

CATTLE PERFORMANCE UNDER THREE GRAZING SYSTEMS^{1/} IN NORTHEASTERN OREGON

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In the only study available on livestock performance under deferred-rotation and season-long grazing in northeastern Oregon there was little difference in livestock performance between the two systems.

Rest-rotation grazing is used by many government agencies to improve range conditions. To be effective, a specialized grazing system such as rest-rotation must maintain livestock performance as well as improve range condition.

This study was designed to determine livestock performance and diet quality under season-long, deferred-rotation, and rest-rotation grazing systems.

PROCEDURE

In the summer of 1975, four pastures of equal grazing capacity were fenced at the Starkey Experimental Range and Forest in northeastern Oregon. One pasture was used for the season-long grazing system. The deferred-rotation system involved alternating grazing between early and late use in consecutive years on one pasture. A four pasture/two herd rest-rotation grazing system was applied to the remaining two pastures. The grazing schedule involved one pasture at season-long use; one pasture grazed early to mid-season; one pasture grazed mid-season to end of grazing; and one pasture rested. Each year each pasture received a different grazing schedule. Because of monetary and space limitations, two pastures with one herd were used. The total number of animal unit months assigned to each grazing system was the same. The stocking rate was designed to result in moderate use of the forage resource. Each of the rest-rotation and deferred-rotation grazing system pastures was stocked with 20 head of yearling heifers. The season-long pasture was stocked with 10 head of yearling heifers. Three animals in each pasture were equipped with esophageal fistula collection devices. Weight data were collected at 28-day intervals using a portable corral and scale. Esophageal fistula samples were collected twice a week in alternate weeks in each pasture. These samples were analyzed for percent crude protein and *in vitro* digestibility. The grazing season last 112 days (June 20 to October 10). Because only one pasture was used for the deferred-rotation grazing system, the grazing season for this system lasted only 60 days during each year. Livestock performance and diet quality data were collected in 1976, 1977, and 1978.

^{1/} Results reported are part of a cooperative study, "Influence of Cattle Grazing Methods and Big Game in Riparian Vegetation, Aquatic Habit, and Fish Populations," with the Pacific Northwest Forest and Range Experiment Station, U.S. Forest Service, Project Number USDA-FS-PNW-1701.

RESULTS AND DISCUSSION

The average daily gains for the three years of study are presented in Tables 1, 2, and 3. Cattle on the season-long, rest-rotation and deferred-rotation pastures averaged 1.24, 1.24, and 1.23 pounds of daily gain, respectively, during the three-year period. These data indicate there were no real differences in livestock performance among the three grazing systems. However, results from the deferred-rotation pasture represent two years of early use and one year of late use. More data will be needed from this pasture to fully evaluate livestock performance.

Table 1. Average daily gain (pounds) for cattle during the 1976 grazing season

Grazing period	Season-long	Rest-rotation ^{1/}	Deferred-rotation
June 21-July 16	1.72	1.61	1.28
July 17-August 16	1.17	1.50	.86
August 17-September 13	1.39	1.54	--
September 14-October 11	1.45	1.23	--
Average	1.43	1.47	1.07

^{1/} Management involved grazing one pasture all season and non-use on the other pasture.

Table 2. Average daily gain (pounds) for cattle during the 1977 grazing season

Grazing period	Season-long	Rest-rotation ^{1/}	Deferred-rotation
June 20-July 18	1.67	2.09	--
July 19-August 15	1.54	.18	--
August 16-September 12	.11	1.56	1.63
September 13-October 10	.68	.68	.26
Average	1.00	1.13	.95

^{1/} Management involved grazing each pasture for half the grazing season.

Table 3. Average daily gain (pounds) for cattle during the 1978 grazing season

Grazing period	Season-long	Rest-rotation ^{1/}	Deferred-rotation
June 19-July 18	2.02	1.89	1.56
July 19 - August 16	1.32	1.43	1.76
August 17-September 12	.66	0.33	--
September 13-October 10	1.21	.79	--
Average	1.30	1.11	1.66

^{1/} Management involved grazing one pasture all season and non-use on the other pasture.

Precipitation patterns at the Starkey Experimental Range and Forest during the three years of study were much different than normal. Both 1976 and 1978 were years of above average forage production. Severe drought resulted in reduced forage quantity in 1977. Livestock performance on the season-long pasture was reduced 0.37 pounds per day per animal during the drought year compared to the other two years. The effect of drought under deferred-rotation and rest-rotation grazing systems cannot be evaluated because management of the pastures differed for the three years.

