

Steer Grazing on Mixed Coniferous Forest Ranges in Northeastern Oregon¹

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Highlight

Steers grazing on pinegrass-browse forage in the mixed coniferous forest make good use of these areas in late spring and early summer. Weight gains average about one pound per day for animals wintered at intermediate levels (gaining about one and one quarter pound per day). Cows on the same area in the fall brought the total stocking rate to about three acres per AUM. The best animal performance appears to coincide with maximum vegetative development, but early grazing is essential to fully utilize pinegrass and legumes. Browse is of primary value in the fall for cows from which calves have been weaned.

Recent reports (Young, 1965; McLean, 1967; and Hedrick, et al., 1968) indicate the value of grazing in forest stands supporting pinegrass (*Calamagrostis rubescens* Buckl.) in the understory. Many of these areas with the highest potential have the lowest output of forage and timber because of dense overstory canopies. Range condition varies more with canopy coverage than with grazing intensity. The purpose of this study was to measure animal performance from pinegrass range in early summer. Yearling steers, used concurrently on nutritional feeding trials at the Eastern Oregon Experiment Station, were used.

Study Area and Sampling Procedures

Young (1965) has described in detail the climate, soils, and plant cover in the area of this trial. This location in the foothills of the Wallowa Mountains receives about 20–25 inches of precipitation which falls principally as rain and snow during the cold winter months. The soils consist of well-drained, medium-textured Regosols developed from wind-deposited volcanic ash. Present vegetation consists of an overstory of predominantly grand fir (*Abies grandis* (Dougl.) Lindl.), Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), western larch (*Larix occidentalis* Nutt.) and a few ponderosa pines (*Pinus ponderosa* Laws.). The shrub layer is composed of two tall shrubs, ninebark (*Physocarpus malvaceus* (Greene) Kuntze) and oceanspray (*Holodiscus discolor* (Pursh.) Maxim.) and several low shrubs of minor im-

portance for grazing. Among herbaceous plants pinegrass is the dominant along with small amounts of elk sedge (*Carex geyeri* Boott.) and blue wildrye (*Elymus glaucus* Buck.). Cusick's vetch (*Lathyrus nevadensis* ssp. *cusickii* (Watsi) C. L. Hitchcock) is the most valuable leguminous forb, and heartleaf arnica (*Arnica cordifolia* Hook.) and meadow rue (*Thalictrum fendleri* Engelm.) are the two most common forbs low in forage value.

Earlier work by Young (1965) indicated that the bulk of forage in these areas comes from pinegrass and ninebark whereas the highest quality is derived from Cusick's vetch. Accordingly, grazing was programmed to take advantage of pinegrass and the legume early and the browse later in the season. Sampling was designed to obtain sufficient quantities of these three components and a catchall category of other for crude protein analyses.

In 1965 samples were taken under three canopy conditions: open, intermediate, and dense. Evaluation of these results revealed that sampling could be simplified and in 1966 collections were limited to the intermediate shade class. Ninebark was sampled at all dates in 1966 compared with only August collections of this species in 1965. Although no attempt was made in either year to obtain precise estimates of forage production, data from this same area (Hedrick, et al., 1968) indicate an average forage production of about 300 pounds per acre which covers both logged and unlogged tree stands used by the steers. One set of enclosures, game and livestock, were established in this area in 1960 and data from the cattle enclosure could be considered as representative of one-half of the pasture which was logged. These data are presented to show the response of the understory to crown reduction and also approximate proportions of grass, forb, and browse forage in the two years of steer grazing.

Steers involved in the study were wintered at three different levels of nutrition for 182 days prior to the grazing season. The thirty head used (29 in 1965) were divided into three groups of ten each and wintered to gain: (1) Low—less than one pound per day, (2) Intermediate—approximately one and one-quarter pounds per day, and (3) High—about one and three-quarters pounds per day. Grazing started on May 13, 1965, and continued for 105 days in a near normal season, whereas in 1966 it began on May 12 and was terminated 63 days later because of dry weather. Steers grazed about two-fifths of the total forage in 1965 and one-third in 1966. Dry cows (calves weaned in late August) harvested the remaining feed after September 1 in both years.

Results and Discussion

Weather data are included in Figure 1. These data indicate that on a crop-year basis 1964–65 was near normal with 1965–66 being dry, particularly in the normally wet winter months. By observing trends in herbage production included in Figure 2, it is apparent that total production on this site was about the same in these two years, but proportion of forage—grass, browse, and forbs—was quite different. In dry years the grass portion increased at the expense of deeper rooted browse and forbs. Shrubs regained their loss in a subsequent year whereas forbs apparently suffered a severe setback in competition with a vigorous grass stand.

