Sheep grazing leafy spurge at the Greene Ranch

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Introduction

The epicenters of many leafy spurge infestations in North America have been abandoned crop- and haylands, and along streams and rivers. In these areas, the competing vegetation is usually dominated by rhizomatous grasses and forbs; many of which are introduced species themselves such as Kentucky bluegrass and smooth brome. Yet in the Northern Rocky Mountains leafy spurge is increasingly invading native range dominated by bunchgrasses such as bluebunch wheatgrass and Idaho fescue. Many bunchgrasses are not as competitive, or tolerant of grazing, as rhizomatous species.

Sheep producers have known for years that sheep will graze leafy spurge. We designed a grazing system to determine if timed, repeated grazing by sheep will reduce populations of leafy spurge without damaging associated, native perennial bunchgrasses. We are also assessing whether yearling sheep that were exposed to leafy spurge on rangeland as lambs graze leafy spurge more readily than yearlings that were not exposed to leafy spurge as lambs.

Materials and methods

This study began in May 1992 and will continue through May 1995. Our study site is 60 km west of Bozeman, MT on a 15-19 inch shallow range site. Within a non-uniform leafy spurge infestation, we enclosed an approximately 3 ha area with high tensile power fence. The 3 ha were divided into 3 blocks with polywire fence, each block was first divided in half lengthwise to compare the grazing behavior of “experienced” and “naïve” yearling sheep, and then further subdivided crosswise into three small paddocks to assess the affect of repeated grazing on leafy spurge and associated bunchgrasses. Sheep grazed each small pasture three times between early June and late September, thus all plants had an equal probability of being grazed at least three times during that four-month period.
In May 1992, we collected baseline information inside and outside exclosures in each small pasture. Prior to grazing in 1992, we set up permanent transects and determined the density of stems and seedlings of leafy spurge and of Idaho fescue, and noted the presence/absence of other plant species. Cover of bare ground and litter was estimated along each transect, and we took soil cores inside each pasture to determine the initial seedbank of leafy spurge before grazing. All of these variables, except the seedbank, are remeasured each year. The seedbanks will be resampled in May 1995.

In 1992, we randomly assigned five yearling Targhee ewes to each of the 6 treatment block combinations (3 blocks, 2 treatments – naive and experienced). The experienced yearlings had been raised as lambs on a summer pasture heavily infested with leafy spurge, whereas the naive yearlings had never been exposed to leafy spurge until they were placed on the pastures in this study. In 1992, we observed the grazing behavior of these yearlings in early June, early July, early August, and mid September on the small pastures. For the first two periods, leafy spurge was abundant, but for the latter two periods, the yearlings were grazing leafy spurge and grass regrowth on pastures that they had previously grazed.

Each block (naive and experienced) was observed by one individual. On day 1 of each period, sheep were turned into a new pasture. That evening and the following morning, their activities were observed for three rounds. A round consisted of 30 minutes of observation [15 minutes (3 minutes/sheep for 5 sheep) with naive yearlings, 15 minutes with experienced yearlings]. We noted whether they were grazing, ruminating, or traveling. While grazing, bites of leafy spurge, grass, or other forbs were recorded. These observations were repeated on Days 3, 5, and 7 during each period, except in September when the sheep were in the small pastures for only three days.

Leafy spurge and Idaho fescue plants were harvested in mid-June, late July, and mid September, separated by plant part (leaves, stems, flowers), and stage (mature growth, regrowth), dried, ground, and analyzed for crude protein, fiber content (ADF and NDF), and in vitro dry matter digestibility.

Results and discussion

Plant response

We only have measures from one complete cycle, May 1992 through May 1993, thus it is too early to conclude what effects one year of repeated grazing may have on leafy spurge and associated perennial bunchgrasses. Visually, in May 1993 grazed areas did not appear to have any more or less leafy spurge than ungrazed areas.

Behavior

In early June, experienced yearlings spent more time grazing leafy spurge than naive yearlings, although neither group grazed it much (5% for experienced versus 0.6% for naive). In early July, the time that the yearlings grazed leafy spurge increased considerably for both groups (45% for experienced versus 31% for naive), although the experi-
enced yearlings still grazed it more than the naive yearlings. Walker et al. (1992) also found that lambs that had been exposed to leafy spurge consumed more of it than lambs that had not been exposed to the plant. The 45% of their grazing time spent on leafy spurge supports Landgraf et al.’s (1984) findings that sheep will consume leafy spurge up to 50% of their diet. In early August, both groups of sheep were grazing leafy spurge equally (40% experienced, 42% naive). There were insignificant differences between the minimal amount of time spent grazing leafy spurge in September (1.4% experienced, 3.4% naive).

Is a sheep a sheep, or might some sheep prefer leafy spurge more than one of their conspecifics? If there are individual differences, a sheep producer could cull sheep that tend to avoid leafy spurge, a trait they may pass onto their young, but keep sheep and their young that tend to prefer leafy spurge. In the early June period, one or two sheep had a much higher preference for leafy spurge compared with other members of their group. In the early July period, there were no strong differences within a group, although time spent grazing leafy spurge by the experienced yearlings was usually higher and much more variable, within a group than time spent grazing by naive yearlings.

During the early June and July observation periods, bite counts on the grasses ranged between 24 and 27 bites per minute. In early June, the naive yearlings averaged around 2 bites per minute on leafy spurge, the experienced group averaged around 8 bites per minute. In early July, these groups averaged 18 and 20 bites of leafy spurge per minute, respectively. The low biting rates in early June, especially for the naive group, could reflect that this was their first exposure to this “new” food, and their inability to efficiently handle it.

In mid-June, crude protein (CP) and digestibility (IVDMD) of leafy spurge leaves and flowers were higher than those for Idaho fescue (leaves 18% CP vs. 6% CP, flowers 17% CP vs. 4% CP). In late July, crude protein and digestibility of mature and regrowth of leafy spurge were higher than Idaho fescue (mature 9% CP vs. 5% CP, regrowth 22% CP vs. 12% CP). These trends were maintained in the September collection. Thus, throughout the grazing season, leafy spurge provided a higher quality diet for sheep than Idaho fescue.

Our results indicate that if an individual has a large scale infestation of leafy spurge, that he or she would be at a slight advantage if they bought or leased sheep that had previous experience with leafy spurge. If possible, it would also be to a producers’ advantage to identify individual sheep that avoid leafy spurge. By avoiding leafy spurge, these sheep will selectively graze other, more desirable plant species, thus placing these plants at a competitive disadvantage to leafy spurge.

**Literature cited**
