Changes in Grazing Use and Herbage Moisture Content of Three Exotic Lovegrasses and Some Native Grasses

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Three introduced African lovegrasses, Lehmann lovegrass *(Eragrostis lehmanniana)*, Boer lovegrass *(E. chloromelas)*, and Wilman lovegrass *(E. superba)*, are being planted in the drier parts of the West. Establishment of stands of these grasses on range areas raises certain questions regarding their management. At what season of the year are they most palatable? How do these grasses compare with native species in palatability? Is it possible to manage a range on which both seeded lovegrasses and native perennial grasses are growing so as to properly utilize both? Data recently collected on the Santa Rita Experimental Range in southern Arizona bear on these questions.

Methods

Seeded plots of the 3 lovegrasses were established on a 2.5-acre area in a 754-acre range in 1951. This range is grazed yearlong, and cattle have free access to the seeded area as well as to the native grasses at all times. Permanent water is available ½ mile from the seeded plots. Between September 5, 1956, and June 3, 1957, 10 observations were made of the percentage of plants grazed of each species of lovegrass. Each observation included 100 plants. A single sample of 100 native perennial grass plants, segregated by species, was also recorded at each observation. No observations were made during the summer growing period. A 100-gram sample of herbage of each of the 3 lovegrasses and of each of 4 native perennial grass species was collected to determine moisture content at each observation. The native grasses were: Arizona cottontop *(Trichachne californica)*, hairy grama *(Bouteloua hirsuta)*, side-oats grama *(B. curtipendula)*, and tanglehead *(Heteropogon contortus)*.

Growth Conditions During the Study Period

In southern Arizona most of the grass herbage is produced from summer rains during July, August, and September. However, there is a definite, though less reliable, cool-season rainy period, which sometimes produces a worthwhile amount of spring growth. Rainfall during the study period is indicated in Figure 1. The series of rains in January and continuing into March were sufficient for some perennial grasses and winter annuals to make considerable spring growth.

Utilization of Lovegrasses

By September 5, the date of the first observation, 47 percent

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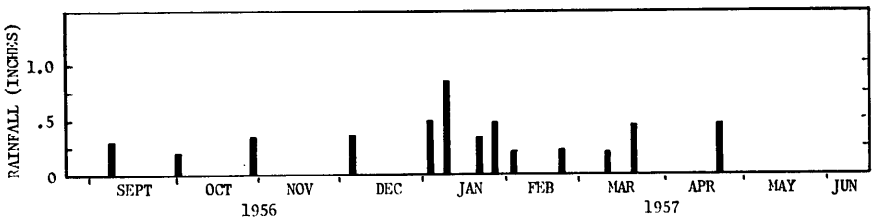

FIGURE 1. Rainfall at the study area by storms.

of the Wilman lovegrass plants had been grazed, compared with 16 percent of Lehmann, and 15 percent of Boer lovegrass plants (Figure 2). By October 5, the percentage of plants grazed had risen sharply to 75, 62, and 44, respectively, for Wilman, Boer, and Lehmann lovegrasses. Thus, Wilman lovegrass was grazed more intensively than Boer, and Boer lovegrass more than Lehmann while it was still green in the late summer and early fall. Most of the grazing of Wilman lovegrass occurred prior to October 5. It was grazed comparatively little during the remainder of the period. Boer and Lehmann lovegrass, however, showed a consistent increase in percentage of plants grazed as the season progressed, although utilization of Lehmann was always less than that of Boer. Use on Boer lovegrass was less than on Wilman lovegrass on October 5, but exceeded that on the Wilman in the early months of 1957. By June 3, 1957, percentages of plants grazed were 89, 95, and 84, respectively, for the Wilman, Boer, and Lehmann lovegrasses.

Utilization of Native Grasses

The native grasses studied were grazed throughout the period. Arizona cottontop appeared to be grazed most during the growing season. By October 5, 92 percent of Arizona cottontop plants had already been grazed. Very little additional use was recorded for this species during the remainder of the season. Use of Arizona cottontop was most nearly like that of Wilman lovegrass from October 5 to June 3, but total use on cottontop was higher. Use of hairy grama resembled that of Boer lovegrass throughout the period. Use on other native perennial grasses was variable, but fell generally between the extremes set by Arizona cottontop and hairy grama during the first part of the study.

