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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' switchgrass (*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.

**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 ($P_2O_5$), and potash ($K_2O$). Bunchgrasses received 60 lb N and 40 lb $P_2O_5$/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† |
| 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.(%)‡ | | | | | | | | 8.8 | |

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

†Total yield means followed by the same letter are not significantly different.

‡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† |
| 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.