.

At Scandia, F75FS13, Rox Orange, ADV S6504, AS6402, Fullgraze II, Bruiser BMR, Nutri King BMR, Super Sugar DM, Sweet Forever BMR, and Sweet Six BMR were in the top LSD group in the first cutting (Table 7). There was no second cutting due to little regrowth caused by soil water ponding and frost in early October.

Silage Test

At Garden City, ADV XF033, AF8301, 705F, Super Sile 20, and Super Sile 30 were in the top LSD group for silage (Table 8).

At Hays, ADV XF033, Silo Mor II BMR, F74FS23 BMR, F76FS77 BMR, Super Sile 20, Super Sile 30, KS Orange, Canex BMR 600, Silex BMR 540, Packer, 4 Ever Green, EXP 10002 BMR, EXP 10218, EXP 10222 BMR, EXP 10225 BMR, EXP 10226 BMR, EXP 10227 BMR, GW 2120, and GW 400 BMR were in the top LSD group for silage (Table 9).

At Scandia, ADV XF033 and Super Sile 30 were in the top LSD group for silage (Table 10).

Recommendation

Inestimable differences in soil type, weather, and environmental conditions play a part in increasing experimental error, therefore one should use more than one location and one year of data to make an informed variety selection decision. Please refer to previous years' forage reports to see how a variety performed across years.

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 U.S.

Table 1. Number of hay and silage entries for each location

Location	Hay	Silage
Garden City	23	33
Hays	36	29
Scandia	18	25
Total	77	87

Table 2. 2018 Hay entries

Year	Company	Variety	Type	BMR	Dwarf	Male sterile	Dry stalk	Photoperiod sensitive	Maturity	Greenbug resistance
2018	Agrilead	AL374x66	FS	N	Y	N	N	N	E	N
2018	Agrilead	374x66	FS	N	Y	N	N	N	E	N
2018	Alta Seeds	AS6402	SS	Y	Y	N	N	N	ML	NA
2018	Alta Seeds	ADV S6504	SS	Y	N	N	N	Y	PS	NA
2018	American Hybrids	Brighton	SS	N	N	N	Y	N	M	N
2018	American Hybrids	Lincoln	SS	Y	N	N	N	N	M	N
2018	American Hybrids	Sugar Sweet	SS	N	N	N	Y	N	M	N
2018	American Hybrids	Navion	SS	Y	N	N	N	N	ML	N
2018	Arrow Seed	1st Choice BMR	SS	Y	N	N	N	N	E	N
2018	Browning Seed	Cadan 99B	SS	N	N	N	Y	N	ML	N
2018	Browning Seed	Sweet Sioux BMR	SS	Y	N	N	N	N	ML	N
2018	Chromatin Inc.	Millex32	MT	N	N	N	N	N	E	NA
2018	Chromatin Inc.	SP4555 BMR	SS	Y	N	N	N	N	M	NA
2018	Chromatin Inc.	SP4105 BMR	SS	Y	Y	N	N	Y	PS	NA
2018	CHS Seed Resources	High Yield Conventional	SS	N	N	N	N	N	L	NA
2018	CHS Seed Resources	High Yield BMR	SS	Y	N	N	N	N	L	NA
2018	CHS Seed Resources	High Yield BMR Dwarf	SS	Y	Y	N	N	N	ME	NA
2018	CHS Seed Resources	PearlPlus BMR	MT	Y	N	N	N	N	ML	NA
2018	CHS Seed Resources	High Yield BMR PS	SS	Y	N	N	N	Y	PS	NA
2018	Dyna-Gro Seed	PearlMil	MT	N	N	N	N	N	M	N

continued

Table 2. 2018 Hay entries

Year	Company	Variety	Type	BMR	Dwarf	Male sterile	Dry stalk	Photoperiod sensitive	Maturity	Greenbug resistance
2018	Dyna-Gro Seed	F75FS13	FS	N	N	N	N	N	M	N
2018	Dyna-Gro Seed	Fullgraze BMR	SS	Y	N	N	N	N	MF	N
2018	Dyna-Gro Seed	Fullgraze II	SS	N	N	N	N	N	MF	N
2018	Dyna-Gro Seed	Fullgraze II BMR	SS	Y	N	N	N	N	MF	N
2018	Dyna-Gro Seed	Danny Bo BMR	SS	Y	N	N	N	Y	PS	N
2018	KSU (check)	Rox Orange	FS	N	N	N	N	N	M	N
2018	KSU (check)	Early Sumac	FS	N	N	N	N	N	M	N
2018	KSU (check)	Mixed Cane	FS	NA	NA	NA	NA	NA	NA	NA
2018	Sharp Bros Seed	Canex	FS	N	N	Y	N	N	ME	N
2018	Sharp Bros Seed	Canex BMR 210	FS	Y	N	N	N	N	ME	N
2018	Sharp Bros Seed	Grazex BMR 801	SS	Y	N	Y	N	N	ME	N
2018	Star Seed	Nutrimaxx II BMR	SS	Y	N	N	N	N	L	NA
2018	Star Seed	Bruiser BMR	SS	Y	N	N	N	N	ME	NA
2018	Walter Moss Seed	Mega Green	SS	N	N	N	N	Y	PS	Y
2018	Walter Moss Seed	Mega Green BMR	SS	Y	N	N	N	Y	PS	Y
2018	Ward Seed	Sweet Six BMR	SS	Y	N	N	Y	N	E	NA
2018	Ward Seed	Super Sugar DM	SS	N	N	N	N	N	L	NA
2018	Ward Seed	Nutri King BMR	SS	Y	N	N	N	N	ME	NA
2018	Ward Seed	Sweet Forever BMR	SS	Y	N	N	N	Y	PS	NA

Hybrid information was provided by seed companies.

Abbreviations: Forage sorghum (FS), sorghum sudan (SS), sorghum (S), brown mid-rib (BMR), photoperiod sensitive (PS), not applicable (NA).

Maturity groups: Early (E), medium early (ME), medium (M), medium late (ML), late (L), and full (F).

Table 3. 2018 Silage Entries

Company	Variety	Type	BMR	Dwarf	Male sterile	Dry stalk	Photoperiod sensitive	Maturity	Greenbug resistance	1000 seed weight, grams
Agrilead	AL374x66	FS	N	N	Y	N	N	E	N	26.98
Agrilead	374x66	FS	N	N	Y	N	N	E	N	26.96
Alta Seeds	AF7401	FS	Y	Y	N	N	N	ML	NA	23.35
Alta Seeds	ADV XF372	FS	Y	Y	N	N	N	M	NA	25.55
Alta Seeds	AF8301	FS	N	N	N	N	N	M	NA	31.83
Alta Seeds	ADV XF033	FS	N	N	N	N	N	M	NA	36.54
Arrow Seed	Silo Mor II BMR	FS	Y	N	N	N	N	ML	N	29.41
Chromatin Inc.	NK300	FS	N	N	N	N	N	ME	N	32.79
Chromatin Inc.	SP2876 BMR	FS	Y	N	N	N	N	M	N	28.53
Chromatin Inc.	SP3808SB BMR	FS	Y	Y	N	N	N	F	NA	26.25
Chromatin Inc.	SP4555 BMR	SS	Y	N	N	N	N	M	NA	30.55
Dyna-Gro Seed	705F	FS	N	N	N	N	N	EM	N	31.33
Dyna-Gro Seed	Super Sile 30	FS	N	N	N	N	N	EM	N	29.08
Dyna-Gro Seed	F74FS23 BMR	FS	Y	N	N	N	N	M	N	32.38
Dyna-Gro Seed	F76FS77 BMR	FS	Y	Y	N	N	N	ML	C	32.51
Dyna-Gro Seed	FX18340	FS	N	N	N	N	N	ML	N	32.67
Dyna-Gro Seed	Super Sile 20	FS	N	N	N	N	N	ML	N	23.35

continued

Table 3. 2018 Silage Entries

Company	Variety	Type	BMR	Dwarf	Male sterile	Dry stalk	Photoperiod sensitive	Maturity	Greenbug resistance	1000 seed weight, grams
KSU (check)	KS Orange	FS	N	N	N	N	N	M	N	18.40
Sharp Bros Seed	Canex BMR 210	FS	Y	N	N	N	N	M	N	26.20
Sharp Bros Seed	Canex BMR 600	FS	Y	N	Y	N	N	ML	N	27.95
Sharp Bros Seed	Silex BMR 540	FS	Y	Y	N	N	N	ML	N	28.78
Star Seed	Packer	FS	N	N	N	N	N	ML	NA	27.32
Star Seed	Brutus BMR	FS	N	N	N	N	N	ML	NA	29.53
Walter Moss Seed	4 Ever Green	FS	N	N	N	N	Y	PS	Y	27.44
Ward Seed	Silo Pro BMR	FS	Y	Y	Y	N	N	M	Y	29.61
Ward Seed	GW 400 BMR	FS	Y	N	Y	N	N	ME	Y	24.98
Ward Seed	GW 475 BMR	FS	Y	N	Y	Y	N	E	Y	29.92
Ward Seed	GW 2120	FS	N	N	Y	N	N	M	Y	24.96
Ward Seed	EXP 10218	FS	N	Y	N	N	N	L	Y	29.09
Ward Seed	EXP 10002 BMR	FS	Y	Y	N	Y	N	M	Y	20.73
Ward Seed	EXP 10222 BMR	FS	Y	Y	N	Y	N	M	Y	25.00
Ward Seed	EXP 10225 BMR	FS	Y	Y	N	Y	N	M	Y	30.98
Ward Seed	EXP 10226 BMR	FS	Y	Y	N	Y	N	M	Y	25.40
Ward Seed	EXP 10227 BMR	FS	Y	Y	N	Y	N	ME	Y	29.68
Ward Seed	EXP 10228 BMR	FS	Y	Y	N	Y	N	ME	Y	25.79

Hybrid information was provided by seed companies.

