

2011 Research Highlight

Title: Rehabilitating Downy Brome (*Bromus tectorum*)–Invaded Shrublands Using Imazapic and Seeding with Native Shrubs

Science Program and SPA Category: RMRS/Forest and Woodland Ecosystems

Principal Investigator/Contact: Suzanne Owen

E-Mail/phone #: smowen@fs.fed.us / (928) 556-2044

Narrative: Downy brome or cheatgrass (*Bromus tectorum* L.) is one of the most invasive and widespread exotic plants in North America. As an annual grass, it can use moisture and nutrients before perennial plant growth initiates in the spring, limiting native plant survival. Downy brome can reduce soil nutrient availability, alter native plant community composition and increase fire frequencies. The rehabilitation of downy brome–infested areas is challenging once this invasive grass dominates native communities. Although downy brome can be temporarily set back by using prescribed fire, mowing, and grazing, these strategies rarely control populations and can result in high mortality of some native species that managers aim to restore. The effectiveness of Plateau[®] imazapic herbicide in reducing downy brome cover has been variable, and there is uncertainty about the impacts of imazapic on native species. Researchers investigated if treatment with imazapic and/or seeding with native shrubs were effective in rehabilitating shrublands highly invaded by downy brome on the Kaibab National Forest in northern Arizona, USA. Researchers also determined the effects of imazapic on different growth stages of both downy brome and three native shrub species in the greenhouse.

In the field, seeding shrubs did not significantly increase shrub density, although imazapic herbicide reduced downy brome cover and nontarget forb cover by 20-25% and altered plant community composition the first year post-treatment. Imazapic was lethal to downy brome at all growth stages in the greenhouse and reduced shrub germination by 50 to 80%, but older shrub seedlings were more tolerant of the herbicide. A one-time application of imazapic

combined with seeding shrubs was only slightly effective in rehabilitating areas with high downy brome and thatch cover and resulted in short-term impacts to nontarget species.

This research helps managers with treatment and prevention for the management of this invasive species. These results highlight the need to treat downy brome infestations before they become too large. Removing thatch before treating with imazapic, although likely lethal to the native shrubs in this study could increase the effectiveness of imazapic. Because imazapic can alter native plant communities, managers should consider the unintended consequences of this herbicide and the consideration of other strategies for downy brome control, such as seeding native plant barriers and using herbicides that selectively reduce downy brome seed viability.

For more information, see: Owen, S.M, C. Hull Sieg and C.A. Gehring. 2011.

Rehabilitating Downy Brome (*Bromus tectorum*)–Invaded Shrublands Using Imazapic and Seeding with Native Shrubs. *Invasive Plant Science and Management*. 4:223-233.

Captions:

Photo 1: Researchers Imazapic herbicide application to downy brome-invaded shrublands. The herbicide is visible because it was mixed with an inert blue dye.

Photo 2: Greenhouse experiment showing downy brome that was treated with imazapac herbicide (left) and DI water as a control (right).