WOLFY FORAGE: ITS EFFECT ON CATTLE DISTRIBUTION AND DIET QUALITY

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Summary

Among bunchgrasses, wolfy plants are clumps that have accumulations of both current and previous years' herbage. There are nutritional disadvantages to foraging on wolfy grasses and both cattle and wildlife will avoid grazing these plants. The objective of this study was to determine whether wolfy forage affected livestock distribution and forage utilization at landscape scales. By using cattle equipped with Global Positioning System (GPS) collars we found that foraging cattle avoided wolfy sections of pastures and favored areas supporting current year's herbage by about a 2.7 to 1 ratio. Indeed, wolfy areas of the pastures actually grew additional forage while cattle were present. Managers can use late-season heavy grazing, burning, or mowing to eliminate wolfy plants and encourage more uniform and complete use of their herbage by livestock in subsequent growing seasons.

Introduction

Four grasses common to the sagebrush/bunchgrass biome are well known for their propensity to become "wolfy." Native grasses include bluebunch wheatgrass, our premier native forage in the region, bottlebrush squirreltail, and Thurber's needlegrass. Crested wheatgrass, an introduced forage used in range reclamation efforts, also produces durable seed stalks that can persist within bunches for one to several years. These accumulations of persistent stems cause cattle to reject individual plants, and their herbage may go unused for many years (Fig. 1).

Earlier research at the Eastern Oregon Agricultural Research Center demonstrated that cattle are aware of even one cured stem in clumps of green grass, and they are about 40 percent less likely to forage on a wolfy plant than on one that does not have cured stems (Ganskopp et al. 1992, 1993). Many have reported preferential use by both wild and domestic animals of individual plants or patches of grass where old growth material has been removed by grazing or fire (Willms et al. 1980, Gordon 1988, Ruyle and Rice 1991, Ganskopp et al. 1992, Pfeiffer and Hartnett 1995). There has been little research, however, on how cattle respond to stands of wolfy forage at landscape levels. That being the case, the objective of this study was to determine where cattle grazed in pastures supplying mixtures of wolfy herbage and forage consisting of only current year's growth. This was accomplished by first conditioning portions of our pastures with heavy grazing, and then equipping cattle with GPS collars as they grazed the subsequent growing season to monitor their distribution patterns.

Experimental Protocol

Four pastures, each about 33 acres in size, were split with electric fence near the end of the growing season in mid-July 2000. One half of each pasture was designated as a "wolfy" treatment, while the other was designated a "conditioned" treatment. Over 7 days, about 75 cow/calf pairs were rotated through the conditioned portions of each pasture and left to forage until herbage was reduced to about a 1-inch stubble. No cattle were allowed in the wolfy sectors. Electric fences were removed, and in late May 2001 we sampled standing crop and forage and

diet quality in both the wolfy and conditioned sectors (Fig. 2). Subsequently, three GPS-collared cattle were placed in each pasture. The GPS units were configured to ascertain a cow's position and activity level every 10 minutes for a total of 144 positions per day per animal. At that time, half of each pasture supported wolfy herbage, made up of current and last year's growth, and the conditioned half contained only green herbage with little to no standing dead stems.

Figure 1. A wolfy crested wheatgrass stand near Burns, Oregon. Herbage has been grazed from the uppermost portions of some wolfy bunches while bunches without residual straw are grazed to a short stubble. Substantial forage is wasted within wolf plants, because current year's growth is intermixed with older, cured materials that are nutritionally deficient and present a physical barrier to cattle grazing.

Figure 2. Wolfy and conditioned sectors of a crested wheatgrass pasture grazed by GPS-collared cattle on the Northern Great Basin Experimental Range near Burns, Oregon, in May 2001. Herbage in the wolfy sector (left of center), a mixture of last year's old material and the current season's growth, exhibited a lighter colored complexion. Grass on the conditioned side (right of center) was primarily current season's growth and contained little, if any, cured material.

