

Research to Practical Use: On-the-Ground Successes

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The US Department of Agriculture–Agricultural Research Service (USDA-ARS) Great Basin Rangelands Research Unit services a large area that runs from south-central Nevada to the Oregon border and from northeastern California to the Utah border. This vast array of landscapes has a variety of stakeholders who request assistance in addressing range, wildlife, and sustainable agriculture issues. At the 64th Annual Society for Range Management Meetings held in Billings, Montana, in February 2011 we were invited to present at a special symposium “Agency Accomplishments—Making a Difference on the Ground.” Here we present three case studies of our efforts to 1) research the problem at hand, 2) deliver practical on-the-ground practices to minimize or eliminate the problem, and 3) improve sustainable agricultural practices.

Case Study 1: Tall Whitetop Control and Rehabilitation

Tall whitetop (*Lepidium latifolium*), also known as perennial pepperweed, is native to Eastern Europe and Asia¹ and was accidentally introduced into North America in the 20th century.² Tall whitetop is a root-creeping exotic weed that has invaded native hay meadows, riparian areas, and agronomic fields throughout the western United States. Landowners and agriculture producers approached us in the early 1990s to address the numerous management problems tall whitetop was causing them, specifically, major losses in forage quality. We tested mechanical (discing), biological (goats), and chemical (herbicides), as well as a combination of these treatments to control tall whitetop infestations. In all we had a combination of 52 treatments. Here we report on what we consider the more important portions.

Discing, conducted in late May and early June, initially reduced tall whitetop cover from 95% cover down to 5% cover, but by the end of summer (October) tall whitetop cover was up to 30% and reached 100% the following July. Discing in early May followed by the application of herbicides (2-4D 2.2 kg/ha [2 pounds/acre] or Chlorsulfuron

[Telar XP] 0.11 kg/ha [0.10 pounds/acre]) initially appeared to be very effective as tall whitetop leaves looked very necrotic. Even though tall whitetop failed to seed due to the combination of discing and spraying, tall whitetop became productive and vigorous by the following July, and cover increased to more than 20%. There were no significantⁱ cover differences between the combination of discing and herbicide application and that of herbicide application by itself.

We also investigated the control of tall whitetop by grazing Spanish goats. Eight 0.1-ha (0.25 acre) enclosures were constructed of which four were grazed and combined with herbicide and seeding treatments while the remaining four enclosures were grazed and seeded. Heavy grazing of tall whitetop decreased forage yield by 78%, yet did not decrease the number of tall whitetop plants in the plots. Grazing tall whitetop as a control method was not successful as the sprouting perennial grass seedlings could not compete with the dense creeping rooted tall whitetop. The control of tall whitetop using goats and herbicide did not significantlyⁱⁱ reduce tall whitetop when compared to herbicide treatments by themselves.

Realizing that the increase in tall whitetop cover in such a short period was a major problem, we tested a variety of plant species in an attempt to suppress tall whitetop. After testing a variety of plant species we chose tall wheatgrass (*Elytrigia elongata*), which performed better in these salt-affected soils. We followed up the May/June (one-half bloom stage) herbicide application (same herbicides and rates) with the seeding of tall wheatgrass at (10.3 kg/ha [9 pounds/acre] rate). The objective was to reduce tall whitetop with the herbicide application and then suppress tall whitetop with a long-lived perennial grass. The following June, well after tall wheatgrass seedlings had emerged and developed three or more leaves, we applied 2-4D at 1.1 kg/ha (1 pound/acre) rate as to negatively affect tall whitetop yet not injure our tall wheatgrass seedlings with this selective herbicide. Tall wheatgrass seed-

ⁱ $P \geq 0.05$.

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