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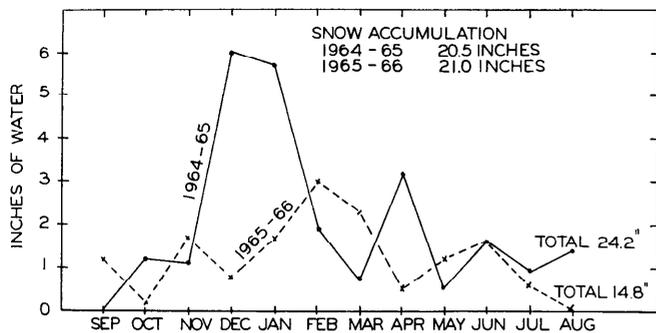


Fig. 1. Crop year precipitation from station near the experimental area.

Summaries of winter and summer gains of steers used in this grazing trial are included in Tables 1 and 2. Crude protein content of forages available along with average daily gains of steers wintered at the intermediate level (fed to gain approximately one and one-quarter pound per day) are plotted in Figure 3.

McLean (1967) reported higher gains per day but these were on lighter animals (550 pounds in British Columbia versus 700 pound steers in this study). Chemical composition data on forage samples from pinegrass forest range in British Columbia reported by McLean and Tisdale (1960) show trends similar to those obtained in this study. Crude protein contents are adequate in early and mid-season but go below levels generally accepted as adequate for growing or fattening animals in late summer and fall. Shrubs and forbs retained a higher crude protein content than pinegrass in the seed and cured growth stages. Cows can get

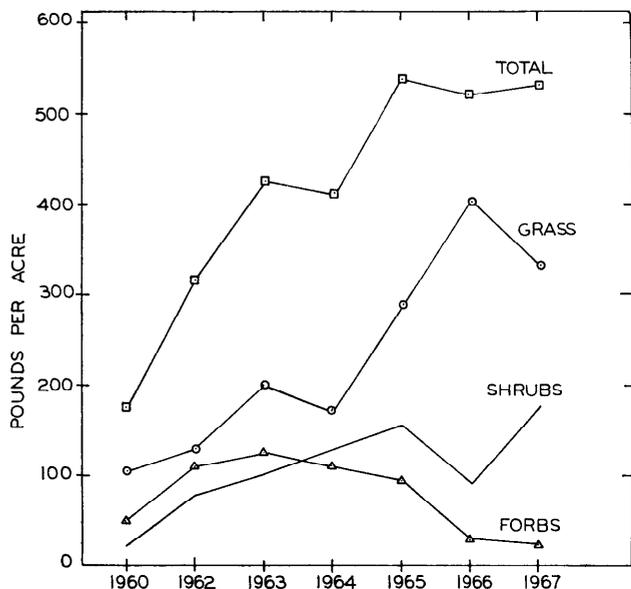


Fig. 2. Annual herbage production within a cattle enclosure in the mixed coniferous forest since logging in 1960.

adequate nutrients for maintenance from this type of range forage in late summer and fall and generally could be grazed at this time by most livestock operators.

Maximum animal gains (Fig. 3) appear to occur at about maximum vegetative development which was reached in early August in 1965 and early July in 1966. Crude protein content of pinegrass is approaching a low level at this time but the content of legume and browse fractions is adequate for satisfactory performance. By the time maturity

Table 1. Steer performance during winter feeding and summer grazing on mixed coniferous forest.

Item	Wintering treatment ¹					
	1965			1966		
	H	I	L	H	I	L
Number of animals	9 ²	10	10	10	10	10
Winter						
Days on feed	182	182	182	182	182	182
Average initial weight (lbs)	504	500	495	499	510	493
Average final weight (lbs)	825	729	655	818	749	649
Average gain (lb/day)	1.8	1.3	0.9	1.8	1.3	0.9
Summer						
Days on pasture	105	105	105	63	63	63
Average initial weight (lbs) ³	810	713	638	808	722	638
Average final weight (lbs) ³	896	815	776	822	776	720
Average gain (lb/day)	0.8	1.0	1.3	0.2	0.9	1.3
Average winter and summer gain (lb/day)	1.4	1.1	1.0	1.3	1.1	0.9

¹ H equals high wintering level; I, intermediate; and L, low.

² One steer died of bloat during the wintering period.

³ All weights were recorded after overnight restriction from feed and water.

Table 2. Steer performance (lbs. per day gain) by periods (days) while grazing mixed coniferous forest range.

Period	Wintering treatment ¹					
	1965			1966		
	H	I	L	H	I	L
1-21	-1.4	-.04	0.8	-1.8	-0.8	0.2
21-42	1.0	1.0	1.6	1.9	2.6	2.7
42-63	2.0	1.5	1.3	0.7	0.8	1.0
63-84	3.1	3.0	2.6	—	—	—
84-105	-0.6	-0.6	0.3	—	—	—
Mean	0.8	1.0	1.3	0.2	0.9	1.3

¹ H equals high wintering level; I, intermediate; and L, low.