Moisture Content of Lovegrasses

The September 5 samples of the 3 lovegrasses contained the maximum moisture content for the 10 months of record, varying from 34 to 49 percent on an oven-dry basis (Figure 3). Moisture content dropped rapidly during September as the herbage cured, and then decreased more slowly through November and December. From late January through early March the average moisture content of herbage increased as new growth developed. By May moisture content had dropped sharply to the low-

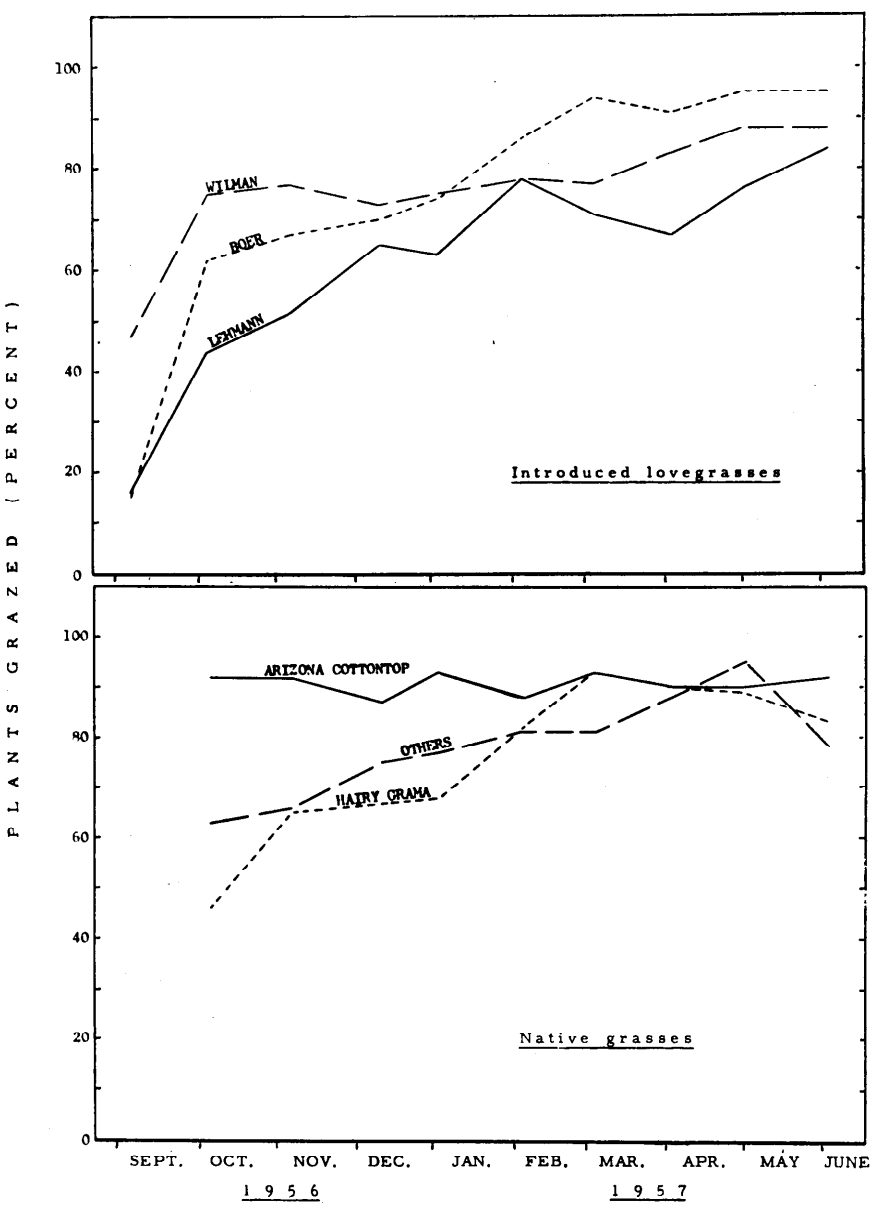

FIGURE 2. Percent of plants grazed by dates of observation.

est point of the study period.

Marked differences in moisture content among the 3 lovegrasses were recorded in all months except April, May, and June, the hottest and driest months during the period of study. In October, January, and March, the moisture content of Boer was more than twice that of Wilman. With minor exceptions, Wilman lovegrass maintained the lowest, and Boer the highest moisture content for the 10-month period. Lehmann lovegrass moisture content fluctuated between these two extremes. Average monthly moisture content for the 10 observations from September 5 to June 3 for the 3 species were: Wilman, 17.0 percent; Boer, 26.9 percent; and Lehmann, 22.6 percent. Average moisture content of Wilman lovegrass was significantly lower (5 per cent level of probability) than that of both Boer and Lehmann lovegrasses. The difference between Boer and Lehmann lovegrasses was not significant.

Moisture Content of Native Perennial Grasses

In general, moisture content of the 4 native perennial grasses exhibited the same seasonal fluctuations as the lovegrasses, but with somewhat smaller variation among species. Moisture content of the side-oats grama was the lowest of the 4 species for 7 of the 10 monthly samples and next lowest for the other 3 samples. Moisture content of Arizona cottontop and tanglehead averaged highest of the 4 species for most months. These two species also showed a sharper rise in moisture content between February 4 and March 4, which suggests that they made more spring growth in response to rains in January and February than did the two species of grama. Moisture content of hairy grama exhibited the widest variation among the 4 species, being lowest in 3 months, highest in 2 months, and intermediate in the other 5 months. Average moisture contents for the 10 monthly samples by species were: side-oats grama, 16.1 percent; hairy grama, 20.3 percent; Arizona cottontop, 23.7 percent; and tanglehead, 23.9 percent. Tests of significance showed that the average moisture content of side-oats grama was significantly lower than Arizona cottontop, tanglehead, and hairy grama, and that hairy grama was lower in moisture content than Arizona cottontop.

