



Forage Research in Texas

1983

The Performance of Warm-Season Legumes with Kleingrass 75 at Beeville

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SUMMARY

Illinois bundleflower and least snoutbean are native, perennial warm-season legumes. Both show promise for forage production in the Rio Grande Plains of Texas. Illinois bundleflower is a good seed producer with acceptable forage production, while least snoutbean is a good forage producer with limited seed production. The usefulness of two annual legumes, alyceclover and hairy indigo, will depend in part on their ability to produce seed under moisture stress and to regenerate stands in the spring in competition with growth of warm-season grasses.

INTRODUCTION

Legumes are seldom grown in pure stands except for hay. Thus, they must be able to compete with grasses for nutrients, moisture and light, and either persist or regenerate stands by self-seeding. Few summer growing legumes, except alfalfa, have either been evaluated or available under Central and South Texas conditions. Recent studies indicate that two native perennial legumes (Illinois bundleflower (*Desmanthus illinoensis*) and least snoutbean (*Rhynchosia minima*)) have considerable promise. Two warm-season annual legumes (alyceclover (*Alysicarpus vaginalis*) and hairy indigo (*Indiofera hirsuta*)) are used in pastures in higher rainfall areas in the Southern United States and in South America. Studies have been initiated with these legumes planted alone and in mixtures with Kleingrass 75 at Beeville.

MATERIALS AND METHODS

Two sources of Illinois bundleflower, Sabine and 80-3, and least snoutbean (80-38) were planted in plots either alone or in various ratios with Kleingrass 75 in May 1981. All plots consisted of 20-inch rows, 20 feet long, with four replications. The legume: grass ratios (0:1, 1:1, and 1:2) expressed in terms of rows of each were: all grass (0:1), alternate rows of each (1:1), and one row of legume to two rows of grass (1:2). The legumes were planted at 6 pounds of seed per acre and kleingrass at 2 pounds of pure live seed per acre. The legumes emerged in early summer but kleingrass did not produce a stand until fall rains were received. Thus, no data were collected in 1981. The plots were harvested two times in 1982.

Alyceclover, hairy indigo, Sabine Illinois bundleflower and Moapa alfalfa were seeded in 20-inch rows alone and in alternate rows

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KEY WORDS: warm-season legumes/tropical legumes/legume-grass mixtures/competition/forage quality.

with Kleingrass 75 on March 24, 1982. Kleingrass alone was included in each legume main plot. Plots consisted of 20-inch rows, 20 feet long with four replications. The design was a split-split plot with mixture combinations serving as subplots and the legume as the main plot. Rainfall in June, July and August was 0, 0.31, and 1.23 inches, respectively. The plots were hand watered in June and July to keep the plants alive. One harvest was made on August 31.

RESULTS

Yields of native legumes alone and with Kleingrass 75 are given in Table 1. Illinois bundleflower was less productive than kleingrass alone and, therefore, the mixtures produced less than kleingrass alone. Least snoutbean was generally more productive than kleingrass and the mixtures produced as much or more than kleingrass alone. The dry summer is reflected in the low total yields and especially in the generally low August yield following two months of regrowth.

It is assumed that no nitrogen transfer occurred from the legume to the grass especially since this is the first full year of production and since the grass and legume were in separate rows. Similarly, there is no indication that the legumes are any more or less competitive for moisture and nutrients than is kleingrass. There is no real pattern or trend in the yield of kleingrass relative to the species growing in the adjacent row indicating no difference in either competition or nitrogen availability. Least snoutbean produces a trailing, viney growth which may shade the grass in adjacent rows if sufficient growth is made. That may have occurred in the 1:1 ratio at the second cutting when grass yield was only 647 pounds. However, it is assumed that this single occurrence resulted from random variation.

The warm-season legumes planted alone and with kleingrass in 1982 produced minimal growth because of limited moisture supply (Table 2). Illinois bundleflower was the most productive and the Illinois bundleflower-kleingrass mixture was the highest producing mixture. Other studies have shown that Illinois bundleflower is very drought resistant so these results are not surprising. Alfalfa was spring planted and would not be expected to perform well from spring plantings as far south as Beeville. Alfalfa will likely be to re-establish in the fall. Hairy indigo and alyceclover are annuals and will require reseeding or the development of volunteer stands from self-seeding.

Table 1. Component and total yield of native legume-kleingrass mixtures, Beeville, 1982.

| Legume | Legume grass ratio ¹ | Component Yield ² | | | | Mixture yield | | |
|--------------------------------|---------------------------------------|------------------------------|-------|------------------|-------|---------------|---------|-------|
| | | 6/29/82 Grass | Leg. | 8/30/82 Grass | Leg. | 6/29/82 | 8/30/82 | Total |
| pounds of dry forage per acre | | | | | | | | |
| 80-35 Illinois bundleflower | 50:50 | 1,338 | 2,409 | 444 | 1,530 | 1,874 | 987 | 2,861 |
| | 33:66 | 1,620 | 1,820 | 859 | 1,063 | 1,753 | 961 | 2,714 |
| 80-3 Illinois bundleflower | 50:50 | 910 | 2,798 | 486 | 1,414 | 1,854 | 965 | 2,819 |
| | 33:66 | 644 | 2,749 | 473 | 1,481 | 2,047 | 1,145 | 3,192 |
| 80-30 Least snoutbean | 50:50 | 2,776 | 1,977 | 2,079 | 647 | 2,376 | 1,363 | 3,139 |
| | 33:66 | 3,807 | 2,137 | 2,299 | 1,743 | 2,993 | 1,928 | 4,921 |
| none | 0:10 | --- | 2,480 | --- | 1,228 | 2,480 | 1,228 | 3,708 |

- ¹ Plots established in 20-inch rows as either alternate rows of legume and grass or one row of legume to two rows of grass.
- ² Based on a harvested section of row of each component of mixture and calculated as a pure stand of that component.

Table 2. Performance of warm-season legumes alone and with Kleingrass 75 at Beeville, 1982.

| Legume | Legume alone | Kleingrass alone | Legume/Klein mixture |
|--------------------------|-------------------------------|---------------------|-------------------------|
| | pounds of dry forage per acre | | |
| Hairy indigo | 838 | 492 | 547 |
| Alyceclover | 405 | 786 | 804 |
| Illinois bundleflower | 969 | 1,030 | 1,130 |
| Moapa alfalfa | 593 | 901 | 606 |