TEXAS A&M AGRILIFE RESEARCH | EXTENSION

2023 Texas A&M AgriLife Bushland Forage Sorghum Silage Trials

Jourdan Bell, Carla Naylor, Kevin Heflin, Preston Sirmon, Nick Porter, Ronnie Schnell, Katrina Horn, Juan Piñeiro, Jason Banta, and Jason Smith

The 2023 Texas A&M AgriLife Research and Extension Forage Sorghum Silage Trials consisted of three separate trials: 1) standard hybrid trial with non-male sterile sorghum hybrids, 2) male sterile sorghum trial, and 3) seeding rate trial. In all trials, evaluated hybrids were submitted by seed companies on a per fee basis except for the grain sorghum and corn hybrid checks, and all trials were evaluated within a production forage sorghum field under center pivot irrigation. The standard trial included 66 non-male sterile sorghum hybrids representing forage sorghum (n=44), sorghum-sudangrass (n=18), and grain sorghum (n=4) entries. Two of the grain sorghum hybrids (DKS 37-07 and P84G62) served as long-term grain production checks. Corn checks (n=3) provided a direct comparison between the forage production potential of corn and sorghum in the same production environment.

The 2023 season was delayed because of above average May and early June rainfall. Preplant rainfall from May 1 through June 21 totaled 9.6 inches. In-season rainfall totaled 2.52 inches (Fig. 1). High temperatures through August caused observable water stress even with irrigation. Extreme heat continued into early September, and grain development was reduced for hybrids that were in the boot to bloom stage between September 1 and September 8. Daytime temperatures were greater than 95°F during this period with temperatures reaching 105°F on September 7. Crauford and Peacock (1993) reported that heat stress from boot to flowering can reduce grain yield by 87%. In research conducted by Djanaguiraman et al. (2018), sorghum pollen was damaged at temperatures greater than 96.8 °F, which reduced seed set. Prasad et al. (2008) reported that even short periods of heat stress during reproductive development could be detrimental to grain yield. The authors reported that the ten day window from before flowering, (~boot) to flowering, is the most sensitive stage to heat stress, and their research demonstrated that heat related yield losses were 54% under non-water stressed conditions and controlled temperatures at 104 °F. Although heat is yield limiting, producers must also consider the interaction between water availability (soil moisture, irrigation, and/or precipitation) and temperature stress, which compound stress related yield losses. The current AgriLife trial consisted of a wide range of maturity classes and moderate water stress mid-season, so grain production and thus total forage yields were not uniformly impacted by heat stress. The average yield was 20.4 tons/ac (65% moisture), and yields for sorghum hybrids ranged from 13.9 to 30.2 tons/acre (65% moisture; Table 1).

Agronomic Information
Cooperator: Michael Menke
Previous Crop: Wheat hay
Planting Date: June 22, 2023
Forage Sorghum Seeding Rate: 80,000 seeds/acre
Corn Silage Seeding Rate: 32,000 seeds/acre

Fertilizer: Manure pre-wheat
Pre-plant strip-tilled 180 lbs. N/ac and 30 lbs. P2O5/ac (6-15-2023)

Herbicide: Pre-plant: S-metolachlor 1 pt/ac plus Atrazine 1 lb./ac (4-25-2023)
Pre-plant burndown: Quinclorac 8 oz/ac plus Paraquat 2 pt/ac (5-22-2023)
Pre-emergent: Warrant (acetochlor) 48 oz/ac plus Starane Ultra (fluroxypyr) 6 oz/ac plus Buccaneer (glyphosate) 48 oz/ac (6-23-2023)
Post-emergent: Huskie FX 18 oz/ac (pyrasulfotole + bromoxynil + fluroxypyr) plus QuinStar (quinclorac) 32 oz/ac plus Atrazine (1 lb/ac)

Insecticide: Sivanto 4 oz/ac with pre-plant strip-tilled N (6-15-2023)
Sorghum aphids (Sugarcane Aphids) identified 7-27-2023
Sivanto 7 oz/ac aerially at 4 gpa on 7-29-2023

Preplant Rainfall (May 1 – June 21): 9.6 inches

Harvest Date	Planting to Harvest	
	Precip. (in)	Irrigation (in)
9/14/2023	1.72	9
9/27/2023	2.46	10
10/3/2023	2.52	11
10/13/2023	2.52	11.5
10/19/2023	2.52	11.5
10/2/2023	2.52	11.5

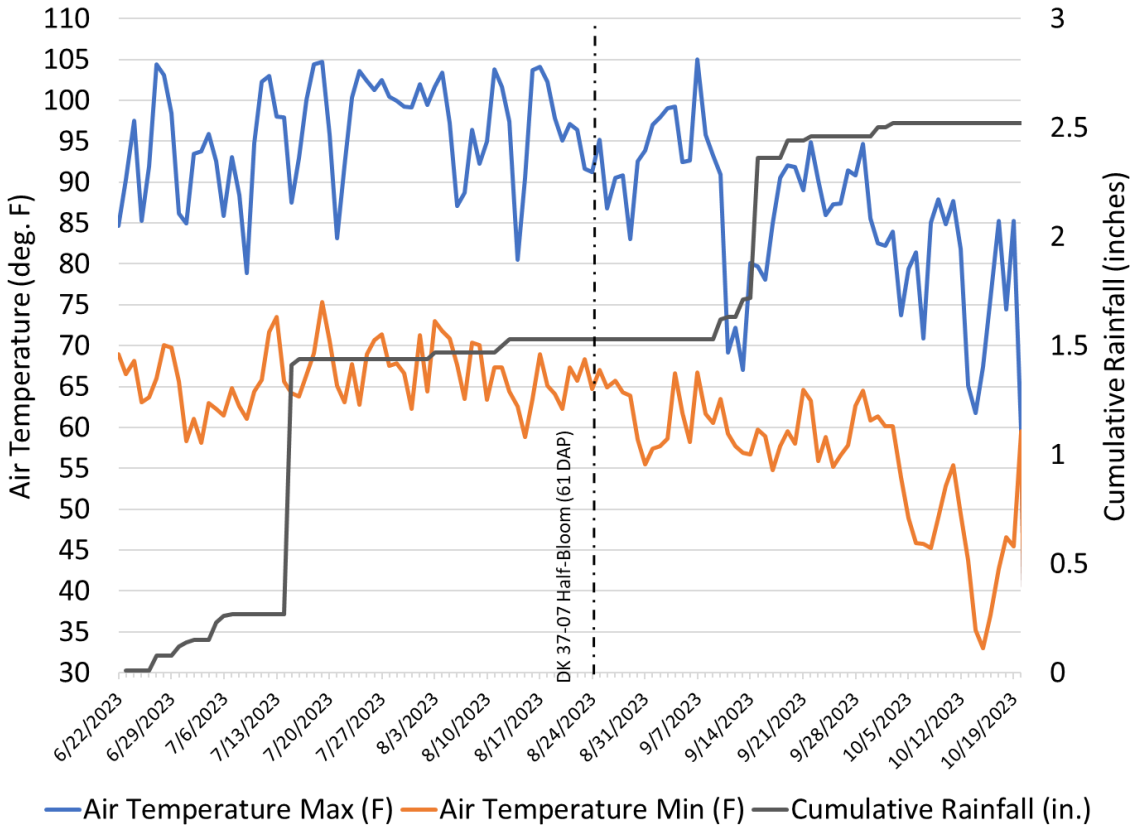

Figure 1. Daily temperatures and rainfall from planting to the final harvest and the half-bloom date of the earliest hybrid in the forage sorghum trial.

Hybrids were blocked according to their marketed maturity class so that forages within each block could be mechanically harvested for yield when grain reached soft dough. All hybrids were replicated three times. When picking a hybrid, producers should inquire about the maturity of the hybrid in their production environment in addition to considering the marketed maturity class. This can be done by evaluating the days to half-bloom (HB), which is when 50% of the plants, in the area of observation, are blooming (Vanderlip, 1993). When evaluating a single plant, HB is when flowering has progressed half-way down the head.

Uniform sub-samples were collected for dry matter and nutritional composition from all plots. A sub-sample of the chopped forage was dried at 221°F (105°C) to determine harvest moisture. All reported yields are corrected to 65% moisture and on a dry matter basis. A 600-gram sample was submitted to Dairy One Forage Laboratory at Ithaca, NY for forage nutritional analyses using near infrared reflectance spectroscopy (NIR). Forage constituents are reported on a dry matter (DM) basis (Tables 2, 4, and 6).

Forage Nutritive Analyses Defined:

CP: crude protein

ADF: acid detergent fiber; a fraction of the cell wall which includes cellulose and lignin.

NDF: neutral detergent fiber; cell wall fraction of the forage, which includes hemicellulose, cellulose, and lignin.

Lignin: A structural material for cell walls and thus important for plant standability. Lignin is almost completely indigestible.

NFC: non-fiber carbohydrates (starch, sugar and pectins).

Starch: A carbohydrate primarily located in the grain. Starch availability is a function of harvest timing and berry processing.

