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PERFORMANCE OF SEVERAL WARM-SEASON PERENNIAL GRASSES AT STEPHENVILLE

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Summary

Two experiments were conducted to determine the adaptation, yield, and forage quality of bermudagrass (*Cynodon dactylon* L. Pers.) hybrids and warm-season perennial bunchgrasses at the Texas A&M University Agricultural Research and Extension Center, Stephenville. In Experiment 1, five bermudagrass hybrids were evaluated for yield during 4 years and forage quality during 2 years. In Experiment 2, seven bunchgrasses were evaluated for yield during 4 years and forage quality in 2 years. 'Coastal' bermudagrass produced more forage than all other hybrids by 1 ton/acre/year during 4 years. 'WW-Spar' old world bluestem (*Bothriochloa* sp..) and 'Alamo' switchgrass (*Panicum virgatum* L.) were the highest yielding bunchgrasses in Experiment 2. There were few differences among bermudagrass hybrids or bunchgrasses in forage quality.

Introduction

Animal production from forage-rangeland systems accounted for more than one-half of the annual $13 billion of agricultural income in Texas (Bartek and Anderson, 1993). To design effective forage systems, producers need information on persistence, productivity, and selection of species or varieties of warm-season perennial grasses. The objective of the experiments reported here was to evaluate bermudagrass hybrids and bunchgrass species for productivity and forage quality during several years.

Procedure

Grazer, Brazos, Coastal, Tifton-78, and Tifton-44 bermudagrass hybrids were established from sprigs in 10- by 20-ft plots in the spring of 1990 for Experiment 1. Plots were irrigated in 1990 to ensure establishment. The plots were on a Windthorst fine sandy loam soil, which is shallow (12 to 18 in.) and has a low water-holding capacity. Fertilizer applied before planting was 198-62-28 lbs/acre of nitrogen (N), P_2O_5, and K_2O. Plots received 100 lbs N/acre in spring

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and after the first, second, and third harvests each year. Plots were harvested four to five times a year from 1991 to 1994.

In Experiment 2, seven bunchgrasses were established from seed in 10- by 20-ft plots. Grasses were seeded at 2 lbs/acre of pure live seed. The plots were adjacent to the bermudagrass experiment. Grasses received 60 lbs N and 40 lbs P_2O_5/acre each spring, and 60 lbs N after the first harvest, except for Alamo switchgrass which did not receive the second application. Grasses were harvested at the anthesis stage during 1991 to 1994.

Experimental design for both experiments was a randomized complete block with four replicates. Concentrations of crude protein (CP) and acid detergent fiber (ADF) in bermudgrasses and bunchgrasses were determined in 1991 and 1992 via a calibrated near infrared reflectance spectrometer.

Results and Discussion

Coastal bermudagrass was the highest yielding hybrid in each year in Experiment 1 and produced about 1 ton/acre/year more forage than any other hybrid (Table 1). Brazos, Tifton-78, and Tifton-44 generally had similar yields and Grazer yielded the least. Grazer has a low-growing, very dense canopy more suited to grazing than hay production (Eichorn et al., 1986). Thus, it may have been at a disadvantage in this clipping trial. There were no differences among hybrids in ADF concentration in 1991 or 1992 (Table 1). Grazer had a slightly higher CP concentration than other hybrids mainly because it was less mature at harvest than other hybrids and because mainly leaves were harvested above 2 to 3 in. because of its low growing height.

During the trial, winter temperatures were not low enough to cause visual winter injury. Tifton-44 is known to be more winter hardy than the other hybrids (Burton and Monson, 1979), whereas the northern limit of Tifton-78, Grazer, and Brazos is not well defined. Tifton-78 may be more sensitive to low temperatures than the other hybrids.

Averaged for years, WW-Spar old world bluestem and Alamo switchgrass were the highest yielding bunchgrasses in Experiment 2 (Table 2). Caucasian bluestem and WW-Ironmaster were the lowest yielding bunchgrasses. Kleberg bluestem began growing earlier in the season and matured faster than other entries, resulting in four harvests per year compared to one to three for the other entries. Yields in 1993 and 1994 were lower than other years because of hot, dry weather during June and July. Regrowth of Alamo switchgrass was not enough for

harvest in fall; however, Alamo produced much more forage in one harvest than did single harvests of any other entry. Also, Alamo produced this yield with only 60 lbs N/acre compared with 120 lbs N applied to the other entries. For all harvests in each year, Caucasian bluestem had the lowest CP concentration (Table 2). Kleingrass had the lowest ADF concentration during all harvests in each year.

Literature Cited

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Table 1. Yields and forage quality of five bermudagrasses at Stephenville.

Hybrid	Yield[a]	Crude protein	Acid detergent fiber
	lb/acre	% of dry matter	
Coastal	12494	14.9	30.9
Brazos	10232	14.8	30.8
Tifton-78	10226	14.3	31.0
Tifton-44	9338	14.2	30.2
Grazer	7620	17.6	29.0
LSD (5%)	700	2.2	NS

[a]Yield data are means of four years (1991-1994), whereas crude protein and acid detergent fiber data are means of two years (1991-1992).

Table 2. Yield and forage quality of warm-season bunchgrasses at Stephenville.

Entry	Yield[a]	Crude Protein	Acid detergent fiber
	lb/acre	% of dry matter	
Kleberg bluestem	6331	9.8	39.4
Caucasian bluestem	5212	8.1	39.3
PMT-587 bluestem	5858	10.4	36.5
WW-Spar bluestem	7562	10.0	37.7
WW-Ironmaster bluestem	4862	10.7	36.8
Selection-75 kleingrass	6146	10.9	33.9
Alamo switchgrass	7430	ND	40.3
LSD (5%)	883	0.9	1.0

[a]Yield data are means of four years (1991-1994), whereas crude protein and acid detergent fiber data are means of two years (1991-1992).