Results and Discussion

When cattle were turned in, standing crop was about 484 pounds per acre in wolfy sectors and 180 pounds per acre in conditioned areas. By weight, about 50 percent of the wolfy herbage was cured material carried over from the previous growing season. Chemical analyses of standing crop (Table 1) found higher levels of crude protein (CP) and digestibility in the conditioned sectors (11 percent CP and 58 percent digestibility) than in the wolfy portions (6.5 percent CP and 47 percent digestibility). Diet quality of rumen cannulated steers confined to each treatment, however, was identical, averaging about 13 percent CP and 59 percent digestibility. This suggests that cattle are very good at sorting among old and new herbage and that they can, at least initially, extract a high-quality diet from stands of wolfy herbage.

Table 1. Forage quality indices of herbage and steer diets from conditioned and wolfy sectors of crested wheat grass pastures on the Northern Great Basin Experimental Range, near Burns, Oregon. in late May 2001. Bold treatment means beneath a common forage quality attribute and within a row are significantly different ($P \leq 0.05$).

	Forage quality indices							
	percent							
Forage	Crude protein		Neutral detergent fiber		Acid detergent fiber		Digestibility (ISDMD)	
Component	Wolfy	Conditioned	Wolfy	Conditioned	Wolfy	Conditioned	Wolfy	Conditioned
Standing crop	6.5±0.2	11.3±0.3	66±1.5	60±0.6	38±1.2	30±0.3	47±1.8	58±0.6
Cured herbage	1.9±0.2	--	74±1.0	--	47±0.9	--	39±0.5	--
Live herbage	11.1±0.2	11.3±0.2	61±1.0	61±0.8	30±0.3	29±0.4	56±0.6	58±0.6
Steer diets	13.1±0.7	14.1±0.4	62±2.6	58±1.4	29±1.1	27±0.6	57±1.9	61±1.2

We obtained a total of 12,096 coordinates from our GPS units. Across all activities, 41 percent of the coordinates occurred in the wolfy sectors and 59 percent were in the conditioned areas. Cattle grazed 45 percent of each day, and during that grazing time we averaged about 18 coordinates per day in the wolfy sectors and 49 coordinates in the conditioned portions of pastures (Fig. 3). Therefore, cattle preferred conditioned areas about 2.7 times more than wolfy areas when grazing. On the seventh day of the trial, however, the cattle switched, and we found them in the wolfy sectors 43 times and the conditioned areas 16 times. Quite possibly, the cattle were running out of feed in the conditioned sectors and were switching to the wolfy

portions of the pasture to find sufficient forage. In hindsight, the trial should have been run for additional days to verify this hypothesis. When the trials were finished, herbage in the conditioned areas had a uniform grazed appearance, but evidence of grazing was difficult to see in the wolfy areas. Assessments after the trials detected a decrease of about 13 percent for standing crop in the conditioned portions of pastures, and herbage actually increased by about 10 percent in the wolfy sectors.

On average, cattle traveled about 2.71 miles per day. They also traveled slightly more each day as the trials progressed (2.25 miles on day 1 increasing to 2.87 miles on day 7). A logical inference is that travel may have increased in response to a dwindling forage supply. With the exception of their trips to water, cattle apparently did little traveling when they were not grazing. On average, 92 percent of their total travel was associated with their grazing activities.