Forage production was much higher during 1978 than either 1976 or 1977. Heavy rainfall during the spring and summer in 1978 resulted in high quality forage being available throughout the grazing season. Cattle performance, however, was best in 1976. The damp weather in 1978 resulted in considerable animal discomfort. Mud made travel over the pastures difficult, which may account for the reduced livestock performance in 1978 compared to 1976.

The movement of cattle from one pasture to another has been thought to be a disadvantage of rest-rotation and deferred-rotation grazing because livestock usually are moved from a pasture with low forage quantity and quality to a pasture of high forage quantity and quality. It has been thought that temporary digestive problems may result from the sudden change in forage. During 1977, cattle under the rest-rotation system were grazed on each pasture for one half the season. Livestock performance in the period following the movement was improved 1.38 pounds per animal per day compared to the previous period. Cattle grazed on the deferred-rotation pasture also gave improved gains in 1977 after movement from another pasture at Starkey. Other northeastern Oregon studies have shown improved livestock gains when livestock was rotated to pastures having higher forage quality.

In 1976 and 1978, the rest-rotation grazing system involved grazing one pasture and resting the other. One of the problems with rest-rotation grazing is that to rest one pasture, use must be increased on other pastures resulting in reduced diet quality and reduced livestock performance.

Crude protein percentages in the diet of cattle under season-long and rest-rotation grazing systems during 1976 are listed in Figure 1. There was little variation in crude protein percent between the two pastures during the entire season. Heavy rainfall in August resulted in considerable regrowth on the grassland areas of both pastures. This may account for the relatively high crude protein values during the latter part of the grazing season.

The protein requirements for growing yearling heifers, as outlined by the National Research Council, indicate that 700-pound yearling heifers require 8.2 percent crude protein for a one-pound-per-day gain. This requirement was more than satisfied on both pastures throughout the 1976 grazing season.

The *in vitro* digestibility of cattle diets on the season-long and rest-rotation pastures in 1976 is shown in Figure 2. The variation between the two pastures during the entire grazing season was small. *In vitro* digestibility and crude protein data indicate no real difference in diet

quality between the season-long and rest-rotation pastures in 1976. Figures 1 and 2 demonstrate the importance of fall rains. Both crude protein and *in vitro* digestibility were stabilized or increased because of regrowth available in late August and September.

Livestock gains on the two pastures were similar in 1976 and 1978 (Tables 1 and 3). Seasonal advance did not greatly influence livestock gains on either pasture in 1976. However, livestock did poorly on both pastures during the last half of the grazing season in 1978.

Results from this investigation indicate there was no difference in livestock performance under rest-rotation, deferred-rotation, and season-long grazing systems on mountain range in northeastern Oregon during three years of study. However, more data are required because vegetation composition may be changing as a result of the grazing systems applied. This could influence livestock performance in the future. The 1977 drought resulted in lower average daily gains than in 1976 or 1978.

The movement of cattle during mid-season in 1977 under the rest-rotation and deferred-rotation grazing resulted in improved livestock performance in the following period. The quality of cattle diets on the heavy use rest-rotation pasture was very similar to those on the season-long pasture in 1976. Only small differences existed in livestock performance on the heavy use rest-rotation and season-long pastures in 1976 and 1978. However, forage production both years was above normal. This may have resulted in better livestock performance on the heavy use rest-rotation pasture than would occur during an average year.

FUTURE WORK

Data for this study on diet quality and forage intake were collected during 1977 and 1978 grazing seasons. Since diet quality samples for 1977 and 1978 had not yet been analyzed, only 1976 diet quality data were included. Livestock performance data will be collected in 1979 for all three grazing systems.