WSC: water soluble carbohydrate; a measurement of simple sugars (glucose, fructose, and sucrose) and fructans. WSCs accumulate in the stalk until anthesis. After anthesis, they remobilize to the grain. WSCs are important for fermentation as they are used during the development of lactic acid.

IVTD30: in vitro true digestibility (30 hour run). Provides an estimate of the extent of digestion after 30 hours in the rumen.

NDFD30: NDF digestibility; estimated fiber digestibility after 30 hours.

TDN: % total digestible nutrients representing digestible protein, digestible NDF, digestible NFC, and digestible fat.

tons TDN produced per acre: Represents the energy production under the evaluated management and environmental conditions.

Calculated as % TDN x forage yield (tons/acre; DM basis) = tons of TDN produced per acre

Milk/ton: An index based on several variables that influence intake and nutritive value. These are applied to a standard dairy cow to project milk produced per ton of forage. Calculated using Milk 2006.

Photoperiod sensitive hybrids were harvested on the last sampling date (October 24, 2023, in the large public trial). Male sterile hybrids were not randomized as part of the larger trial as in previous years. Results include two side trials: a male sterile hybrid trial (Table 3) and seeding rate trial (Table 5). The objectives of the male

sterile trial were to 1) evaluate yield differences between pollinated and unpollinated male sterile hybrids harvested on the same day, 2) determine if unpollinated male sterile hybrids dry down at the same rate as pollinated male sterile hybrids, and 3) evaluate differences in forage nutritive values between pollinated and unpollinated male sterile hybrids.

Select hybrids, based on company entries, were evaluated at 4 harvest stages (boot, heading, unpollinated soft dough stage, and pollinated soft-dough stage; Table 3). To obtain an unpollinated sample, all heads in an 8.3 ft^2 area within each plot were bagged at heading to ensure an unpollinated sub-sample. Once the pollinated area reached soft-dough, the unpollinated and pollinated areas were sampled on the same day. There were no yield differences between the pollinated and unpollinated hybrids at the soft-dough stage. There was no statistically significant difference in the moisture at harvest between the pollinated and unpollinated male sterile hybrids at the soft-dough harvest stage. Variability in forage nutritive value constituents, specifically starch and water soluble carbohydrates, was a function of variability in forage maturity. Three of the evaluated hybrids (F430, X54243, and ID1337) reached half-bloom in October (Table 4), and because of declining temperatures, observed pollination and grain development were negligible. Physiological stage variability within plots of the two experimental hybrids (X54243 and ID1337) increased the reported variability of nutritive value parameters especially for starch values. Reported summary statistics show differences across all harvest periods, but forage nutritive value differences between the pollinated and unpollinated stages were hybrid specific.

The Texas High Plains has a shorter growing season for late season hybrids to mature because of declining fall temperatures, but the timing of reproductive stages (pollinated through grain fill) is also impacted by the planting date. If a producer wishes to achieve grain development with a late season hybrid, especially those that reach HB approximately 100 days after planting or later, an earlier planting date should be considered. However, producers should consider the duration of growth and water use when evaluating the pros and cons of planting early versus late and when selecting a maturity class. Matching the maturity class to the planting date and available water can help a producer achieve a more desirable end-product.

The seeding rate trial evaluated 4 seeding rates (40,000, 60,000, 80,000, and 100,000 seeds per acre) with 4 hybrids (Table 5). The objectives of the seeding rate trial were to 1) evaluate the yield response to increased seeding rates, 2) quantify if increased seeding rates decrease stalk diameter, 3) determine if increased seeding rates impact the rate of dry down, and 4) determine if seeding rate impacts forage nutritive value. While a separate seeding rate trial in 2015 indicated that there was no significant yield difference between seeding rates of 75,000 and 100,000 seeds per acre, lodging was reduced at the 75,000 seeds per acre rate (https://amarillo.tamu.edu/files/2016/03/2015-Texas-Panhandle-Forage-Sorghum-Silage-Trial.pdf); however, there continues to be questions surrounding optimum seeding rates. In the current trial, yields for the 100,000 seeds per acre rate were significantly greater for all evaluated hybrids, and there was no lodging at the 100,000 seeds per acre rate in any of the evaluated hybrids. Across reported forage constituents, there were no differences between seeding rates (Table 6), but there were significant differences between seeding rates for specific hybrids. Evaluated hybrids reached half-bloom at the same time regardless of seeding rate. Harvest moisture and thus dry-down were impacted by a hybrid x seeding rate interaction. The moisture content at harvest significantly decreased as seeding rates increased for Super Sile 30 and Pearl (Fig. 2). There was no difference in the moisture at harvest for either F72FS05 or F74FS72 BMR at any of the evaluated seeding rates. Seeding rate did not significantly impact stalk diameter (Fig. 3). Stalk diameter appears to be controlled more by genetics, although some hybrids may respond to seeding rates more readily than others. Significant

differences between forage nutritive value constituents were not consistent across seeding rates, but there were differences across all evaluated hybrids.

Grain yields for requested hybrids (Table 7) were collected following forage harvest and once grain reached physiological maturity. Grain yield data is submitted annually, if requested by the seed company at the time of harvest, to the USDA-Farm Service Agency (FSA) to update the table of forage sorghum hybrids eligible for loan deficiency payment. Grain production can contribute significantly to forage yield and nutritional profiles, but the desired grain quantity varies depending on end-user-goals. Harvest Index, pound of grain per pound total biomass (forage + grain) provides an indication of the grain fraction of the total biomass yield.

Statistical analyses were completed for sorghum hybrids using SAS 9.4. Adjusted least significant differences for multiple comparisons were determined using Tukey's Honest Significant Difference post hoc test. Effects and comparisons were determined significant at the 0.05 probability level. The discussion addresses broad averages for types of forage sorghums, grain sorghums, and sorghum-sudangrass hybrids evaluated in the 2023 trial as a fresh forage but managed as a silage. It is not recommended that hybrid selection be made based on marketed forage type. While the marketed forage types provide an indication of potential quality and nutritive value, actual parameters vary for hybrids of the same forage type, and there is often an overlap among hybrids in these type categories. Because nutrient requirements vary between livestock class, evaluated parameters provide a broad comparison of forage nutritive value in the respective production environment.

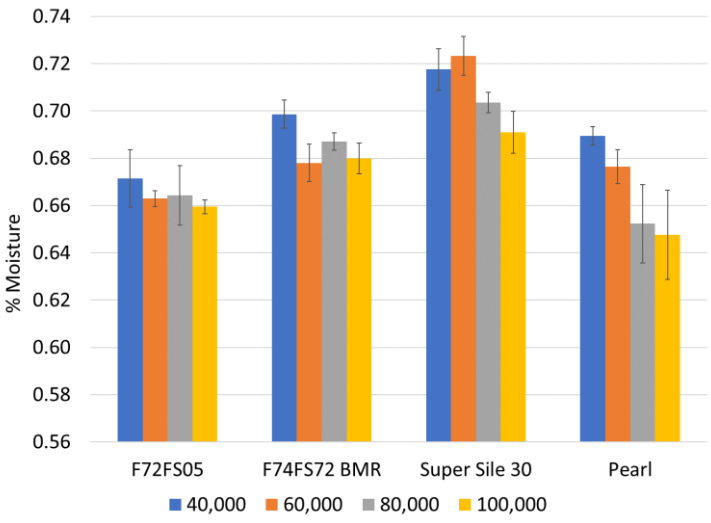

Figure 2. Plant moisture at harvest for evaluated seeding rates.

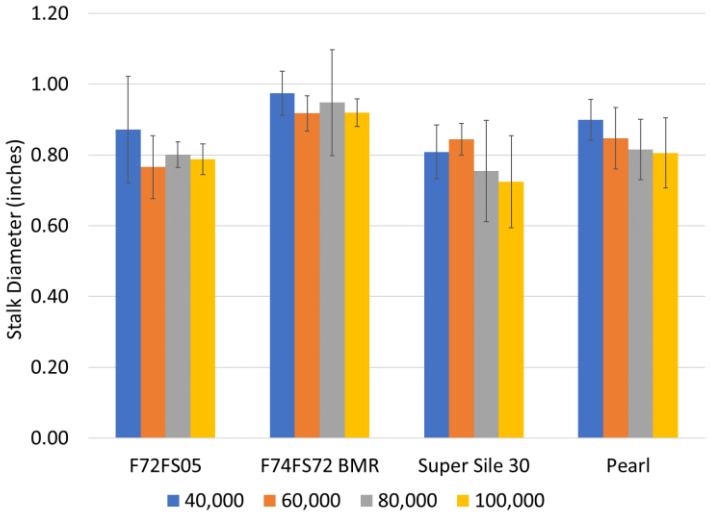

Figure 3. Stalk diameter at harvest for evaluated seeding rates.