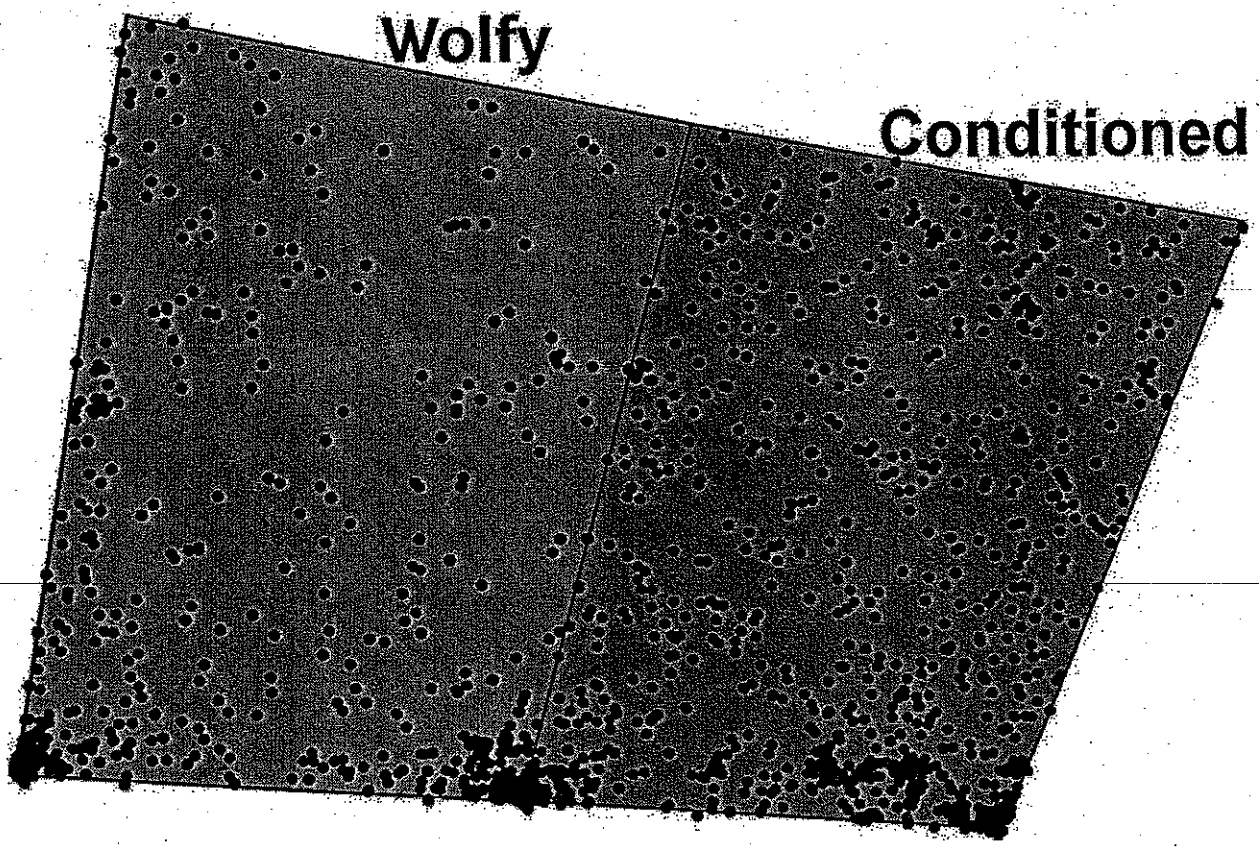

Figure 3. The distribution patterns of three GPS-equipped cattle (1,394 locations) as they grazed in a crested wheatgrass pasture supporting wolfy and conditioned sectors of forage over a 7-day period on the Northern Great Basin Experimental Range near Burns, Oregon, in 2001. In this figure, 394 locations occurred in the wolfy sector and 1,000 locations occurred in the conditioned area.

Management Implications

Given a choice, cattle exhibit a significant preference for conditioned portions of rangeland pastures as opposed to those areas supporting wolfy forage when they are grazing (about 2.7 to 1, respectively). Indeed, wolfy areas in pastures actually grew additional herbage while cattle were present.

The demonstrated preference for conditioned sectors of pastures may partially explain why livestock habitually use the same portions of pastures over successive years. Cattle quite likely are avoiding those locales that support a mixture of old and current season herbage and are selecting those areas and grasses where they do not have to sort between old and new growth. Some Canadian research has shown that there are some economically significant gains to be had from clean-up of wolfy crested wheatgrass stands (Romo et. al 1997).

Previous work at the Eastern Oregon Agricultural Research Center has shown that cattle forage less selectively after all grasses have cured. That being the case, the use of heavy grazing to clean out stands of wolfy plants will probably be more successful if it is applied late in the growing season after all herbage has cured. Other options for removing wolfy vegetation include mowing or prescription burning. Regardless of the treatment chosen, removing wolfy forage across the entire pasture will encourage more uniform use of all forage and more complete use of the newly available herbage by livestock or wildlife.

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