EFFECT OF RUMINAL INCUBATION ON GERMINATION OF PERENNIAL PEPPERWEED SEED

Michael Carpinelli

Summary

Perennial pepperweed invades productive habitats such as flood meadows, riparian areas, and wetlands in most western states, where it displaces desirable forage species. Where chemical or mechanical control is inappropriate, it may be possible to control perennial pepperweed by grazing. However, there is a concern that livestock may ingest seeds that may then be spread to uninfested areas. The goal of this study was to determine the effect of grazing on the viability of perennial pepperweed seeds. Prior to performing a standard germination test, perennial pepperweed seeds were subjected to one of three treatments: incubated in a steer rumen for 48 hours, soaked in water for 48 hours, or kept dry. Ruminal incubation or soaking in water greatly increased germination compared to seeds that were kept dry. These results suggest that if livestock are used to control mature pepperweed, they should be held on weed-free forage for about 1 week prior to being moved to uninfested areas. These results also suggest that spread of pepperweed may be reduced by controlling it in areas where its seeds may eventually be transported by water.

Introduction

Perennial pepperweed (*Lepidium latifolium*) is a perennial weed that spreads from seed, as well as from new stems arising from its creeping root system. It invades productive habitats such as flood meadows, riparian areas, and wetlands in most western states, where it displaces desirable forage species.

It is possible that grazing may be used to control perennial pepperweed. Livestock may be especially effective in areas that are inappropriate for chemical or mechanical control, such as riparian areas. If livestock are used in control efforts, there is a concern that the animals may ingest seeds that may then be spread to uninfested areas. The goal of this study was to determine the effect of grazing on the viability of perennial pepperweed seeds.

Materials and Methods

In fall 2001, perennial pepperweed fruits were collected from the Malheur Wildlife Refuge, about 30 miles south-southeast of Burns, Oregon. Seeds were removed from fruits and were subjected to one of three treatments: 1) incubated in the rumen of a fistulated steer for 48 hours; 2) soaked in water for 48 hours, or; 3) untreated (not incubated or soaked). All treatments were replicated 5 times, and each replicate contained 150 seeds. After incubation or soaking, seeds were rinsed in water and air dried for 3 days. All seeds were then put on sterile, moist media and placed in a germination chamber for 23 consecutive days: the first 14 days at 37° F and the remaining 9 days at 72° F. Seeds were checked daily for germination. It was assumed that seeds that did not germinate within 23 days were not viable. Mean comparisons were made using two-tailed t-tests ($P = 0.05$).

Results and Discussion

Ruminal incubation or soaking in water increased germination 13-fold or 15-fold, respectively, compared to seeds that were kept dry prior to the germination test (Fig. 1).

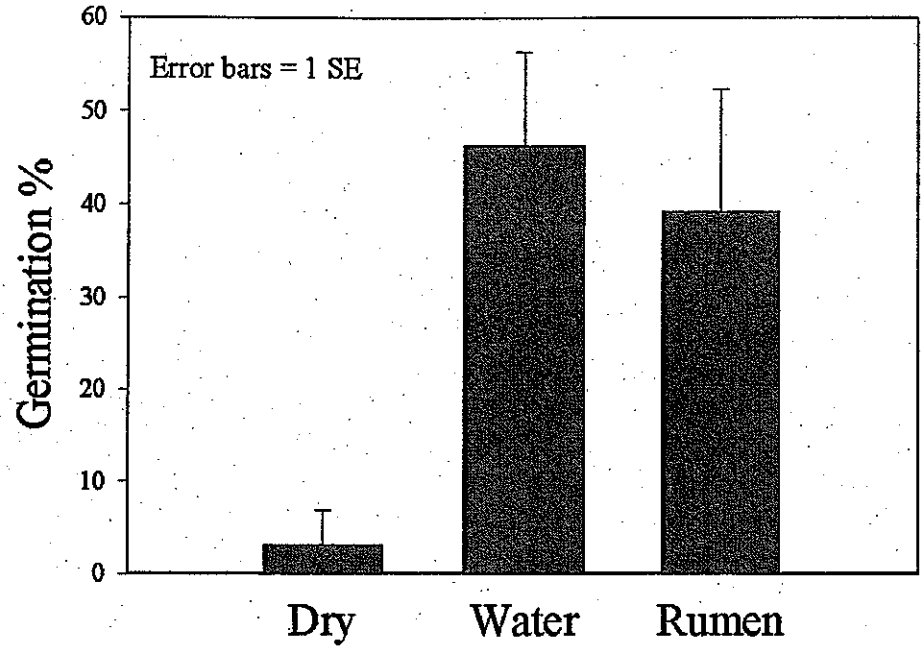

Figure 1. Germination of perennial pepperweed seeds that were soaked in water or ruminally incubated increased more than 10-fold compared to seeds that were kept dry prior to being tested for germination.

Germination did not significantly differ between ruminal incubation and soaking in water. These results suggest that spread of perennial pepperweed may be reduced by controlling it in areas where its seeds may eventually be transported by water (e.g., riparian areas, flood meadows, and irrigation ditches). These results also suggest that if livestock graze perennial pepperweed that has gone to seed, they should be held on weed-free forage for about 1 week prior to being moved to uninfested areas where otherwise, viable perennial pepperweed seeds may be deposited in their dung. Ideally, it may be best to graze perennial pepperweed at the time of flowering to reduce the likelihood that enough growing season or soil moisture will remain to allow grazed plants to flower again and set seed in the same year.