

# **PUBLICATIONS**

## **1992**

**Forage Research  
in Texas,  
1992**

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## Yield of Warm-Season Perennial Grasses at Stephenville in 1991

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### Summary

Seven warm-season bunchgrasses and five hybrid bermudagrasses (*Cynodon dactylon* (L.) Pers.) were established in 1990 and harvested in 1991. Bunchgrasses were caucasian bluestem (*Bothriochloa caucasica*), 'Kleberg' bluestem (*Dichanthium annulatum*), 'PMT-587' old world bluestem (*Dichanthium annulatum*), 'Selection-75' kleingrass (*Panicum coloratum* L.), 'Alamo' switch-

grass (*Panicum virgatum* L.), and 'WW-Spar' and 'Ironmaster' old world bluestem (*B. ischaemum*). Bermudagrass hybrids were 'Coastal', 'Grazer', 'Brazos', 'Tifton 78', and 'Tifton-44'. WW-Spar yielded the most dry matter (DM) (11,535 lb/A) followed by kleingrass, Kleberg, PMT-587, Alamo, WW-Ironmaster, and caucasian bluestem. Even though Alamo was severely stressed by drought, it yielded 7,200 lb DM/A in one harvest. Coastal bermudagrass yielded 12,745 lb/A and outyielded all bermudagrass hybrids by more than 3,500 lb of DM/A. No significant difference in yield was observed among Brazos, Grazer, Tifton-44, and Tifton-78.

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**Keywords:** bunchgrasses / bermudagrasses / old world bluestem.

## Introduction

Perennial warm-season grasses are the predominant forages used in beef cattle production systems in Texas. Bermudagrasses are commonly used for hay and grazing and are most productive with greater nitrogen and water inputs. Perennial bunchgrasses are typically used on less productive soils with fewer inputs. We evaluated several bermudagrass hybrids and bunchgrasses for yield and morphological composition at Stephenville in 1991.

## Procedures

Seven bunchgrasses and five bermudagrass hybrids were established in 10- x 20-ft plots in two separate experiments in the spring of 1990. The plots were on a Windthorst fine sandy loam soil, which is shallow (12 to 18 in.) and has a low water-holding capacity. Bunchgrasses were caucasian and Kleberg bluestem, PMT-587, WW-Spar, and Ironmaster old world bluestem, Alamo switchgrass, and Selection-75 kleingrass. Grazer, Brazos, Coastal, Tifton-78, and Tifton-44 were the bermudagrass hybrids. Bunchgrasses were seeded at 2 lb/A of pure live seed, and bermudagrasses were sprigged on 1-ft centers in rows 3 ft apart. All plots were irrigated to ensure establishment. Fertilizer applied before planting was 198-62-28 lb/A of nitrogen (N), phosphate (P<sub>2</sub>O<sub>5</sub>), and potash (K<sub>2</sub>O). Bunchgrasses received 60 lb N and 40 lb P<sub>2</sub>O<sub>5</sub>/A in spring 1991, and 60 lb N after the first harvest. Bermudagrasses received 100 lb N/A in spring and after the second harvest.

Bunchgrasses were harvested at anthesis stage. This resulted in a variable number of harvests for each grass. Kleberg bluestem was harvested four

times; caucasian bluestem, WW-Spar, WW-Ironmaster, PMT-587, and kleingrass were harvested three times, and switchgrass was harvested once. Coastal and Tifton-44 bermudagrasses were harvested five times, whereas the other hybrids were harvested four times. At each harvest, a 2.8-by 17-ft strip was cut at 3 in. aboveground (4 in. for switchgrass) for yield measurement. A 1-lb subsample of forage was dried at 160 °F for 48 hours to determine dry matter concentration. The proportion of leaf blade, sheath, stem, and inflorescence was determined in bunchgrasses by manually dissecting 25 random shoots and by drying plant parts at 160 °F for 48 hours.

## Results and Discussion

WW-Spar was the highest yielding bunchgrass in 1991 (Table 1). Kleingrass, PMT-587, and Kleberg bluestem also had relatively high yields. Kleberg bluestem matured early in the season (April 29), which enabled more harvests. Caucasian bluestem and WW-Ironmaster old world bluestem yielded the least. Alamo switchgrass was harvested once at the internode elongation stage. Severe water-deficit stress was apparent in the switchgrass plots, and many leaves had turned brown by mid-July. PMT-587 also appeared severely water stressed, as evidenced by the high percentage of dead leaves at the second harvest.

Caucasian, WW-Spar, WW-Ironmaster, and kleingrass consisted of about one-third leaf blade and two-thirds stem and sheath during the season. Kleberg bluestem consisted of one-fourth leaf blade and three-fourths stem and sheath. Alamo switchgrass was harvested before inflorescence emergence and was composed of one-fourth leaf blade and three-fourths stem and leaf sheath. The

Table 1. Yield of warm-season bunchgrasses at Stephenville at several harvests in 1991.

Entry	Harvest date							Total
	April 22	May 16	May 23	June 25	Aug. 5	Aug. 28	Sept. 11	
	DM (lb/A)							
Kleberg	1739		2040	3544		2102		9426 ab <sup>†</sup>
Caucasian		2579		3106		1283		6647 d
PMT-587			4428			2097	2623	9148 bc
WW-Spar		4926		4494		2115		11535 a
WW-Ironmaster			3640	2310		1391		6994 d
Selection-75 kleingrass		4497		3402		1806		9705 ab
Alamo switchgrass					7224			7224 cd
LSD(0.05)*								2130
C.V.(%) <sup>‡</sup>								8.8

\*LSD = least significant difference at the 5% probability level.

<sup>†</sup>Total yield means followed by the same letter are not significantly different.

<sup>‡</sup>C.V. = coefficient of variation.

inflorescence contributed less than one-tenth of the plant dry matter for each grass.

Coastal bermudagrass outyielded other bermudagrasses by more than 3,500 lb/A (Table 2). Grazer had a low yield at harvest 1 because of its low growth habit and leaf placement. Tifton-44 was slow to establish and still had some bare areas

in plots in spring of 1991. Only Coastal and Tifton-44 had harvestable amounts of forage in late summer. Additional years of data will be necessary to determine long-term yields, persistence, and forage quality of both the bunchgrasses and bermudagrasses.

**Table 2. Dry matter yields of five bermudagrasses at Stephenville in 1991.**

Hybrid	Harvest date					Total		
	April 29	May 21	June 11	July 17	Aug. 28			
	..... DM (lb/A) .....							
Brazos	1075	2189	2424		3279	8967	b <sup>†</sup>	
Coastal	1568	2881	2812	1758	3726	12745	a	
Grazer	189	2795	1416		3128	7528	b	
Tifton-78	1005	1812	2468		2439	7724	b	
Tifton-44	705	2235	2192	860	2826	9032	b	
LSD(0.05)*						1633		
C.V.‡							7.9	

\*LSD = least significant difference at the 5% probability level.

†Total yield means with different superscripts are significantly different.

‡C.V. = coefficient of variation.