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J. L. Moyer
Kansas State University, jmoyer@ksu.edu

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Abstract

Total production from three cuttings of eight hay-type sorghum entries was greater from 'Sweet Sioux WMR,' 'Cadan 99B,' and 'Trudan Headless' than from 'SDH 2942BMR' and 'AS6402.' A separate test of 15 forage sorghums was conducted to assess dry matter (DM) production and other characteristics. Yields of 'SPX-28313' and '1990' exceeded yields of 11 other entries. Production of 'SPX3952,' 'AF7102,' and 'Atlas' was less than that of six of the higher-yielding entries. Sorghum production tests were also conducted at Ottawa and Hutchinson (see KAES Research Reports, Vol. 1, Issue 2, Kansas Field Research).

Keywords

sudangrasses, ensilage, hay, maturity, lodging

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J.L. Moyer

Summary

Total production from three cuttings of eight hay-type sorghum entries was greater from 'Sweet Sioux WMR,' 'Cadan 99B,' and 'Trudan Headless' than from 'SDH 2942BMR' and 'AS6402.' A separate test of 15 forage sorghums was conducted to assess dry matter (DM) production and other characteristics. Yields of 'SPX-28313' and '1990' exceeded yields of 11 other entries. Production of 'SPX3952,' 'AF7102,' and 'Atlas' was less than that of six of the higher-yielding entries. Sorghum production tests were also conducted at Ottawa and Hutchinson (see KAES Research Reports, Vol. 1, Issue 2, Kansas Field Research: http://newprairiepress.org/kaesrr/vol1/iss2/).

Introduction

Sorghums are an efficient genus of warm-season grasses, some of which are produced for forage. Finer-stemmed cultivars, including sudangrass types, are often harvested multiple times as hay. Cultivars marketed as forage sorghum are also selected for seed production characteristics and often used as green-chop or for processing as ensilage. The latter types also have been identified by the U.S. Department of Energy as a possible dedicated energy crop. Tests of the two types were conducted and harvested separately to compare cultivars for adaptation in eastern Kansas. Yield and other agronomic characteristics were evaluated.

Experimental Procedures

The sorghum tests at Mound Valley were seeded on May 19 after fertilization with 110-50-60 lb/a of N-P_2O_5-K_2O. Plots were 30 ft × 5 ft in a randomized complete block with three replications. Eight entries were seeded in the hay production trial in 10-in. rows at the rate of about 450,000 live seeds/a. On June 18, the test was sprayed with 1.5 lb/a of atrazine with crop oil and 0.25 lb/a of 2,4-D. In the forage sorghum trial, 15 entries were seeded in 30-in. rows and thinned to 35,000 plants/a on June 4. The plot area was treated preemergent with 1.5 lb/a metolachlor and 1.0 lb/a atrazine.

The hay production trial was harvested from a 3-ft × 20-ft strip with a flail-type harvester at a 4-in. height on June 27, August 6, and October 20. In the forage sorghum trial, bloom dates were noted, and measurements of height to flag leaf, tillers per plant, lodging, and an estimate of grain production were taken prior to harvest for DM production. Two rows were harvested on September 11 for a length of 20 ft per plot at 2.5-in. height, and forage was subsampled and dried at 140° F for moisture content.

Results and Discussion

Hay production in the first cutting averaged 1.41 tons/a, with the headless types of 'Sordan' and 'Trudan' yielding more ($P < 0.05$) than four other entries (Table 1). Early growth in the second cutting was hampered by heavy rains, but production averaged 1.54 tons/a, led by 'Sweet Sioux WMR,' which yielded more than all the other cultivars except for 'Cadan 99B.'

The third cutting, taken after killing frosts, yielded an average of 1.34 tons/a (Table 1). Cadan 99B produced more than the other cultivars except for 'Sweet Sioux WMR,' which in turn yielded more than 'SDH 2942BMR.' Total annual production of 'Sweet Sioux WMR,' 'Cadan 99B,' and 'Trudan Headless' were greater than yields of 'SDH 2942BMR' and 'AS6402.'

