

PUBLICATIONS

1992

**Forage Research
in Texas,
1992**

Sorghum-Sudangrass Performance Trial at Stephenville, 1991

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Summary

Twelve commercial sorghum-sudangrass hybrids were evaluated for dry matter (DM) yield, morphological composition, and forage quality at the Texas A&M University Research and Extension Center at Stephenville in 1991. Each hybrid was harvested four times. At harvests 1 and 2, plants were separated into leaf blades and stalks, and crude protein (CP) and acid detergent fiber (ADF) were determined on whole plants. Total DM yield for the season ranged from 9,300 to 11,800 lb DM/A and averaged 10,494 lb DM/A. The hybrids 'Greentreat II', 'Greentreat III', 'Grazex', 'Grazex II', and '8096G' were highest yielding. Differences in CP and ADF among hybrids were few.

Introduction

Sorghum-sudangrass hybrids are widely used for grazing and hay production in Texas. We evaluated 12 commercial hybrids for yield, leaf and stalk proportions, and forage quality during 1991 at Stephenville.

Keywords: summer-annual grasses / hay yields / forage quality.

Procedures

The performance trial was conducted at the Texas A&M University Research and Extension Center at Stephenville. The soil at the site is a Windthorst fine sandy loam.

Entries were solicited from various seed companies and a \$100 fee was charged for each entry. There were 12 entries from 7 companies. Entries were planted at 8 lb of seed/A on April 29 in two-row plots 30 ft long with 36 in. between rows. Each entry was planted in four replicate plots. Plots received 180 lb nitrogen (N), 70 lb phosphate (P_2O_5), and 10 lb zinc sulfate ($ZnSO_4$)/A before planting. An additional 75 lb N/A was applied after the first harvest. Rainfall was 2.3 in. in April, 4.4 in May, 3.0 in June, 0.9 in July, 6.6 in August, and 4.8 in September. No rain fell between harvest 1 and harvest 2 (June 17 to July 23).

Plots were harvested on June 17, July 23, August 20, and September 26, when plants were near boot stage. At each harvest, a 10-ft section of each row was hand-cut at a 4-in. height and weighed. A subsample of five plants was chopped in a garden mulcher, and a 1-lb sample of the chopped material was dried at 140 °F for 48 hours. A second subsample of eight plants was separated

into leaf blades and stalks. Individual plant parts were dried at 140 °F for 48 hours. Whole plants from harvests 1 and 2 were analyzed for CP and ADF with a calibrated near infrared reflectance spectrometer. The experimental design was a randomized complete block with four replications. The protected least significant difference (LSD) test was used to compare hybrid means.

Results and Discussion

The hybrids Greentreat II, Greentreat III, Grazex, Grazex II, and 8096G yielded the most DM during the season (Table 1). Yields were greatest at harvest 1 and least at harvest 3. Even though no rain fell between harvests 1 and 2, yields were relatively high at harvest 2. Hybrids did not differ signifi-

Table 1. Dry matter yield of 12 sorghum-sudangrass hybrids at Stephenville in 1991.

| Hybrid† | June 17 | July 23 | August 20 | September 26 | Total |
|-----------------------|---------|---------|-----------|--------------|-------|
| DM (lb/A) | | | | | |
| HS-91-ST | 4202 | 2292 | 1659 | 1844 | 9998 |
| SG-91-1 | 3950 | 2203 | 1493 | 1971 | 9617 |
| SX-17 | 3930 | 1892 | 1560 | 1925 | 9307 |
| Cowhand III | 3682 | 2314 | 1565 | 1789 | 9350 |
| Sucrosse S-2 | 4061 | 2248 | 1235 | 2004 | 9548 |
| Greentreat III | 4495 | 2591 | 1687 | 2712 | 11485 |
| Grazex | 4678 | 3033 | 1805 | 2116 | 11632 |
| Greentreat II | 4599 | 2582 | 1756 | 2837 | 11773 |
| 8096G | 4468 | 2917 | 1825 | 2512 | 11721 |
| 9110G | 4227 | 2828 | 1522 | 1870 | 10448 |
| 9432G | 3578 | 2062 | 1438 | 2220 | 9298 |
| Grazex II | 4590 | 2874 | 1642 | 2647 | 11753 |
| Mean | 4205 | 2486 | 1599 | 2204 | 10494 |
| LSD* (0.05) | 654 | 585 | ns | 628 | 1301 |
| C.V.‡ (%) | 10.8 | 16.4 | 16.5 | 17 | 9 |

† Company and address: HS-91-ST and SG-91-1, Riley Yieldmaster Seed Corp., HCR 2 Box 59, Hart, TX 79043; Cowhand III, Western Heritage Seed Co., Box 756, Winters, TX 79567; Sucrosse S-2, George Warner Seed Co., P.O. Box 1877, Hereford, TX 79045; Greentreat II and III, Research Seeds, Inc., RR2 Box 65, Webster City, IA 50595; Grazex and Grazex II, Sharp Bros. Seed Co., Box 140, Healy, KS 67850; SX-17, Dekalb Plant Genetics, Rt. 2 Box 56, Lubbock, Texas 79415; 8096G, 9110G, 9432G, Crosbyton Seed Co., P. O. Box 429, 306 East Main, Crosbyton, TX 79322.