Abbreviations: Forage sorghum (FS), sorghum sudan (SS), sorghum (S), brown mid-rib (BMR), photoperiod sensitive (PS), not applicable (NA).

Maturity groups: Early (E), medium early (ME), medium (M), medium late (ML), late (L), and full (F).

Table 4. Irrigation, planting, harvesting, and fertilizing details for hay and silage variety tests near Garden City, Hays, and Scandia, KS, in 2018

Location	Irrigation	Planting date	1st harvest date(s)	2nd harvest	Seeding rate	Harvest area	Fertilizer	
				date			lb N/a	lb P ₂ O ₅ /a
	in.				lb/a	ft ²		
Hay test								
Garden City	9.17	5-Jun	2-Aug / 14-Aug / 27-Aug	2-Nov	20	360		0
Hays	---	15-Jun	28-Aug / 18-Sep / 25-Sep	---	15	90	50	30
Scandia	---	14-Jun	28-Aug	---	30	60	50	0
Silage test								
					Seeds/a			
Garden City	9.17	4-Jun	14-Sep / 27-Sep	---	100000	225	180	0
Hays	---	15-Jun	18-Sep / 2-Oct / 16-Oct	---	50000	25	50	30
Scandia	---	14-Jun	17-Sep / 24-Sep / 27-Sep	---	80800	67.5	50	

**Table 5a. Hay performance test near Garden City
2018 Garden City, Kansas Hay Performance Test, Finney County**

Brand	Name	Performance					
		1st cutting	2nd cutting	Total yield	1st cutting	2nd cutting	1st height
		----- lb DM/a -----			----- % moisture -----		in.
Forage sorghum							
Dyna-Gro Seed	F75FS13	8251	3835	12086	0.83	0.47	94
KSU (check)	Early Sumac	7931	4093	12024	0.84	0.48	79
KSU (check)	Mixed Cane	7202	4109	11310	0.84	0.46	84
KSU (check)	Rox Orange	6471	2166	8637	0.85	0.42	69
Sharp Bros Seed	Canex	7323	4987	12309	0.86	0.59	100
Sharp Bros Seed	Canex BMR 210	9341	3239	12580	0.84	0.47	93
Millet							
Chromatin Inc.	Millex32	7128	4866	11995	0.86	0.34	88
Dyna-Gro Seed	PearlMil	7163	3823	10986	0.83	0.30	85
Sorghum sudan							
Alta Seeds	ADV S6504	10483	1852	12335	0.85	0.35	77
Alta Seeds	AS6402	10700	1292	11992	0.80	0.32	73
Chromatin Inc.	SP4105 BMR	10260	1065	11325	0.85	0.37	69
Chromatin Inc.	SP4555 BMR	6598	5548	12146	0.87	0.60	97
Dyna-Gro Seed	Danny Boy BMR	6090	5451	11542	0.88	0.63	99
Dyna-Gro Seed	Fullgraze BMR	9411	1123	10534	0.83	0.34	83
Dyna-Gro Seed	Fullgraze II	7361	3614	10974	0.86	0.51	101
Dyna-Gro Seed	Fullgraze II BMR	10135	2545	12680	0.81	0.46	90
Sharp Bros Seed	Grazex BMR 801	8852	4203	13055	0.83	0.41	109
Star Seed	Bruiser BMR	7968	3298	11266	0.84	0.47	79
Star Seed	Nutrimaxx II BMR	12243	1271	13514	0.83	0.43	99
Ward Seed	Nutri King BMR	7321	5455	12775	0.86	0.57	87
Ward Seed	Super Sugar DM	11479	2475	13954	0.81	0.38	99
Ward Seed	Sweet Forever BMR	6054	5673	11727	0.85	0.54	98
Ward Seed	Sweet Six BMR	7531	5941	13473	0.86	0.57	96
	Average	8404	3562	11966	0.84	0.46	89.09
	LSD (0.05)	1776	1352	2305			

**Table 5b. Hay performance test near Garden City
2018 Garden City, Kansas Hay Performance Test, Finney County**

Brand	Name	Forage quality											Crude protein	RFQ	TDN
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC				
----- % -----															
Forage sorghum															
Dyna-Gro Seed	F75FS13	39.56	61.62	72.77	8.24	54.33	57.31	0.22	0.52	0.55	18.60	10.23	93.82	51.85	
KSU (check)	Early Sumac	37.91	60.10	71.40	8.38	50.93	55.89	0.24	0.53	0.56	21.72	9.75	97.54	52.68	
KSU (check)	Mixed Cane	39.32	63.48	70.07	8.37	51.13	59.03	0.21	0.51	0.54	17.63	10.74	92.74	51.05	
KSU (check)	Rox Orange	38.24	61.65	72.80	7.55	55.77	57.34	0.26	0.55	0.58	21.95	8.45	98.82	54.25	
Sharp Bros Seed	Canex	38.69	61.16	72.77	8.13	54.07	56.88	0.24	0.54	0.57	21.08	9.90	99.57	53.35	
Sharp Bros Seed	Canex BMR 210	38.39	61.59	74.10	8.27	56.63	57.28	0.24	0.54	0.57	19.34	9.90	100.14	53.36	
Millet															
Chromatin Inc.	Millex32	41.60	64.39	71.37	9.31	54.67	59.88	0.21	0.51	0.53	14.26	12.44	87.17	50.50	
Dyna-Gro Seed	PearlMil	39.46	62.79	73.80	8.41	58.03	58.40	0.24	0.53	0.56	16.83	11.36	95.13	52.81	
Sorghum sudan															
Alta Seeds	ADV S6504	43.19	66.82	70.90	8.23	54.77	62.15	0.19	0.49	0.52	15.18	8.69	79.23	49.17	
Alta Seeds	AS6402	42.18	65.24	70.20	8.36	51.73	60.67	0.19	0.49	0.52	15.26	10.47	82.90	49.12	
Chromatin Inc.	SP4105 BMR	41.67	64.13	71.20	8.32	53.33	59.64	0.19	0.49	0.52	15.77	9.76	83.53	49.38	
Chromatin Inc.	SP4555 BMR	38.89	59.99	74.23	8.09	55.53	55.79	0.22	0.52	0.55	17.16	11.70	94.11	51.48	
Dyna-Gro Seed	Danny Boy BMR	41.17	62.42	76.73	8.14	62.43	58.05	0.24	0.53	0.57	14.49	12.27	95.92	53.02	
Dyna-Gro Seed	Fullgraze BMR	40.70	63.56	73.20	8.47	55.33	59.11	0.22	0.52	0.55	19.75	8.38	88.60	51.63	
Dyna-Gro Seed	Fullgraze II	40.27	65.07	68.27	9.14	50.50	60.52	0.19	0.49	0.52	16.29	9.40	84.32	49.17	
Dyna-Gro Seed	Fullgraze II BMR	42.76	67.71	67.43	8.07	49.73	62.97	0.18	0.48	0.51	16.69	7.73	75.13	48.48	
Sharp Bros Seed	Grazex BMR 801	42.66	65.98	67.53	9.43	49.57	61.36	0.18	0.49	0.51	15.08	10.30	80.39	48.65	
Star Seed	Bruiser BMR	38.37	62.47	75.63	7.82	60.47	58.09	0.26	0.55	0.59	18.40	9.89	104.13	54.56	
Star Seed	Nutrimaxx II BMR	42.01	63.13	71.80	9.47	51.13	58.71	0.18	0.49	0.51	18.60	8.97	80.62	48.80	
Ward Seed	Nutri King BMR	38.37	60.12	76.57	7.56	60.10	55.91	0.24	0.54	0.57	16.47	12.18	100.73	53.11	
Ward Seed	Super Sugar DM	40.82	63.26	68.93	8.90	48.93	58.83	0.20	0.50	0.53	20.71	8.43	84.34	50.31	
Ward Seed	Sweet Forever BMR	40.64	62.46	70.97	9.09	52.07	58.08	0.21	0.51	0.54	17.84	10.99	90.08	50.86	
Ward Seed	Sweet Six BMR	40.28	62.43	74.77	7.99	58.57	58.06	0.24	0.53	0.57	17.04	10.94	97.68	53.02	
	Average	40.31	63.53	72.06	8.42	54.34	58.69	0.22	0.52	0.54	17.66	10.12	90.72	51.33	

