

# The Use of Goat Grazing to Biologically Suppress Perennial Pepperweed

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Perennial pepperweed (*lepidium latifolium*) is a creeping deep-rooted exotic weed that has infested riparian areas, native hay meadows and agronomic fields throughout the western United States. Perennial pepperweed is highly invasive (**Figure 1**) causing management and economic problems through the loss of diversity and quality forage.

The use of herbicides is the most common practice to control this invasive perennial weed, however there has been increasing interest in biological control using goat or sheep grazing.

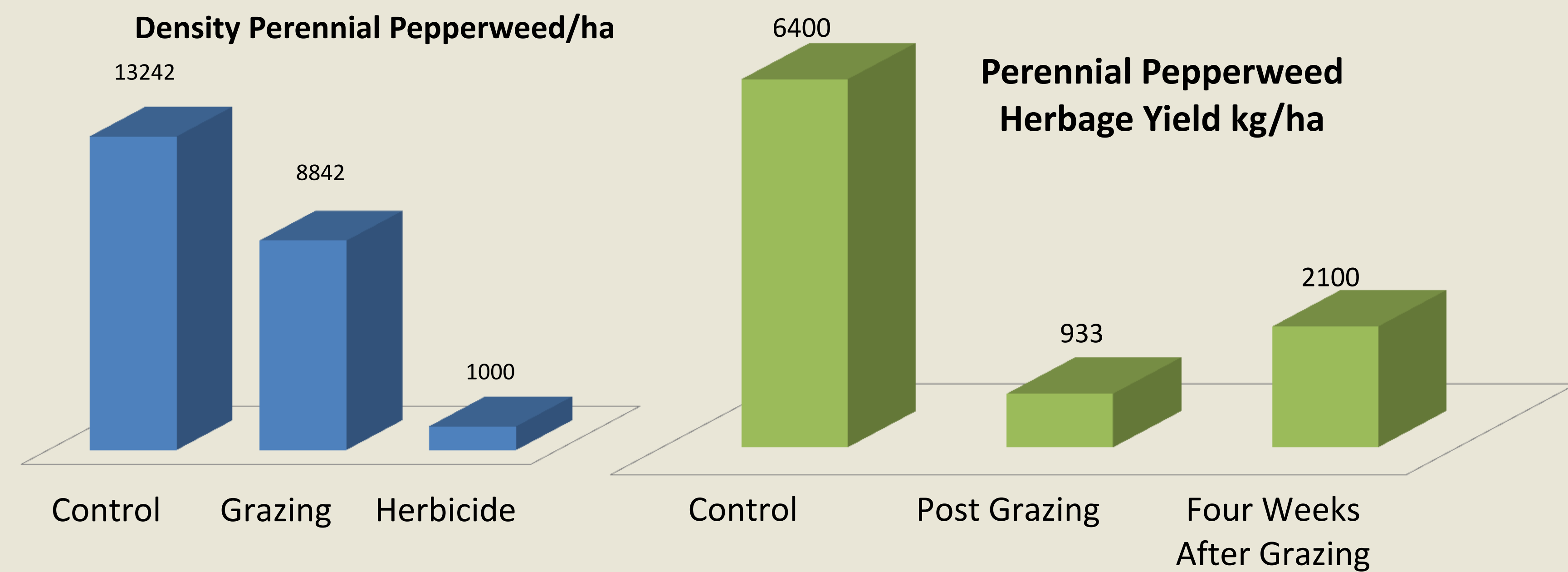


**Figure1.** Aggressive nature of perennial pepperweed

## Results

Grazing rapidly reduced pepperweed density by 33% and herbage yield by 85.5%. Within four weeks plants recovered increasing herbage 225% (**Figure 4**).

**Figure 4.** Density and herbage yield data before and after each grazing, herbicide and seeding event.



*We compared two control treatments prior to rehabilitation seeding.*

- 1) Goat grazing
- 2) Herbicide application (2,4-dichlorophenoxy)

## Methods

Eight 0.1 hectare enclosures were constructed in a perennial pepperweed infested agronomic field at the University of Nevada Reno Experiment Station.

- 1) From May through August enclosures were heavily grazed one at a time and then rotated to the next enclosure (**Figure2**).



**Figure 2.** Perennial pepperweed infested goat enclosure

- 2) Comparative plots (**Figure 3**) were treated with the selective herbicide 2,4-D (2.2 kg/ha) during the one-half bloom stage (late May-early June) and again (1.1kg/ha) the following May after perennial grass seedlings reached the 3+ leaf stage. (Young, J.A., C.D. Clements, and R.R. Blank. 2002. Herbicide residues and perennial grass on establishment perennial pepperweed sites. *J. Range Manage.*)

Tall wheatgrass was seeded in the fall (October) following herbicide treatment and removal of goats.



**Figure 5.** Deep rooted pepperweed resprout

## Discussion

Grazing does not affect the massive and extensive root system of perennial pepperweed. Similarly herbicides alone can not eliminate the regrowth from massive root systems (**Figure 5**) without the establishment of a competitive long lived perennial i.e. tall wheatgrass. Although perennial pepperweed above ground biomass and plant density were negatively affected by grazing, the reduction did not increase grass establishment and lead to long-term pepperweed suppression (**Figure 6**).

