University of Idaho
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Promoting Collaborative Solutions for Rangelands

Research Summary: Indaziflam application reduces invasive annual grass cover in mountain big sagebrush steppe

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Rangelands and sagebrush communities are at risk from invasive annual grasses such as cheatgrass (*Bromus tectorum*), which outcompete native plants and increase wildfire frequency and intensity. Management activities that provide durable control in annual grass invaded rangelands are needed, and one possible technique is the use of indaziflam (Rejuvra).

Indaziflam has a novel herbicide mechanism, preventing cell division and therefore root elongation, and is applied before seed germination. It also has low water solubility, which aids in increased residual soil activity. This herbicide has shown promising results at reducing invasive annual grasses for at least three years post-application. However, there have been few studies that have examined effects of Indaziflam on the landscape-scale, effects from aerial applications, and no research on the impact of indaziflam on fuel continuity and fire behavior.



Fieldwork at Rinker Rock Creek Ranch (Georgia Harrison photo)

KEY TAKEAWAYS

- This research supports the use of indaziflam as an effective method for reducing invasive annual grasses for multiple years.
- Aerial indaziflam treatment effectively reduced invasive annual grass cover and increased cover of native perennial grasses.
- Aerial indaziflam treatment did not significantly affect fuel continuity or fuel loading relative to nontreated areas.

METHODS

This study took place at the University of Idaho Rinker Rock Creek Ranch, in south-central Idaho. This area is primarily composed of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) plant communities. In September 2020 a total of 19 ha across three pastures were treated with indaziflam (5 oz/ac) by helicopter and researchers established 32 permanent assessment plots within both treated and adjacent nontreated areas. Vegetation cover and fuel continuity were measured one and two years post-treatment. To assess the impact of indaziflam on potential fire behavior, custom fuel beds were created using field observations, and fire behavior was modeled under different weather conditions in the Fuel Characteristic Classification System (FCCS) with the Fuel and Fire Tool.

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RESULTS

Areas treated with indaziflam had significantly reduced invasive annual grass cover, a 64% and 74% reduction one and two years after treatment respectively, in treated plots relative to nontreated plots.

In nontreated plots, the mean invasive annual grass vegetation cover was 11% one-year post treatment and 38% two years post treatment. In the treated plots, these numbers were 4% and 10% respectively. Additionally, native perennial grass cover was 7% greater in treated areas.

Fuel loading did not differ between treated and nontreated plots, since shrubs constituted a majority of the fuel bed. Though invasive annual grasses contribute to increased fuel continuity, they are a relatively minor component of the overal fuel bed in sagebrush rangeland. Areas with indaziflam treatment had slightly lower modeled rates of fire spread, flame lengths and intensity compared to nontreated areas, but only in areas with low shrub cover.

A concern with indaziflam is its potential impact on native plant communities, particularly native annual species. The results of this study did not indicate any differences in native species richness following indaziflam treatment. However, there was a reduction in native annual forb cover observed two-years post treatment. Although the cover of annual forbs was reduced, overall high species richness and persistence suggests few impacts to plant species composition.

IMPLICATIONS

This study adds to the emerging body of research in landscape-scale application of indaziflam in mountain big sagebrush ecosystems. The findings from this research suggest that the application of indaziflam can be an effective tool for controlling invasive annual grasses, while having minimal impacts on native plants in sagebrush communities for at least two years. These results are promising for managers seeking ways to improve minimally degraded sagebrush ecosystems by reducing invasive annual grass abundance.



Study sites at Rinker Rock Creek Ranch (Georgia Harrison photos)

ADDITIONAL INFORMATION

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This research brief was written by Ella Hall and Georgia Harrison.
This summary is based on Georgia Harrison's dissertation "Controlling Annual Grasses in Sagebrush Communities with Higher Resistance and Resilience is Crucial to Prevent Fire Risk and Invasion Expansion" (University of Idaho, 2023)