(seed production) is reached, gains fall off appreciably and cows should be used instead of market animals. Poor performance early in the season probably results mainly from the lush forage which limits an adequate intake of dry matter. It is not unusual for the highest gain of range animals to be realized while percent content of protein is going down. The highest carbohydrate content occurs at maximum vegetative development and as long as protein content is adequate the nitrogen free extract is a more efficient source of energy than is excess protein.

Combined steer and cow stocking rates for north-eastern Oregon mixed coniferous range has averaged somewhat higher than British Columbia but animal gains per acre are lower. Per acre steer gains on this range were about 8 pounds in 1965 and 4 pounds in 1966. In 1965 steers grazed two-fifths of the animal unit months (AUM's) and in 1966 one-third. Remaining forage was taken by cows

in September. These figures compare to an average of 19 pounds per acre for British Columbia pinegrass pastures where extremes varied between thirteen and twenty-six pounds per acre.

Recommendations for Grazing Mixed Coniferous Forests

As reported by Young, et al., (1967) this type of a range is most effectively used by steers, replacement heifers, cows from which calves have been weaned and cows with calves in decreasing order of efficiency. Steers use rough and relatively inaccessible areas well and should be grazed during the main growing season when nutritive content is adequate and gains average one pound or more per day. About the time of peak production, these animals should be moved to better feed and followed by cows. If cows and calves must be used they should have prior acquaintance with the area and be grazed during the periods of succulent forage. Use of these areas when better forages are available, e.g., legumes and pinegrass in the early growth stage, results in more efficient animal production. Accordingly, early calf weaning (not later than September 1) is essential to maintain desirable animal performance on these type ranges.

Recommendations (Hedrick, et al., 1968) including fencing, adequate water development, trail construction, proper kind of animals and right season of use have enabled graziers to obtain sustained production of 3 acres/AUM from this same mixed coniferous forest over the past seven years without impairing vigor of the principal forage plants. Much of this capacity appears to come from an abundant browse level not currently being used

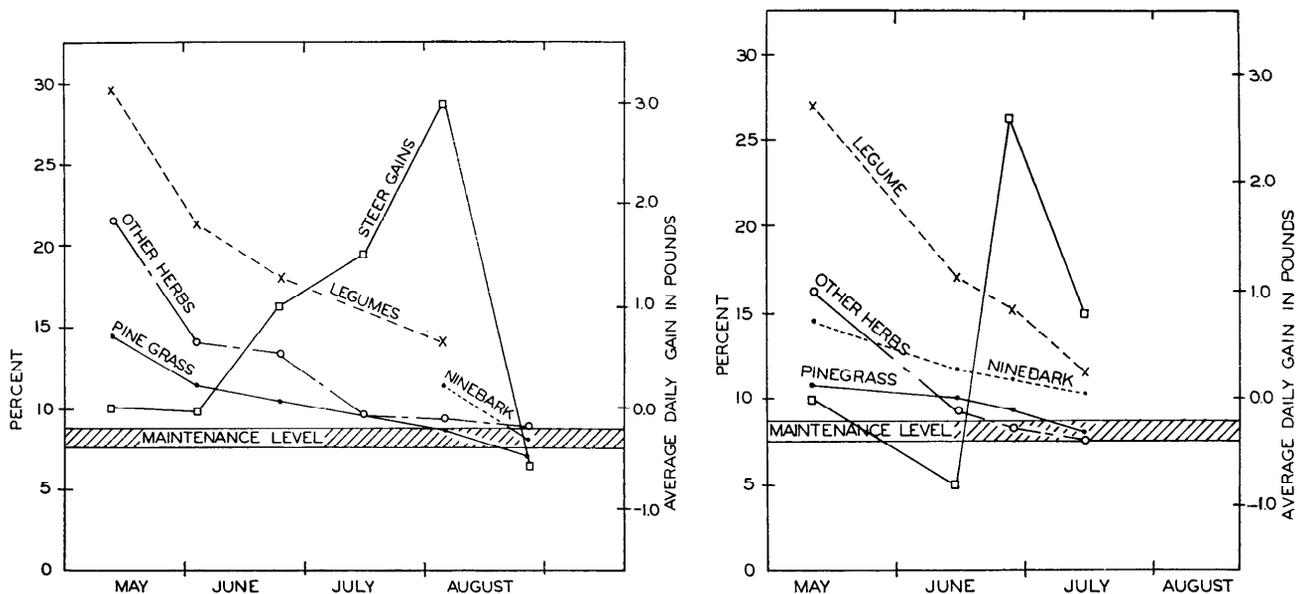


FIG. 3. Percent crude protein of important forages in the mixed coniferous forest and average daily gains of steers (intermediate winter gains) in 1965 (left) and 1966 (right).

appreciably on many similar ranges. Use of light weight steers should provide livestock operators on these ranges with maximum returns considering both weight gains and grazing efficiency.

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