Table 1. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage trial mean yields of non-male sterile hybrids sorted by maximum yielding hybrid. FS=Forage Sorghum, SS=Sorghum-Sudan, GS=Grain Sorghum, PS = Photoperiod Sensitive, BMR = Brown Midrib, SCA = Sugarcane Aphid (Sorghum Aphid), HB=Half-Bloom

Hybrid and Characteristics								Days to Half-Bloom (HB), Harvest Date, Height, Lodging, Moisture, and Yield						
Entry	Hybrid	Company	Type	Advertised Maturity	SCA Tol.	BMR	Brach-ytic	Days to HB†	Harvest Date	Height at Harvest (ft)	% Lodge	% Moist. at Harvest	Yield (tons/ac) DM Basis	Yield (tons/ac) 65% Moist.‡
67	P4205	Warner Seeds	FS	Med-Late	Yes	No	No	92	10/19/2023	7.5	0	67	10.6	30.2 ± 0.9
72	38F80	Wilbur-Ellis	FS	Late	Yes	No	No	90	10/19/2023	6.8	0	66	10.1	29.0 ± 2.7
55	SS405	S&W Seed	FS	Med-Late	No	No	No	97	10/19/2023	10.3	0	71	10.0	28.5 ± 1.7
24	Super SIle 20	DynaGro	FS	Med-Late	No	No	No	85	10/19/2023	9.0	0	68	9.3	26.6 ± 2.3
50	S72	Richardson Seeds	SS	Late	Yes	Yes	No	107	10/19/2023	9.1	0	72	8.7	24.9 ± 1.4
4	ADV F8484IG	Advanta	FS	Late	No	No	Yes	92	10/19/2023	5.6	0	67	8.7	24.9 ± 3.4
71	33F70	Wilbur-Ellis	FS	Late	No	Yes	Yes	92	10/19/2023	5.0	0	68	8.6	24.6 ± 0.9
9	ADVS 6525	Advanta	SS	PS	Yes	Yes	No	118	10/24/2023	9.1	0	71	8.6	24.5 ± 1.0
2	ADV F7424	Advanta	FS	Med-Late	Yes	Yes	Yes	91	10/19/2023	6.1	0	70	8.5	24.3 ± 0.7
12	Danny Boy II BMR	DynaGro	SS	PS	No	Yes	No	.	10/24/2023	8.8	0	74	8.5	24.3 ± 1.0
42	F429	Richardson Seeds	FS	Med-Late	No	Yes	No	95	10/19/2023	6.9	0	69	8.4	24.1 ± 1.8
21	Fullgraze II	DynaGro	SS	Late	No	No	No	96	10/19/2023	10.5	0	65	8.3	23.7 ± 2.7
23	FX23001	DynaGro	SS	PS	No	No	No	.	10/24/2023	9.4	0	73	8.3	23.6 ± 0.6
11	AF7401	Advanta	FS	Med-Late	No	Yes	Yes	92	10/19/2023	5.0	0	68	8.2	23.5 ± 1.3
28	Silo-Max 100	Golden Acres	FS	Medium	Yes	No	No	93	10/13/2023	5.3	0	72	8.1	23.2 ± 2.4
22	Fullgraze II BMR	DynaGro	SS	Late	No	Yes	No	100	10/19/2023	10.0	0	69	8.1	23.1 ± 1.4
47	S470	Richardson Seeds	SS	PS	Yes	No	No	.	10/24/2023	9.0	0	72	8.0	22.8 ± 0.5
66	P4196BMR	Warner Seeds	FS	Late	No	Yes	Yes	91	10/19/2023	5.4	0	71	7.9	22.5 ± 0.5
29	X22077DT	MOJO Seed	FS	Med-Early	Yes	No	No	63	9/27/2023	6.8	0	62	7.7	21.9 ± 0.9
65	P2880	Warner Seeds	GS	Med-Early	Yes	No	No	68	9/27/2023	5.9	0	63	7.6	21.8 ± 2.7
3	ADV F8322	Advanta	FS	Medium	Yes	No	No	91	10/13/2023	5.6	0	71	7.6	21.6 ± 1.6
30	X22097DT	MOJO Seed	FS	Med-Early	Yes	No	No	67	9/27/2023	6.1	0	60	7.5	21.5 ± 0.8
37	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	67	9/27/2023	6.4	0	66	7.5	21.3 ± 1.6
62	ID1235PM	Supra Ag	SS	PS	No	No	No	71	10/24/2023	7.6	0	76	7.4	21.3 ± 1.2
25	Super Sile 30	DynaGro	FS	Med-Early	No	No	Yes	84	10/3/2023	7.3	0	69	7.4	21.2 ± 1.0
36	X23015DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9/27/2023	6.0	0	66	7.4	21.1 ± 2.0
34	X23013DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9/27/2023	6.3	0	64	7.4	21.1 ± 2.1
32	X23011DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9/27/2023	6.1	0	63	7.3	21.0 ± 1.6
68	P8616	Warner Seeds	SS	PS	No	Yes	No	.	10/24/2023	9.0	0	74	7.3	21.0 ± 1.0
64	P2747	Warner Seeds	GS	Med-Early	Yes	No	No	67	9/27/2023	5.4	0	64	7.3	20.8 ± 0.8
48	S473	Richardson Seeds	SS	PS	Yes	Yes	No	.	10/24/2023	8.6	0	74	7.2	20.4 ± 0.7
77	P1366Q	TAMU Check	Corn	Medium	.	.	.	.	10/13/2023	7.3	0	61	7.1	20.4 ± 2.4
33	X23012DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9/27/2023	6.3	0	64	7.1	20.2 ± 0.7
49	S60	Richardson Seeds	SS	Med-Early	Yes	Yes	No	68	9/27/2023	7.8	13	69	7.0	20.1 ± 1.2
58	X52242	Scott Seed Co	FS	Medium	Yes	No	No	90	10/13/2023	6.4	0	72	7.0	20.1 ± 1.2
35	X23014DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9/27/2023	5.8	0	62	7.0	20.1 ± 0.5
31	OPAL +DT	MOJO Seed	FS	Med-Early	Yes	No	No	68	9/27/2023	6.1	0	65	7.0	20.0 ± 2.3
16	F72FS05	DynaGro	FS	Med-Early	No	Yes	Yes	95	10/3/2023	6.1	0	68	7.0	19.9 ± 0.4
14	Dynagraze II BMR	DynaGro	SS	Med-Early	No	Yes	No	64	9/27/2023	7.8	7	68	6.9	19.7 ± 1.9

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Hybrid and Characteristics								Days to Half-Bloom (HB), Harvest Date, Height, Lodging, Moisture, and Yield						
Entry	Hybrid	Company	Type	Advertised Maturity	SCA Tol.	BMR	Brach-ytic	Days to HB†	Harvest Date	Height at Harvest (ft)	% Lodge	% Moist. at Harvest	Yield (tons/ac) DM Basis	Yield (tons/ac) 65% Moist.ǂ
26	Super Sweet 10	DynaGro	SS	Med-Early	No	No	No	65	9/27/2023	7.7	0	62	6.9	19.7 ± 0.7
38	F24	Richardson Seeds	FS	Early	Yes	No	Yes	63	9/14/2023	5.6	0	72	6.9	19.6 ± 0.9
61	ID1131	Supra Ag	SS	Medium	No	No	No	92	10/13/2023	8.4	0	73	6.8	19.4 ± 1.2
15	F71FS72 BMR	DynaGro	FS	Early	No	Yes	No	63	9/14/2023	5.9	10	69	6.7	19.3 ± 1.5
40	F27	Richardson Seeds	FS	Medium	No	No	No	92	10/13/2023	6.1	0	71	6.7	19.0 ± 3.5
53	SP2606 BMR	S&W Seed	FS	Medium	No	Yes	No	85	10/13/2023	5.9	0	73	6.6	19.0 ± 0.4
60	X56023	Scott Seed Co	FS	Medium	No	Yes	No	92	10/13/2023	6.8	0	75	6.6	18.8 ± 1.4
69	PSS587	Warner Seeds	SS	Med-Early	No	Yes	No	65	9/27/2023	7.4	23	65	6.6	18.8 ± 1.9
18	F74FS23 BMR	DynaGro	FS	Medium	No	Yes	No	86	10/13/2023	6.7	20	74	6.6	18.8 ± 2.1
56	X5061038	Scott Seed Co	FS	Medium	No	Yes	Yes	85	10/13/2023	4.6	0	71	6.5	18.6 ± 0.8
39	F251	Richardson Seeds	FS	Early	Yes	No	No	66	9/14/2023	6.7	10	71	6.4	18.2 ± 1.9
13	Dynagraze II	DynaGro	SS	Med-Early	No	No	No	62	9/27/2023	8.1	3	64	6.3	17.9 ± 1.0
57	X50665	Scott Seed Co	FS	Medium	No	Yes	Yes	86	10/13/2023	4.4	0	72	6.2	17.6 ± 0.8
46	S425	Richardson Seeds	SS	Late	Yes	No	No	95	10/19/2023	9.6	0	73	6.2	17.6 ± 0.4
5	ADV XF051	Advanta	FS	Early	No	Yes	No	63	9/14/2023	5.6	7	70	6.1	17.3 ± 0.9
6	ADV XF171	Advanta	FS	Early	No	Yes	No	63	9/14/2023	6.1	20	71	6.0	17.3 ± 0.6
54	SP2707 DT	S&W Seed	FS	Med-Early	No	No	No	92	10/3/2023	4.4	0	68	6.0	17.2 ± 1.2
51	NK300	S&W Seed	FS	Med-Early	No	No	No	86	10/3/2023	5.5	0	69	6.0	17.2 ± 2.3
76	P1548	TAMU Check	Corn	Medium	.	.	.	.	10/13/2023	6.8	0	58	5.9	17.0 ± 0.6
75	DKC70-64	TAMU Check	Corn	Medium	.	.	.	.	10/13/2023	7.6	0	65	5.9	16.9 ± 1.9
19	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	91	10/13/2023	4.6	0	74	5.9	16.9 ± 0.5
73	84G62	TAMU Check	GS	Early	No	No	No	63	9/14/2023	4.4	0	67	5.9	16.8 ± 0.3
70	31F65	Wilbur-Ellis	SS	Medium	No	Yes	Yes	87	10/13/2023	6.4	0	73	5.8	16.7 ± 1.3
17	F72FS25 BMR	DynaGro	FS	Medium	No	Yes	Yes	92	10/13/2023	5.1	0	74	5.7	16.4 ± 0.1
1	ADV F7232	Advanta	FS	Medium	No	Yes	Yes	90	10/13/2023	5.2	0	73	5.7	16.3 ± 1.4
41	F382	Richardson Seeds	FS	Early	Yes	Yes	No	66	9/14/2023	6.4	0	72	5.7	16.2 ± 0.3
20	F75FS13	DynaGro	FS	Medium	No	No	No	67	10/13/2023	7.8	37	67	5.6	16.1 ± 0.6
10	AF7102	Advanta	FS	Early	No	Yes	No	63	9/14/2023	5.9	7	71	5.6	16.1 ± 1.0
44	F431	Richardson Seeds	FS	Early	Yes	Yes	Yes	66	9/14/2023	5.0	0	72	5.0	14.4 ± 0.2
74	DK37-07	TAMU Check	GS	Early	Yes	No	No	63	9/14/2023	4.2	0	65	4.9	13.9 ± 0.8
													Mean*	**20.4**
													CV (%)	**7.3**
													p-val	**<0.0001**
													LSD	**0.8**