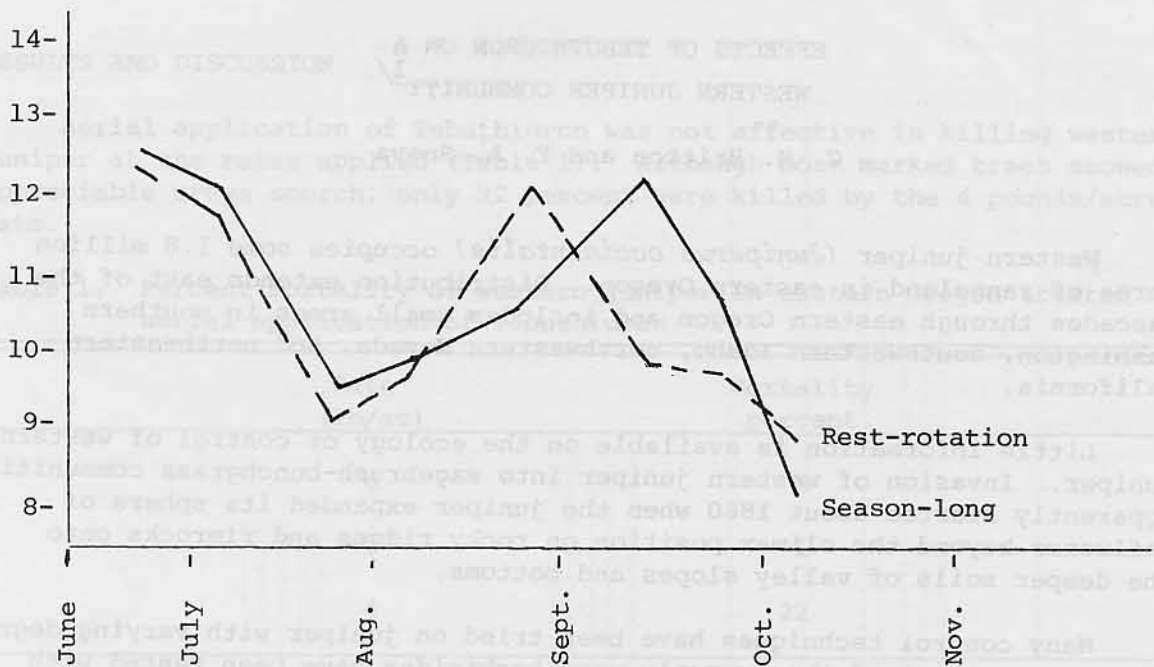


Figure 1. Average change in the crude protein content of the diet on season-long and rest-rotation pastures during the 1976 grazing season.

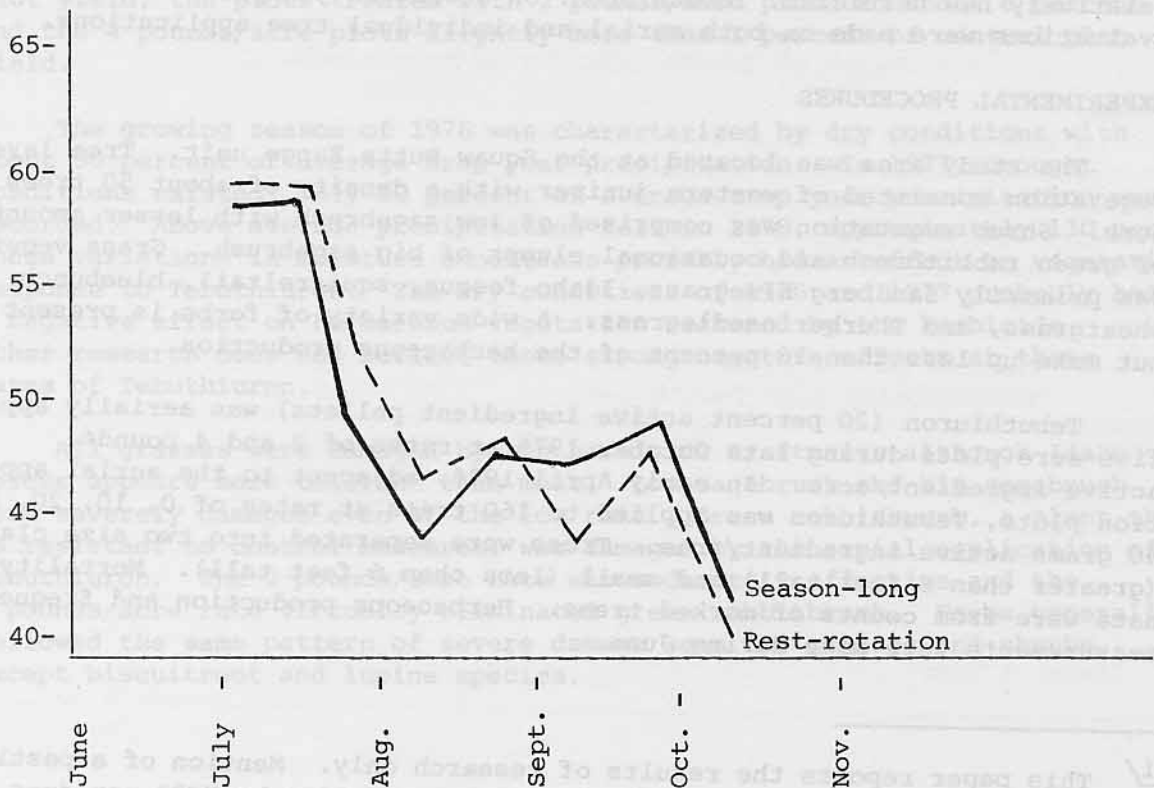


Figure 2. Average change in *in vitro* digestibility of the diet on season-long and rest-rotation pastures during the 1976 grazing season.