

Grazing Preference Comparisons of Six Native Grasses in the Mixed Prairie

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It has often been observed that cattle seem to prefer some species of grass more than others. Although many attempts have been made to classify plants as to palatability, very few quantitative investigations have been reported. Hurd and Pearse (1944) working with eight grasses commonly used in re-seeding found that some were definitely preferred over others. They concluded that grasses of high and low preference should not be planted together. Weaver and Tomanek (1951) found certain grasses on a native range in the true prairie were grazed more frequently than others.

A number of studies have been conducted to determine what factors influence preference of animals for certain species. There seems to be no appreciable correlation between the chemical composition of forage and its selection by livestock (Johnstone-Wallace, et. al, 1944; Hardison, et. al, 1954). It is not the purpose of this study to investigate causes of preference but rather to determine if preference exists for the major species of grass on native prairies of the central Great Plains.

Methods of Study

The study area was a large range which has been moderately grazed in recent years and previously had been only lightly used. It was a typical mixed prairie composed of three principal communities—buffalo grass-blue grama (*Buchloe dactyloides - Bouteloua gracilis*), lit-

tle bluestem (*Andropogon scoparius*), and big bluestem (*A. gerardi*) types (Albertson, 1937). The buffalo-blue grama type was located on the uplands and had a deep, mature, silty clay loam soil. This type comprised about 30 percent of the pasture. The little bluestem type was found on the slopes where the soil layer was from 6 to 24 inches deep, overlying fragmented limestone. Even the top soil often had fragments of limestone scattered through it. The big bluestem type was located in the lowlands where, due to constant accumulation, the soil was deep but immature. All three types were sampled and are referred to as sites in this paper. The buffalo-

blue grama type is referred to as upland site, the little bluestem type as breaks site and the big bluestem type as lowland site. This is in agreement with a recent classification of sites by the Soil Conservation Service in Kansas. Principal grass species on all three sites were studied to find out which ones were most preferred by grazing cattle. The comparisons were limited to six grasses which were found to be the most abundant. The amount of forage was plentiful for the number of animals grazing in the pasture during the study. The number of animals varied somewhat during the growing season, but the fluctuations in numbers were not great enough to affect the results.

A steel cylinder 3 inches in diameter and ¼ inch thick was used as a vegetation sampling device. This device was first used by Weaver and Tomanek (1951) in the true prairie of Nebraska. The investigator paced off five steps in any direction across the site being considered and at the end of five steps the steel cylinder was placed in front



FIGURE 1. Small area of big bluestem in mixed prairie closely grazed among other less preferred, ungrazed species.

Table 1. Percent occurrence of six grasses on three sites of moderately grazed pasture.

Species	Upland	Hillside	Lowland
Buffalo grass	72.5	15.7	40.3
Blue grama	52.1	23.0	10.7
Side-oats grama	3.7	49.2	14.3
Western wheatgrass	2.4	6.4	54.7
Little bluestem		8.7	
Big bluestem		24.8	25.3

of the toe of his shoe. The species present within the cylinder were recorded as well as whether or not they had been grazed. No attempt was made to determine the extent of grazing. Samples were taken during the growing season from May to August, inclusive, on all three sites. A total of 3,019 samples were taken on the lowland, 3,537 on the hillside and 1,799 on the upland. More samples were taken on sites that supported the most complex vegetation. From these samples three kinds of data could be secured: (1) percent occurrence of principal species, (2) number of times a species was grazed in relation to the number of times present (expressed as percent) and (3) percent of samples grazed on each site. These data were used to determine the relative preference of cattle for the principal species of grass.

Chi-square was used to determine whether the number of times a species was grazed was significantly different than the amount expected from a hypothesis of random grazing.

Results

The vegetation on the uplands in this prairie was dominated by the two short grasses, buffalo grass and blue grama. Small amounts of other grasses occurred but were not sufficiently abundant to be included in a significant number of samples. Earlier studies have reported that these two species made up 80 percent of the vegetation on this site, and in this study they both occurred in over 50 percent of the samples (Table 1).

All six grasses considered in this study were found in sufficient amounts to be sampled on the hillsides. This type was dominated by side-oats grama (*Bouteloua curtipendula*), big bluestem, and blue grama. Lesser amounts of little bluestem, buffalo grass, and western wheatgrass (*Agropyron smithii*) were also present.

A great variety of grasses was found on the lowlands, but five species were most important. Western wheatgrass was most abundant, as it was found in 54.7 per cent of the samples.