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

**Table 6a. Hay performance test near Hays
2018 Hays, Kansas Forage Hay Performance Test, Ellis County**

Brand	Name	Performance		
		1st cutting lb DM/a	1st cutting % moisture	1st height in.
Forage sorghum				
Agrilead	374x66	10211	0.74	84
Agrilead	AL374x66	8635	0.72	89
Dyna-Gro Seed	F75FS13	9609	0.72	88
KSU (check)	Early Sumac	9520	0.75	101
KSU (check)	Mixed Cane	6311	0.74	99
KSU (check)	Rox Orange	7958	0.76	88
Sharp Bros Seed	Canex	7185	0.74	95
Sharp Bros Seed	Canex BMR 210	7100	0.72	95
Millet				
CHS Seed Resources	PearlPlus BMR	5189	0.71	50
Dyna-Gro Seed	PearlMil	3466	0.70	72
Sorghum sudan				
Alta Seeds	ADV S6504	9862	0.72	87
Alta Seeds	AS6402	8983	0.67	74
American Hybrids	Brighton	8529	0.68	112
American Hybrids	Lincoln	8915	0.71	88
American Hybrids	Navion	8515	0.69	85
American Hybrids	Sugar Sweet	8412	0.69	106
Arrow Seed	1st Choice BMR	8771	0.73	89
Browning Seed	Cadan 99B	8897	0.69	111
Browning Seed	Sweet Sioux BMR	6932	0.74	89

continued

**Table 6a. Hay performance test near Hays
2018 Hays, Kansas Forage Hay Performance Test, Ellis County**

Brand	Name	Performance		
		1st cutting lb DM/a	1st cutting % moisture	1st height in.
CHS Seed Resources	High Yield BMR	8970	0.67	88
CHS Seed Resources	High Yield BMR Dwarf	5395	0.71	83
CHS Seed Resources	High Yield BMR PS	8573	0.71	89
CHS Seed Resources	High Yield Conventional	10727	0.66	98
Dyna-Gro Seed	Danny Boy BMR	8835	0.69	90
Dyna-Gro Seed	Fullgraze BMR	7414	0.70	89
Dyna-Gro Seed	Fullgraze II	10758	0.66	100
Dyna-Gro Seed	Fullgraze II BMR	10398	0.65	77
Sharp Bros Seed	Grazex BMR 801	7841	0.65	98
Star Seed	Bruiser BMR	6370	0.72	88
Star Seed	Nutrimaxx II BMR	9196	0.71	109
Walter Moss Seed	Mega Green	8319	0.68	86
Walter Moss Seed	Mega Green BMR	9678	0.71	86
Ward Seed	Nutri King BMR	9947	0.70	100
Ward Seed	Super Sugar DM	10646	0.68	103
Ward Seed	Sweet Forever BMR	7997	0.68	89
Ward Seed	Sweet Six BMR	8935	0.68	91
	Average	8417	0.70	90.66
	LSD (0.05)	2183		

**Table 6b. Hay performance test near Hays
2018 Hays, Kansas Forage Hay Performance Test, Ellis County**

Brand	Name	Forage quality												
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ	TDN
----- % -----														
Forage sorghum														
Agrilead	374x66	40.10	62.83	72.90	6.72	55.10	58.43	0.26	0.55	0.58	22.48	7.99	96.68	54.36
Agrilead	AL374x66	40.11	62.58	72.40	6.51	54.57	58.20	0.25	0.55	0.58	22.12	8.34	96.88	53.97
Dyna-Gro Seed	F75FS13	39.32	61.88	73.77	6.27	55.63	57.55	0.28	0.57	0.61	25.82	6.81	98.13	55.96
KSU (check)	Early Sumac	39.51	61.24	74.30	6.44	56.43	56.96	0.28	0.57	0.61	25.90	7.01	99.58	56.13
KSU (check)	Mixed Cane	40.33	63.31	73.20	6.47	56.00	58.88	0.26	0.55	0.59	23.72	6.50	92.38	54.72
KSU (check)	Rox Orange	40.82	63.28	72.93	6.27	56.00	58.85	0.25	0.54	0.57	20.91	8.20	94.91	53.62
Sharp Bros Seed	Canex	38.23	60.32	74.07	6.60	54.90	56.10	0.28	0.57	0.61	26.48	7.37	101.02	56.02
Sharp Bros Seed	Canex BMR 210	35.95	57.93	79.77	6.31	62.90	53.87	0.34	0.62	0.67	29.80	7.16	118.74	60.47
Millet														
CHS Seed Resources	PearlPlus BMR	37.76	58.73	75.83	6.19	58.43	54.62	0.27	0.56	0.59	22.62	8.84	103.03	54.92
Dyna-Gro Seed	PearlMil	40.08	59.20	73.47	6.55	53.70	55.06	0.24	0.53	0.56	25.05	6.42	86.79	52.84
Sorghum sudan														
Alta Seeds	ADV S6504	40.59	63.07	73.00	6.39	56.17	58.66	0.25	0.54	0.58	22.55	6.33	89.60	53.88
Alta Seeds	AS6402	39.32	61.01	75.00	6.19	58.20	56.74	0.28	0.57	0.60	24.72	6.17	94.50	55.91
American Hybrids	Brighton	39.87	64.15	69.27	6.95	49.77	59.66	0.24	0.53	0.57	22.87	7.46	90.56	52.92
American Hybrids	Lincoln	36.55	59.05	76.63	5.78	58.43	54.91	0.29	0.58	0.62	25.45	8.51	110.51	57.09
American Hybrids	Navion	39.54	59.70	73.37	6.41	53.90	55.52	0.25	0.54	0.57	23.25	7.39	92.86	53.59
American Hybrids	Sugar Sweet	39.70	61.93	71.83	7.15	52.20	57.59	0.27	0.56	0.59	26.34	6.87	94.78	55.14
Arrow Seed	1st Choice BMR	38.54	61.45	75.47	6.19	58.17	57.15	0.28	0.57	0.61	22.37	8.93	107.03	56.06
Browning Seed	Cadan 99B	40.48	64.42	70.17	7.27	51.57	59.91	0.24	0.54	0.57	22.49	7.13	88.69	53.03
Browning Seed	Sweet Sioux BMR	39.35	61.25	73.77	6.39	55.30	56.96	0.25	0.54	0.57	21.17	8.93	97.41	53.53

continued

**Table 6b. Hay performance test near Hays
2018 Hays, Kansas Forage Hay Performance Test, Ellis County**

Brand	Name	Forage quality												
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ	TDN
CHS Seed Resources	High Yield BMR	37.60	59.35	77.03	5.86	60.17	55.19	0.31	0.59	0.64	27.16	6.23	105.11	58.29
CHS Seed Resources	High Yield BMR Dwarf	39.34	62.49	76.17	6.12	61.23	58.11	0.29	0.58	0.62	24.75	5.88	97.57	56.74
CHS Seed Resources	High Yield BMR PS	38.54	61.11	77.80	6.01	62.63	56.84	0.32	0.60	0.65	30.34	3.59	91.00	59.29
CHS Seed Resources	High Yield Conventional	42.49	63.21	69.23	7.51	49.60	58.79	0.23	0.53	0.56	25.16	4.84	75.41	52.27
Dyna-Gro Seed	Danny Boy BMR	39.37	60.39	75.83	5.78	58.60	56.16	0.27	0.56	0.60	22.91	7.84	100.53	55.17
Dyna-Gro Seed	Fullgraze BMR	40.11	62.89	73.53	6.89	55.60	58.48	0.27	0.56	0.60	25.30	5.84	91.93	55.38
Dyna-Gro Seed	Fullgraze II	41.64	65.46	68.80	7.05	51.80	60.88	0.24	0.54	0.57	23.44	5.41	81.01	53.22
Dyna-Gro Seed	Fullgraze II BMR	40.98	63.96	71.97	6.81	55.77	59.48	0.27	0.56	0.60	27.10	3.39	76.06	55.16
Sharp Bros Seed	Grazex BMR 801	40.47	62.97	70.73	7.37	51.40	58.56	0.25	0.54	0.57	24.09	7.09	88.22	53.59
Star Seed	Bruiser BMR	37.05	60.38	77.33	5.57	60.60	56.15	0.30	0.58	0.62	22.95	9.40	114.45	57.39
Star Seed	Nutrimaxx II BMR	40.23	62.19	75.13	6.57	58.03	57.83	0.28	0.57	0.61	25.76	5.77	93.40	56.03
Walter Moss Seed	Mega Green	40.15	61.20	69.87	7.78	49.13	56.92	0.23	0.53	0.56	26.81	5.12	80.36	52.60
Walter Moss Seed	Mega Green BMR	40.81	62.41	72.50	6.96	54.33	58.04	0.24	0.53	0.56	23.18	5.86	81.55	52.84
Ward Seed	Nutri King BMR	37.70	60.44	76.87	6.12	60.43	56.21	0.29	0.58	0.62	23.39	8.94	108.61	56.92
Ward Seed	Super Sugar DM	39.24	60.68	73.40	6.78	54.93	56.44	0.28	0.57	0.60	25.13	7.70	100.33	55.79
Ward Seed	Sweet Forever BMR	42.06	63.78	70.47	7.21	52.07	59.32	0.24	0.54	0.57	23.46	6.57	85.99	53.08
Ward Seed	Sweet Six BMR	38.19	61.65	74.93	6.04	57.53	57.33	0.28	0.56	0.60	22.69	8.79	103.10	55.71
	Average	39.50	61.72	73.69	6.54	55.87	57.40	0.27	0.56	0.59	24.44	6.96	95.24	55.10