† Days to HB represents the number of days from planting to HB. If HB date is not reported, the respective hybrid did not reach HB prior to the last harvest date. *Mean and statistical evaluations do not include corn hybrids. Forage characteristics and advertised maturity are provided by developer/company at the time of entry. ǂMean for each hybrid is folloed by the standard deviation (±).

Table 2. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage trial forage nutritive values by maximum tons of TDN per acre. FS=Forage Sorghum, SS=Sorghum Sudan, GS=Grain Sorghum, PS=Photoperiod Sensitive, SCA=Sugarcane Aphid (aka Sorghum Aphid), BMR=Brown midrib, HB=Half Bloom

Hybrid and Characteristics									Nutrient Composition (DM Basis)												Yield (tons/ac) DM Basis
Entry	Hybrid	Company	Type	Advertised Maturity	SCA Tol.	BMR	Brach-yitc	Days to HB†	% CP	% NDF	% NDFD30	% IVTD30	% ADF	% Lignin	% NFC	% Starch	% WSC	Milk lbs./Ton	% TDN	tons TDN/ac	
67	P4205	Warner Seeds	FS	Med-Late	Yes	No	No	92	8.5	48.1	45.0	73.7	28.2	3.6	33.7	5.8	27.4	3242	64.7	6.8	10.6
72	38F80	Wilbur-Ellis	FS	Late	Yes	No	No	90	7.3	52.8	46.0	71.3	31.2	4.5	30.4	10.7	19.5	3131	63.0	6.4	10.1
55	SS405	S&W Seed	FS	Med-Late	No	No	No	97	7.0	53.8	44.7	70.3	33.0	4.3	30.8	1.8	28.5	3067	62.0	6.2	10.0
2	ADV F7424	Advanta	FS	Med-Late	Yes	Yes	Yes	91	8.4	48.1	58.3	80.0	27.6	2.8	33.2	6.2	26.2	3581	70.7	6.0	8.5
24	Super Slle 20	DynaGro	FS	Med-Late	No	No	No	85	8.0	48.4	41.7	71.7	29.1	3.7	34.1	8.9	24.8	3204	64.0	6.0	9.3
42	F429	Richardson Seeds	FS	Med-Late	No	Yes	No	95	8.9	54.0	54.3	75.0	30.5	2.3	28.0	2.8	24.6	3334	68.0	5.7	8.4
11	AF7401	Advanta	FS	Med-Late	No	Yes	Yes	92	8.5	49.1	57.0	79.0	28.6	3.0	31.8	6.6	24.6	3490	69.7	5.7	8.2
4	ADV F8484IG	Advanta	FS	Late	No	No	Yes	92	8.6	48.6	45.0	73.3	28.6	3.7	33.8	13.5	19.9	3309	65.7	5.7	8.7
9	ADVS 6525	Advanta	SS	PS	Yes	Yes	No	118	7.0	52.2	51.7	74.7	33.6	3.5	31.4	0.2	31.9	3243	66.0	5.7	8.6
22	Fullgraze II BMR	DynaGro	SS	Late	No	Yes	No	100	8.2	51.8	57.0	78.0	30.3	3.0	29.6	6.4	22.0	3424	69.0	5.6	8.1
12	Danny Boy II BMR	DynaGro	SS	PS	No	Yes	No	.	7.3	51.6	50.0	74.3	34.4	3.9	30.6	0.2	31.2	3142	64.7	5.5	8.5
21	Fullgraze II	DynaGro	SS	Late	No	No	No	96	8.5	52.5	52.3	75.0	30.9	4.0	27.6	14.1	12.8	3269	66.0	5.5	8.3
77	P1366Q	TAMU Check	Corn	Medium	.	.	.	.	9.1	37.7	52.0	82.0	20.7	2.6	45.3	32.4	11.3	3137	76.0	5.4	7.1
29	X22077DT	MOJO Seed	FS	Med-Early	Yes	No	No	63	9.7	43.8	44.3	75.7	26.4	3.6	35.6	25.8	6.9	3555	69.3	5.3	7.7
28	Silo-Max 100	Golden Acres	FS	Medium	Yes	No	No	93	9.0	51.2	48.3	73.3	29.8	3.6	30.7	6.3	24.0	3233	64.7	5.3	8.1
50	S72	Richardson Seeds	SS	Late	Yes	Yes	No	107	7.3	54.5	42.7	68.7	34.9	4.8	28.8	0.2	28.1	2929	60.0	5.2	8.7
36	X23015DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	10.1	42.0	43.0	76.0	24.5	4.1	37.0	27.3	7.4	3614	70.3	5.2	7.4
30	X22097DT	MOJO Seed	FS	Med-Early	Yes	No	No	67	9.3	44.4	43.0	75.0	26.4	3.5	36.4	26.9	6.1	3466	68.3	5.1	7.5
66	P4196BMR	Warner Seeds	FS	Late	No	Yes	Yes	91	6.9	54.6	49.0	72.3	35.3	3.7	29.7	0.2	29.0	3239	65.3	5.1	7.9
65	P2880	Warner Seeds	GS	Med-Early	Yes	No	No	68	9.4	46.3	43.7	73.7	27.6	3.8	34.3	25.3	6.1	3441	67.0	5.1	7.6
37	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	67	9.3	45.5	46.0	75.3	26.5	3.7	34.7	24.9	8.7	3504	68.3	5.1	7.5
71	33F70	Wilbur-Ellis	FS	Late	No	Yes	Yes	92	6.5	59.1	41.7	65.3	37.3	4.6	26.5	1.3	24.8	2855	58.3	5.0	8.6
64	P2747	Warner Seeds	GS	Med-Early	Yes	No	No	67	9.7	42.2	40.0	74.7	25.0	3.9	38.2	28.7	5.5	3561	68.3	5.0	7.3
34	X23013DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9.0	46.2	43.3	74.0	27.2	3.9	34.5	25.5	6.7	3470	67.7	5.0	7.4
32	X23011DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9.3	46.3	44.7	74.3	27.2	3.8	34.1	23.8	7.8	3449	67.7	5.0	7.3
35	X23014DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9.3	42.2	43.3	76.0	24.4	3.4	38.7	28.3	6.0	3625	70.0	4.9	7.0
47	S470	Richardson Seeds	SS	PS	Yes	No	No	.	7.1	56.8	47.3	70.0	35.3	4.5	26.2	0.2	25.8	2956	61.3	4.9	8.0
3	ADV F8322	Advanta	FS	Medium	Yes	No	No	91	9.1	50.9	48.0	73.7	29.6	3.0	30.8	5.0	25.4	3229	64.7	4.9	7.6
33	X23012DT	MOJO Seed	FS	Med-Early	Yes	No	No	69	9.3	43.3	41.0	74.7	25.4	3.8	36.9	27.3	6.7	3547	68.7	4.9	7.1
15	F71FS72 BMR	DynaGro	FS	Early	No	Yes	No	63	8.8	44.7	52.0	78.7	27.1	3.1	36.6	23.9	10.7	3618	70.3	4.7	6.7
23	FX23001	DynaGro	SS	PS	No	No	No	.	7.4	56.3	43.0	67.7	37.3	4.7	25.9	0.2	25.5	2735	57.3	4.7	8.3
25	Super Sile 30	DynaGro	FS	Med-Early	No	No	Yes	84	8.5	49.2	42.7	72.0	29.8	4.0	33.3	11.1	21.5	3212	63.7	4.7	7.4
49	S60	Richardson Seeds	SS	Med-Early	Yes	Yes	No	68	8.5	49.9	46.0	73.3	28.7	3.7	30.6	19.6	10.3	3339	66.7	4.7	7.0
31	X22201DT	MOJO Seed	FS	Med-Early	Yes	No	No	68	8.9	46.5	43.3	74.0	27.3	3.7	34.2	24.4	6.7	3433	67.0	4.7	7.0
58	X52242	Scott Seed Co	FS	Medium	Yes	No	No	90	8.5	49.7	47.7	73.7	29.1	3.3	32.5	9.5	22.5	3345	66.0	4.6	7.0
60	X56023	Scott Seed Co	FS	Medium	No	Yes	No	92	8.1	45.1	55.0	79.7	27.3	2.2	36.5	0.5	35.1	3519	70.0	4.6	6.6
76	P1548	TAMU Check	Corn	Medium	.	.	.	.	9.1	39.4	56.7	83.0	21.6	2.2	43.5	31.4	9.4	3044	76.3	4.5	5.9
38	F24	Richardson Seeds	FS	Early	Yes	No	Yes	63	10.1	46.5	45.7	74.3	29.8	4.3	32.6	21.2	9.7	3294	66.0	4.5	6.9
68	P8616	Warner Seeds	SS	PS	No	Yes	No	.	7.7	57.7	46.7	69.7	35.6	4.0	24.9	0.2	25.3	2957	61.7	4.5	7.3
18	F74FS23 BMR	DynaGro	FS	Medium	No	Yes	No	86	8.0	46.8	52.3	78.0	27.6	3.0	35.3	10.8	23.5	3473	69.0	4.5	6.6
53	SP2606 BMR	S&W Seed	FS	Medium	No	Yes	No	85	8.6	47.1	50.0	76.3	28.1	3.8	34.3	17.9	15.4	3455	68.0	4.5	6.6
48	S473	Richardson Seeds	SS	PS	Yes	Yes	No	.	7.8	56.6	48.3	70.7	35.1	3.7	26.0	0.2	26.4	3029	63.0	4.5	7.2
56	X5061038	Scott Seed Co	FS	Medium	No	Yes	Yes	85	9.3	49.2	54.7	77.7	28.0	3.4	31.1	15.4	15.1	3442	68.7	4.5	6.5
75	DKC70-64	TAMU Check	Corn	Medium	.	.	.	.	9.6	39.6	54.7	82.3	21.9	2.5	42.2	29.5	11.3	3107	74.7	4.4	5.9
62	ID1235PM	Supra Ag	SS	PS	No	No	No	71	11.3	53.7	43.3	69.3	34.4	3.7	21.9	1.0	20.5	2781	58.7	4.4	7.4