Forage sorghums' date of half-bloom was earliest ($P < 0.05$) for 'SD1741,' 'SPX3952,' and 'AF 7102' than for the other entries, whereas 'SPX-28313' was later than all other entries, and three entries failed to produce seedheads (Table 2). Forage dry matter content was, as expected, somewhat related to bloom date: the six entries that were drier than the rest represented the earliest seven entries. Conversely, the three with the highest moisture content were those that did not bloom.

Forage production for 'SPX-28313' and '1990' exceeded ($P < 0.05$) yields of 11 other entries (Table 2). Conversely, yields of 'SPX3952,' 'AF7102,' and 'Atlas' were less than six of the higher-yielding entries, probably related to the earlier maturity of the former three. Estimated grain production was higher for 'AF7401' and 'AF7202' than for nine other entries. For ensilage production, some grain is desirable in the forage because of its higher digestible energy content, so a hybrid such as 'NK300,' which ranks third in both DM production and grain content, might be desirable for ensilage production compared with higher-producing hybrids that produce little grain.

The tallest ($P < 0.05$) plants were produced by 'SPX-28313,' by 14 in. (Table 2). Conversely, 'AF7202' had shorter plants than nine of the other entries, less than half the height of 'SPX-28313.' Three entries, 'X942BMR,' 'SD 1741,' and 'SPX3952,' averaged more tillers per plant than the other entries.

Lodging percentage was greater ($P < 0.05$) for 'SPX-28313' than for any of the other entries, and the rest were similarly lower (Table 2). The two entries with lodging issues seemed have different causes; for instance, 'SPX-28313' may have been more susceptible because of its greater height, but 'AF7202' was the shortest entry. The latter was holding more grain, however, which may have contributed to its lodging susceptibility, whereas 'SPX-28313' ranked 10th in estimated grain production.

Table 1. Hay yield in 2014 for sorghums, including sudangrass types, Mound Valley Unit, Southeast Agricultural Research Center

Cultivar	Yield 1[1]	Yield 2	Yield 3	Total
	---------- Tons/a, 12% moisture ----------			
AS6401	1.37	1.48	1.29	4.14
AS6402	0.90	1.56	1.34	3.80
Cadan 99B	1.04	1.93	1.79	4.76
Sweet Sioux WMR	1.21	2.21	1.46	4.87
Trudan Headless	1.75	1.61	1.28	4.64
SPX 3952	1.60	1.35	1.38	4.33
Sordan Headless	1.82	1.20	1.15	4.17
SDH 2942BMR	1.57	1.01	1.06	3.65
Average	1.41	1.54	1.34	4.30
LSD (0.05)	0.27	0.39	0.34	0.67

[1] Harvested on June 27, August 6, and October 20.

Table 2. Bloom date, dry matter, yield, and other agronomic traits in 2014 for forage sorghum, Mound Valley Unit, Southeast Agricultural Research Center

Cultivar	Bloom date	Dry matter (DM)	Yield	Plant height	Tillers per plant	Lodging	Grain production[3]
	Julian day[1]	%	lb DM/a	in.		in.	0-10
AF7401	230	24.5	11,234	10	52	1.4	3
AF7102	209	30.9	9,004	7	52	1.3	3
AF7202	211	31.2	9,603	8	48	1.3	24
Bundle King	213	28.1	9,632	6	72	1.2	10
Silage Master	227	26.8	11,366	7	86	1.3	8
1990	---[2]	19.1	13,089	0	86	1.1	6
NK300	220	30.5	12,250	7	54	1.2	6
SD1741	208	29.1	10,092	2	80	1.7	7
SPX903	---[2]	18.6	11,799	0	93	1.1	13
SPX3952	209	28.1	8,464	2	57	1.7	3
SPX3903	230	23.0	9,982	7	53	1.2	4
SPX3902	230	25.0	10,079	6	62	1.2	1
SPX-28313	241	25.0	14,050	4	107	1.0	27
X942BMR	---[2]	16.6	10,231	0	78	1.8	2
Atlas	218	25.1	9,519	5	73	1.2	5
Average	221	25.4	10,693	5	70	1.3	8
LSD 0.05	1.6	1.2	1,456	2	9.5	0.3	11

[1] Average date of 50% bloom, day 221 = August 10.
[2] Failed to produce seedheads.
[3] Rating where 0 = no grain production, and 10 = all plants with heads fully filled with grain.