

R E S E A R C H   N O T E S  
SOUTHWESTERN FOREST AND RANGE EXPERIMENT STATION<sup>1/</sup>  
Arthur Upson, Director

Note No. 80

December 1939  
(Revised December 1940)

SEMIDEFERRED GRAZING AS A RESTORATIVE MEASURE  
FOR BLACK GRAMA RANGES<sup>2/</sup>

By Roy H. Canfield  
Assistant Forest Ecologist

The Southwestern Forest and Range Experiment Station is engaged in a series of long-time experiments designed to determine the best method of handling each of the important types of range occurring in southern Arizona, New Mexico, and West Texas. Among the native forage plants in this area, probably the one of highest economic value is black grama (Bouteloua eriopoda). As such, it is deserving of particular attention from the standpoint of range management.

The purpose of this note is to describe one of the methods which has been proven successful by experimentation in the restoration of depleted black grama ranges on the Jornada Experimental Range<sup>3/</sup> in southern New Mexico. The pasture in which this experiment was conducted is representative of the black grama type which is commonly spotted with tobosa grass (Hilaria mutica) flats on the heavier soils. The black grama areas are not pure stands but contain, in addition to black grama, a mixture of summer palatable grasses. These are principally sand dropseed (Sporobolus spp.) and three-awn grasses (Aristida spp.).

The method of range management here discussed is generally referred to as semideferred grazing. More precisely, the system is one that is based on the partial deferred use of black grama. A major part of the black grama is reserved for winter use by a system of lighter summer stocking and by the distribution of the cattle in a way that will encourage them to graze less of the black grama and more of the seasonally usable companion grasses. Such summer palatable grasses usually are associated with black grama in the black grama type and often occur in pure stands on small areas included within the black grama

---

<sup>1/</sup>Maintained by the Forest Service, U. S. Department of Agriculture, for Arizona, New Mexico, and West Texas, with headquarters at Tucson, Ariz.

<sup>2/</sup>Prepared with the assistance of Works Progress Administration Project O. P. No. 101-2-02-170.

<sup>3/</sup>The Jornada Experimental Range is a branch of the Southwestern Forest and Range Experiment Station located 23 miles northeast from Las Cruces, N. Mex. Results obtained here are particularly applicable to black grama ranges in southeastern Arizona, southern New Mexico, and West Texas.

type. In contrast with straight deferred grazing, where all livestock are removed from portions of the range during a part of the year, the semideferred method of management includes no season of complete nonuse. Deferred use of black grama ranges until after seed production (straight deferred grazing) usually gives excellent results, but in many instances this practice results in the loss of forage produced by companion species, which are chiefly valuable as summer feed.

Under the semideferred range management system, partially deferred use was obtained in part by removal of some of the livestock to more suitable summer pastures and partly obtained by encouraging the livestock to graze on the tobosa flats through the distribution of salt and the development of temporary tanks in the flats. This pasture has shown considerable improvement under such use, and at the same time the livestock have shown the benefits derived from the use of this winter forage reserve.

What happened in this pasture is illustrated in the accompanying graph (figure 1).

Semideferred grazing combined with conservative use gives best results. The first 7 years (1915 to 1921 inclusive) should be regarded as the exploratory period. At the beginning of the Jornada experiment in 1915 the existing rate of stocking was continued. The first 3 years witnessed severe reduction in the perennial grass cover (see figure 1) caused by overuse and by years of unfavorable rainfall. Gradual reduction in numbers of stock were made, and while the annual stocking rate appears to have been a reasonable one, these reductions probably were not drastic enough at any one time to be effective in bringing about an increase in grass density. Furthermore, the relative summer and winter rates of stocking maintained at a fairly constant figure throughout the 7-year period, were too nearly alike to be effective. These relative rates were, on a proportional basis, 100 head in summer (July, August, and September) to 117 head in winter (the 9-month period representing the balance of the year). Rainfall, computed on an annual basis for the 7-year period, ranged from a low of 3.54 to a high of 12.75 inches. Average annual rainfall for the 7 years was 8.49 inches.

