

Factsheet: Control of Japanese brome (*Bromus japonicus* L.) in barley



Objective:

There are three main objectives of this study:

- 1) To determine crop tolerance to various herbicide combinations and application timing
- 2) To determine the best herbicide combination and application timing to control Japanese brome
- 3) Pursue a potential Minor Use Registration for control of Japanese brome in barley

Methodology:

This study was located at Scott in 2017, 2018 and 2019 and Lethbridge, Alberta in 2017. Barley cultivar AC Metcalfe was seeded at a rate of 250 seeds m⁻². Japanese brome was seeded at a rate of 200-250 seeds m⁻² at Lethbridge, 2017. However, Japanese brome was not seeded at Scott as a natural population was present. The treatments consisted of four herbicides (glyphosate, flumioxazin, pinoxaden, and triallate) applied alone and in-combination at two application timings (fall vs. spring) (Table 1). The flumioxazin application rates were based on the current recommended pre-seed application rates for spring wheat of 70 and 105 g ai/ha (low vs. high). Triallate applications always occurred in the fall and were incorporate prior to fall applications of flumioxazin. Pinoxaden applications occurred post-emergent at the 3-4 leaf stage of the barley. In total, there were seventeen herbicide combinations evaluated to control Japanese brome in malt barley (Table 1). Fertilizer was applied according to soil test recommendations. Pesticides were also applied as and when required

Table 1. Treatment list, products, rates and herbicide application timings.

Treatment number	Herbicide	Rate (g a.i. ha ⁻¹)	Application Timing
1	Unsprayed Check		
2	Glyphosate ^A	900	Fall
3	Glyphosate	900	Spring
4	Flumioxazin ^B & Glyphosate	70 & 900	Fall
5	Flumioxazin & Glyphosate	105 & 900	Fall
6	Flumioxazin & Glyphosate	70 & 900	Spring
7	Flumioxazin & Glyphosate	105 & 900	Spring
8	Pinoxaden	60	POST- Emergent
9	Flumioxazin & Glyphosate & Pinoxaden	70 & 900 & 60	Fall & POST
10	Flumioxazin & Glyphosate & Pinoxaden	105 & 900 & 60	Fall & POST
11	Flumioxazin & Glyphosate & Pinoxaden	70 & 900 & 60	Spring & POST
12	Flumioxazin & Glyphosate & Pinoxaden	105 & 900 & 60	Spring & POST
13	Triallate	1400	Fall
14	Triallate & Flumioxazin & Glyphosate	1400 & 70 & 900	Fall
15	Triallate & Flumioxazin & Glyphosate	1400 & 105 & 900	Fall
16	Triallate & (Flumioxazin & Glyphosate)	1400 & 70 & 900	Fall & Spring
17	Triallate & (Flumioxazin & Glyphosate)	1400 & 105 & 900	Fall & Spring

^A Glyphosate formulated as Roundup Transorb 540

^B Flumioxazin formulated as Valtera

^C Pinoxaden formulated as Axial

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Key Findings:

- Overall ranking of these products will be based on overall consistency of weed control and degree of crop injury. Spring applied glyphosate provided effective yet slightly inconsistent weed control that resulted in weed regrowth and slightly less yields compared to spring applied flumioxazin (high and low) with triallate and pinoxaden.
- Single herbicide applications, regardless of application timing, were generally less effective than herbicides applied in combination. Applications of triallate applied alone over a three-year average resulted in 30% less weed control than when used in combination with flumioxazin and to a lesser extent (26%) when flumioxazin combined with pinoxaden.
- Fall glyphosate, triallate, and post-emergent pinoxaden applications were very ineffective in controlling Japanese brome and ultimately resulted in low yields and to some degree poorer seed quality.
- Spring applied flumioxazin with triallate and with pinoxaden provided the most consistent weed control when averaged over all years.
- However, flumioxazin applied at a high rate with triallate and pinoxaden tended to cause greater crop injury compared to a low rate of flumioxazin with triallate and pinoxaden.
- Although these two combinations were the most effective in controlling Japanese brome, the risk of crop injury remains a prominent concern with both spring and fall applications.
- The most practical and safe practice would be to spray glyphosate in the spring prior to seeding combined with an in-crop herbicide application.

