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Evaluation of Hay-Type Sudan-Sorghum Hybrids for Yield and Crude Protein

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Summary

Sudan-sorghum crosses are summer annuals used for hay or grazing on land in rotation with summer crops or cool season annual pastures. Eleven hybrids from two- and three-way crossing were tested for 3 years at Stephenville. Averaged over 3 years the top yielding hybrids were SX-17+ (4.42 tons/A), Kow Kandy (3.21 tons/A), and XSG-13 (3.03 tons/A). Higher yields were related to maturity with later maturing varieties being the most productive. Three-year mean crude protein percentage ranged from 6.6 to 9.5 and was inversely related to yield and maturity.

Introduction

Sudan-sorghum hybrids provide forage for beef and dairy animals primarily as hay and pasture in north-central Texas. Hybrids resulting from genetically different recombinations are continually becoming available through commercial seed companies. Most of these sudan-sorghum hybrids are described as two-way or three-way crosses. Seed cost to the farmer or rancher depends primarily on the type of crossing program required to produce seed. However, seed cost may not directly relate to forage yield or quality. Hybrids have been developed specifically for good regrowth potential from multiple harvests, a desirable trait for pasture use where rainfall is adequate or supplemental irrigation is available. However, much of north-central Texas has adequate rainfall only through mid-June requiring that much of the total production of a sudan-sorghum hybrid occur before that time under dry land conditions. Generally, the forage can either be cut once for hay or provide pasture for 30 to 45 days. In many situations, this early production determines the value of the hybrid. The objective of this study was to determine the forage yield and crude protein content of selected sudan-sorghum hybrids.

Procedure

Two-way, three-way, and modified single cross sudan-sorghum hybrids were seeded on Windthorst fine sandy loam in May of 1983, 1984, and 1985. Management practices are presented in Table 1. Seeding rates are listed in Table 2. The test was irrigated five times between May 8 and June 22, 1984 with 4.75 acre-inches of water due to an extremely dry spring. Seeding rate in 1983 was 12 seed per foot of row; in 1984 and 1985 this was increased by adjusting for germination and adding 10 percent.

KEYWORDS: Sudan/sudan-sorghum hybrids/crude protein/dry matter.

The test utilized a randomized complete-block design with four replications. Analysis of variance procedures and Duncan's multiple range test were used to determine significant yield differences among hybrids.

TABLE 1. AGRONOMIC INFORMATION FOR HAY-TYPE SORGHUM TEST

	1983	1984	1985
Planting date	9 May	4 May	20 May
Fertilizer applied ¹	148-48-48	148-60-0	206-72-0
Plot size	four 15 inches rows x 16 ft	four 15 inches rows x 15.5 ft	six 11.4 inches rows x 19.5 ft
Rainfall ²			
SX-17+	6.82	4.88	8.51
Trudan 8	5.85	2.78	
Kow Kandy			8.51
Others	5.85	3.4	8.34

¹ Pounds of N, P₂O₅ and K₂O/A.

² All hybrids received 4.75 inches of irrigation in 1984 due to lack of rainfall.

TABLE 2. SEEDING RATE FOR SUDAN-SORGHUM HYBRIDS FOR 3 YEARS

Hybrid	1983	1984	1985
	lbs/ac ¹		
SX-17+	21.8	28.2	27.9
T E Chieftan-A	34.3	52.3	44.9
Kow Kandy	29.6	42.8	45.2
XSG-13	31.2	41.3	40.8
Kow Kist	29.2	39.2	35.3
Got-Cha	26.4	34.9	41.7
MorGain III	25.8	34.6	31.2
Stockman's Pride	29.5	47.7	45.1
T E Haygrazer II	29.4	34.2	37.1
Cattle Grazer	22.4	42.6	36.9
Trudan 8	16.8	20.0	20.4

¹ Rate based on 12 seeds per row-foot in 1983. In 1984 and 1985 rate was based on planned population of 12 and 9 plants per row-foot, respectively. Seeding rates were based on pure live seed by adjusting for germination and further increased by 10% to allow for anticipated plant mortality. Row spacing was 15, 15, and 11.2 inches, respectively, in 1983, 1984, and 1985.

