



Evaluating downy and Japanese brome control

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Fluazifop, quizalofop, clethodim, sethoxydim, and glyphosate can all reduce downy brome and Japanese brome biomass, especially when applied shortly after germination to plants less than 4.3 inches tall –with a tendency for fluazifop and quizalofop to be most effective.

Research evaluated the efficacy of glyphosate and four graminicides to control downy brome and Japanese brome. It was conducted at Montana State University, Bozeman, Montana, under controlled conditions in a greenhouse.

The first objective was to evaluate the efficacy of glyphosate and four graminicides, clethodim (i.e. Select), sethoxydim (Poast Ultra), fluazifop (Venture L), and quizalofop (i.e. Assure II) on downy brome biomass at high and low label-recommended application rates when applied across 2, 3.3, 4.3, 6 and 6.7 inch (5, 8.5, 11, 15.5, and 17 cm) plant heights on one downy brome accession. An accession is a group of related plants from a single species that is collected at one time from a specific location.

The second objective was to compare the efficacy of glyphosate and the same four graminicides at high and low label-recommended application rates across three accessions of both downy brome and Japanese brome, applied at 4.3 inches (11 cm) plant height.

For glyphosate, the low rate (0.42 kg ai/ha) applied was approximately 0.69 l/ac formulated with 540 g ai/litre, and the high rate (0.56 kg ai/ha) was approximately 0.93 l/ac with the 540 g ai/litre formulation.

Table 1. Herbicide common and trade names and the recommended low and high rates used for our downy brome and Japanese brome experiments.

Herbicide	Trade Name	kg ai ha ⁻¹	
		Low rate	High rate
Sethoxydim	Poast® Plus ^a	0.210	0.315
Clethodim	Select Max® ^b	0.076	0.136
Fluazifop	Fusilade® II ^c	0.280	0.420
Quizalofop	Assure® II ^d	0.077	0.092
Glyphosate	Roundup Ultra® ^e	0.420	0.560

Spray early

Targeting plants 4.3 inches or smaller provided the most reliable reduction in weed biomass. In Experiment 1, plants of this size at time of herbicide application resulted in a reduction of weed biomass of more than 50% of the control, except for glyphosate. For glyphosate, the high application rate was necessary to ensure adequate control.

There was little difference among herbicide treatments applied at the high rate, but fluazifop and quizalofop were more effective at reducing plant biomass at low rates.

Little or no reduction in biomass was observed when herbicides were applied at the 6.7 inch height.

When Experiment 1 was analyzed using number of leaves at time of spraying instead of height at time of spraying, the results were similar. Generally the herbicides worked best on plants with fewer than 12 leaves, and as the number of leaves increased, herbicide effectiveness decreased.

In Experiment 2 where treatments were only applied to 4.3 inch plants, similar results were observed. Quizalofop and fluazifop were again the most effective, and the low rate of glyphosate was the least effective at reducing biomass at 45 days after treatment.

In summary, application rate did not affect the efficacy of graminicides when applied to smaller plants (≤ 4.3 inches, ≤ 12 leaves). For glyphosate, the high application rate was necessary to ensure adequate control; this will likely be especially important in a field setting, where target plant heights could vary.

Metier EP, Lehnhoff EA, Mangold J, Rinella MJ, Rew LJ (2019) Control of downy brome (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*) using glyphosate and four graminicides: effects of herbicide rate, plant size, species, and accession. *Weed Technol.*

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