

Grazing Preferences of Cattle for Certain Reseeding Grasses

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STUDIES in New Mexico in the early fall of 1949 showed that grazing preferences of cattle should be considered when selecting reseeding species for this season of grazing. Cattle preferences for reseeded grasses were found to be influenced by several factors most important of which were succulence of forage and time of day.

EXPERIMENTAL AREA

The study site is in the ponderosa pine type at an elevation of 8,300 feet near Vallecitos, New Mexico. Before reseeding it was typical of pine openings which, when deteriorated, support only a sparse stand of native vegetation but have a high forage-producing potential. Principal native plants, occupying most of these deteriorated openings, are Kentucky bluegrass (*Poa pratensis*), winter redtop (*Agrostis hiemalis*), blue grama (*Bouteloua gracilis*), rabbitbrush (*Chrysothamnus* spp.), and pingue (*Actinea richardsoni*). Soil is a deep loam, well drained, with high water-holding capacity. Average annual rainfall is about 22 inches.

In August 1946 the following species were planted in quarter-acre plots, randomized in three blocks: Crested wheatgrass (*Agropyron cristatum*), bluestem wheatgrass (*A. smithi*), slender wheatgrass (*A. trachycaulum*), tall oatgrass (*Arrhenatherum elatius*), smooth brome

(*Bromus inermis*), orchardgrass (*Dactylis glomerata*), big bluegrass (*Poa ampla*), and Kentucky bluegrass (*P. pratensis*). No grazing was permitted—until August 1949, by which time good stands had been established in all plots.

EXPERIMENTAL PROCEDURE

Thirty-one grade Herefords including 24 cows, 6 calves, and 1 yearling bull were allowed to graze freely over the reseeded plots from August 21 to September 12, 1949. Cattle grazed only the seeded plots since the plantings were included within a 12-acre fenced enclosure.

All species of plants were mature and seeds had been cast by the time grazing began. Total herbage production of each species before grazing was measured by the double sampling method (Wilm, 1944) on belt transects located randomly over the plots. Herbage was clipped at ground level. Utilization was determined by resampling the same plots on August 28, September 2, and September 12.

Cattle movements were observed hourly between 6 a.m. and 7 p.m. throughout the grazing period. Records were kept which made possible calculation of daily cow-hours of grazing for each species.

RESULTS

Relative preferences

Cattle chose a wide selection of plant species before forage scarcity influenced grazing habits. Of the eight species, all but one were grazed during the first week

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and no one species made up more than 26 percent of the diet. Yet cattle clearly preferred certain species as indicated by differences in percentage of diet contributed by each. Orchardgrass and smooth brome together made up half of the total diet, contributing 26 and 24 percent, respectively (Fig. 1). Slender wheatgrass also was grazed heavily the first week, comprising 21 percent of the diet. Crested wheatgrass, Kentucky bluegrass, and tall oatgrass, each made up about 9 percent of the diet, and thus formed an intermediate preference group. Bluestem wheatgrass and big blue grass were least preferred of the eight grasses. They were not grazed until almost all other forage was gone, and during the first week made up together only 3 percent of the diet.

only 1 percent and big bluegrass 43 percent of the diet during the last week of grazing. This shift in diet took place only after the most preferred species had been grazed so closely that it was difficult for the cattle to obtain sufficient forage from them for sustenance.

Several factors influenced preferences

Succulence of forage, as described by moisture content, appeared to strongly influence preference during this late summer and early fall grazing period. Those species with highest moisture content were most highly preferred (Fig. 2). Other workers, under different seasons of use, and other range conditions, have observed a similar preference for succulent forage. On semidesert grassland ranges



FIG. 1. Smooth brome formed a major part of the cattle diet during the first week of grazing

As the highly preferred species became scarce cattle consumed a greater proportion of the others. During the later periods of grazing less preferred species made up a progressively larger part of the diet. For example, in contrast to the first grazing period, orchardgrass made up

of southern Arizona new growth of range grasses is preferred and appears to be correlated with higher moisture content, digestibility, and nutrition (Stanley and Hodgson, 1938). At the beginning of the growing season, cattle concentrate on areas where local showers have started

new growth and will remain in local areas, such as washes, where growth remains green longer at the end of the growing season (Culley, 1937).

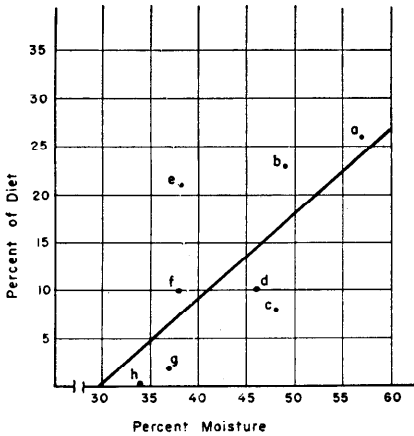


FIG. 2. Relation between percent in diet and moisture content of eight reseeded species. a, orchardgrass; b, smooth brome; c, tall oatgrass; d, Kentucky bluegrass; e, slender wheatgrass; f, crested wheatgrass; g, bluestem wheatgrass; h, big bluegrass. Line fitted by least squares ($r = 0.69$).

In this particular study those species which were preferred apparently had the ability to maintain succulence for a longer period or to respond to soil moisture late in the growing season.

Cattle altered their grazing habits with changes in the weather. They grazed less discriminately when mature grasses were wet from rain or heavy dews. Animals also grazed for longer periods during cloudy weather.