Table 2. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage trial forage nutritive values by maximum tons of TDN per acre. FS=Forage Sorghum, SS=Sorghum Sudan, GS=Grain Sorghum, PS=Photoperiod Sensitive, SCA=Sugarcane Aphid (aka Sorghum Aphid), BMR=Brown midrib, HB=Half Bloom

Hybrid and Characteristics									Nutrient Composition (DM Basis)												Yield (tons/ac) DM Basis
Entry	Hybrid	Company	Type	Advertised Maturity	SCA Tol.	BMR	Brach-yitc	Days to HB†	% CP	% NDF	% NDFD30	% IVTD30	% ADF	% Lignin	% NFC	% Starch	% WSC	Milk lbs./Ton	% TDN	tons TDN/ac	
69	PSS587	Warner Seeds	SS	Med-Early	No	Yes	No	65	9.3	46.0	45.3	74.7	26.7	3.8	33.2	20.4	11.7	3373	66.3	4.4	6.6
14	Dynagraze II BMR	DynaGro	SS	Med-Early	No	Yes	No	64	8.4	53.4	46.0	71.0	30.1	4.0	28.5	10.1	18.0	3129	63.3	4.4	6.9
16	F72FS05	DynaGro	FS	Med-Early	No	Yes	Yes	95	9.2	52.0	45.3	71.3	30.2	3.6	29.8	2.5	26.9	3103	62.3	4.4	7.0
40	F27	Richardson Seeds	FS	Medium	No	No	No	92	8.9	50.1	48.3	74.3	30.0	3.6	31.0	6.2	24.5	3215	64.7	4.3	6.7
61	ID1131	Supra Ag	SS	Medium	No	No	No	92	8.1	48.7	44.0	72.7	30.4	3.2	34.6	2.0	31.9	3168	63.0	4.3	6.8
57	X50665	Scott Seed Co	FS	Medium	No	Yes	Yes	86	9.7	49.2	54.0	77.3	28.7	3.3	29.9	11.1	18.0	3406	68.3	4.2	6.2
6	ADV XF171	Advanta	FS	Early	No	Yes	No	63	9.0	45.2	53.7	79.0	27.1	3.8	35.4	24.7	9.8	3608	69.7	4.2	6.0
39	F251	Richardson Seeds	FS	Early	Yes	No	No	66	8.8	48.0	47.0	74.7	29.1	4.8	34.1	21.0	11.9	3349	65.7	4.2	6.4
5	ADV XF051	Advanta	FS	Early	No	Yes	No	63	8.8	48.6	53.7	77.7	29.3	4.0	32.1	21.9	9.2	3487	68.7	4.2	6.1
26	Super Sweet 10	DynaGro	SS	Med-Early	No	No	No	65	8.1	50.8	41.0	70.3	29.8	4.4	30.6	17.3	12.6	2983	60.0	4.1	6.9
73	84G62	TAMU Check	GS	Early	No	No	No	63	10.1	44.4	44.7	75.7	26.1	3.6	36.3	26.9	5.6	3529	68.7	4.0	5.9
19	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	91	9.3	49.5	56.3	78.0	29.0	3.3	30.6	5.4	24.4	3403	68.0	4.0	5.9
17	F72FS25 BMR	DynaGro	FS	Medium	No	Yes	Yes	92	8.7	49.8	56.7	78.3	29.7	3.1	30.9	3.8	26.5	3436	69.3	4.0	5.7
1	ADV F7232	Advanta	FS	Medium	No	Yes	Yes	90	8.8	49.4	57.0	79.0	29.7	2.9	31.3	5.1	25.6	3428	69.0	3.9	5.7
70	31F65	Wilbur-Ellis	SS	Medium	No	Yes	Yes	87	9.0	49.0	53.0	77.0	30.2	2.9	31.5	0.3	30.6	3322	67.0	3.9	5.8
13	Dynagraze II	DynaGro	SS	Med-Early	No	No	No	62	8.8	45.9	39.0	72.3	27.3	4.5	34.9	20.3	12.7	3148	62.3	3.9	6.3
51	NK300	S&W Seed	FS	Med-Early	No	No	No	86	9.0	50.9	46.0	72.7	30.2	4.0	30.6	14.0	15.7	3229	64.3	3.9	6.0
46	S425	Richardson Seeds	SS	Late	Yes	No	No	95	8.2	53.8	45.7	71.0	33.8	4.2	28.5	0.2	27.8	3060	62.3	3.8	6.2
41	F382	Richardson Seeds	FS	Early	Yes	Yes	No	66	9.5	50.8	53.0	76.0	29.6	4.2	30.5	14.8	14.6	3385	67.3	3.8	5.7
10	AF7102	Advanta	FS	Early	No	Yes	No	63	8.5	48.3	51.0	76.7	30.1	4.1	32.9	20.7	10.9	3444	67.7	3.8	5.6
54	SP2707 DT	S&W Seed	FS	Med-Early	No	No	No	92	9.0	52.0	46.3	72.0	30.5	3.8	30.3	7.3	22.0	3121	62.3	3.8	6.0
20	F75FS13	DynaGro	FS	Medium	No	No	No	67	7.6	43.5	41.7	74.7	26.2	3.7	39.4	17.9	20.9	3322	64.7	3.6	5.6
44	F431	Richardson Seeds	FS	Early	Yes	Yes	Yes	66	10.9	50.9	53.7	76.0	29.8	3.4	28.0	15.0	12.3	3381	67.7	3.4	5.0
74	DK37-07	TAMU Check	GS	Early	Yes	No	No	63	10.3	44.9	43.0	74.3	27.0	4.1	34.0	26.6	4.8	3439	67.0	3.3	4.9
† If HB date is not reported, the respective hybrid did not reach HB prior to the last harvest date. *Mean and statistical evaluations do not include corn hybrids. Forage characteristics and advertised maturity are provided by developer/company at the time of entry.								**Mean***	8.7	49.3	47.7	74.3	29.6	3.7	32	12.5	18.4	3306	65.7	4.7	7.2
								CV (%)	5.6	5.4	4.9	2.2	6.4	12.4	8.3	22.4	7.9	3.9	2.7	7.5	7.2
								p-val	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<.0001	<.0001	<.0001
								LSD	0.8	4.3	3.8	2.6	3	0.7	4.3	4.5	2.3	206	2.9	0.58	0.8