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

**Table 7a. Hay performance test near Scandia
2018 Scandia, Kansas Forage Hay Performance Test, Republic County**

Brand	Name	Performance		
		1st cutting lb DM/a	1st cutting % moisture	1st height in.
Forage sorghum				
Dyna-Gro Seed	F75FS13	8624	0.83	108
KSU (check)	Early Sumac	5630	0.82	94
KSU (check)	Mixed Cane	6353	0.82	102
KSU (check)	Rox Orange	6816	0.82	91
Sorghum sudan				
Alta Seeds	ADV S6504	7510	0.85	112
Alta Seeds	AS6402	6844	0.81	89
Arrow Seed	1st Choice BMR	6364	0.83	107
Dyna-Gro Seed	Danny Boy BMR	5169	0.82	112
Dyna-Gro Seed	Fullgraze BMR	6313	0.84	107
Dyna-Gro Seed	Fullgraze II	7545	0.80	124
Dyna-Gro Seed	Fullgraze II BMR	6438	0.84	112
Star Seed	Bruiser BMR	6965	0.83	104
Star Seed	Nutrimaxx II BMR	6178	0.83	110
Ward Seed	Nutri King BMR	7631	0.81	101
Ward Seed	Super Sugar DM	7763	0.80	117
Ward Seed	Sweet Forever BMR	7541	0.77	110
Ward Seed	Sweet Six BMR	7977	0.78	107
	Average	6921	0.82	106
	LSD (0.05)	2166		

**Table 7b. Hay performance test near Scandia
2018 Scandia, Kansas Forage Hay Performance Test, Republic County**

Brand	Name	Forage quality											Crude protein	RFQ	TDN
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	%			
Forage sorghum															
Dyna-Gro Seed	F75FS13	41.21	64.96	69.70	7.69	51.53	60.41	0.24	0.53	0.56	20.31	8.55	91.71	52.70	
KSU (check)	Early Sumac	37.37	60.45	73.23	6.93	53.50	56.22	0.28	0.57	0.60	23.67	10.12	110.02	55.75	
KSU (check)	Mixed Cane	40.50	65.61	69.20	7.88	51.40	61.02	0.24	0.53	0.57	19.86	8.94	94.75	52.90	
KSU (check)	Rox Orange	38.14	61.64	73.07	7.14	55.07	57.33	0.27	0.56	0.60	22.02	9.81	106.81	55.25	
Sorghum sudan															
Alta Seeds	ADV S6504	41.05	65.40	72.77	7.12	56.97	60.82	0.23	0.53	0.56	14.92	9.77	91.28	52.13	
Alta Seeds	AS6402	40.24	64.17	75.50	6.75	61.43	59.68	0.27	0.56	0.59	14.86	11.52	104.02	54.94	
Arrow Seed	1st Choice BMR	40.09	64.66	75.00	7.10	59.57	60.14	0.27	0.56	0.60	18.31	9.45	104.02	55.29	
Dyna-Gro Seed	Danny Boy BMR	40.97	64.67	73.80	7.66	58.67	60.14	0.24	0.54	0.57	14.50	11.34	97.31	53.19	
Dyna-Gro Seed	Fullgraze BMR	42.52	67.22	72.60	8.03	57.33	62.51	0.23	0.53	0.56	16.14	8.62	88.79	52.44	
Dyna-Gro Seed	Fullgraze II	45.34	71.71	61.23	9.78	43.77	66.69	0.15	0.46	0.48	14.39	7.87	67.78	46.24	
Dyna-Gro Seed	Fullgraze II BMR	43.77	70.03	68.67	7.96	54.50	65.13	0.21	0.51	0.53	12.85	9.19	82.85	50.43	
Star Seed	Bruiser BMR	41.33	67.23	73.50	7.77	58.73	62.53	0.25	0.55	0.58	16.28	9.22	97.69	54.02	
Star Seed	Nutrimaxx II BMR	41.43	65.38	72.70	7.92	55.70	60.80	0.22	0.52	0.55	16.04	9.70	89.70	51.54	
Ward Seed	Nutri King BMR	39.22	62.80	74.90	6.79	58.83	58.41	0.27	0.56	0.59	17.96	10.94	106.20	55.03	
Ward Seed	Super Sugar DM	42.01	66.49	69.50	8.10	52.60	61.83	0.23	0.53	0.56	17.34	9.63	91.52	52.37	
Ward Seed	Sweet Forever BMR	42.71	65.08	67.70	8.76	48.17	60.52	0.22	0.52	0.55	21.20	8.11	85.53	51.46	
Ward Seed	Sweet Six BMR	40.20	64.81	71.50	7.24	54.53	60.27	0.24	0.54	0.57	17.58	10.12	97.99	53.25	
	Average	41.07	65.43	71.45	7.68	54.84	60.85	0.24	0.53	0.56	17.54	9.58	94.59	52.88	

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

**Table 8a. Silage performance test near Garden City
2018 Garden City, Kansas Silage Performance Test, Finney County**

Brand	Variety	Performance							
		Yield	Harvest moisture	Stand	Vigor	Flowering date	Days to harvest	Height	Lodging
		lb DM/a	%					in.	%
Agrilead	374x66	13265	0.74	10	9	8/24/18	102	114	0
Agrilead	AL374x66	14978	0.74	10	9	8/24/18	102	112	0
Alta Seeds	ADV XF033	17134	0.71	10	9	9/14/18	115	92	0
Alta Seeds	ADV XF372	11745	0.76	10	9	9/14/18	115	75	0
Alta Seeds	AF7401	13504	0.75	10	9	9/14/18	115	79	0
Alta Seeds	AF8301	16421	0.72	10	9	9/14/18	115	91	0
Chromatin Inc.	NK300	14320	0.72	10	9	9/14/18	115	87	0
Chromatin Inc.	SP2876 BMR	14192	0.76	10	9	8/24/18	102	120	0
Chromatin Inc.	SP3808SB BMR	12905	0.76	10	9	9/14/18	115	104	3
Chromatin Inc.	SP4555 BMR	13062	0.75	10	9	8/24/18	102	111	0
Dyna-Gro Seed	705F	16419	0.73	10	9	9/14/18	115	90	0
Dyna-Gro Seed	F74FS23 BMR	14897	0.73	9	9	9/14/18	115	117	0
Dyna-Gro Seed	F76FS77 BMR	13494	0.75	10	8	9/14/18	115	76	0
Dyna-Gro Seed	FX18340	13395	0.76	10	9	8/24/18	102	120	0
Dyna-Gro Seed	Super Sile 20	16898	0.74	10	8	9/14/18	115	118	0
Dyna-Gro Seed	Super Sile 30	17097	0.74	10	9	9/14/18	115	113	2
KSU (check)	KS Orange	12649	0.71	9	9	8/24/18	102	127	0

continued

**Table 8a. Silage performance test near Garden City
2018 Garden City, Kansas Silage Performance Test, Finney County**

Brand	Variety	Performance							
		Yield lb DM/a	Harvest moisture %	Stand	Vigor	Flowering date	Days to harvest	Height in.	Lodging %
Sharp Bros Seed	Canex BMR 210	11911	0.76	9	9	8/24/18	102	113	0
Sharp Bros Seed	Canex BMR 600	15077	0.75	9	9	9/14/18	115	122	8
Sharp Bros Seed	Silex BMR 540	13962	0.74	10	9	9/14/18	115	95	0
Star Seed	Brutus BMR	13897	0.74	9	9	9/14/18	115	97	2
Star Seed	Packer	15005	0.73	9	9	9/14/18	115	95	0
Ward Seed	EXP 10002 BMR	13150	0.73	9	9	8/24/18	102	111	0
Ward Seed	EXP 10218	15021	0.77	9	9	9/14/18	115	107	0
Ward Seed	EXP 10222 BMR	13914	0.72	10	9	9/14/18	115	107	0
Ward Seed	EXP 10225 BMR	13784	0.69	10	9	9/14/18	115	117	3
Ward Seed	EXP 10226 BMR	12213	0.71	9	9	8/24/18	102	106	0
Ward Seed	EXP 10227 BMR	13288	0.67	9	9	9/14/18	115	125	0
Ward Seed	EXP 10228 BMR	12644	0.74	9	8	8/24/18	102	107	0
Ward Seed	GW 2120	13992	0.74	10	9	8/24/18	102	113	0
Ward Seed	GW 400 BMR	13901	0.76	10	9	8/24/18	102	109	0
Ward Seed	GW 475 BMR	14165	0.71	10	9	8/24/18	102	117	0
Ward Seed	Silo Pro BMR	12332	0.74	9	9	9/14/18	115	86	0
Average		14080	0.74	10	9	-	110	105	0.55
LSD (0.05)		1942							