Plants were cut three inches above ground when one-fourth to one-half the plants in a specific plot reached the boot stage of growth. Harvest of SX-17+ and Kow Kandy was delayed in 1985 until plants reached 50 and 100 percent booting, respectively. The middle rows of each plot were cut to insure uniform plant competition and other effects from adjacent plants. Harvested plants were weighed and samples were dried 36 hours at 70°C in a forced draft oven to determine dry matter percentage. Crude protein was determined by the Kjeldahl method. A single analysis of each of the four replications of each hybrid was performed.

Results and Discussion

Few differences in dry matter yield occurred for the 3 years (Table 3). Hybrid SX-17+ was highest in 1983 and 1984 while in 1985 yields of Kow Kandy and SX-17+ were greater

than all others. The 3-year mean for SX-17+ was greater than all other hybrids. The higher yield of SX-17+ was probably because it matured later (77 days) than other hybrids. Trudan 8 had the lowest 3-year average yield probably because it matured earlier (50 days). Higher test yields in 1985 were due to higher rainfall and nitrogen rate (Table 1).

Crude protein percentage was influenced by year and hybrid. Hybrids lowest in crude protein generally were highest in yield (Tables 3 and 4). A significant year by hybrid interaction indicates that hybrids did not rank the same year to year relative to crude protein content.

Hybrid SX-17+ may not be a true hay-type sorghum since it was observed to be much taller at booting, had somewhat larger stem diameter and reached boot stage 20 days later than most hybrids in the test.

Table 3. Dry Matter Yields of 11 Hybrids of Hay-Type Sorghums over 3 Years at Stephenville

Hybrid	Company	Dry Matter ¹			Mean
		1983	1984	1985	
		Tons/A			
SX-17+	DeKalb-Pfizer	3.96	4.53a	4.78a	4.42a
T E Chieftan-A	Taylor-Evans	2.53b	2.40b	3.34b	2.76bcd
Kow Kandy	R. C. Young	2.71b	2.47b	4.45a	3.21b
XSG-13	Pioneer Hi-Bred	2.64b	2.85b	3.61b	3.03bc
Kow Kist	Harper	2.92b	2.77b	3.21b	2.97bc
Got-Cha	Harpool	2.57b	2.44b	3.62b	2.88bc
MorGain III	Conlee	2.37b	2.50b	3.56b	2.81bcd
Stockman's Pride	R. C. Young	2.50b	2.34b	3.40b	2.75bcd
T E Haygrazer II	Taylor-Evans	2.27b	2.48b	3.33b	2.69cd
Cattle Grazer	Kan-Tex	2.49b	2.29b	3.10b	2.63b
Trudan 8	Northrup King	2.15b	1.78b	3.20b	2.38d
	Mean	2.65	2.62	3.60	2.96
	CV%	17.7	24	12	17.6

¹Means followed by the same letter within a column are not statistically different (p=0.05).

TABLE 4. CRUDE PROTEIN CONCENTRATION IN 11 HYBRIDS OF HAY-TYPE SORGHUMS OVER 3 YEARS AT STEPHENVILLE

Hybrid	Company	Crude Protein ¹			Mean
		1983	1984	1985	
		percent			
SX-17+	DeKalb-Pfizer	7.8cd	5.9a	6.1c	6.6e
TEChieftan-A	Taylor-Evans	9.6abc	8.9b	7.2b	8.6bc
Kow Kandy	R. C. Young	8.6bcd	9.4b	6.2c	8.1cd
XSG-13 Pioneer	Hi-Bred	8.6bcd	8.4b	7.0bc	8.0cd
KowKist	Harper	7.2d	8.1b	7.7b	7.7d
Got-Cha	Harpool	8.3cd	8.4b	6.9bc	7.9cd
MorGain III	Conlee	9.6abc	8.5b	7.5b	8.5bc
Stockman's Pride	R. C. Young	9.2abc	8.4b	7.5b	8.4bcd
TEHaygrazer II	Taylor-Evans	10.5a	8.7b	7.5b	8.9ab
CattleGrazer	KanTex	9.6abc	8.3b	7.2b	8.4bcd
Trudan 8	Northrup King	10.4ab	9.1b	8.9a	9.5a
Mean		9.1	8.4	7.2	8.2
CV%		12	9	8	10

¹Means followed by the same letter within a column are not statistically different (p=0.01)