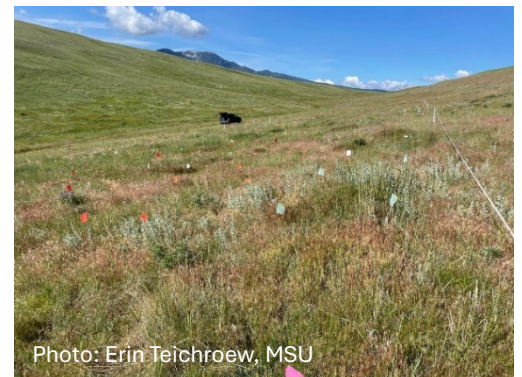


Testing Novel Approaches to Cheatgrass Management

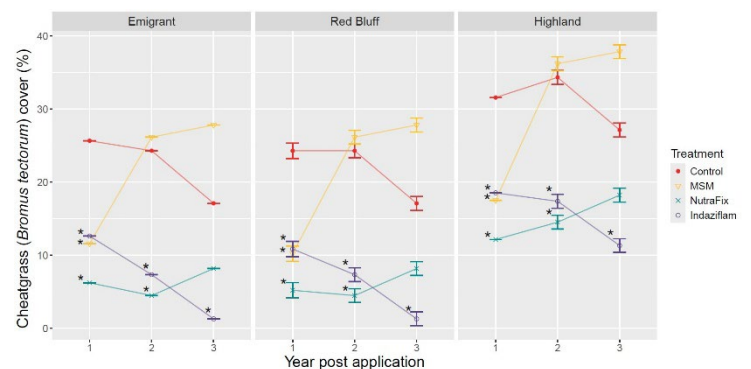
By Jane Mangold, Erin Teichroew, Lilly Sencenbaugh, and Lisa Rew

Introduction Many rangelands in the West have been invaded by the annual grass cheatgrass (*Bromus tectorum*). Herbicides are commonly used to control cheatgrass but their use may harm desired plant species and overuse can lead to resistance. For these reasons and others, some weed managers are interested in alternatives to herbicides, and it is important we understand the effects they have on cheatgrass and the rest of the plant community. One potential alternative approach is mustard seed meal (MSM), a biofumigant that has been used for soil pathogens in crops and can also inhibit seed germination. Selectivity of MSM varies by species, and biofumigants are volatile, quickly dissipating into the air, only providing short-term control. Another potential alternative is modifying the soil environment through soil amendments. NutraFix® is a micronutrient-based fertilizer designed to restore rangeland soils. Micronutrients can be phytotoxic in large amounts, however it has been proposed that perennial species have a higher tolerance for micronutrients than annuals, so cheatgrass abundance could be reduced with low risk to perennials. NutraFix® is designed to provide multiple years of control.

Methods We applied the herbicide indaziflam (Rejuvra®), MSM, and NutraFix® at recommended rates and timings at two sites in 2020 and three sites in 2021; sites were southwestern Montana rangelands mildly-to-moderately infested with cheatgrass. Treatments, including a non-treated control, were replicated five times at each site on 3m² plots. Half of each plot was broadcast seeded with a mix of native, perennial grasses common to the sites. Vegetation was monitored for three growing seasons after treatment application, assessing changes in cheatgrass cover, species richness (# of species), diversity (# and abundance of species), and rank abundance (species that are dominating the plant community).



Results MSM controlled cheatgrass for one year but also reduced species richness, and cheatgrass was highly dominant two and three years after treatment. NutraFix® provided control for two years and had no impacts on species richness or diversity. Indaziflam provided three years of cheatgrass control, reduced species richness, and led to a shift toward a western wheatgrass-dominated plant community. Seeding did not affect cheatgrass cover but increased diversity and richness.



Cheatgrass cover as affected by treatment at three sites over three years.

Conclusions In our study we found that all three control methods reduced cheatgrass cover but for different lengths of time. They also had differing impacts on species richness, diversity, and plant community composition. When exploring novel tools, it is important that the impacts to cheatgrass and the entire plant community are considered before large-scale application occurs. Testing how different control tactics perform across a greater range of sites within and across ecosystems is a crucial next step in this research and will help advance both the efficacy and sustainability of invasive plant management.

Read the full article by [Teichroew, Mangold, Sencenbaugh, and Rew](#).