Table 3. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage trial mean yields and moisture at harvest of male sterile hybrids harevested at four stages (boot, heading, unpollinated (bagged), and pollinated at soft-dough). The unpollinated row was harvested on the same day as the pollinated row at soft-dough (SD). FS=Forage Sorghum, SS=Sorghum-Sudan, BMR = Brown midrib, SCA=Sugarcane Aphid (aka Sorghum Aphid)

Hybrids and Characteristics								Harvest Date, Moisture at Harvest, and DM yield for 4 harvest stages (boot, heading, unpollinated/ bagged, and pollinated at SD)											
								Boot			Heading			Unpollinated			Pollinated at SD		
Entry	Hybrid	Company	Type	Advertised Maturity	SCA TOL.	BMR	Brach-ytic	Harvest Date	% Moist.	Yield (tons/ ac) DM Basis	Harvest Date	% Moist.	Yield (tons/ ac) DM Basis	Harvest Date	% Moist.	Yield (tons/ ac) DM Basis	Harvest Date	% Moist.	Yield (tons/ ac) DM Basis
27	Sweet Ton MS	DynaGro	FS	Medium	No	No	No	8/11/2023	85	3.4	8/18/2023	84	4.0	9/25/2023	68	6.6	9/25/2023	66	7.1
43*	F430	Richardson Seeds	FS	Late	Yes	Yes	No	9/29/2023	73	5.1	10/4/2023	75	7.6	10/25/2023	72	7.9	10/25/2023	74	8.0
45	F465	Richardson Seeds	FS	Medium	Yes	No	No	8/11/2023	87	3.3	8/18/2023	85	4.5	9/25/2023	67	10.2	9/25/2023	69	10.6
52	SP1727 MS BMR	S&W Seed	FS	Medium	No	Yes	No	8/18/2023	87	4.0	8/23/2023	84	6.6	9/29/2023	75	7.8	9/29/2023	72	8.4
59*	X54243	Scott Seed Co	SS	Med-Late	Yes	No	No	9/29/2023	78	6.7	10/4/2023	74	8.6	10/25/2023	69	8.2	10/25/2023	71	8.0
63*	ID1337	Supra Ag	FS	Medium	No	No	No	9/15/2023	79	5.9	9/23/2023	78	7.3	10/25/2023	71	8.2	10/25/2023	72	8.7
								Mean*	81	4.7	Mean*	80	6.4	Mean*	70	8.1	Mean*	71	8.5
								CV (%)	3.3	16.7	CV (%)	2.5	21.3	CV (%)	3.3	14.7	CV (%)	2.8	5.8
								p-val	0.0002	0.0008	p-val	<0.0001	0.0086	p-val	0.0161	0.7670	p-val	0.0052	0.0002
								LSD	0.05	1.4	LSD	0.03	2.4	LSD	0.02	2.2	LSD	0.04	0.9

* Poor pollination and grain development. Hybrids that reach half-bloom in October do not have time to develop grain because of temperature decline in the Texas High Plains and northern sorghum production environments.

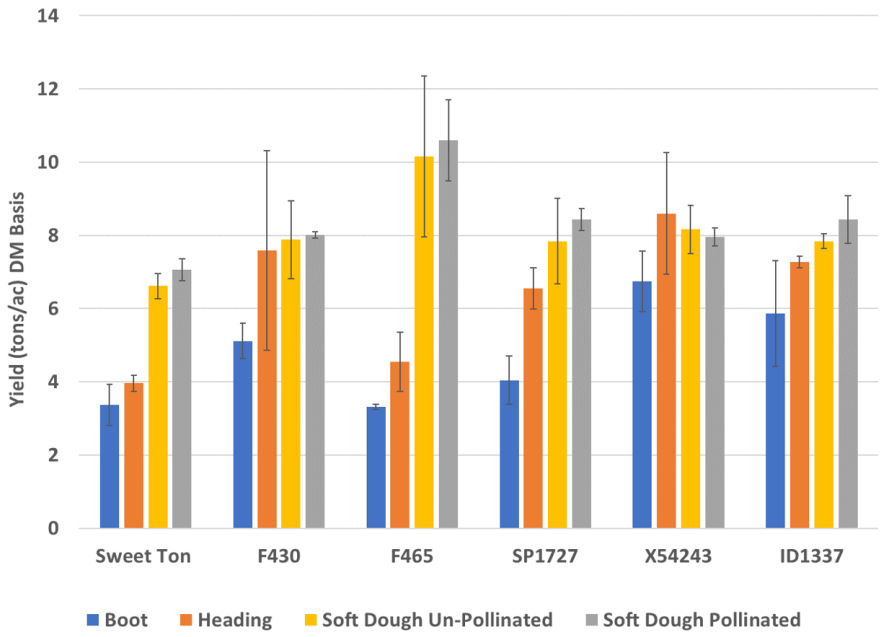

Figure 4. Forage yield of evaluated male-sterile hyrbids at evaluated physiological stages (boot, heading, unpollinated bagged at the soft-dough stage, soft-dough stage pollinated).

Table 4. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage trial nutritive values of male sterile hybrids sampled at four stages (boot, heading, unpollinated (bagged), and pollinated at soft-dough. The unpollinated (bagged) sorghum was sampled on the same day as the pollinated row at the soft-dough stage. Hybrids with poor grain development (*) were harvested on the last harvest date. FS=Forage Sorghum, SS=Sorghum-Sudan, BMR=Brown midrib, SCA=Sugarcane Aphid (aka Sorghum Aphid) P-value < 0.05 is statistically significant.

Hybrid and Characteristics									Harvest Dates and Growth Stage					
Entry	Hybrid	Company	Type	Advertised Maturity	SCA TOL.	BMR	Brachytic	Male Sterile	Boot Harvest	Heading Harvest	Half-Bloom Date	Days to Half-Bloom	UnPollinated Harvest	Pollinated at SD Grain Stage harvest
27	Sweet Ton MS	DynaGro	FS	Medium	No	No	No	Yes	8/11/23	8/18/23	8/23/23	62	9/25/23	9/25/23
43*	F430	Richardson Seeds	FS	Late	Yes	Yes	No	Yes	9/29/23	10/4/23	10/11/23	111	10/25/23	10/25/23
45	F465	Richardson Seeds	FS	Medium	Yes	No	No	Yes	8/11/23	8/18/23	8/25/23	64	9/25/23	9/25/23
52	SP1727 MS BMR	S&W Seed	FS	Medium	No	Yes	No	Yes	8/18/23	8/23/23	8/27/23	67	9/29/23	9/29/23
59*	X54243	Scott Seed Co	SS	Med-Late	Yes	No	No	Yes	9/29/23	10/4/23	10/13/23	113	10/25/23	10/25/23
63*	ID1337	Supra Ag	FS	Medium	No	No	No	Yes	9/15/23	9/23/23	10/12/23	112	10/25/23	10/25/23

Hybrid			% Crude Protein (DM Basis)						% Lignin (DM Basis)					
Entry	Hybrid	Company	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val
27	Sweet Ton MS	DynaGro	11.9	9.7	8.1	7.7	0.0004	0.2866	4.5	4.7	3.2	4.9	0.1426	0.0128
43*	F430	Richardson Seeds	9.2	8.2	7.5	7.7	0.1809	0.9027	2.9	3.1	3.0	4.5	0.0312	0.0475
45	F465	Richardson Seeds	11.2	9.7	8.4	7.1	0.0061	0.0948	4.0	4.3	3.6	4.6	0.4253	0.0912
52	SP1727 MS BMR	S&W Seed	11.9	10.2	9.3	8.3	<0.0001	0.0115	3.1	3.0	3.2	3.8	0.1604	0.0474
59*	X54243	Scott Seed Co	7.4	8.2	5.9	6.8	0.1457	0.2763	5.9	4.6	5.1	4.3	0.1881	0.2688
63*	ID1337	Supra Ag	8.6	8.2	7.8	7.8	0.6210	0.9653	4.4	4.7	3.4	4.1	0.5169	0.5821
* Poor pollination and grain development		Mean	10.1	9.0	7.8	7.6			4.1	4.2	3.6	4.5		
		CV (%)	10.1	10.7	9.1	11.9			17.2	19.7	12.7	23.9		
		p-val	0.0002	0.0614	0.0019	0.4512			0.0027	0.0469	0.0009	0.8507		

