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South East Alberta Watershed Alliance

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# Effect of Mowing on the Growth of Leafy Spurge

November 2022

A riparian restoration site of the South East Alberta Watershed Alliance (SEAWA) has long been infested with the common noxious weed, Leafy spurge, which is regulated under the Alberta *Weed Control Act*. This site is along the Seven Persons Creek, south of the hamlet of Seven Persons, AB. It is named the Yeast site, after its original landowner who took interest in our work.

Riparian areas are lands between a surface waterbody (stream or lake) and its upland. Healthy riparian areas are essential components of a healthy aquatic ecosystem. The presence of noxious and invasive plants reduces the health of riparian areas and damages aquatic ecosystem health.

Despite the sustained populations of biological control agents (hawk moth and flea beetles) at this site, leafy spurge infestation is extensive. Chemical control is being avoided due to the risk of contaminating the creek. Therefore, SEAWA's research team has been conducting experiments on different methods to suppress leafy spurge growth such as mechanical removal and planting of shrubs with known allelopathic (inhibits the growth of other plants) or shading characteristics. The intent is to reduce the competitiveness of leafy spurge and allow native plants to outcompete it.

At the Yeast site, mature, tall, and dense leafy spurge grow (up to 45 cm in height) on the dry locations towards the top bank (Fig. 1). To test if mowing of leafy spurge would help suppress its growth, we selected a location at the foot of the high bank (20% slope) that had shorter leafy spurge populations growing amongst some grasses.


Fig. 1

Photo by Marilou Montemayor

Around this location were young native shrubs, wolf willows and thorny buffaloberry that were planted and cared for, as a key part of the overall riparian restoration project at this site.

In the summer of 2019, we laid out three randomly located 1m x 1m experimental plots, collected plant data, and applied the first mowing (treatment). Mowing was done using a pair of hedge trimmers (Fig. 2). Subsequently, mowing was done on the first week of May, June, July, and August for the years 2020, 2021, and 2022. The following above-ground leafy spurge plant data were collected, each time before mowing was performed: total number of stems per square meter, stem height (cm) (10 samples per plot), number of flowers per stem (of the ten stem samples), and number of flowers gone to seed. Percent grass cover described other dominant vegetation. Presence of other weeds was also recorded.

Fig. 2

Statistical analysis was performed using the 2-factor ANOVA test to determine the effect of mowing at different months (May, June, and August) (factor1) and years (2020, 2021, and 2022) (factor2). Number of flowers per stem were transformed as log(x+.05) due to the presence of zero values. Standard errors (accuracy) were calculated and shown as error bars on graphs. July data were not included in the statistical analysis as data could not be gathered in July 2021. However, July 2020 and 2022 data are shown in the graphs of all results.

Total Annual Precipitation (mm) for Seven Persons obtained from Alberta Climate Information Service: 2019 = 266.84, 2020 = 303.18, 2021 = 181.39, and 2022 (up to October 31) = 276.9.

## Results

Grass cover (%). Grasses were a mix of crested wheatgrass, western wheatgrass, and smooth brome. There were no significant differences between years neither were there differences between months.

Number of stems per square meter area. There were no significant differences between years, neither were there difference between months.

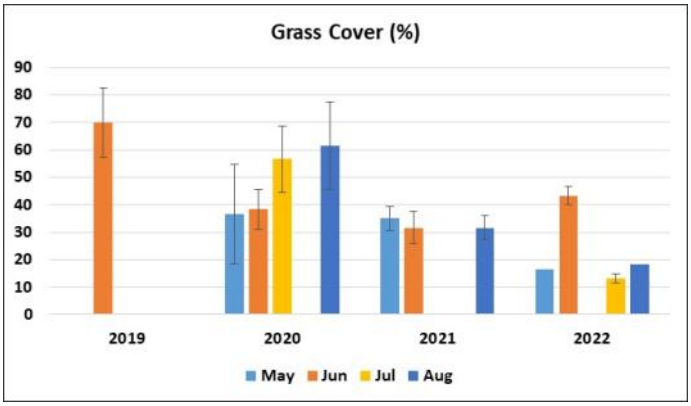
Stem height (cm). There were statistically significant differences between years and between months. Average stem height in 2022 was shorter (11.13) than in 2021 (14.01) and 2020 (13.76). Average stem height was highest in June (14.77) compared to May (11.42) and August (12.72).