The monthly averages of moisture content for the 3 lovegrasses and the 4 native perennial grasses were similar throughout the study period.

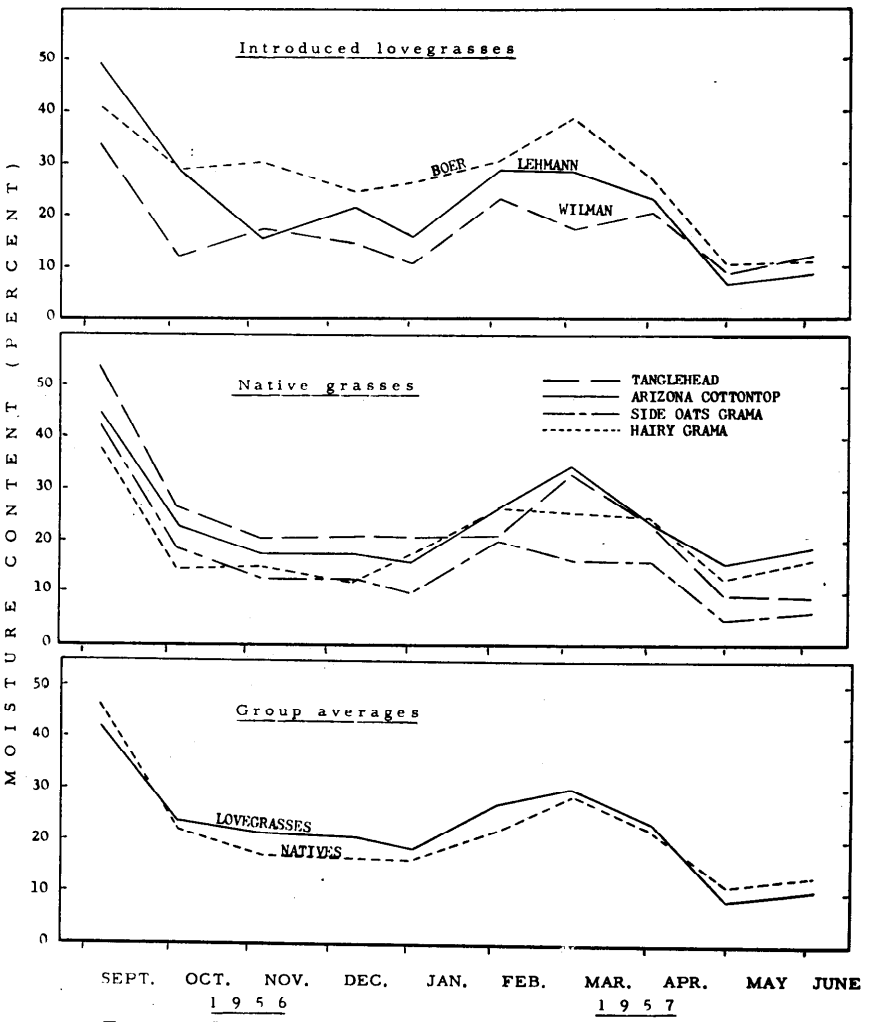

FIGURE 3. Moisture content of the grasses by dates of observation.

Discussion

The data collected do not show a relationship between grazing use and moisture content of herbage for either the lovegrasses or native grasses studied.

The numbers of plants grazed show large differences in apparent cattle preference both in the lovegrasses and in the native perennials. Arizona cottontop was used more closely earlier in the season than any of the lovegrasses. Utilization of Lehmann lovegrass lagged behind all other species until late in the spring. Otherwise, the general patterns of use of the native and introduced grasses were similar. These results suggest that management of a range with a mixture of native perennials and introduced lovegrasses should be no more difficult than managing for native perennials alone. However, on a seasonal range, the planned season of use should be

considered in deciding which of the 3 lovegrasses to plant. It seems apparent that Wilman lovegrass would be the best choice for range that is used during the summer growing season and in the early fall. Either Boer of Lehmann lovegrass could be used for late fall, winter, and spring use. Since Boer is harder to establish and is preferred above Lehmann lovegrass by cattle, it should be planted on sites where conditions for establishment are good and where the new stand can be given some protection from grazing. Lehmann lovegrass is a better choice for less favorable sites or sites where protection from grazing is not practical.