Hybrid			% Neutral Detergent Fiber (DM Basis)						% NDF Digestibility - 30 hours (DM Basis)					
Entry	Hybrid	Company	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val
27	Sweet Ton MS	DynaGro	66.4	67.1	49.4	48.2	<0.0001	0.6720	44.3	41.3	44.3	38.7	0.1049	0.0039
43*	F430	Richardson Seeds	58.7	59.4	49.9	53.7	0.1251	0.5202	50.3	47.3	44.0	39.3	0.0012	0.0572
45	F465	Richardson Seeds	65.8	68.6	52.1	50.9	<0.0001	0.5805	43.0	43.3	43.7	38.7	0.2355	0.1497
52	SP1727 MS BMR	S&W Seed	63.4	62.8	51.3	52.0	<0.0001	0.6064	44.0	45.7	47.3	48.3	0.0427	0.5655
59*	X54243	Scott Seed Co	65.1	65.8	61.3	58.8	0.1457	0.3846	40.0	40.7	37.0	39.3	0.6171	0.3603
63*	ID1337	Supra Ag	56.0	56.6	47.9	48.9	0.1766	0.8839	40.3	41.7	41.3	34.3	0.7033	0.5107
* Poor pollination and grain development		Mean	62.6	63.4	52.0	52.1			43.7	43.3	42.9	42.9		
		CV (%)	3.1	3.4	9.6	8.4			5.9	7.2	4.7	18.3		
		p-val	<0.0001	0.0001	0.0689	0.1044			0.0015	0.1279	0.001	0.3658		

Hybrid			% Starch (DM Basis)						% Water Soluble Carbohydrates (DM Basis)					
Entry	Hybrid	Company	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val
27	Sweet Ton MS	DynaGro	0.8	1.8	4.6	14.7	0.0002	0.0093	8.5	9.9	27.4	19.7	<0.0001	0.0141
43*	F430	Richardson Seeds	0.2	0.2	0.2	0.2	NS	NS	22.2	22.7	34.5	28.7	0.0517	0.3549
45	F465	Richardson Seeds	0.2	1.0	4.6	18.0	<0.0001	0.0099	10.4	9.2	24.7	14.4	0.0001	0.0013
52	SP1727 MS BMR	S&W Seed	0.2	1.3	1.5	3.3	0.2422	0.3998	9.5	12.6	26.7	25.5	<0.0001	0.4209
59*	X54243	Scott Seed Co	1.2	2.5	0.8	1.2	0.5327	0.6384	16.2	13.2	23.9	24.9	0.0112	0.7281
63*	ID1337	Supra Ag	0.7	0.7	0.5	0.2	0.7566	0.3739	24.2	24.8	35.3	33.9	0.0699	0.8166
* Poor pollination and grain development		Mean	0.5	1.2	2.0	52.1			15.2	15.4	28.8	24.5		
		CV (%)	64.0	76.1	86.1	8.4			17.2	18.4	16.7	16.1		
		p-val	0.001	0.2373	0.0216	0.1044			<0.0001	<0.0001	0.0467	0.0010		

Hybrid			Milk lbs/Ton (DM Basis)						% Total Digestible Nutrients (DM Basis)					
Entry	Hybrid	Company	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val	Boot	Heading	Unpollinated	Pollinated at SD	All Stages p-val	Unpol vs Pol p-val
27	Sweet Ton MS	DynaGro	2379	2342	3103	3104	<0.0001	0.9973	52.7	51.7	63.0	61.7	0.0003	0.4918
43*	F430	Richardson Seeds	3089	3010	3277	2936	0.0226	0.0188	64.0	62.3	65.7	60.7	0.0900	0.0717
45	F465	Richardson Seeds	2336	2368	3034	3016	0.0014	0.9232	52.3	52.3	61.0	60.0	0.0079	0.7415
52	SP1727 MS BMR	S&W Seed	2382	2607	3189	3216	<0.0001	0.4150	54.3	57.3	65.0	65.3	<0.0001	0.6433
59*	X54243	Scott Seed Co	2503	2440	2658	2855	0.1949	0.3117	53.7	52.3	54.7	58.3	0.3461	0.2783
63*	ID1337	Supra Ag	2847	2896	3164	3158	0.1264	0.9731	58.7	59.0	64.7	63.7	0.0403	0.6932
* Poor pollination and grain development		Mean	2589	2611	3071	3048			55.9	55.8	62.3	61.6		
		CV (%)	5.5	5.7	4.1	6.5			4.1	4.9	3.5	5.2		
		p-val	<0.0001	0.0006	0.0008	0.2864			0.0002	0.003	62.3	0.1649		

Table 5. 2023 Texas A&M AgriLife Bushland Forage Sorghum Seeding Rate Trial. FS=Forage Sorghum, BMR=Brown midrib, HB=Half Bloom, SCA=Sugarcane Aphid (aka Sorghum Aphid)

Hybrid and Characteristics											
Entry	**Hybrid**	**Company**	**Type**	**Advertised Maturity**	**SCA Tol.**	**BMR**	**Brach-ytic**	**Male Sterile**	**Half Bloom Date**	**Days to HB†**	**Harvest Date**
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	No	9/25/23	95	10/19/23
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	No	9/22/23	92	10/19/23
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	No	9/17/23	88	10/13/23
4	Pearl	MOJO	FS	Med-Early	Yes	No	No	No	8/29/23	68	9/27/23

† There was no difference in half-bloom dates between planting populations. All populations for the same hybrid were harvested on the same day. No significant difference between hybrids at the same seeding rate, but there were differences between seeding rates for all hyrbids. P-value less than 0.05 is statistically significant.

		Yield (tons/ac) DM Basis				**Seeding Rate Summary Statistics**			
Entry	**Hybrid**	**40,000 seeds/ac**	**60,000 seeds/ac**	**80,000 seeds/ac**	**100,000 seeds/ac**	**Mean**	**CV (%)**	**p-val**	**LSD**
1	F72FS05	7.0	6.7	6.7	9.2	7.4	7.8	0.0018	1.1
2	F74FS72 BMR	6.1	6.1	6.4	7.9	6.6	7.6	0.0065	0.9
3	Super Sile 30	6.0	6.1	6.6	8.5	6.8	8.0	0.0012	1.0
4	Pearl	6.7	7.1	7.1	8.4	7.3	6.7	0.0144	0.9
Mean		6.5	6.5	6.7	8.5				
CV (%)		7.6	10.1	5.9	6.3				
p-val		0.0835	0.2739	0.1388	0.0835				
LSD		NS	NS	NS	NS				

Table 6. 2023 Texas A&M AgriLife Bushland Forage Sorghum seeding rate trial nutritive value.