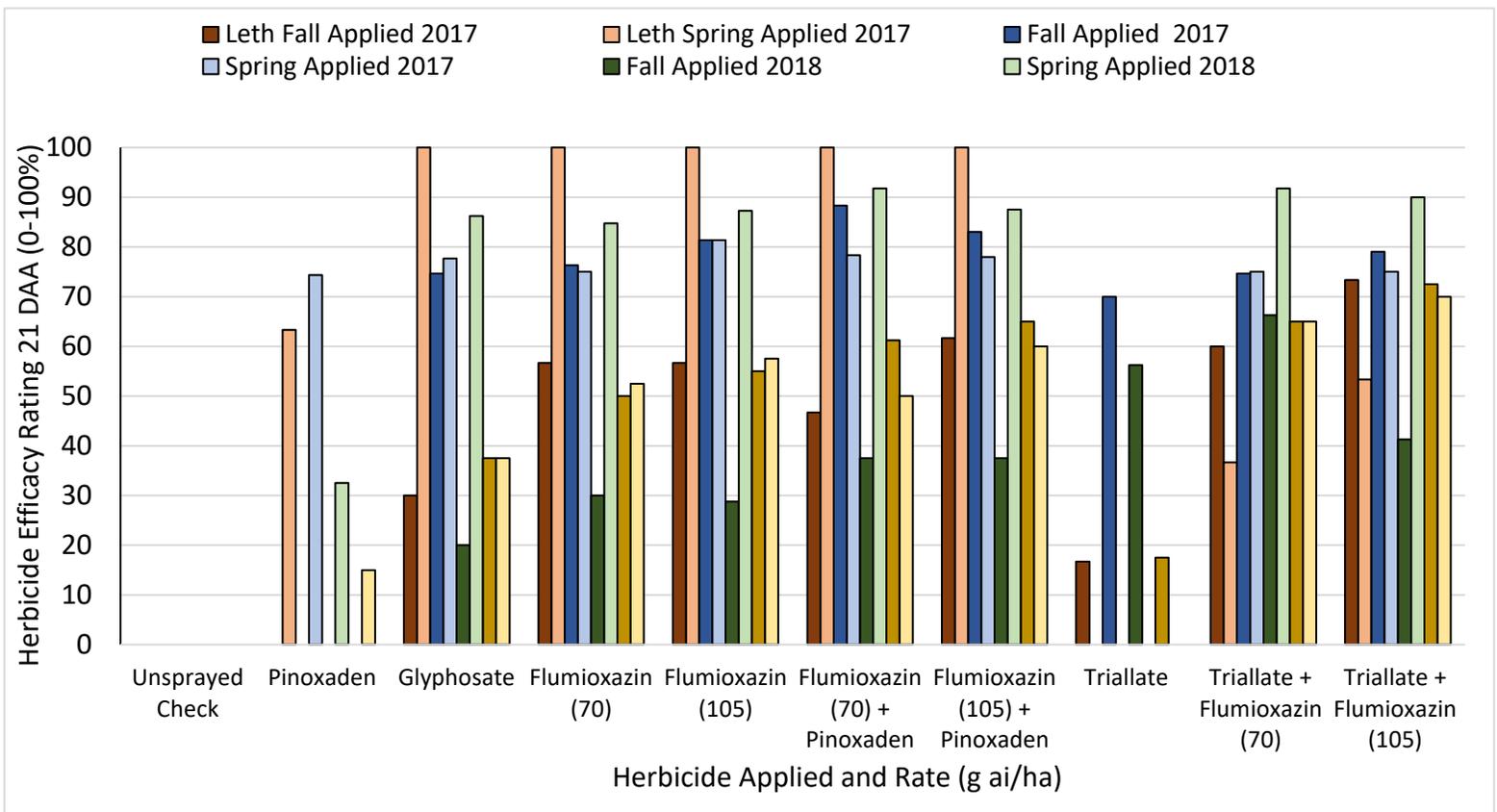


Figure 6. Visual weed control (herbicide efficacy) ratings conducted 7 DAA (days after post-emergent application) on Japanese brome at Lethbridge in 2017 and Scott in 2017, 2018, and 2019. Pinoxaden was applied post-emergent on the crop at the 3-4 leaf stage, while glyphosate and flumioxazin were applied in the fall and spring (7 days prior to seeding). Triallate was only applied in the fall.