Improving Late-summer and Winter Forage Quality with Livestock Grazing

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Introduction

Some years ago (1963), Dwayne Hyder and Forrest Sneva noted that spring grazing of boot-stage or later crested wheatgrass stimulated a growth of new stems that did not progress through their typical reproductive phases of development before curing. They speculated the resulting cured but leafy herbage would be of higher nutritional value than ungrazed forage reserved for late-summer or fall use. In 1975, E. William Anderson and Richard J. Scherzinger reported that use of a similar grazing program in the Bridge Creek, Oregon, area subsequently resulted in a four-fold increase in the number of wintering elk frequenting the area. Several researchers have subsequently explored the forage-conditioning hypothesis with clipping and grazing studies with mixed results. The objective of this study was to test the forage-conditioning hypothesis with cattle grazing. Our specific goals were to 1) evaluate the subsequent fall and winter nutritional characteristics of bluebunch wheatgrass, Idaho fescue, and bottlebrush squirreltail in stands that were ungrazed, lightly grazed, or heavily grazed by cattle during the boot-stage of grass development; and 2) determine the effects of implementing these same treatments on fall forage supplies.

Experimental Protocol

The study area occupied Bureau of Land Management-administered, pine-forest, sagebrush-steppe transition range and big-game winter range near Burns, Oregon. Nine small pastures supporting a shrub layer dominated by Wyoming big sagebrush and a herbaceous layer supporting the three grasses were used in 1998 and 1999. Three lightly grazed pastures supported two cows for about 11 days when grasses were in the boot-stage, three supported four cows, and three were ungrazed by livestock. Herbage was sampled at four times in the pastures: 1) just prior to grazing, 2) just after cows exited, 3) early September, and 4) late December. Forages were analyzed for crude protein (CP) content and digestibility.

Results and Discussion

Crop-year precipitation for both years of study was above average, with 1998 being 196 percent of average and 1999 being 106 percent of average. There were no differences in forage quality between grazing treatments when cattle entered the pastures in either year. Average forage utilization by cattle in lightly grazed pastures was 33 percent by weight and 69 percent in heavily stocked pastures. The September standing crop was 675 lb/acre in ungrazed pastures, 462 lb/acre in lightly grazed units, and 219 lb/acre in heavily grazed paddocks. Using the ungrazed standing crop as the standard, light grazing reduced fall standing crop by 32 percent and heavy grazing reduced fall standing crop by about 67 percent.

The fall and winter CP content of the grasses was affected by the species of forage, differences between years, grazing treatments, and the months they were sampled (September and December). However, several consistent patterns were evident in the data (Fig. 1). First, ungrazed controls always ranked lowest for CP content, with lightly grazed grasses being slightly higher, and heavily grazed grasses consistently the highest. Within the three species of grasses, the CP content of heavily grazed forage exceeded that of ungrazed controls for 11 of 12 comparisons. Crude protein content of lightly grazed grasses exceeded that of ungrazed controls for 6 of 12 comparisons. These included the last three sampling dates for Idaho fescue, December 1998 and September 1999 for bottlebrush squirreltail, and December 1998 for bluebunch wheatgrass. Between the two grazed treatments, the CP percentages were consistently higher for bottlebrush squirreltail in heavily grazed units than in lightly grazed pastures. Crude protein content of heavily grazed Idaho fescue and bluebunch wheatgrass significantly exceeded that of lightly grazed pastures on only one date (September 1999).

Among the grasses and within sampling dates, the CP content of grazed bottlebrush squirreltail always exceeded that of grazed bluebunch wheatgrass. Grazed bottlebrush squirreltail CP was greater than Idaho fescue for four of eight comparisons. These were the

heavy-grazing treatment of December 1998, light- and heavy-grazing treatments of 1999, and the heavy-grazing treatment of December 1999. Crude protein percentages of grazed Idaho fescue were higher than those of grazed bluebunch wheatgrass in 1998 but similar in 1999. With one exception, the CP concentration of ungrazed controls was similar among species. The exception occurred in December 1998, when Idaho fescue had a higher CP content (4.7 percent) than bluebunch wheatgrass (3.1 percent). Digestibility data exhibited patterns similar to the CP data and are not presented.