Hybrid and Characteristics									Nutrient Composition (DM Basis)										
Entry	HYBRID	COMPANY	TYPE	Advertised MATURITY	SCA TOL.	BMR	BRACH-YTIC	Seeding Rate	% CP	% NDF	% NDFD30	% IVTD30	% ADF	% Lignin	% NFC	% Starch	% WSC	Milk lbs./Ton	% TDN
Average of all seeding rates for each hybrid. Average represents 12 plots (4 seeding rates per hybrid x 3 reps)																			
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	Average	8.4	51.3	47.6	73.1	29.9	3.5	31.1	4.6	25.9	3224	64.6
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	Average	8.7	48.8	56.5	78.6	28.2	2.9	32.3	6.5	24.9	3490	69.9
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	Average	7.7	49.5	41.8	71.3	30.5	4.4	33.4	9.6	23.6	3159	63.2
4	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	Average	9.2	47.5	45.7	74.3	28.5	4.0	33.0	21.5	9.9	3399	66.8
								Mean	8.5	49.3	47.9	74.3	29.3	3.7	32.4	10.8	21.0	3318	66.1
								CV (%)	4.8	3.1	3.7	1.5	4.3	8.6	4.3	15.9	6.6	2.1	1.5
								p-val	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**0.0016**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**
								LSD	0.3	1.3	1.5	0.9	1.1	0.3	1.2	1.5	1.2	57.5	0.9
Average of all 4 hybrids at each evalauted seeding rate. Average represents 12 plots (4 hybrids x 3 reps)																			
								40,000	8.3	49.3	48.1	74.4	29.8	3.9	33.1	11.2	21.0	3341	66.2
								60,000	8.5	49.1	47.3	74.1	29.4	3.9	32.6	12.2	19.5	3323	66.1
								80,000	8.7	49.2	47.5	74.2	29.0	3.5	32.2	10.1	21.7	3306	66.0
								100,000	8.5	49.4	48.0	74.3	29.0	3.6	32.0	9.9	21.2	3298	66.1
								Mean	8.5	49.2	47.7	74.2	29.3	3.7	32.5	10.8	20.9	3317	66.1
								CV (%)	8.1	4.2	3.7	4.1	5.4	17.6	4.9	66.6	33.5	4.6	4.3
								p-val	0.5660	0.9857	0.9845	0.9957	0.6017	0.4338	0.3589	0.8653	0.8914	0.9105	0.9990
Averages for each hybrid and seeding rate combination.																			
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	40,000	8.4	51.4	48.0	73.0	30.0	3.4	31.8	5.0	26.4	3243	64.5
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	60,000	8.3	51.3	47.3	72.7	30.1	3.6	31.3	5.1	25.8	3228	64.7
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	80,000	8.9	51.5	47.7	73.3	29.7	3.2	30.3	4.5	25.4	3218	64.7
1	F72FS05	DynaGro	FS	Med-Early	No	No	No	100,000	8.1	51.1	47.7	73.3	30.0	3.6	31.1	4.2	26.1	3212	64.7
								Mean	8.4	51.3	47.6	73.1	29.9	3.5	31.1	4.7	25.9	3224	64.6
								CV (%)	2.76	1.7	2.2	0.7	2.3	4.6	2.7	30.7	5.6	0.6	0.9
								p-val	**0.0204**	0.9722	0.9205	0.4245	0.8796	0.0818	0.3300	0.8543	0.9025	0.4163	0.9874
								LSD	0.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	40,000	8.7	48.5	57.3	79.3	28.4	3.1	33.3	8.0	24.5	3534	70.3
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	60,000	8.8	49.2	55.5	78.0	29.0	3.1	31.8	7.2	23.7	3458	69.5
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	80,000	8.8	48.9	56.0	78.3	27.9	2.8	32.1	5.8	25.4	3476	69.7
2	F74FS72 BMR	DynaGro	FS	Medium	No	Yes	Yes	100,000	8.6	48.9	56.7	78.7	27.7	2.7	31.7	5.4	25.5	3480	70.0
								Mean	8.7	48.8	56.5	78.6	28.2	2.9	32.3	6.5	24.9	3490	69.9
								CV (%)	5.3	2.4	3.1	1.2	3.4	8.9	3.2	23.7	4.7	0.3	1.1
								p-val	0.9525	0.9281	0.6801	0.4510	0.5500	0.3058	0.2687	0.2276	0.3321	0.4563	0.6050
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	40,000	7.4	49.6	40.3	70.3	30.9	4.7	34.0	8.7	24.5	3155	62.7
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	60,000	7.7	49.8	42.7	71.7	31.1	4.6	33.2	11.6	21.1	3192	63.7
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	80,000	8.0	48.7	41.7	71.7	29.3	4.0	33.9	8.8	25.3	3169	63.3
3	Super Sile 30	DynaGro	FS	Med-Early	No	No	No	100,000	7.7	49.9	42.7	71.3	30.7	4.4	32.4	8.5	23.3	3121	63.0
								Mean	7.7	49.5	41.8	71.3	30.5	4.4	33.4	9.1	23.6	3159	63.2
								CV (%)	4.6	2.4	6.4	2.3	4.6	11.0	3.1	11.2	4.4	3	2.2
								p-val	0.2973	0.5850	0.6817	0.7160	0.4302	0.4091	0.2652	**0.0409**	**0.0053**	0.7741	0.8400
								LSD	NS	NS	NS	NS	NS	NS	NS	2.4	1.9	NS	NS
4	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	40,000	8.7	48.5	46.7	74.3	29.9	4.2	32.9	20.9	10.4	3399	66.7
4	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	60,000	9.5	46.1	46.3	75.3	27.4	4.1	33.8	23.2	8.7	3459	67.7
4	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	80,000	9.1	47.9	44.7	73.3	29.1	4.0	32.6	20.8	10.5	3359	66.3
4	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	100,000	9.4	47.6	45.0	74.0	27.6	3.9	32.7	21.0	9.8	3379	66.7
								Mean	9.2	47.5	45.7	74.3	28.5	4.0	33.0	21.5	9.9	3399	66.8
								CV (%)	4.5	3.5	3.5	1.4	5.5	4.5	7.2	9.8	7.0	3	2.0
								p-val	0.1646	0.7212	0.3846	0.1808	0.2189	0.2869	0.9103	0.4738	0.0524	0.6596	0.6649

P-value less than 0.05 is statistically significant.

LSD values only shown for hybrid if there is a significant parameter.

Table 7. 2023 Texas A&M AgriLife Bushland Forage Sorghum Silage Trial Grain Yields. BMR=Brown Midrib, HB=Half Bloom
Yields for all hybrids evaluated as a percent of the trial's long-term grain sorghum check Pioneer 84G62.
(2023 84G62 yield: 9,423 lbs/acre; 14 year average: 8,506 lbs/acre)

Forage Trial Entry #	Hybrid	Company	Type	Advertised Maturity	SCA TOL.	BMR	Brach-ytic	Male Sterile	Days to HB	Grain Yield (lb/ac) 13% GM	Grain Yield as a % of 2023 84G62 Grain Yield	Grain Yield as a % of 84G62 13-year Avg. Yield	Forage Yield (tons/ac) DM Basis	Harvest Index
35	X23014DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	69	10172	1.08	1.19	7.03	0.63
37	Pearl	MOJO Seed	FS	Med-Early	Yes	No	No	No	67	10051	1.07	1.18	7.46	0.59
30	X22097DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	67	9507	1.01	1.12	7.53	0.55
73	**84G62**	**TAMU Check**	**GS**	**Early**	**No**	**No**	**No**	**No**	**63**	**9423**	**1.00**	**1.11**	**7.34**	**0.56**
31	OPAL +DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	68	9175	0.97	1.08	7.00	0.57
5	ADV XF051	Advanta	FS	Early	No	Yes	No	No	63	8484	0.90	1.00	6.07	0.61
33	X23012DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	69	8239	0.87	0.97	7.09	0.51
32	X23011DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	69	8146	0.86	0.96	7.34	0.48
10	AF7102	Advanta	FS	Early	No	Yes	No	No	63	7501	0.80	0.88	5.62	0.58
6	ADV XF171	Advanta	FS	Early	No	Yes	No	No	63	7438	0.79	0.87	6.04	0.54
36	X23015DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	69	7321	0.78	0.86	7.40	0.43
74	DK37-07	TAMU Check	GS	Early	Yes	No	No	No	63	7183	0.76	0.84	6.58	0.48
34	X23013DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	69	7064	0.75	0.83	7.37	0.42
64	P2747	Warner Seeds	GS	Med-Early	Yes	No	No	No	67	6917	0.73	0.81	6.80	0.44
29	X22077DT	MOJO Seed	FS	Med-Early	Yes	No	No	No	63	6416	0.68	0.75	7.66	0.36
51	NK300	S&W Seed	FS	Med-Early	No	No	No	No	86	6140	0.65	0.72	6.01	0.44
53	SP2606 BMR	S&W Seed	FS	Medium	No	Yes	No	No	85	6061	0.64	0.71	6.64	0.40
65	P2880	Warner Seeds	GS	Med-Early	Yes	No	No	No	68	5511	0.58	0.65	7.44	0.32
66	P4196BMR	Warner Seeds	FS	Late	No	Yes	Yes	No	91	5377	0.57	0.63	7.29	0.32
57	X50665	Scott Seed Co	FS	Medium	No	Yes	Yes	No	86	5266	0.56	0.62	6.18	0.37
72	38F80	Wilbur-Ellis	FS	Late	Yes	No	No	No	90	5065	0.54	0.59	10.55	0.21
56	X5061038	Scott Seed Co	FS	Medium	No	Yes	Yes	No	85	5021	0.53	0.59	6.52	0.33
71	33F70	Wilbur-Ellis	FS	Late	No	Yes	Yes	No	92	4538	0.48	0.53	7.87	0.25
4	ADV F8484IG	Advanta	FS	Late	No	No	Yes	No	92	4334	0.46	0.51	8.72	0.22
1	ADV F7232	Advanta	FS	Medium	No	Yes	Yes	No	90	3968	0.42	0.47	5.72	0.30
11	AF7401	Advanta	FS	Med-Late	No	Yes	Yes	No	92	3875	0.41	0.45	8.24	0.20
54	SP2707 DT	S&W Seed	FS	Med-Early	No	No	No	No	92	3611	0.38	0.42	6.04	0.26
28	Silo-Max 100	Golden Acres	FS	Medium	Yes	No	No	No	93	3551	0.38	0.42	8.12	0.19
3	ADV F8322	Advanta	FS	Medium	Yes	No	No	No	91	3503	0.37	0.41	7.56	0.20
2	ADV F7424	Advanta	FS	Med-Late	Yes	Yes	Yes	No	91	2490	0.26	0.29	8.52	0.13
58	X52242	Scott Seed Co	FS	Medium	Yes	No	No	No	90	1173	0.12	0.14	7.03	0.07
55	SS405*	S&W Seed	FS	Med-Late	No	No	No	No	97	863	0.09	0.10	9.98	0.04
60	X56023*	Scott Seed Co	FS	Medium	No	Yes	No	No	92	482	0.05	0.06	6.58	0.03
9	ADVS 6525	Advanta	SS	Photoperiod	Yes	Yes	No	No	118	.	.	.	8.58	.
70	31F65*	Wilbur-Ellis	SS	Medium	No	Yes	Yes	No	87	.	.	.	7.61	.
*Panicles fully extended, but poor grain development in this hybvrid									**Mean**	5875				
									p-val	<0.0001				
									CV (%)	16				
									LSD	1497				

The authors are appreciative of student employees who provide valuable labor maintaining plots (Jessica Smith, Kylie Deaton, Abel Valenzuela, and Haydin Nino). We are greatly appreciative of our cooperator, Michael Menke.

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