

Goats Go After Spurge

Goats prove to be able partners in grazing leafy spurge in Northern Nevada, but how much impact do they make?

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Leafty spurge is a noxious weed native to Eurasia that was brought to America in 1827 as a seed impurity. At the time, no one knew it would be detrimental to the native plant species inhabiting the North American rangelands because it was controlled by pathogens in Europe. Since coming to America, it has spread across millions of acres of productive rangeland, decreasing native vegetation stands, reducing livestock carrying capacity and encroaching on wildlife habitat.

The Bureau of Land Management (BLM) and ranchers who rely on the productivity of the range to make their living are equally concerned about this growing problem.

Goats have been used as a biological control method for leafy spurge since the 1980's, beginning in the Midwest. Studies using goats to control leafy spurge are being conducted all over North America. Most of these studies are being conducted in riparian areas where the use of herbicides would be harmful to native vegetation and water quality.

Goats can be an effective control method because they strip the leaves off the stems, which decreases the photosynthesis and impacts the nutrient reserves in the roots. Some studies have used fencing systems to define the area the goats graze, and other studies have herded hundreds of goats through dense infestations of leafy spurge.

The Elko, NV BLM office initiated a study with the Silver Sage FFA Chapter in the spring of 1999 to evaluate the impact of intensive grazing by domestic goats on leafy spurge. Their

intent was to work with a local high school student who could carry out the experiment. I was a sophomore in high school when I was selected from my chapter to participate in this study. The goal of the study was to find a control method that would stop the progress of leafy spurge in our area. I have been the principal investigator in this study from the beginning.

Setting Up The Study

A study site was established 15 miles southwest of Elko on a BLM cattle-grazing allotment. The topography and vegetation of the study site is typical for high desert sagebrush-grass rangeland in the Great Basin. Soils in the area are classified as Fine-Loamy, Aridic Argixerolls. Leafy spurge occupies primarily the north-facing aspects

and concave positions in this area where extra moisture from snow accumulates and run-off collects.

During the first year of the study, I borrowed five goats from a local rancher. The goats came from a lush green meadow and were placed in a new environment of dry grasses and leafy spurge. The first paddock was large and provided many grazing alternatives for the goats. The goats were reluctant to graze the leafy spurge until the fence was adjusted to make the paddock smaller. This adjustment forced the goats to graze the leafy spurge by reducing their alternatives.

To make the project more efficient, I purchased six goats and used them the second year. These goats came from a dry region similar to the study area. Their diet consisted of grass hay. They



were placed in the smaller paddock from the beginning and immediately began to graze the leafy spurge. The goats were not provided with any supplemental feed during the time that they were grazing the leafy spurge paddocks in either year. They were provided with water as needed.

The study site I chose contained three infestations that were close together. The leafy spurge sites were split into two grazing paddocks and one control area. Each site was approximately one half acre in size. To keep the goats in the correct grazing paddock, I used a temporary electric fencing system purchased by the BLM. The paddocks were intensively grazed for approximately a two-week period in late May to early June during 1999 and 2000. I took before and after grazing vegetation measurements and used the student's T-test to determine differences between any two means. (The T-test takes into account the variability of the data and sample size to determine whether two means are statistically different.)

Vegetation measurements were taken along a 100-foot transect line in each paddock. I measured the percent cover of leafy spurge using the line intercept method. Data was collected by measuring the amount of each leafy spurge plant that intercepted the transect line and then calculated as a percent of the line length. On alternating sides of the transect lines, I measured the stem density of leafy spurge by counting the number of stems within in a 1 meter squared hoop at 20 locations.

What Did We Learn?

Throughout this study I was constantly evaluating new variables or concerns. The weather was among my first concerns. In 1999, a cold wet spring delayed the growth of the leafy spurge, causing me to take measurements and place the goats on the site in June. The next year, 2000, produced a mild warm spring that prompted earlier growth, allowing me to take measurements and put the goats on the site by the end of May.

In 1999, before grazing data indicated an average of 33.4% cover of leafy spurge along each transect. After grazing, there was only 2.5% cover. At the 95% confidence level, this reduction in percent cover was significant. A decrease in cover was demonstrated again in 2000. The after grazing measurement of 0.8% cover was significantly less than the before grazing measurement of 22.0% ($p < 0.05$).

Obviously, the goats made a significant impact on the leafy spurge cover each year. However, when the percent cover measurements from before grazing were compared at the beginning of the growing season, the 33.4% cover before grazing in 1999 was not significantly different from the 22.0% cover before grazing in 2000. This data indicates that from one growing season to the next, there was no real change in the leafy spurge cover.

Stem density measurements produced similar results. The before grazing mean stem density in 1999 was 46.1 stems/m². After grazing the density was reduced to 24.8 stem/m², which is significantly lower ($p < 0.05$). In 2000, the before grazing measurement of 56.7 stems/m² was significantly different than the after grazing measurement of 33.3 stems/m². However, when the before-grazing mean stem densities are compared the 2000 before grazing measurement of 56.7 stems/m² is significantly greater than the 1999 before grazing measurement. The leafy spurge had in fact made a vigorous return.

In summary, goats did not significantly impact percent cover or stem density of leafy spurge overall from one growing season to the next. It was frustrating not to see positive results from this study in the first two years, but I expect to see an impact on the leafy spurge cover and stem density in the future. I hope to see this project continue for at least five years. During this time I suggest that multiple grazing periods each year be incorporated as well as testing the impacts of grazing and herbicide treatments combined, and measuring the expansion of the stand.

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