# Forage Research in Texas

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LOCATION: Stephenville

# YIELD COMPARISON OF KLEINGRASS, BUFFELGRASS AND BLUESTEMS IN NORTH CENTRAL TEXAS

## OBJECTIVE:

To make a comparison of yield potential of kleingrass, buffelgrass and bluestems under similar environmental conditions.

## PROCEDURE:

All grasses were planted in 1975 in plots 6 x 12 feet. Kleingrass, Llano buffelgrass (hybrid No. 331) and Pretoria 90 bluestem were transplanted on May 27 and June 2 from small pots started in the greenhouse. Old World bluestem and Caucasian bluestem were field seeded in early June.

The kleingrass breeding lines and the four bluestem and buffelgrasses were planted in two separate but adjacent areas in randomized complete-block designs. Therefore, yields of kleingrasses, buffelgrass, and bluestems are compared statistically (Table 3). All conditions were similar for the two tests.

Fertilizer, harvest dates, and rainfall received are shown in Table 1. Nitrogen was applied as ammonium nitrate, phosphorus as triple superphosphate, and potassium as muriate of potash. At harvest a 3 x 12 ft. swath was cut from the center of the plot at a height of two inches. Forage was weighed and subsamples were dried at 70°C to determine dry matter yields. Harvests were usually made at boot-flowering stage, but at two or three harvests seed had formed.

All varieties were irrigated by solid-set sprinklers in 1975 to insure a stand. Three-fourths of an acre-inch was applied June 1, June 30, July 11, and August 7.

## RESULTS AND DISCUSSION:

Dry matter yields are shown in Table 3. Forage yields of kleingrass breeding lines in 1975, 1976 and 1978 were not statistically higher than Klein-75. In 1977 and 1979 forage yields of klein 67-13 and klein 67-11, respectively, were significantly lower than Klein 75.

The effects of rainfall are readily seen in the yield differences between 1976 and 1977 or 1978. Rainfall from April through September of

both 1977 and 1978 was near the thirty-eight year average for that period while in 1976, rainfall was 6.7 inches above the average. Higher fertilizer rates in the latter two years did not override the effects of less rainfall as compared with 1976.

Old World bluestem produced significantly higher yields than Caucasian bluestem in 1978 while Caucasian bluestem was higher in 1979. Yields of Old World bluestem were higher, though not statistically higher, in 1976-1977.

Pretoria 90 bluestem and Llano buffelgrass produced more forage than all other grasses in 1976. Yields of Pretoria 90 continued statistically higher than other grasses through 1978. However, significant loss of stand of Llano buffelgrass resulted from cold temperatures of the 1976-77 winter. Complete winterkilling of the stand occurred in the winter of 1977-78 when Pretoria 90 bluestem was also destroyed. There were one, nine, and eight days in the winters of 1975-76, 1976-77, and 1977-78, respectively, on which minimum temperatures of 7-15°F were recorded.

Kleingrass-75 and Old World bluestem emerge as the two best species in this test. Yields were about the same for each. Analysis of forage cut on June 11, 1976 showed Klein-75 at 46.6% IVDMD while Old World bluestem showed 49.8% IVDMD (Table 2). Although not enough samples were analyzed to make a definite comparison of IVDMD, there is indication that Old World bluestem might warrant further tests.

Table 1. Record of fertilizer application, harvest dates, and rainfall for kleingrass, buffel, and bluestem tests during five years at Stephenville.

| 1975 | 1976 | 1977 | 1978 | 1979 |
|---|---|---|---|---|
| | | Pounds $N-P_2O_5-K_2O$ Per Acre | | |
| 50-40-0 | 150-80-160 | 300-40-0 | 200-80-160 | 150-0-0 |
| | | Dates of Harvest | | |
| 9/24 | 6/11,7/23,10/18 | 5/25,7/11,11/18 | 5/31,9/18 | 7/2 |
| | | Acre-Inches of Rainfall Received from April-September | | |
| 11.91 | 24.54 | 18.44 | 17.87 | 20.55 |

Table 2. Percentage *in vitro* digestible dry matter for kleingrass, buffelgrass, and bluestems in 1976.

| | %IVDDM* | |
|---|---|---|
| | June 11 | July 23 |
| Klein 67-13 | 42.7 | 43.0 |
| Klein 64-5 | 46.7 | 46.6 |
| Klein-75 | 46.6 | 41.9 |
| Klein 64-2 | 44.0 | 42.1 |
| Klein 67-11 | 44.4 | 43.8 |
| Klein 63-1 | 42.4 | 43.8 |
| Old World bluestem | 49.8 | |
| Pretoria 90 bluestem | 50.2 | |
| Caucasian bluestem | 44.7 | |
| Llano buffelgrass | 51.4 | |

*Duplicate average of four replications of klein; duplicate average of two replications of Old World, Pretoria 90, Caucasian, and Llano.

Table 3. Dry matter yields of kleingrass, buffelgrass and bluestems grown at Stephenville on Windthorst fine sandy loam

| Specie or breeding line | Pounds Dry Matter Per Acre | | | | |
|---|---|---|---|---|---|
| | 1975 | 1976 | 1977 | 1978 | 1979 |
| Klein 67-13 | 5131a* | 8463b | 5263d | 6490bcd | 1448bcd |
| Klein 64-5 | 4932ab | 9160b | 6186bcd | 6652bcd | 2186b |
| Klein-75 | 4618ab | 10154b | 6917bc | 7013b | 2440b |
| Klein 64-2 | 4167b | 9006b | 5419cd | 6478bcd | 1584bcd |
| Klein 67-11 | 4167b | 8144b | 5684bcd | 6462bcd | 829d |
| Klein 63-1 | 4048b | 9834b | 6538bcd | 7053b | 1367bcd |
| Old World Bluestem | 5464a** | 9331b | 7262b | 6912bc | 1936bc |
| Pretoria 90 Bluestem | 5371a** | 16454a | 13224a | 10833a | 998cd |
| Caucasian Bluestem | 4314a** | 7900b | 5917bcd | 5363d | 3513a |
| Llano Buffelgrass | 4258a** | 15776a | 2650e | *** | *** |

*Means within a year not followed by the same letter are significantly different at the 0.05 level, Duncan's New Multiple Range Test. Bluestem analysis was separate from kleingrass analysis for 1975 data only.

**Only two of four replications were harvested in 1975.

***Llano killed by freezing temperatures in winter of 1977-78.