Forage preferences varied with time of day (Fig. 3). Cattle consumed the greatest variety and abundance of species during the morning and evening and when moving to water at noon. At other times, the few animals which grazed were highly selective in their habits.

Cattle followed a fairly definite daily grazing routine. They usually began grazing about daylight (5:30 a.m.), then moved to water about 8:00 a.m., and

afterwards rested in the shade. Shortly before noon cattle moved to water, drank, grazed a short time, and returned to rest in the shade. Most animals passed the afternoon by resting, although a few animals grazed for short periods. At about 5:00 p.m. animals grazed to water as a group and after drinking continued to graze until late evening.

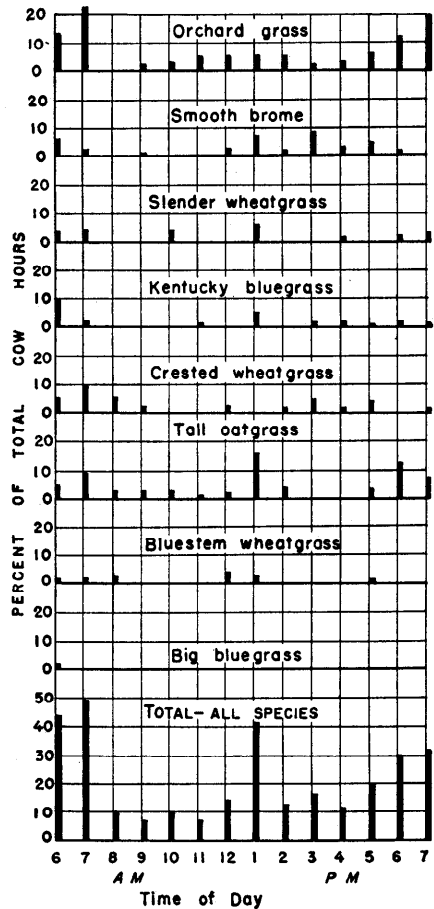


FIG. 3. Effect of time of day on cattle preference for eight reseeded grasses based upon hourly observations and expressed as percent of total cow-hours available for grazing.

Individual species were taken more readily at different times of the day. Orchardgrass was grazed mostly during the morning and evening, whereas smooth brome was taken largely in the afternoon.

Cattle grazed slender wheatgrass about the same throughout the day. Kentucky bluegrass and crested wheatgrass were taken in greatest amounts during the early morning. Other species were grazed rather indiscriminately.

Cattle preferred individual plants of a species. Although no regrowth of grazed plants occurred, animals tended to return to the same plants leaving other plants of the same species untouched until almost all other forage was gone. For example, when crested wheatgrass was 50 percent utilized, 40 percent of the individual plants remained ungrazed, and about 30 percent of the plants were grazed to 2 inches stubble height or less. Even when total utilization of crested wheatgrass reached 70 percent, one-fifth of the individual plants were still ungrazed.

This observation conforms to the more general conclusion that cattle grazing native mixed grama ranges show preference for individual plants of a given species. Grazing seldom is to a constant stubble height; some plants of a species may be grazed to near ground level, while others remain untouched (Canfield, 1942).

APPLICATION OF RESULTS

Moisture content of forage appears to be an index as to how readily cattle graze reseeding species during the early fall in northern New Mexico. Perhaps a similar relation exists for other range types and regions. If so, determinations of moisture content of herbage samples taken during different seasons might be employed as an indicator as to what time of year a particular reseeded species is most valuable for grazing. This study suggests that species which maintain succulence over long periods of time, or show the ability to respond to intermit-

tent rainfall, may provide preferred forage.

When given free choice, cattle select a wide variety of forage. Selection of forage varies with time of day, changing weather conditions, associated species, and other factors. These observations suggest a justification for mixture plantings in range reseeding. Mixtures, however, require both careful design and management. Highly preferred species cannot be planted with relatively unpalatable species. Unless plants of a similar preference class are used together, destructive grazing and eventual elimination of the most highly preferred species may result under full use of all species. Cattle shift their diet to less preferred species only when the highly preferred species have been closely grazed; even then they will continue to graze any accessible forage of the preferred species.

It is commonly recognized that utilization of a range varies with distance from water, steepness of slope and other factors (Glendening, 1944). Some workers have suggested that highly preferred species can be reseeded on parts of the range area where natural barriers tend normally to reduce utilization; whereas least preferred species can be planted on the more accessible sites (Hurd and Pearse, 1944). On cattle ranges in the pine type in northern New Mexico, such species as orchardgrass and smooth brome might better be planted in the less accessible sites, while, of the species tested, big bluegrass would be best for planting around concentration areas.

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THE RANGE IN 1886

In estimating the carrying capacity of the range, it is generally calculated that 40 acres should be allowed to a steer. . . . But whether 40 acres are required or less than 40 acres, one thing is quite certain, that it takes a great deal more than any one who has never been upon the range would suppose. The native grasses are not strong and luxuriant growers, and even if moisture and all the conditions of soil and surface were favorable would not produce heavily. And as their period of growth is confined mainly to the spring and early summer, when they are stimulated by an occasional rain they produce very little in point of weight and bulk, and their admirable quality is not sufficient to compensate for their lack of quantity.

George W. Rust
in Third Annual Report of
the Bureau of Animal Industry
for the year 1886.