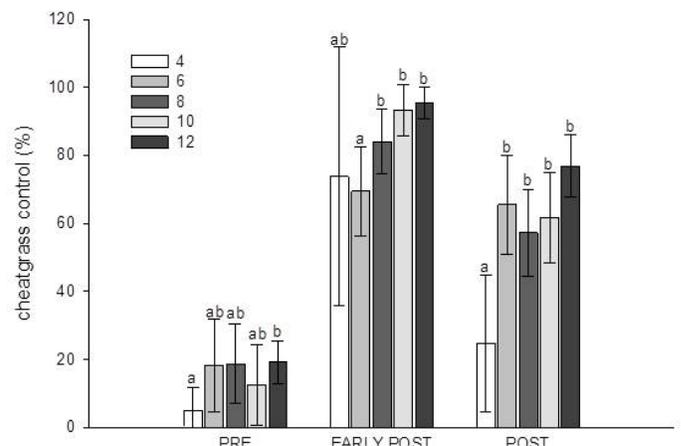


Controlling cheatgrass with imazapic (Plateau®) on Montana rangeland

Introduction: Cheatgrass is a winter annual grass. Most cheatgrass germinates and emerges in the fall, overwinters as a seedling and resumes growth early in the spring, taking advantage of early season soil moisture. Spraying cheatgrass seedlings when they are most susceptible to herbicide is critical for effective control, but timing of applications can be complex because sometimes cheatgrass seedling emergence can continue fall through spring, depending on precipitation patterns. The herbicide imazapic (Plateau®) has been the focus of research and on-the-ground management of cheatgrass in many areas of the western U.S. Imazapic has both soil and foliar activity and is labeled for pre- and post-emergent application. Imazapic has been applied by both researchers and range managers in Montana with mixed results.

Research at MSU: Researchers from across Montana compiled data from 25 herbicide trials that included imazapic. Imazapic efficacy was evaluated across application rate and timing and choice of adjuvant. Rates included 4, 6, 8, 10, and 12 ounces Plateau®/acre; application timings were all in the fall and included pre-emergent, early post-emergent (1-2 leaf growth stage), and late post-emergent (3-4 leaf growth stage); adjuvants included methylated seed oil (MSO) and non-ionic surfactant (NIS). Imazapic efficacy ranged from less than 20% control to greater than 95% control of cheatgrass, and efficacy was primarily influenced by timing of application (see graph below). Control was best in the early post-emergent applications. Efficacy was not very dependent on the rate of imazapic applied except with late post-emergent applications where the lowest application rate (4 oz/A) did not perform as well as higher rates. Imazapic efficacy was not influenced by choice of adjuvant.

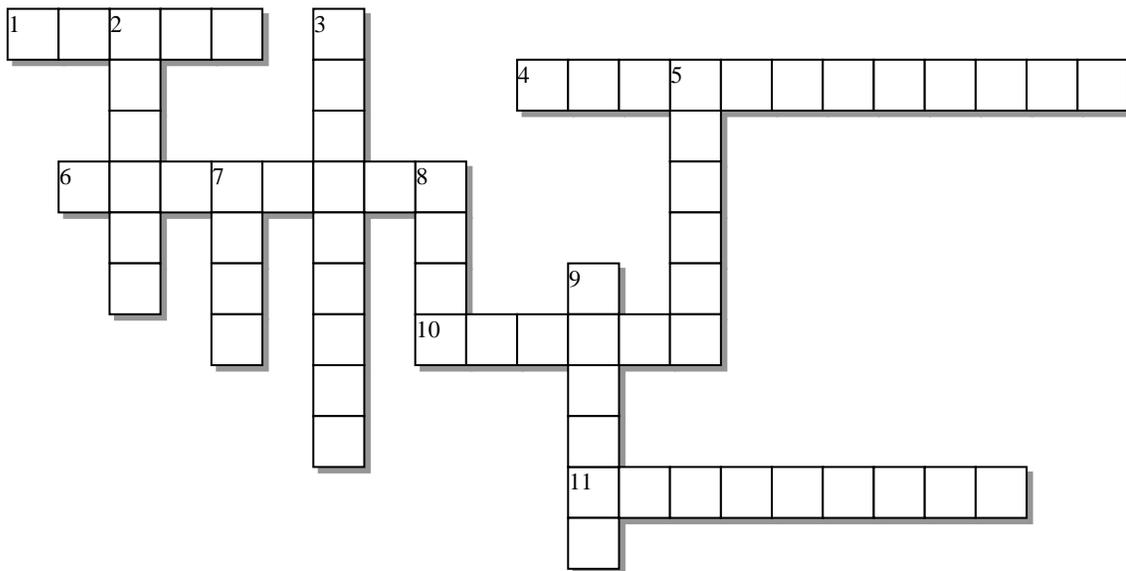
Further exploration of imazapic efficacy was conducted through a series of field and greenhouse studies. Studies took place on cheatgrass-infested CRP and rangeland. Imazapic was applied at different rates in the early to late post-emergent growth stage. Because plant litter is believed to interfere with imazapic uptake, some plots were raked to remove litter prior to herbicide application. Soil samples were collected at increasing dates post-herbicide application to better understand how long imazapic persists in the soil and might therefore continue to provide control. Cheatgrass control was variable across sites and years, but in general low application rates (4-8 oz/A) were just as effective as high application rates (10-12 oz/A). As timing of application was delayed at the CRP site, a higher application rate was necessary to reduce cheatgrass below that of non-treated plots. Litter did not influence imazapic efficacy. Soil samples indicated that there was enough imazapic in the soil up to 180 days after application to decrease cheatgrass growth. This suggests fall applications targeting 1-2 leaf seedlings will still have activity on those seedlings that do not emerge until spring.



Cheatgrass control as affected by imazapic application timing and rate. Bars represent mean % control, and error bars represent 95% confidence intervals. Means with different letters are different from each other within an application timing. Application rates in oz Plateau®/A are represented by the shades of gray fill as indicated in the legend.

For more information: The studies described above are currently in preparation for publication. You can read more about cheatgrass biology, ecology, and management in range and croplands in the MSU Extension MontGuide <http://msuextension.org/publications/AgandNaturalResources/MT200811AG.pdf>

Weed Post Puzzle: Controlling cheatgrass with imazapic



Across:

- 1 - Cheatgrass increases the continuity of fine-textured fuel which promotes larger and more frequent _____*
- 4 - Cheatgrass' life cycle is a _____ (two words)
- 6 - In Montana, cheatgrass was first reported in this county in 1898*
- 10 - Soil samples indicated that imazapic applied in the fall will still have some effect on cheatgrass seedlings emerging in the _____
- 11 - Control with imazapic was best in the _____ - _____ emergent applications (two words)

Down:

- 2 - While doing this in research plots gave the researcher a nice cardio workout, it didn't influence imazapic efficacy
- 3 - MSO or NIS, different types of _____, did not influence imazapic control
- 5 - Research from 25 herbicide trials found efficacy was primarily dependent on _____, and not as dependent on rate
- 7 - Imazapic has both _____ and foliar activity
- 8 - The _____ on cheatgrass seed enable seeds to stick to hair and fur of animals, and most notoriously human socks and hiking boots*
- 9 - If application timing is delayed, a _____ application rate may be necessary

*Refer to the MSU MontGuide "Cheatgrass: Identification, Biology and Integrated Management" for solutions.

Solutions are posted to the MSU Extension Invasive Rangeland Weed website:

<http://www.msuextension.org/invasiveplantsMangold/extensionsub.html>