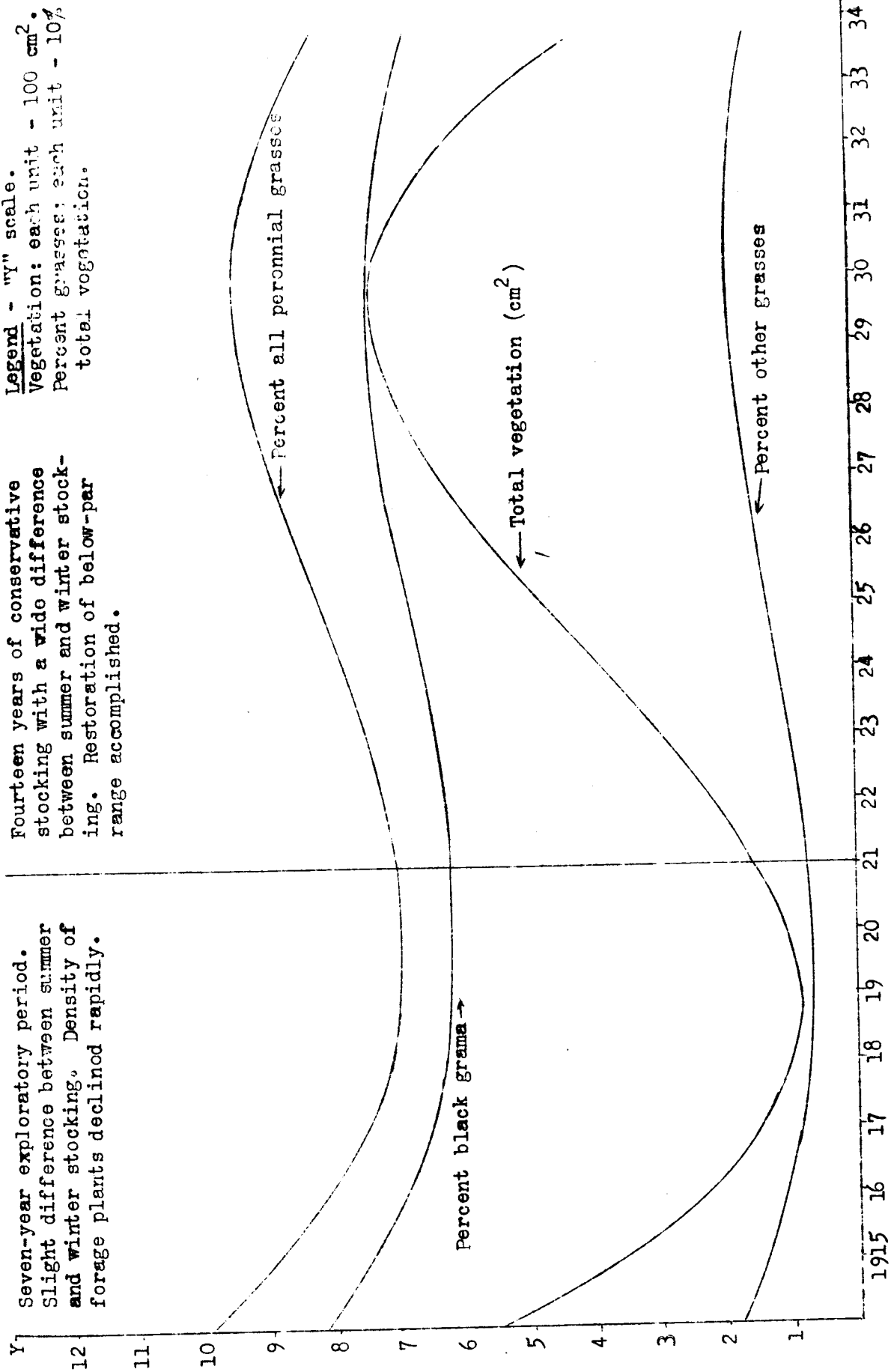
The forage grasses on the sample plots under this treatment declined from an average of 418 cm<sup>2</sup> per square meter in 1915 to an average of 141 cm<sup>2</sup> per square meter in 1921. About two-thirds of the vegetational cover of 1915 had been lost in the 7 years included in this period. The 17-head difference between relative stocking rates of itself produced no beneficial results.

Below-par black grama ranges show improvement under properly regulated semideferred grazing. The next 14 years (1922 to 1935, inclusive) of experimentation with semideferred grazing were more productive of positive results. Stocking was regulated with a wider difference between summer and winter use. For each 100 head grazed in the pasture during the summer, 156 head were grazed in winter. Rainfall for the 14-year period was: lowest year - 5.18 inches; highest year - 17.73 inches; with a period average annual of 9.29 inches. The perennial grasses increased their density from 141 cm<sup>2</sup> in 1921 to 446 cm<sup>2</sup> at the

Seven-year exploratory period.  
Slight difference between summer  
and winter stocking. Density of  
forage plants declined rapidly.

Fourteen years of conservative  
stocking with a wide difference  
between summer and winter stock-  
ing. Restoration of below-par  
range accomplished.

Legend - "y" scale.  
Vegetation: each unit - 100 cm<sup>2</sup>.  
Percent grasses: each unit - 10%  
total vegetation.



U.S. ARMY  
Signal Corps  
Fort Monmouth, N.J.  
Document K-100-1

Figure 1.-- Comparison of vegetational trends under ordinary range use and under semideferred management.

close of the growing season in 1934. The rate of this range recovery is indicated by slope of the curves in figure 1.

Effects of drought minimized by semideferred grazing. As an indication of what may be expected during periods of low rainfall under semideferred use, the data from 2 drought years are placed side by side in table 1. The first drought year selected (1921) represents the last year of the 7-year exploratory period just before the revised system of seasonal stocking was put into effect. The second drought year (1934) indicates the condition of the same pasture as determined by measurements made on the same sample plots after 13 years of conservative semideferred use. Drought in 1934 was the most severe on record with only 1.74 inches of rain during the summer growing season.

Table 1.—Essential data taken at the end of drought years.

Year	General character of prior use	Relative stocking rate	Summer* seasonal rain	Annual rainfall	Perennial grass cover**	
		Summer Cattle	Winter Cattle	Inches	Inches	cm <sup>2</sup>
1921	Moderately heavy	100	117	3.49	5.72	141
1934	Conservative	100	156	1.74	5.18	446

\*July, August, and September. \*\*At close of drought.

The sample plots in the fall of 1934 had more grass on them than the same plots at the beginning of the experiment. In 1915 the average plot density was 418 cm<sup>2</sup>, whereas in the fall of 1934 the average density was 442 cm<sup>2</sup> on the same plots. These data indicate that range areas managed under a properly applied system of semideferred use may be expected to improve under average conditions of rainfall and to stand up well in periods of severe drought.

Semideferred grazing provides for the utilization of seasonally palatable forage.—With semideferred grazing the pasture is never completely deferred by being cleared of all stock. Although a number of plants are palatable for but a short time during the growing season, they can be utilized during the period of highest usability because a sufficient number of animals are left in the pasture to consume them.

Availability of seasonally usable plants is a matter of considerable moment in the operation of ranches in southeastern Arizona, southern New Mexico, and western Texas. On these ranches the sparsely growing browse, yucca blooms, and scattered annuals produced under a "spotted" distribution of summer rainfall may be needed to carry the stock through a short but extremely difficult period.