**Table 8b. Silage performance test near Garden City
2018 Garden City, Kansas Silage Performance Test, Finney County**

Brand	Variety	Forage quality											Total starch		
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein		RFQ	TDN
----- % -----															
Agrilead	374x66	34.19	55.71	71.83	4.40	51.20	51.81	0.29	0.58	0.62	28.82	7.74	106.59	56.71	11.87
Agrilead	AL374x66	34.69	57.24	70.50	4.55	51.33	53.23	0.28	0.57	0.61	27.14	7.82	104.43	56.02	9.23
Alta Seeds	ADV XF033	37.64	61.80	65.50	4.64	49.90	57.47	0.25	0.54	0.58	24.91	5.56	85.23	53.72	6.30
Alta Seeds	ADV XF372	36.13	58.09	72.93	3.50	57.13	54.02	0.28	0.57	0.61	23.92	8.30	106.70	56.22	4.70
Alta Seeds	AF7401	36.08	58.14	71.03	3.61	55.53	54.07	0.28	0.57	0.61	25.69	6.75	100.24	56.25	6.03
Alta Seeds	AF8301	39.46	62.27	64.97	5.15	47.93	57.91	0.22	0.52	0.55	23.72	5.28	76.92	51.42	9.93
Chromatin Inc.	NK300	40.94	65.80	62.07	4.59	48.20	61.19	0.20	0.50	0.53	19.89	5.45	73.96	50.22	6.47
Chromatin Inc.	SP2876 BMR	38.97	62.41	68.60	5.25	54.43	58.04	0.26	0.55	0.58	22.40	6.88	93.35	54.24	3.33
Chromatin Inc.	SP3808SB BMR	37.88	62.57	69.40	3.21	56.53	58.19	0.26	0.55	0.59	19.93	8.24	100.50	54.53	2.47
Chromatin Inc.	SP4555 BMR	38.81	60.46	68.37	4.75	51.83	56.23	0.26	0.55	0.59	24.58	6.95	94.22	54.41	7.13
Dyna-Gro Seed	705F	38.41	62.05	65.40	4.71	48.57	57.71	0.23	0.52	0.55	23.48	5.91	81.36	52.08	7.50
Dyna-Gro Seed	F74FS23 BMR	33.89	57.05	73.50	3.32	55.93	53.05	0.31	0.59	0.64	28.04	7.89	113.34	58.29	7.57
Dyna-Gro Seed	F76FS77 BMR	37.44	60.64	70.90	3.69	56.90	56.40	0.27	0.56	0.60	22.11	8.38	103.92	55.63	3.70
Dyna-Gro Seed	FX18340	38.57	61.10	69.17	4.71	53.90	56.82	0.27	0.56	0.59	24.65	6.05	92.10	54.97	6.43
Dyna-Gro Seed	Super Sile 20	37.58	62.80	64.37	4.72	49.33	58.41	0.24	0.53	0.57	24.45	5.46	82.43	52.97	4.63
Dyna-Gro Seed	Super Sile 30	40.24	64.98	63.43	5.12	49.47	60.43	0.22	0.52	0.55	22.97	4.77	74.82	51.69	4.80
KSU (check)	KS Orange	38.26	62.94	66.77	5.14	50.67	58.53	0.26	0.56	0.59	24.67	6.01	91.27	54.82	7.60

continued

**Table 8b. Silage performance test near Garden City
2018 Garden City, Kansas Silage Performance Test, Finney County**

Brand	Variety	Forage quality													
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ	TDN	Total starch
----- % -----															
Sharp Bros Seed	Canex BMR 210	37.68	61.13	70.00	4.65	55.10	56.85	0.29	0.58	0.62	25.18	6.89	102.17	56.78	5.07
Sharp Bros Seed	Canex BMR 600	36.82	62.22	69.00	3.74	56.33	57.87	0.30	0.58	0.62	25.40	6.34	101.24	57.21	3.50
Sharp Bros Seed	Silex BMR 540	35.50	58.67	71.60	4.18	55.77	54.57	0.29	0.58	0.62	26.00	7.06	104.41	56.98	6.17
Star Seed	Brutus BMR	37.02	60.95	68.73	4.29	55.03	56.69	0.28	0.57	0.60	24.18	6.84	99.18	55.85	3.07
Star Seed	Packer	39.02	62.93	64.43	4.57	49.23	58.53	0.23	0.52	0.55	22.94	5.76	81.05	52.01	4.97
Ward Seed	EXP 10002 BMR	37.19	58.47	70.30	4.05	51.70	54.38	0.26	0.55	0.59	26.24	5.82	89.41	54.62	10.07
Ward Seed	EXP 10218	40.44	66.52	64.87	4.82	52.03	61.86	0.24	0.53	0.57	21.50	5.71	83.03	52.92	2.94
Ward Seed	EXP 10222 BMR	37.05	59.90	70.97	3.71	55.47	55.71	0.26	0.55	0.59	23.26	6.79	94.27	54.48	3.97
Ward Seed	EXP 10225 BMR	38.26	62.30	68.70	3.93	53.97	57.94	0.27	0.56	0.60	24.60	5.45	89.74	55.29	6.03
Ward Seed	EXP 10226 BMR	36.44	59.14	72.10	3.65	55.23	55.00	0.29	0.57	0.61	25.23	7.33	103.85	56.55	8.13
Ward Seed	EXP 10227 BMR	42.71	68.92	59.87	5.58	48.90	64.09	0.21	0.51	0.54	20.30	4.51	70.40	50.93	1.93
Ward Seed	EXP 10228 BMR	38.13	60.33	70.50	4.49	54.00	56.11	0.25	0.55	0.58	22.50	7.88	97.21	54.05	3.07
Ward Seed	GW 2120	36.42	59.02	69.50	4.78	51.03	54.89	0.27	0.56	0.60	26.38	6.67	96.30	55.23	9.17
Ward Seed	GW 400 BMR	36.84	55.52	75.23	3.73	55.90	51.64	0.30	0.59	0.63	27.71	8.14	111.71	57.80	9.13
Ward Seed	GW 475 BMR	36.77	59.73	72.20	3.91	55.10	55.55	0.28	0.57	0.60	24.44	7.16	100.47	55.77	6.07
Ward Seed	Silo Pro BMR	33.28	56.58	73.77	3.10	57.77	52.62	0.31	0.60	0.64	26.21	8.88	118.00	58.44	5.90
Average		37.54	60.86	68.80	4.31	53.07	56.60	0.26	0.55	0.59	24.35	6.69	94.66	54.82	6.03

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

**Table 9a. Silage performance test near Hays
2018 Hays, Kansas Silage Performance Test, Ellis County**

Brand	Variety	Performance							
		Yield lb DM/a	Harvest moisture %	Stand	Vigor	Flowering date	Days to harvest	Height in.	Lodging %
Alta Seeds	ADV XF033	15605	0.68	10	9	---	123	82	0
Alta Seeds	ADV XF372	11325	0.66	9	8	---	109	69	0
Alta Seeds	AF7401	11588	0.69	9	8	---	123	76	0
Alta Seeds	AF8301	13212	0.67	10	10	---	109	76	0
Arrow Seed	Silo Mor II BMR	13683	0.68	9	8	---	123	82	0
Dyna-Gro Seed	705F	12862	0.65	10	10	---	109	80	0
Dyna-Gro Seed	F74FS23 BMR	13809	0.69	10	10	---	109	101	0
Dyna-Gro Seed	F76FS77 BMR	14345	0.69	10	10	---	123	74	0
Dyna-Gro Seed	FX18340	11724	0.74	10	40	---	95	101	0
Dyna-Gro Seed	Super Sile 20	15662	0.68	10	10	---	123	100	0
Dyna-Gro Seed	Super Sile 30	14275	0.65	10	10	---	109	95	0
KSU (check)	KS Orange	15847	0.69	10	40	---	95	114	12
Sharp Bros Seed	Canex BMR 210	11484	0.74	10	10	---	95	111	15
Sharp Bros Seed	Canex BMR 600	16870	0.68	10	10	---	123	102	0
Sharp Bros Seed	Silex BMR 540	14244	0.70	9	10	---	123	83	12
Star Seed	Brutus BMR	13112	0.68	9	8	---	123	88	0
Star Seed	Packer	16827	0.65	10	10	---	123	76	0

continued

**Table 9a. Silage performance test near Hays
2018 Hays, Kansas Silage Performance Test, Ellis County**

Brand	Variety	Performance							
		Yield	Harvest moisture	Stand	Vigor	Flowering date	Days to harvest	Height	Lodging
		lb DM/a	%					in.	%
Walter Moss Seed	4 Ever Green	14019	0.76	9	8	---	123	94	0
Ward Seed	EXP 10002 BMR	14099	0.69	10	9	---	95	104	0
Ward Seed	EXP 10218	13482	0.71	10	9	---	123	98	0
Ward Seed	EXP 10222 BMR	15200	0.72	10	10	---	109	89	0
Ward Seed	EXP 10225 BMR	15289	0.65	10	10	---	109	94	0
Ward Seed	EXP 10226 BMR	13550	0.67	9	9	---	109	94	0
Ward Seed	EXP 10227 BMR	16719	0.66	10	10	---	109	104	0
Ward Seed	EXP 10228 BMR	12780	0.74	10	9	---	95	95	0
Ward Seed	GW 2120	13923	0.74	10	10	---	95	98	0
Ward Seed	GW 400 BMR	15693	0.71	10	10	---	95	101	0
Ward Seed	GW 475 BMR	12128	0.71	10	10	---	95	95	0
Ward Seed	Silo Pro BMR	11207	0.68	9	8	---	123	83	0
Average		13950.48	0.69	10	11	---	111	92	1.32
LSD (0.05)		3458							

