THE INFLUENCE OF GRAZING SYSTEMS AND ADVANCE IN SEASON ON THE DIET AND PERFORMANCE OF YEARLING CATTLE

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Experimentally, little research has been conducted investigating the detrimental or beneficial aspects of grazing systems as they influence beef cattle production. Most studies are designed to observe changes in the vegetation grazed. A system that is benefical to the range may not be beneficial to cattle production. Results reported are part of a cooperative study, "Influence of Cattle Grazing Methods and Big Game on Riparian Vegetation, Aquatic Habitat, and Fish Populations," with the Pacific Northwest Forest and Range Experiment Station U.S. Forest Service Project Number USDA-FS-PNW-1701.

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 for the rest-rotation pastures involved one year of season-long use; one year of grazing early and resting after midseason; one year of resting early and grazing after midseason, and one pasture rested. Each year, each pasture of the two involved in rest-rotation were treated with a different grazing schedule. The reasons for using half the required number of pastures were initial monetary and spatial limitations. The total number of animal unit months assigned to each grazing system was the same. The stocking rate used was designed to result in moderate use of the forage resource and representative of Forest Service allotments in the area.

Each of the rest-rotation and deferred rotation grazing systems pastures was stocked with 17 yearling heifers. The season-long pasture was stocked with 7 yearling heifers. In addition to the aforementioned animals in all three grazing systems, each pasture had three esophageal fistulated animals. These animals provided the opportunity to estimate the various diet quality entities selected by cattle in each system. The yearling cattle were used to estimate animal performance as influenced by grazing treatment. Weight data were collected at 28-day intervals using a portable scale and corral. Esophageal fistula samples were collected once a week every week during the grazing season. These samples were analyzed for percent crude protein and *in vitro* digestibility. The grazing season lasted 112 days (June 21 to October 11). Since only one pasture of the deferred rotation grazing system was used, cattle were present for only the latter 60 days during the grazing season.

RESULTS AND DISCUSSION

Average daily gains for cattle in 1979 are presented in Table 1. Cattle on the rest-rotation, season-long, and deferred-rotation pastures averaged 1.20, 1.29, and .98 lb/day, respectively. Late spring gains were not as high as expected, considering forage quality consumed (Table 2).

Table 1. Average daily gain (lbs) by grazing system for the summer of 1979

	Phase II		
Grazing period	Rest rotation[1/]	Season long	Deferred Rotation
Late spring (6-21 to 7-17-79)	0.23	0.07	---
Early summer (7-19 to 8-16-79)	2.32	2.89	---
Late summer (8-16 to 9-13-79)	1.28	1.35	0.85
Fall (9-13 to 10-11-79)	0.96	0.75	1.10
Seasonal daily gain	1.20	1.29	0.98

[1/] Management involved grazing each pasture for half the grazing season.

Table 2. Crude protein (%CP) and *in vitro* dry matter digestibility (IVDMD) of cattle diets.

	Rest rotation		Season long		Deferred rotation	
Grazing period	% CP	IVDMD	% CP	IVDMD	% CP	IVDMD
Late spring	11.5	54.5	10.8	54.4		
Early summer	12.0	45.9	11.0	44.5		
Late summer	9.1	47.5	11.1	49.2	8.5	43.9
Fall	10.1	44.9	8.7	40.6	8.9	41.7

Moving cattle from one pasture to another has been considered a disadvatage of rest-rotation and deferred-rotation grazing. During 1979, cattle in the rest-rotation system were grazing each pasture for one-half the season. Livestock performance in the period after the pasture movement began was much lower than the previous period (early summer) but above the seasonal average. Since both rest-rotation and season-long pastures showed a decline in animal performance, increasing forage maturity and the simultaneous decline in quality, rather than pasture change, caused the decline in animal production in all pastures (Table 2).

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. In 1979, percent crude protein was lowest when cattle were moved at mid-season to the second rest-rotation pasture. Also, in vitro dry matter digestibility (IVDMD) was near its lowest value at the mid-season move for rest-rotation cattle. Crude protein requirements were met for the full season but IVDMD dropped, indicating energy was more limiting than crude protein. Gains may have been higher if IVDMD had been higher. IVDMD, with advance in season, declined at a greater rate than percent crude protein, suggesting advance in season affected IVDMD of available forage more than crude protein content.