



Restoring Cheatgrass Invaded Rangelands Decreases Wildfire Risk and Increases Wildlife Browse

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Management Implications:

- Rejuvra® (indaziflam, Bayer) is a pre-emergence restoration herbicide that provides multi-year invasive annual grass control with a single application, while allowing for the re-establishment of desirable perennial grasses, forbs, and shrubs.
- Cheatgrass treatments on Boulder County Open Space properties resulted in increased leader growth (1.5X-2.8X) on shrub species in treated areas compared to non-treated areas, increasing critical winter forage for mule deer and elk.
- Cheatgrass treatments resulted in 4-5X increase in perennial grass biomass.
- Cheatgrass litter was reduced by 92% 8 months after treatment, and eliminated by 20 months after treatment.
- This research suggests that Rejuvra could be a useful tool in wildlife habitat improvement projects, specifically in critical winter range areas that are at high risk for cheatgrass-fueled wildfires.

The Number One Threat to Mule Deer and Sage-Grouse in the West is Cheatgrass Fueled Wildfires¹

Invasive winter annual grasses such as cheatgrass, medusahead, and ventenata continue to spread at an alarming rate. These invasive species are one of the largest threats to western rangeland, and the wildlife that depend on these shrubland communities for survival. The fine-fuels that accumulate from annual grasses significantly alter the fire regime by increasing wildfire frequency, and facilitating the conversion to invasive annual grass monocultures. Between 2000 and 2018, more than 15 million acres of sagebrush steppe have burned by wildfire, and although fire is a natural part of the sagebrush steppe, its frequency and severity are increasing far above natural levels². Hundreds of wildlife species across 14 states are dependent on intact shrub communities such as sage-grouse, mule deer, pronghorn, and elk; however, once these sites convert to invasive grass monocultures, it is nearly impossible to restore these critical shrub-dominated plant communities.



wildlife. A major concern of BCOS ecologists and wildlife biologists is the loss of critical wildlife habitat areas due to cheatgrass-fueled wildfires.

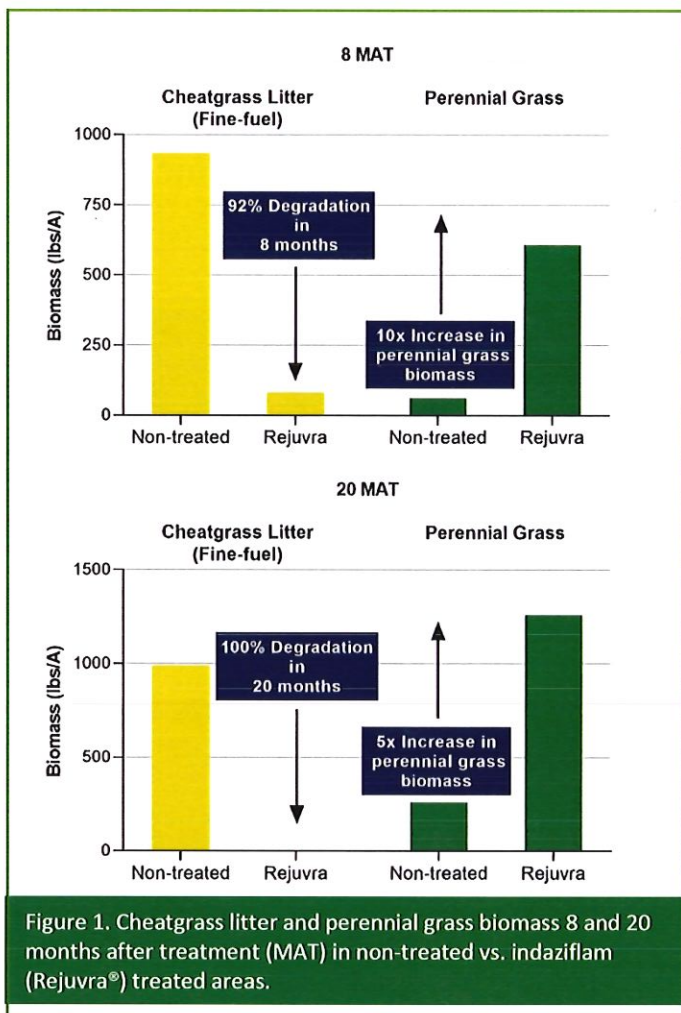
In winter 2017 and 2018, six sites were treated with indaziflam (Rejuvra®, Bayer) (7 oz/ac) plus glyphosate (12 oz/ac), while desirable shrub species were in dormancy and no leaves were present. These sites were 2 to 20 acres in size with dense stands of mountain mahogany, four-lobed sumac, antelope bitterbrush, winterfat, rubber rabbitbrush, four-winged saltbush, and fringed sage.

Permanent random transects (3 X 200') were created inside cheatgrass-treated, and immediately adjacent, non-treated plots. Data collection included line intercept canopy cover for cheatgrass and all desirable perennial vegetation. In addition, biomass was collected for all species including cheatgrass litter to determine fine-fuel weights in treated vs. non-treated plots. This provided an indication of how quickly cheatgrass fine-fuel litter degrades after indaziflam (Rejuvra®) treatments. Shrub measurements including longest leader growth were collected along the entirety of the transect. Data were collected over two consecutive summers, at approximately 8 and 20 months after treatment (MAT).