**Table 9b. Silage performance test near Hays
2018 Hays, Kansas Silage Performance Test, Ellis County**

Brand	Variety	Forage quality												Total starch	
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ		TDN
----- % -----															
Alta Seeds	ADV XF033	39.46	63.76	66.77	4.83	51.50	59.29	0.26	0.55	0.59	25.35	5.69	89.68	54.69	4.93
Alta Seeds	ADV XF372	37.86	59.46	70.90	4.17	52.00	55.30	0.28	0.56	0.60	27.92	5.30	89.90	55.69	11.10
Alta Seeds	AF7401	36.26	57.55	73.30	3.93	53.80	53.52	0.29	0.58	0.62	27.84	7.33	105.75	57.01	11.00
Alta Seeds	AF8301	38.37	60.29	67.83	4.43	47.53	56.07	0.24	0.54	0.57	28.11	4.24	75.93	53.29	14.67
Arrow Seed	Silo Mor II BMR	38.80	62.67	68.47	4.78	53.20	58.28	0.28	0.57	0.61	26.84	5.48	93.94	56.37	6.57
Dyna-Gro Seed	705F	39.77	62.87	66.43	4.69	48.07	58.47	0.23	0.53	0.56	25.67	4.56	74.61	52.64	10.13
Dyna-Gro Seed	F74FS23 BMR	34.99	56.02	72.60	3.53	52.33	52.10	0.30	0.58	0.63	30.01	6.32	101.02	57.45	13.47
Dyna-Gro Seed	F76FS77 BMR	38.67	62.13	70.93	3.80	55.50	57.78	0.27	0.56	0.60	24.44	6.39	94.98	55.51	6.13
Dyna-Gro Seed	FX18340	40.44	61.86	69.30	5.33	51.73	57.53	0.25	0.55	0.58	25.67	5.23	84.58	54.13	8.97
Dyna-Gro Seed	Super Sile 20	40.72	66.32	64.57	5.17	50.00	61.68	0.24	0.53	0.57	23.42	4.97	78.61	52.89	4.93
Dyna-Gro Seed	Super Sile 30	39.20	63.17	66.90	4.90	50.70	58.75	0.25	0.55	0.58	25.00	6.03	88.97	54.09	6.40
KSU (check)	KS Orange	40.24	62.83	64.97	6.23	46.50	58.43	0.23	0.53	0.56	25.54	5.68	81.75	52.39	8.70
Sharp Bros Seed	Canex BMR 210	39.76	63.32	69.17	4.95	54.30	58.89	0.29	0.57	0.61	25.05	6.77	100.96	56.59	5.47
Sharp Bros Seed	Canex BMR 600	38.32	61.73	69.33	4.59	53.13	57.41	0.28	0.57	0.61	25.62	6.88	100.12	56.20	6.73
Sharp Bros Seed	Silex BMR 540	38.07	62.03	70.43	3.93	55.70	57.69	0.29	0.58	0.62	26.11	6.01	99.23	57.13	6.00
Star Seed	Brutus BMR	40.77	65.81	66.47	4.78	52.57	61.20	0.26	0.55	0.59	23.94	5.04	85.59	54.49	6.80
Star Seed	Packer	37.67	59.74	68.57	4.76	49.60	55.56	0.27	0.56	0.60	28.34	5.48	89.76	55.14	11.23

continued

**Table 9b. Silage performance test near Hays
2018 Hays, Kansas Silage Performance Test, Ellis County**

Brand	Variety	Forage quality													
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ	TDN	Total starch
----- % -----															
Walter Moss Seed	4 Ever Green	43.18	68.70	65.00	5.44	51.33	63.89	0.22	0.51	0.54	21.30	4.05	68.24	51.19	4.00
Ward Seed	EXP 10002 BMR	38.07	57.78	71.87	4.39	49.70	53.73	0.26	0.55	0.59	28.26	5.46	86.70	54.42	14.60
Ward Seed	EXP 10218	41.90	67.57	64.73	5.43	50.87	62.84	0.23	0.52	0.55	21.32	5.54	78.78	51.98	3.70
Ward Seed	EXP 10222 BMR	38.32	61.66	70.50	4.22	53.07	57.34	0.27	0.56	0.60	26.44	5.21	88.58	55.35	8.20
Ward Seed	EXP 10225 BMR	36.47	56.06	72.17	3.75	50.57	52.14	0.27	0.56	0.60	29.80	5.31	89.42	55.68	18.33
Ward Seed	EXP 10226 BMR	37.86	60.24	69.57	3.83	51.43	56.02	0.27	0.56	0.60	27.45	5.03	86.78	55.34	11.90
Ward Seed	EXP 10227 BMR	41.15	64.45	65.07	5.03	47.47	59.94	0.22	0.52	0.55	24.58	4.15	71.19	51.67	12.40
Ward Seed	EXP 10228 BMR	39.51	62.61	70.33	4.67	52.73	58.23	0.25	0.54	0.58	22.75	7.17	92.24	53.73	6.17
Ward Seed	GW 2120	38.22	59.74	68.40	5.17	47.83	55.56	0.25	0.54	0.58	27.09	5.99	87.37	53.84	11.07
Ward Seed	GW 400 BMR	36.96	55.55	73.00	4.37	49.70	51.66	0.27	0.56	0.60	29.49	6.48	96.51	55.60	16.20
Ward Seed	GW 475 BMR	39.87	60.94	69.83	4.73	50.07	56.67	0.26	0.55	0.58	24.44	5.88	88.74	54.26	10.63
Ward Seed	Silo Pro BMR	38.52	62.86	70.83	3.87	56.77	58.46	0.28	0.57	0.61	24.13	6.76	99.94	56.24	3.10
Average		38.94	61.71	68.90	4.61	51.37	57.39	0.26	0.55	0.59	25.93	5.67	88.62	54.66	9.09

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

**Table 10a. Silage performance test near Scandia
2018 Scandia, Kansas Silage Performance Test, Republic County**

Brand	Variety	Performance							
		Yield lb DM/a	Harvest moisture %	Stand	Vigor	Flowering date	Days to harvest	Height in.	Lodging %
Alta Seeds	ADV XF033	12623	0.76	10	10	9/14/18	102	83	1
Alta Seeds	ADV XF372	9888	0.80	10	10	9/14/18	102	73	0
Alta Seeds	AF7401	10554	0.78	9	10	9/14/18	102	71	0
Alta Seeds	AF8301	9877	0.74	10	10	9/11/18	102	81	8
Arrow Seed	Silo Mor II BMR	8698	0.75	10	10	9/14/18	105	85	3
Dyna-Gro Seed	705F	11055	0.78	10	10	9/11/18	102	83	6
Dyna-Gro Seed	F74FS23 BMR	7257	0.80	8	10	9/11/18	102	113	1
Dyna-Gro Seed	F76FS77 BMR	10014	0.78	9	9	9/14/18	105	74	0
Dyna-Gro Seed	FX18340	5485	0.80	10	9	8/23/18	95	111	2
Dyna-Gro Seed	Super Sile 20	8831	0.79	9	10	9/14/18	105	126	1
Dyna-Gro Seed	Super Sile 30	14568	0.76	10	10	9/11/18	102	100	8
KSU (check)	KS Orange	9590	0.75	7	8	8/30/18	95	119	0
Star Seed	Brutus BMR	9282	0.77	10	10	9/14/18	102	88	4
Star Seed	Packer	10627	0.78	10	10	9/9/18	102	92	2
Ward Seed	EXP 10002 BMR	6812	0.75	8	10	8/25/18	95	105	4
Ward Seed	EXP 10218	11569	0.80	10	10	9/14/18	105	101	5
Ward Seed	EXP 10222 BMR	7190	0.76	10	10	9/9/18	95	96	5
Ward Seed	EXP 10225 BMR	8651	0.74	10	10	9/9/18	102	103	5
Ward Seed	EXP 10226 BMR	7173	0.73	9	10	8/25/18	95	99	1
Ward Seed	EXP 10227 BMR	9202	0.70	10	10	9/11/18	102	117	5
Ward Seed	EXP 10228 BMR	5395	0.76	10	10	8/30/18	95	105	7
Ward Seed	GW 2120	8867	0.78	9	10	8/25/18	95	106	0
Ward Seed	GW 400 BMR	8989	0.78	10	10	8/25/18	95	105	1
Ward Seed	GW 475 BMR	8197	0.75	10	10	8/25/18	95	107	0
Ward Seed	Silo Pro BMR	8910	0.79	10	10	9/9/18	102	86	0
Average		9172	0.77	10	10		100	97	3
LSD (0.05)		2525							