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

‡C.V. = coefficient of variation.

Table 2. Leaf and stalk proportions of 12 sorghum-sudangrass hybrids at 3 harvests in 1991 at Stephenville.

| Hybrid | June 17 | | July 23 | | August 20 | |
|--|---------|-------|---------|-------|-----------|-------|
| | Leaf | Stalk | Leaf | Stalk | Leaf | Stalk |
| percentage of whole plant dry matter | | | | | | |
| HS-91-ST | 38.9 | 61.1 | 45.6 | 54.4 | 42.6 | 57.4 |
| SG-91-1 | 33.8 | 66.2 | 35.4 | 64.6 | 40.2 | 59.8 |
| SX-17 | 36.4 | 63.6 | 51.3 | 48.7 | 44.1 | 55.9 |
| Cowhand III | 30.9 | 69.1 | 35.8 | 64.2 | 40.2 | 59.8 |
| Sucrosse S-2 | 26.1 | 73.9 | 38.8 | 61.2 | 43.6 | 56.4 |
| Greentreat III | 33.4 | 66.6 | 41.9 | 58.3 | 41.6 | 58.4 |
| Grazex | 32.9 | 67.1 | 38.0 | 62.1 | 41.0 | 59.1 |
| Greentreat II | 31.3 | 68.7 | 41.9 | 58.1 | 42.8 | 57.1 |
| 8096G | 32.4 | 67.6 | 38.7 | 61.3 | 43.1 | 56.9 |
| 9110G | 31.6 | 68.4 | 37.2 | 62.8 | 43.5 | 56.5 |
| 9432G | 34.5 | 65.5 | 46.0 | 54.0 | 44.7 | 55.3 |
| Grazex II | 34.2 | 65.8 | 34.6 | 65.4 | 42.9 | 57.1 |
| Mean | 33 | 67 | 40.4 | 59.6 | 42.5 | 57.5 |
| LSD† (0.05) | ns | ns | 5.7 | 5.7 | 2.9 | 2.9 |
| C.V.‡ (%) | 14.1 | 7 | 9.8 | 6.6 | 4.7 | 3.5 |

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

‡C.V. = coefficient of variation.

cantly in leaf and stalk percentage at harvest 1, but showed differences at harvests 2 and 3 (Table 2). The hybrids 'SX-17', '9432G', and 'HS-91-ST' had the highest leaf percentages at harvest 2. Grazex II, 'Cowhand III', and SG-91-1 had the lowest leaf percentages in harvest 2. Leaf percentages were higher in harvest 3 and also showed fewer differences among hybrids. The hybrids SG-91-1 and Cowhand III had the lowest leaf percentages at harvest 3.

At harvest 1, hybrids had no significant differences in ADF but differed in CP (Table 3). Cowhand III had the highest CP, whereas SX-17 had the lowest CP. Few differences existed among the remaining hybrids. At harvest 2, Grazex II had the lowest CP, whereas Greentreat II had the highest. Differences in ADF at harvest 2 were few; Greentreat II and hybrid 9432G had the lowest ADF.

Table 3. Crude protein and acid detergent fiber in whole plants of 12 sorghum-sudangrass hybrids in 2 harvests at Stephenville in 1991.

| Hybrid | June 17 | | July 25 | |
|----------------|-------------------------------------|----------------------|---------------|----------------------|
| | Crude protein | Acid detergent fiber | Crude protein | Acid detergent fiber |
| |percentage of dry matter | | | |
| HS-91-ST | 13.3 | 36.4 | 9.3 | 30.8 |
| SG-91-1 | 12.8 | 37.3 | 9.3 | 30.8 |
| SX-17 | 11.9 | 37.1 | 9.4 | 30.3 |
| Cowhand III | 14.0 | 35.8 | 10.3 | 30.3 |
| Sucrosse | 13.0 | 36.5 | 10.1 | 30.0 |
| Greentreat III | 12.0 | 38.1 | 9.8 | 29.5 |
| Grazex | 12.6 | 36.8 | 9.5 | 29.4 |
| Greentreat II | 13.0 | 36.8 | 10.4 | 28.8 |
| 8096G | 13.1 | 36.4 | 9.7 | 30.9 |
| 9110G | 12.2 | 38.7 | 10.0 | 29.4 |
| 9432G | 13.5 | 35.5 | 10.3 | 28.5 |
| Grazex II | 12.5 | 37.7 | 9.0 | 30.7 |
| Mean | 12.9 | 36.9 | 9.7 | 30.0 |
| LSD* (0.05) | 1.06 | ns | 0.81 | 1.3 |
| C.V.† (%) | 5.7 | 3.7 | 5.8 | 3.0 |

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

†C.V. = coefficient of variation.