Percent of Samples Grazed

The lowland appeared to be the most heavily utilized with 63.9 percent of the samples grazed (Table 2). The hillside had 54 percent of them grazed while the upland had only 26.5 percent. Lowlands are frequently more heavily grazed than the other two sites especially during the early part of the season. Range conservationists have found that lowlands are consistently in a lower range condition

class than hillsides or uplands. This may be partially due to their more heavy utilization (Weaver and Tomanek, 1951).

Heavier use of hillsides in comparison to uplands may be a result of differences in species composition. The greater variety of grasses on the hillside might have encouraged heavier utilization on this site.

Preference for Species

Buffalo grass is one of the principal grasses of the central Great Plains. It is best adapted to deep mature soils of the uplands and gentle slopes. On the uplands, where it is codominant, it did not have significant preference rating (Table 2). In other words, the cattle did not seem to prefer it but rather it was grazed about as often as one would expect in relation to the degree of grazing on this site. However, on the hillside and lowland sites this grass had a negative preference rating which indicates that other grasses found on these sites were preferred over this species. It has been noted that some grasses decrease while others increase in abundance with grazing. Dyksterhuis (1949) has labeled these decreasers and increasers. This species is one of the most common increasers in the mixed prairie. One of the basic reasons for this reaction is probably its low growing point (Branson, 1953). However, the definite lack of preference for this species

Table 2. Percent of total samples grazed and of those samples containing species studied. Significant grazing preference indicated as follows: N-significant negative preference; O-No significant preference; P-significant positive preference.

	Upland		Hillside		Lowland	
	Percent	Sig.	Percent	Sig.	Percent	Sig.
Total Samples	26.5		54.0		63.9	
Samples containing:						
Buffalo grass	26.1	O	34.3	N	51.8	N
Blue grama	26.5	O	35.9	N	45.5	N
Side-oats grama			55.1	O	65.9	O
Western wheatgrass			54.1	O	68.9	P
Little bluestem			69.8	P		
Big bluestem			77.3	P	81.3	P

would also augment its increase.

Blue grama is the most common grass of the entire Great Plains and forms an important part of the vegetation on many sites. It did not have any significant preference rating on the upland and like its codominant, buffalo grass, it was grazed at about the same frequency as the total degree of grazing on this site. It also had a significant negative preference rating on the other two sites.

Side-oats grama was found in considerable quantities on both the hillsides and lowlands. However, cattle did not show any significant grazing preference for this species on either site. Total percent of samples grazed on the hillside was 54, while 55.1 percent of those containing side-oats grama had been grazed. Close correlation between the grazed total samples and grazed side-oats samples was also found on the lowland. This grass is an increaser on breaks and lowlands. It generally increases at the expense of big and little bluestem which are preferred on both sites.

Western wheatgrass is the most abundant cool-season grass in the Great Plains. Normally this grass is grazed early in the spring and in the fall. After it matures in June, the old seed stalks are seldom grazed until new growth starts in the fall. It was grazed about the same degree as the total number of samples on the hillside, but on the lowland the utilization was heavy in the spring, and it did have a significant positive preference rating.

Little bluestem grows primarily on open soils in the central Great Plains. It is most common on sandy or shallow, rocky sites.

It was found on the hillside site in this study area and was definitely preferred by cattle over buffalo grass, blue grama, side-oats grama and western wheatgrass. However, it was not grazed as frequently as big bluestem.

Big bluestem had the highest preference rating on the two sites where it occurred. More than three-fourths of the samples in which it was found were grazed. Big bluestem and little bluestem are decreasers on the sites where they occur. The definite preference of cattle for these two species is probably an important factor in their decrease in abundance.

Summary

A study was conducted on a moderately grazed range near Hays, Kansas to determine the preference of cattle for the six major grass species of that area. Samples were on upland, breaks, and lowland sites. Three types of determinations were made from the samples: (1) percent occurrence of species on each site, (2) percent of grazed samples on each site and (3) number of times a species was grazed in relation to the number of times present. From these data an attempt was made to determine whether a species had a significant positive preference, no preference, or negative preference rating.

The uplands were dominated by blue grama and buffalo grass. Small amounts of other species occurred but not abundant enough to be sampled. All six species studied were found on the breaks. Side-oats grama, big bluestem and blue grama were most common. Western wheatgrass, buffalo grass and big bluestem were abundant on the lowlands.

More samples were grazed on the lowland (63.9 percent) than on either the breaks (54.0 percent) or uplands (26.5 percent). This may account for the low range condition generally found on the lowlands.

Big and little bluestem had a significant positive preference rating wherever they occurred. Side-oats grama was neither preferred nor shunned but was grazed about the same as the average for the habitat. Western wheatgrass was preferred in the lowland but not on the breaks. Buffalo grass and blue grama were grazed without preference on the uplands but had significant negative preference ratings on the breaks and lowlands.

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