Management Implications

Typically all but the earliest of growing season grazing among cool-season grasses causes some depression of growth or peak standing crop. The earliest grazing, however, removes only leafy material, does not suppress development of reproductive stems, and has negligible effects on late-season forage quality. That being the case, one should expect some depression of herbage yield (32–65 percent) if grazing applications are late enough to effect a positive change in nutrient content. With the assumption that 7.5 percent CP is an "adequate" forage quality threshold, there were six instances where fall and winter CP concentration equaled or exceeded 7.5 percent. Four occurred with bottlebrush squirreltail, one with Idaho fescue, and one with bluebunch wheatgrass. Five instances were a product of heavy grazing and one occurred in lightly grazed units.

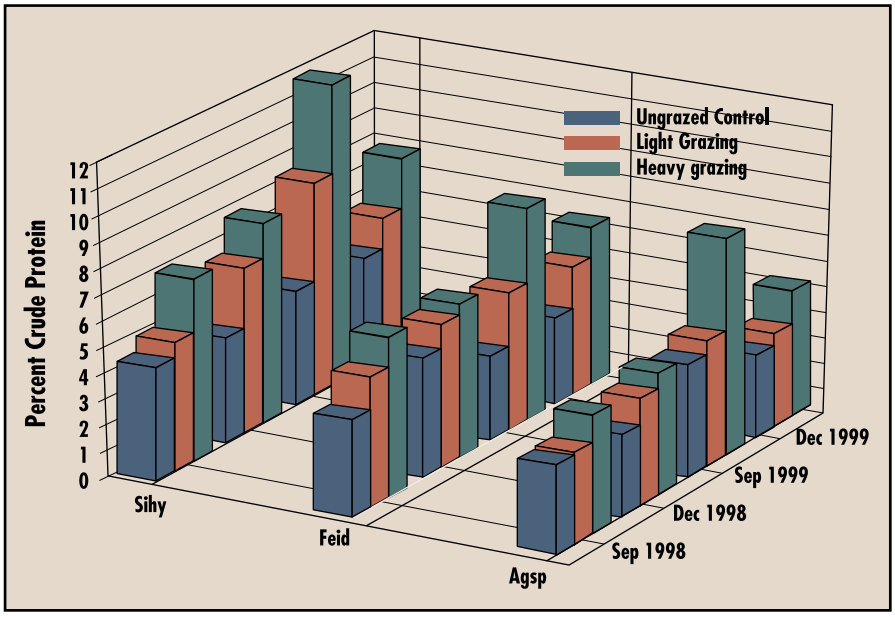

Figure 1. September and December crude protein content of bluebunch wheatgrass (Agsp), Idaho fescue (Feid), and bottlebrush squirreltail (Sihy) in ungrazed, lightly grazed, and heavily grazed pastures on big game winter range near Burns, Oregon, in 1998 and 1999.

If one's goal is to generate herbage with elevated fall/winter CP concentrations, then forage conditioning efforts probably will yield progressively greater returns from bluebunch wheatgrass, Idaho fescue, and bottlebrush squirreltail herbage, respectively. Our results suggest that bluebunch wheatgrass is probably the most difficult of the three species to condition with livestock grazing.

Judicious use of spring grazing to enhance late-season forage quality is an option for managers, and it probably should be applied within a rotation program that allows rest or deferred use of a pasture every second or third year. Opportunity costs of spring grazing also occur in that both annual and fall/winter standing crops will be reduced. The remaining herbage, however, will be nutritionally superior to ungrazed stands of grasses reserved for fall and winter use by livestock or big game.