**Table 10b. Silage performance test near Scandia
2018 Scandia, Kansas Silage Performance Test, Republic County**

Brand	Variety	Forage quality													Total starch
		ADF	NDF	IVTDMD @48hr	Lignin	NDFD @48hr	NDFn	NEG	NEL	NEM	NFC	Crude protein	RFQ	TDN	
----- % -----															
Alta Seeds	ADV XF033	41.37	68.09	65.57	5.63	51.17	63.32	0.23	0.52	0.55	18.41	7.21	86.08	51.96	1.90
Alta Seeds	ADV XF372	38.98	63.20	74.40	3.83	59.40	58.78	0.27	0.56	0.60	18.80	9.12	105.83	55.60	0.00
Alta Seeds	AF7401	38.15	61.49	74.10	4.17	57.80	57.19	0.27	0.56	0.60	19.95	9.47	106.70	55.46	1.57
Alta Seeds	AF8301	40.68	65.81	66.40	5.39	49.60	61.21	0.22	0.52	0.55	20.48	6.80	84.15	51.87	4.70
Arrow Seed	Silo Mor II BMR	37.01	61.43	71.80	4.58	55.33	57.13	0.28	0.57	0.61	22.15	9.18	108.74	56.16	3.37
Dyna-Gro Seed	705F	42.96	69.60	65.20	5.65	51.07	64.73	0.20	0.50	0.53	16.43	6.92	78.26	50.10	1.20
Dyna-Gro Seed	F74FS23 BMR	40.10	65.75	69.73	4.87	53.87	61.15	0.25	0.54	0.57	19.46	7.68	93.21	53.52	2.90
Dyna-Gro Seed	F76FS77 BMR	38.08	62.36	73.30	4.07	57.33	58.00	0.28	0.56	0.60	21.48	7.90	103.14	55.73	1.23
Dyna-Gro Seed	FX18340	42.46	67.86	68.70	5.41	55.67	63.11	0.24	0.54	0.57	17.44	7.18	88.34	53.08	1.80
Dyna-Gro Seed	Super Sile 20	42.50	70.17	63.47	5.59	49.50	65.26	0.20	0.50	0.53	18.76	5.29	72.69	50.22	3.10
Dyna-Gro Seed	Super Sile 30	41.70	68.81	63.67	5.45	49.53	63.99	0.21	0.51	0.54	19.71	5.63	76.84	50.97	2.80
KSU (check)	KS Orange	40.39	66.72	67.10	5.08	53.30	62.05	0.26	0.55	0.58	20.26	7.21	93.77	54.25	2.43
Star Seed	Brutus BMR	38.69	64.01	70.53	4.84	56.23	59.53	0.28	0.57	0.60	21.01	8.22	104.62	55.91	1.17
Star Seed	Packer	43.28	69.30	65.10	5.66	51.20	64.45	0.21	0.51	0.54	18.03	6.09	77.63	51.08	1.30
Ward Seed	EXP 10002 BMR	43.37	68.93	66.80	4.92	53.80	64.11	0.22	0.52	0.55	16.73	6.45	80.58	51.61	0.00
Ward Seed	EXP 10218	42.20	68.82	67.00	4.97	53.10	64.00	0.23	0.53	0.56	17.97	7.11	85.79	52.29	0.53
Ward Seed	EXP 10222 BMR	40.80	67.43	67.83	4.72	54.23	62.71	0.25	0.55	0.58	19.23	7.47	93.84	54.11	2.13
Ward Seed	EXP 10225 BMR	44.10	70.52	66.27	4.55	55.03	65.58	0.23	0.53	0.56	16.34	6.14	80.86	52.49	0.00
Ward Seed	EXP 10226 BMR	38.17	63.89	70.50	4.18	54.93	59.41	0.27	0.56	0.59	20.87	7.95	100.75	55.05	3.50
Ward Seed	EXP 10227 BMR	45.21	73.14	60.57	6.04	48.33	68.02	0.19	0.49	0.52	16.79	4.97	66.55	49.21	0.00
Ward Seed	EXP 10228 BMR	42.06	67.88	67.27	4.77	53.80	63.13	0.24	0.53	0.56	17.58	7.29	87.86	52.67	0.00
Ward Seed	GW 2120	39.31	65.05	67.50	5.03	50.97	60.49	0.24	0.53	0.57	20.96	7.68	92.26	52.97	5.00
Ward Seed	GW 400 BMR	35.67	59.69	73.60	3.85	56.03	55.51	0.30	0.58	0.62	23.59	9.60	115.74	57.26	5.53
Ward Seed	GW 475 BMR	39.29	64.41	71.20	3.95	56.57	59.90	0.28	0.57	0.61	21.61	7.49	101.61	55.96	2.07
Ward Seed	Silo Pro BMR	37.80	62.33	73.43	4.24	57.63	57.97	0.28	0.57	0.61	20.78	8.93	108.49	56.26	2.37
Average		40.57	66.27	68.44	4.86	53.82	61.63	0.25	0.54	0.57	19.39	7.40	91.77	53.43	2.02

Values in bold are in the top LSD group.

Acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro true dry matter digestibility after 48 hours (IVTDMD@48hr), % of NDF digestible after 48 hours (NDFD@48hr), nitrogen free NDF (NDFn), net energy for gain (NEG), net energy for lactation (NEL), net energy for maintenance (NEM), non-fibrous carbohydrates (NFC), relative forage quality (RFQ), total digestible nutrients (TDN).

