

Testing Indaziflam for Restoring Cheatgrass (*Bromus tectorum*) Infested Montana Rangelands

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Introduction In summer 2020 the active ingredient indaziflam (Rejuvra™) was approved by the Environmental Protection Agency for use on rangelands, CRP, and natural areas. Indaziflam's mode of action inhibits cellulose biosynthesis in seedlings, making it an effective pre-emergent herbicide for annuals such as cheatgrass (*Bromus tectorum*), a non-native winter annual grass. Cheatgrass is the most widespread invasive plant in the western U.S., and it is problematic for many range managers throughout Montana. Ranchers and other land managers in Montana are interested in indaziflam as another tool for controlling cheatgrass. This project focused on effectiveness of control of cheatgrass, measuring the perennial grass response, and return on investment of this herbicide for ranchers.



Sweetgrass County site first year after treatment.
Photo: Ben Hauptman

Methods In fall 2018, 10 x 30-foot plots were sprayed with 5 oz/A indaziflam at two sites in Montana (Sweetgrass and Granite Counties), prior to rainfall and seed germination. Indaziflam integrates into the soil profile following a precipitation event due to its high water solubility characteristics, so timing of spraying is important to achieve control of the cheatgrass seedbank. There were three replications at each site. Treated and untreated plots were sampled for canopy cover by species and clipped for biomass by functional groups of cheatgrass, perennial grasses, perennial forbs, and annual forbs in 2019 and 2020.

Results Indaziflam reduced cheatgrass canopy cover below 1% in 2019, compared to 50% and 32% cheatgrass cover in untreated plots at sites 1 and 2, respectively. Perennial grass cover was higher in treated plots, 27% and 33%, compared to untreated plots where perennial grass cover was 9% and 16% at the two sites. In 2020, two years after application, cheatgrass cover in treated plots was still below 1%, while untreated plots were at 54% and 39% cover. Perennial grass cover was 57% and 44% in treated plots and 20% and 24% in untreated plots at sites 1 and 2, respectively.

Perennial grass biomass increased in indaziflam-treated plots at the Sweetgrass County site, averaging 2,096 pounds/A compared to 1,444 pounds/A in untreated plots. Using a conservative stocking rate, this increase amounted to an additional 0.2 AUMs/A. Using the 2019 average lease rate per AUM of \$24.50, this equated to a benefit of \$4.90 per acre. Herbicide cost \$46.45/A in this study. This study, along with other research in the western U.S., shows indaziflam can control cheatgrass for multiple years. The cost of the herbicide needs to be considered relative to the duration of cheatgrass control and return on investment. Increased production will be site dependent; highly degraded sites may see greater change in perennial grass production compared to sites with moderate cheatgrass infestations, but they may not have high enough production potential over time to justify the cost. It is also important to note that grazing management may need to change to prevent reinfestation of cheatgrass once the residual herbicide is no longer present in the soil. Finally, the long-term economic and ecological impact of not controlling cheatgrass should be factored into decision-making.