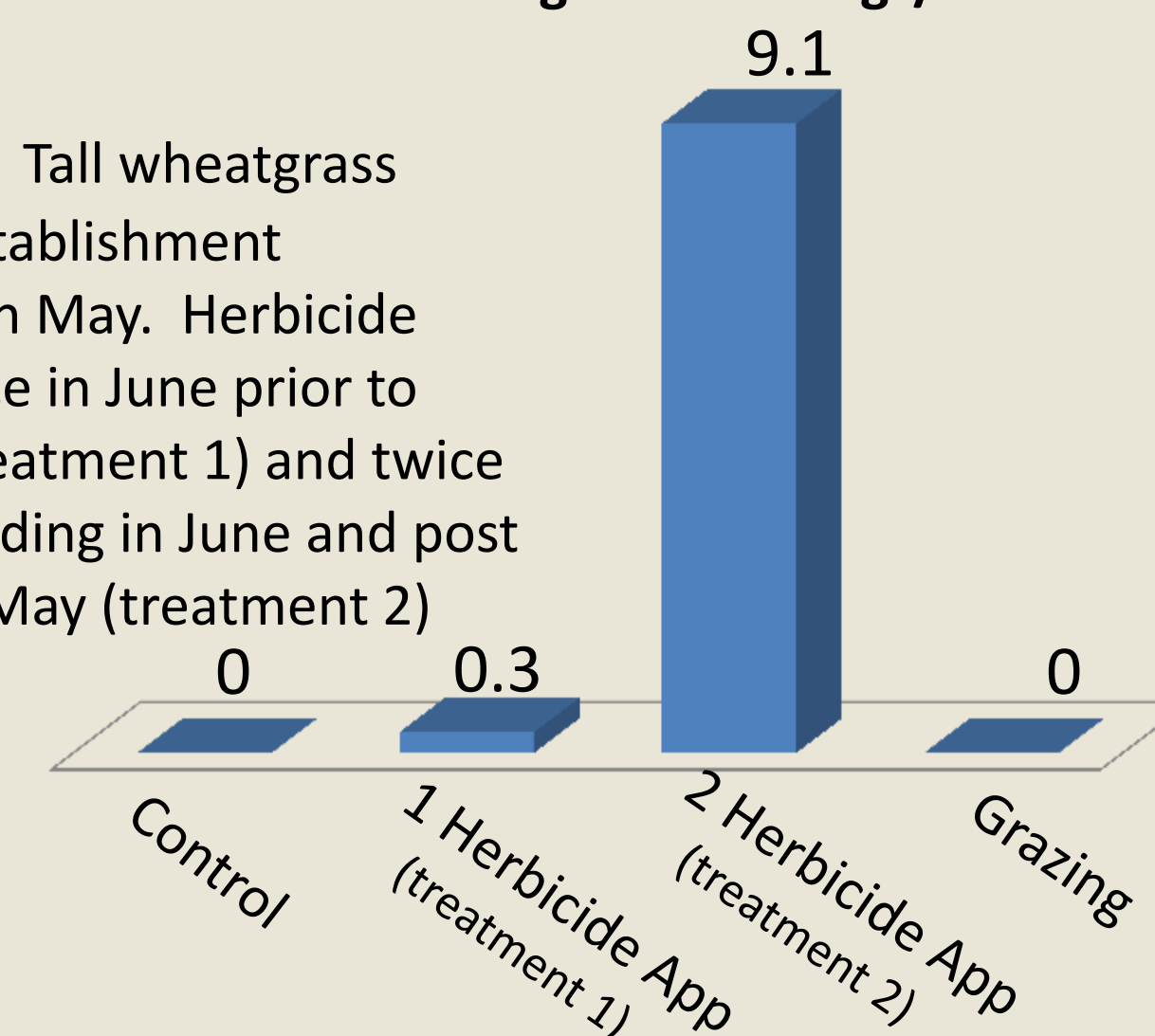
Grazing perennial pepperweed as a control method followed by perennial grass seeding was unsuccessful due to the fact that the grass seedlings could not compete with the dense deep rooted perennial pepperweed resprouts.



Regrowth of perennial pepperweed shortly after being heavily grazed.

Tall wheatgrass seedlings/m<sup>2</sup>

**Figure 6.** Tall wheatgrass seedling establishment measured in May. Herbicide applied once in June prior to seeding (treatment 1) and twice prior to seeding in June and post seeding in May (treatment 2)



June 2,4-D application

May wheatgrass seedlings and 2<sup>nd</sup> application 2,4D

2 years after wheatgrass seeding, Active pepperweed suppression

The use of 2,4-D (2.2kg/ha)(June) followed by the seeding of tall wheatgrass (October) and follow up application of 2,4-D (1.1kg/ha)(May) facilitates the best perennial grass establishment and suppression of perennial pepperweed.

... A return to production agriculture (rye/wheat hybrid *Triticale*s)

**Figure3**