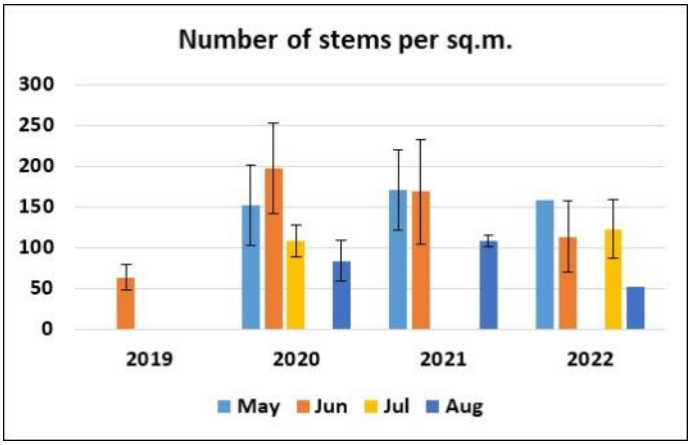
Number of flowers per stem. Flowers were very few (less than 10) with several zero values. Based on transformed data (necessary with zeroes), there were no statistically significant differences between years and neither were there significant differences between months. Standard error was unnecessary. Of the few flowers, none developed into seed in any of the years or months.

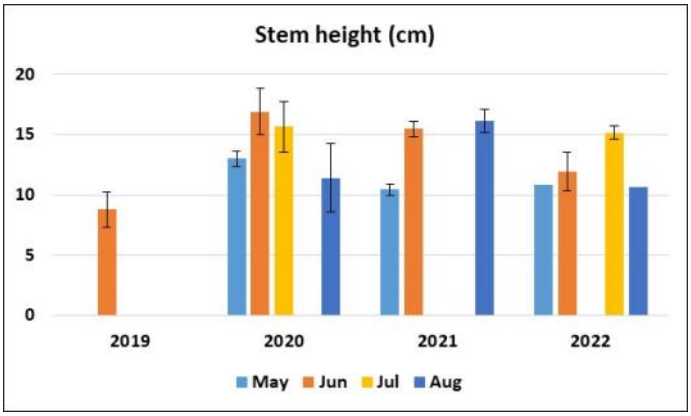
Other common weeds were: flixweed, mustard, stinkweed, alfalfa, goat's beard, black medick, sweet clover, chickweed, sow thistle, and lamb's quarters.

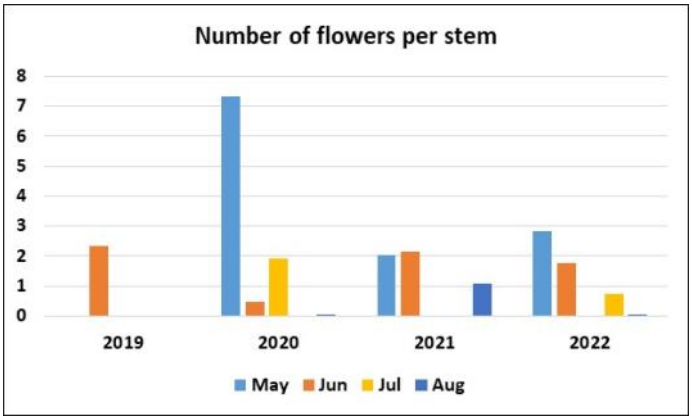
Wildflowers were: gumweed, golden and white asters.

The driest year was 2021.




## Discussion and Conclusion

Monthly mowing decreased stem height by the third year. It is likely that mowing kept stems from maturing each year which in turn discouraged flowering. The number of stems per unit area remained more or less the same throughout the 3 years. Therefore, the overall effect of mowing was to stall leafy spurge growth.

For practical application, mowing can be done with a motorized equipment (example, weed whip). It is likely that goat grazing would have a similar effect to mowing. However, mowing can be controlled to cut closer to the ground and more uniformly than goat grazing. At restoration sites, new shrubs and trees might get damaged by goat grazing. In addition, goat wastes might contaminate the adjacent waterbody with deleterious input of nutrients (nitrogen and phosphorus).

Short stems, few flowers and no seed development indicated that the experimental area had either young leafy spurge or leafy spurge that was under strong competition from grasses (grass cover year-average ranged between 26% to 46%).

In the future, the same experiment should be conducted on the upper slopes of the riparian area that have dense stands of mature leafy spurge. The sample size for number of flowers per stem should be increased to improve the accuracy of this measure.

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