Restoring cheatgrass infested critical winter range

Boulder County Open Space (BCOS) manages properties in the lowland, foothills and mountains of Colorado that provide critical overwintering habitat for mule deer, elk, and other

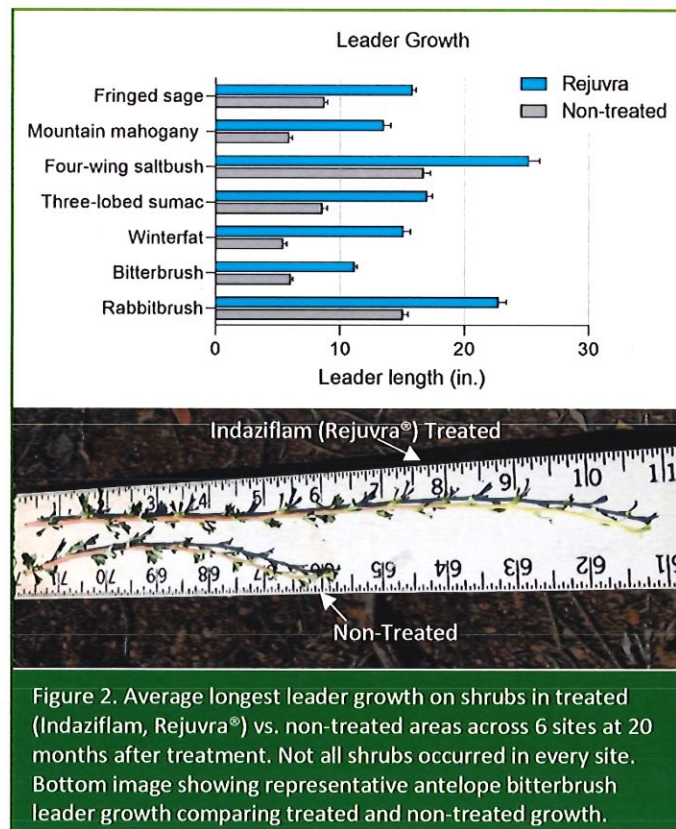


The first summer after application, cheatgrass litter biomass averaged 935 lb/A in non-treated areas compared to 82 lb/A in treated areas, a 92% degradation of cheatgrass litter in areas treated with indaziflam (Rejuvra®). By the second summer after application, cheatgrass litter had completely degraded in indaziflam (Rejuvra®) treated sites. Perennial grass at the sites responded positively to the treatments, with an average 5x increase in biomass by 20 MAT (Figure 1).

New growth measurements on shrubs spanning the transect lines revealed increased leader growth and shrub canopy volume in the treated areas for all seven shrub species evaluated. New leader growth was 1.5x to 2.8x longer on shrubs in areas treated for cheatgrass compared to non-treated areas (Figure 2), while shrub canopy volume increased 120% to 400% with cheatgrass treatments (data not shown).

FOR FURTHER READING

1. Nikonow, H (2019). Cheating the Sage. Mule Deer Foundation Journal, Sept/Oct Issue. <https://www.partnersinthesage.com/blog/2019/cheating-the-sage-mdf>
2. Audobon Society <https://rockies.audubon.org/sagebrush/cheatgrass-fire>
3. Sebastian DJ, Sebastian JR, Nissen SJ, Beck KG, (2016). A potential new herbicide for invasive annual grass control on rangeland. *Rangeland Ecology and Management*, 69(3): 195-198. doi: 10.1016/j.rama.2015.11.001
4. Clark SL, Sebastian DJ, Nissen SJ, Sebastian JR, (2019). Effect of indaziflam on native species in natural areas and rangeland. *Invasive Plant Science and Management*, 12: 60-67. doi: 10.1017/inp.2019.4
5. Rejuvra Plot Tour Video Series, Utah, Colorado, & Montana, 2019: : <https://www.environmentalscience.bayer.us/vegetation-management/range-and-pasture/portfolios-and-solutions/rejuvra/plot-tour>



Conclusions:

This research suggests that indaziflam (Rejuvra®) could be a useful tool in wildlife habitat improvement projects on invasive winter annual grass dominated sites. Sites responded favorably to the removal of cheatgrass and benefits to wildlife habitat were realized in a relatively short time-frame (8 to 20 MAT). Within indaziflam (Rejuvra®) treated sites, the fine-fuel created by cheatgrass litter was completely degraded within 20 months after application, significantly reducing the risk of habitat loss from cheatgrass-fueled wildfires. Wildlife browse was increased for seven different shrub species utilized by mule deer, elk and other browse species during winter months, indicating a substantial improvement to critical winter range in Boulder County, CO.

Our findings reinforce the findings of field managers, that cheatgrass and other invasive annual grasses pose a significant threat to the habitat and population of browse species. For land managers, this management tool provides a long-term control option to reduce wildfire risk and begin the restoration process on the millions of infested acres within critical habitat areas