Yield and Quality of Six Summer Annual Forages

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Summary

In 1977, all summer annual forages studied produced excellent yields. Based on leafiness and regrowth ability, sudangrasses and pearl millet appeared to be best for early vegetative and boot cutting management. The sorghum-sudan hybrids had suitable yields and quality at all harvest stages. The hybrid forage sorghum appeared best suited for soft-dough-stage harvest although yields of pearl millet and sorghum-Sudan hybrids were also excellent.

Introduction

Many summer annual crops can provide excellent forage during the hot, dry summers in Kansas when other pasture grasses have declined in production and quality. Summer annuals, including sudangrasses, hybrid sudangrasses, sorghum-sudangrass hybrids, sorgos, hybrid forage sorghums, and pearl millets, may be used for pasture, hay, silage, and greenchopping. Differences in their anatomy and growth characteristics reward producers who carefully select the proper crop to match their livestock needs.

Materials and Methods

In 1977 at Manhattan and Hutchinson, we evaluated forage yield and quality of six forages, harvested at early vegetative, boot, and soft-dough stages of growth. Forages tested were 'Piper' sudangrass, Northrup King 'Trudan 6' hybrid sudangrass, Dekalb 'Sudax SX-11', and Ring Around 'Super Chow Maker 235' sorghum-sudangrass hybrids, Dekalb 'FS 25a' hybrid forage sorghum, and Northrup King 'Millex 23' hybrid pearl millet.

The hybrid forage sorghum was planted in 30-inch rows; all others, in 6-inch rows. Plots were 5 x 20 feet for the narrow spacing and 10 x 20 feet for the wide spacing. The center 3 feet or 2 rows were harvested for yield, leaving a 6-inch stubble. Harvests were by stage of growth, not calendar date. At Hutchinson, forages were cut 3 times at the early vegetative stage, 2 times at the boot stage, and 1 time at the dough stage. One additional early vegetative cutting was obtained at Manhattan. Samples were taken from the flail-chopped material for dry matter and quality analyses.

Experimental Results

As shown in Tables 12.1 and 12.2, mean forage yields were similar at Hutchinson and Manhattan for the early vegetative stage, greater at Hutchinson for the boot stage, and greater at Manhattan for the soft-dough stage. The forages sometimes responded differently at the two locations. The most difference was noted for Millex at the soft dough stage; it yielded much better at Manhattan. Cuttings were at different calendar dates, and rainfall patterns differed between locations, but such differences are expected and would be expected in other years.

Crude protein content and in vitro digestible dry matter (IVDDM) declined with advancing maturity. Crude protein was always lower at Hutchinson, particularly at the soft dough stage, probably partly because of near-record August rainfall, unusually high yields, and moderate nitrogen fertilization.

Piper sudangrass and Trudan hybrid sudangrass performed best for early vegetative and boot harvests. The FS 25A hybrid forage sorghum, as expected, performed poorly under early vegetative management, and its yield was quite low at the boot stage at Manhattan. At Hutchinson, it yielded well despite being cut only once, while the others were cut twice. Yields of the two sorghum-sudan hybrids and pearl millet varied most at the various stages and locations. Additional years of data are needed to better estimate the forages' true yielding abilities.

Summer annual forages vary in growth characteristics.

Table 12.1. Forage yields and quality of six summer annual forages cut at three stages of growth, Manhattan.

Forage	Forage yield (ton/acre) Dry matter	60% $H_2 0$	Crude protein %	IVDDM[a] %
		Early vegetative stage		
Piper	5.0	14.3	19.2	67.3
Trudan-6	4.9	14.0	17.8	67.6
S.C. Maker 235	5.1	14.7	19.2	66.1
Sudax SX-11	5.4	15.5	20.1	65.1
Millex 23	6.1	17.5	21.5	67.4
FS 25A	2.9	8.4	19.7	65.6
Mean	4.9	14.1	19.6	66.5
		Boot stage		
Piper	6.5	18.7	14.3	63.1
Trudan 6	6.3	18.0	15.6	61.8
S.C. Maker 235	8.2	23.4	14.5	62.6
Sudax SX-11	6.9	19.6	12.6	61.0
Millex 23	7.4	21.2	16.6	63.9
FS 25A	5.0	10.3	12.5	58.6
Mean	6.7	19.2	14.4	62.6
		Soft dough stage		
Piper	7.6	21.7	10.2	49.8
Trudan 6	8.4	24.0	8.9	51.5
S.C. Maker 235	16.6	47.3	8.3	50.9
Sudax SX-11	9.1	26.0	9.9	50.3
Millex 23	13.4	38.2	10.2	52.8
FS 25A	12.2	34.8	8.7	53.1
Mean	11.2	32.0	9.4	51.4
LSD.05	2.3	4.8	1.2	2.5

[a] IVDDM = In vitro digestible dry matter.

Table 12.2. Forage yields and qualities of six summer annual forages cut at three stages of growth, Hutchinson.

Forage	Forage yield (ton/acre) Dry matter	Forage yield (ton/acre) 60% $H_2 0$	Crude protein %	IVDDM [a] %
		Early vegetative stage		
Piper	5.1	14.5	13.8	66.2
Trudan 6	5.7	16.4	14.3	67.2
S.C. Maker 235	5.8	16.7	13.8	67.4
Sudax SX-11	5.8	16.7	14.9	66.6
Millex 23	4.4	12.6	14.8	70.8
FS 25A	3.9	11.4	17.3	64.6
Mean	5.1	14.7	14.8	67.1
		Boot stage		
Piper	7.8	22.2	9.1	59.8
Trudan 6	8.3	23.6	8.5	62.9
S.C. Maker 235	10.0	28.7	8.3	62.3
Sudax SX-11	12.4	35.3	10.3	61.0
Millex 23	7.0	20.0	11.1	65.8
FS 25A	9.9	28.4	7.8	58.3
Mean	9.2	26.4	9.2	61.7
		Soft dough stage		
Piper	5.4	15.5	6.6	50.9
Trudan 6	8.1	23.1	6.0	51.3
S. C. Maker 235	15.7	44.7	3.3	53.9
Sudax SX-11	11.0	31.0	5.7	56.3
Millex 23	8.4	23.9	3.9	55.3
FS 25A	12.0	34.2	4.0	58.6
Mean	10.1	28.3	4.9	54.4
LSD .05	1.6	3.7	1.7	2.4

[a] IVDDM=In vitro digestible dry matter.