FORAGE REPORT 2018

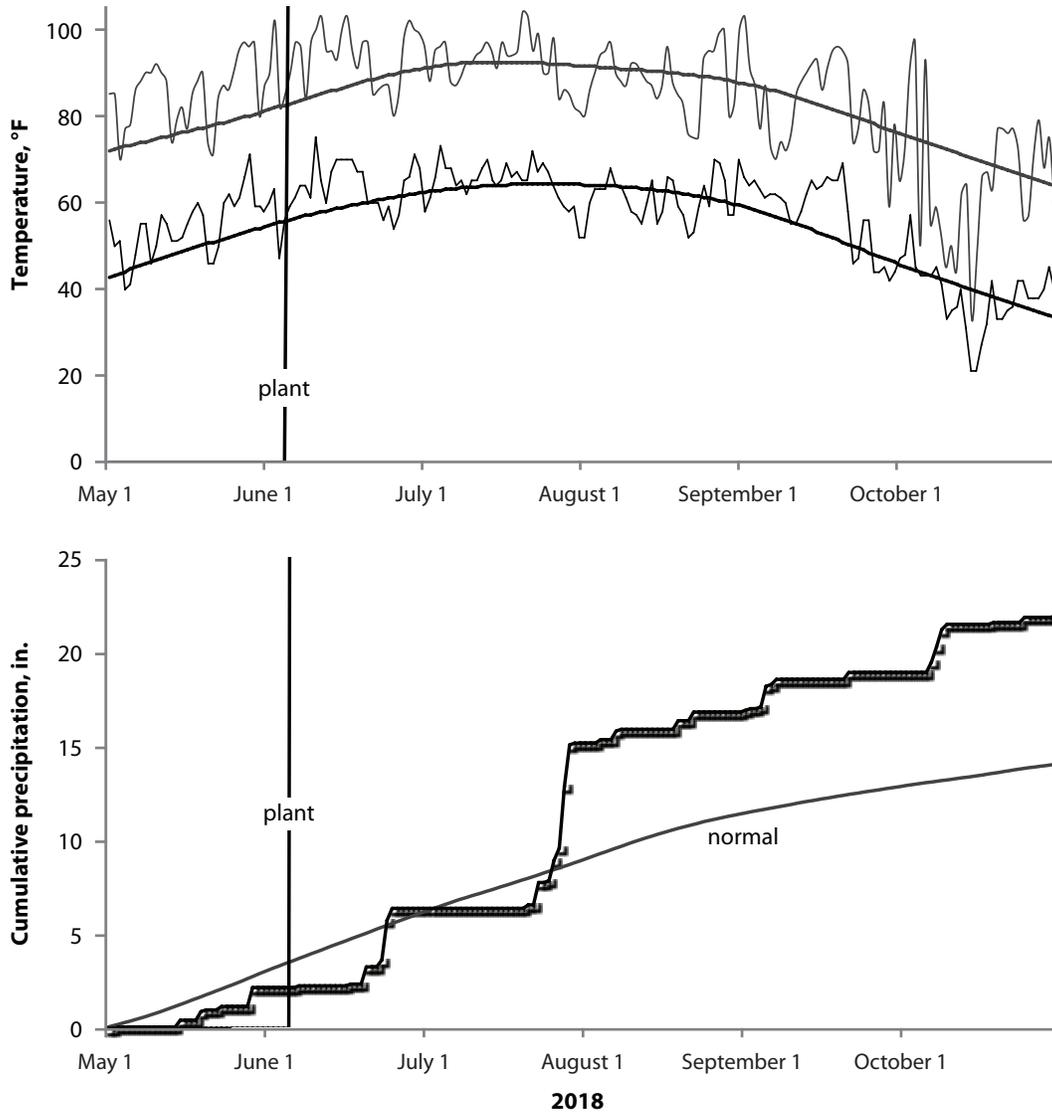
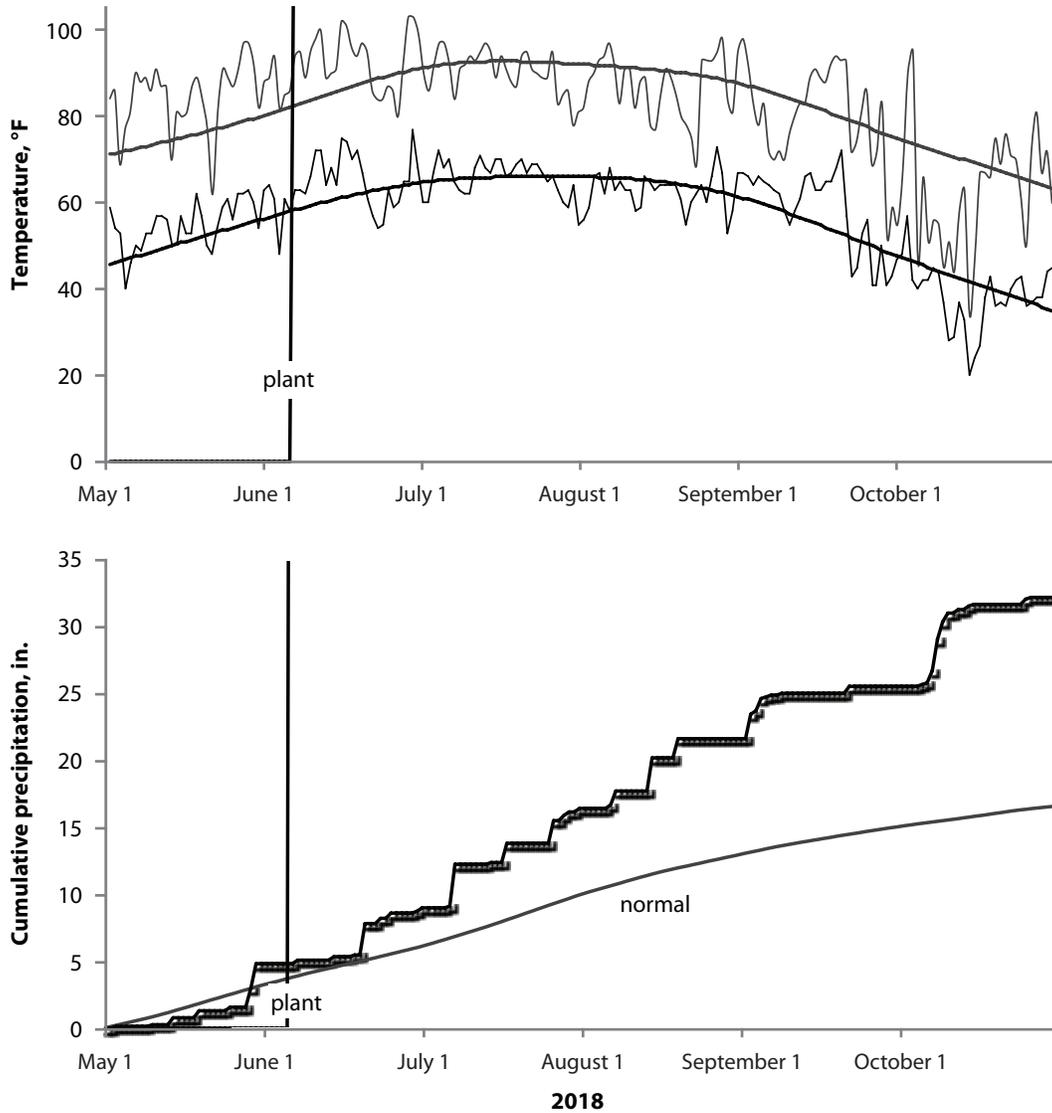


Figure 1. Precipitation and temperature during the 2018 growing season near Garden City, KS. Top pane: daily and mean (1981 to 2010) high and low temperature. Bottom pane: daily and mean (1981 to 2010) cumulative precipitation.

FORAGE REPORT 2018



2018

Figure 2. Precipitation and temperature during the 2018 growing season near Hays, KS. Top pane: daily and mean (1981 to 2010) high and low temperature. Bottom pane: daily and mean (1981 to 2010) cumulative precipitation.

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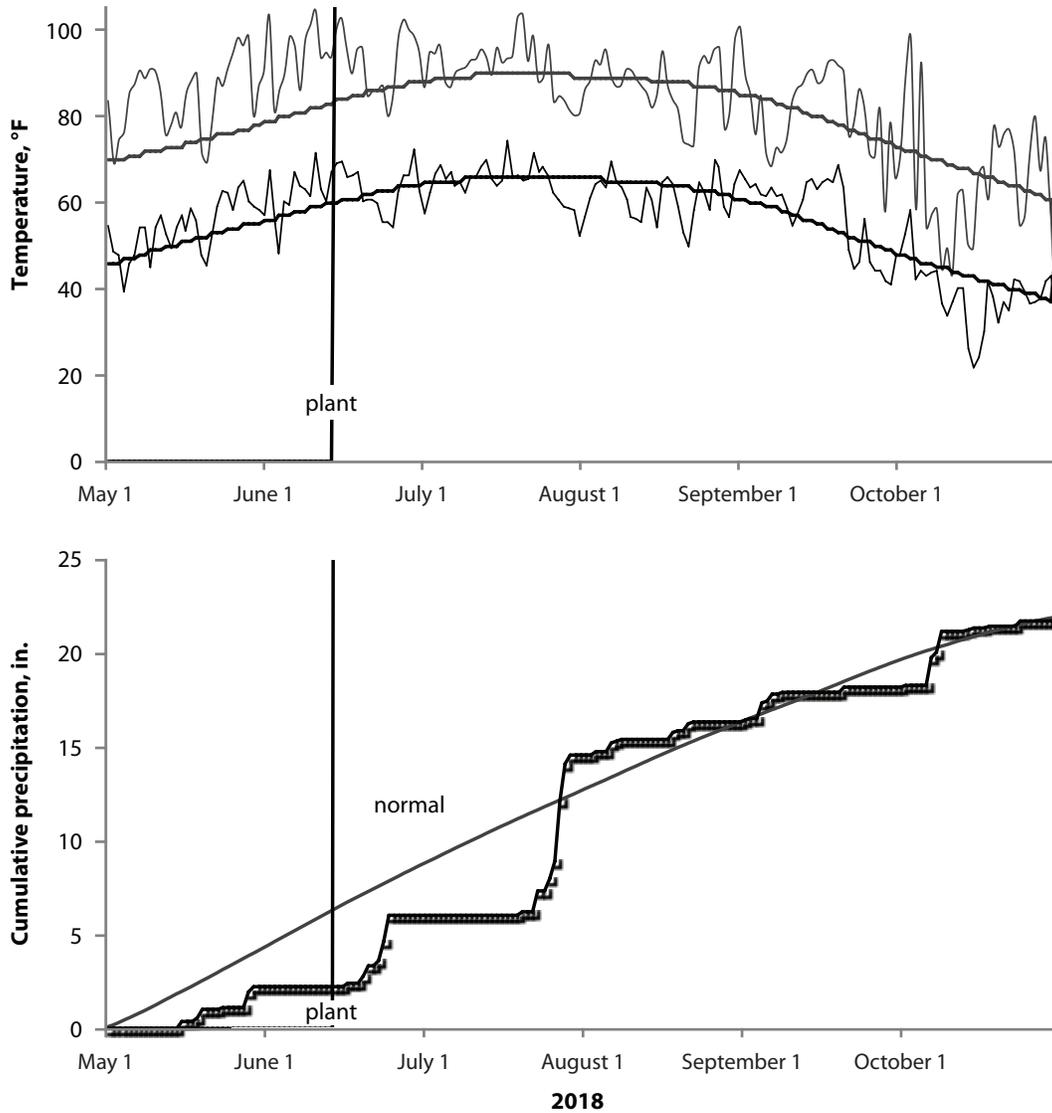


Figure 3. Precipitation and temperature during the 2018 growing season near Scandia, KS. Top pane: daily and mean (1981 to 2010) high and low temperature. Bottom pane: daily and mean (1981 to 2010) cumulative precipitation.

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