

Efficacy of False-Brome Control Methods – DRAFT May 2007

1. Chemical and Heat Controls

Category of Chemical	Herbicide* Name	Timing of Application	Necessary Years of Application	Success/ Notes
Vegetative Herbicide	Glyphosate**: <i>Round-up</i> <i>Rodeo</i> <i>Aquamaster</i>	Fall application to retain natives, but follow-up necessary to kill seedlings. Spring application will reduce re-emergence from seeds.	Two to three	Effective broad-spectrum: Experimental treatments have used only one application, late summer and fall
	Fusilade	Spring may be superior, but fall application works well (spring seedlings will need to be sprayed). Grass specific herbicide will reduce impacts to native forbs.	Two to three	Effective grass-specific: Fine leaf fescues are tolerant. Experimental treatments have used only one application, late summer and fall.
	Poast	Same as Fusilade.	Two to three	Effective grass-specific: Fine leaf fescues are tolerant. Similar in effects to Fusilade.
Pre-emergent Herbicide	Surflan	Surflan applied in late Summer/early Fall helps to control seedling emergence the following Spring.	Two to three?	Most effective in combination with other herbicides. Experimental treatments have found this herbicide to be most effective in combination with <i>Round-up</i> or Fusilade. Active in soil to six months. Potential off-site movement.
Hot-foam	Super-heated foam of corn and coconut: <i>Waipuna</i>	Apply during Spring and Summer for best control. Apply before seed set to limit seedling recruitment the following Spring.	Two to three	Effective Non-specific: Kills roots and aboveground vegetation. Most useful on roadsides. More expensive than herbicides.

* for all herbicides, one needs to be aware of Oregon Department of Forestry regulations and land-use designation

** with glyphosate, the surfactants vary by brand and most surfactants have adverse effects on aquatic organisms

2. Physical Controls

Type of Control	Timing of Control	Necessary Years of Application	Success/Notes
Mowing	Mow in June to eliminate seed production.	Yearly, but only as a stop gap method for containment.	Not recommended for use alone (see IPM table). Mowing alone is unlikely to eliminate the plants, but it is useful for controlling spread via seed. Especially useful along roads or trails. Timing is critical: after false-brome seed heads emerge and before seeds are mature. However, if weather is too wet, soil structure is harmed; If native and/or rare species present, they must be allowed to go through reproductive cycle before mowing.
Soil Cultivation (tilling)	Summer	Unknown.	Not recommended for use alone (see IPM table). Tilling has successfully reduced false-brome encroachment on abandoned roadbeds only when used in combination with mulching and seeding.
Hand-pulling (with tools)	Hand pulling in April and early May may be most effective because soil is loose and plants have not gone to seed.	For small patches, hand pulling may be effective for several years. May need to be repeated 2-3 times for lasting control.	Effective in small locations. Hand pulling has been successful at some sites, but generally only when patches are very small (less than 5 square meters). Hand pulling in larger patches has been very labor intensive and has not resulted in lasting success.
Mulching	Summer	Two to three	Sometimes used alone to suppress false-brome. Often used with other treatments (see IPM table). Straw for native blue-wildrye (<i>Elymus glaucus</i>) is commercially available and is preferable to straw composed of non-native pasture grasses (native straw reduces the likelihood of introduction of additional invasive species).
Fire	Fall	Unknown	Not recommended for use alone (see IPM table). False-brome resprouts vigorously after fire.

3. Biological Controls

Type of Control	Organism	Success/ Notes
Grazing	Sheep	<p>Not recommended. False-brome contains a fungal endophyte (<i>Epichloe sylvaticum</i>) that produces an alkaloid toxic to mammals; therefore, feeding false-brome to sheep may harm the sheep (“sheep-stagger,” etc.) and is not recommended. Effects of the alkaloid on young sheep weaned onto false-brome is unknown at this time.</p>
Bio-control Insects	Unknown	
Disease	<i>Epichloe</i> (fungus)	<p>Not recommended. European populations of the false-brome endophyte, <i>Epichloe sylvaticum</i> are sexual and produce “choke” in false-brome. “Choke” reduces and/or prevents seed production in false-brome plants. North American populations of <i>E. sylvaticum</i> are the asexual strain and do not produce “choke.” Introducing the sexual strain of <i>E. sylvaticum</i> to North America might cause infections in other grass species. Substantial screening of fungal genotypes and vulnerable native species, research, and planning required before release will be appropriate or permitted.</p>
Native Grass Seed	<i>Elymus glaucus</i>	<p>Use after some form of chemical or mechanical control method. Often used after mulching (see IPM table). After removing false-brome, native grasses can be seeded and possibly establish, keeping out non-native plants. In an experiment, seedling establishment of blue-wildrye was very low following a mulching/seeding treatment. Germination may have been limited due to inadequate light penetration through the mulch, or a very compacted seedbed (roadside). Reseeding experiments should focus on appropriate seed mixes that include both forbs and grasses, as well as fast growing annual species and slower growing perennial species.</p>

4. Integrated Pest Management (IPM)

IPM Treatments	Sequence of application	Necessary Years of Application	Success/Notes
Hot Foam, Mulch, Seed	<ol style="list-style-type: none"> 1. Hot foam in summer before seed production. 2. Seed in fall with native species mix. 	One year	Hot foam is expensive. Machine is very heavy.
Mow, mulch, seed	<ol style="list-style-type: none"> 1. Mow April – June; 2. Mulch (3-6 cm deep) with native straw in June; 3. Seed with native grass at time of mulching. 	One to two years	<p>Appropriate along roads and trails and on small (<50 m²) patches. Not likely to completely eliminate false-brome, but may reduce levels substantially.</p> <p>Straw mulch may be considered a fire hazard prior to fall rains.</p>
Mow, Herbicide	<ol style="list-style-type: none"> 1. Mow in June; 2. <i>Roundup</i> in fall. 	Several years	Appropriate along roads and trails and on small (<50 m ²) patches. Not likely to completely eliminate false-brome, but may reduce levels substantially.
Herbicide, Seed	<ol style="list-style-type: none"> 1. Apply grass-specific herbicide heavily in summer to kill grass before seeds produced; 2. Seed with native species. 	Unknown	Net yet tested, however grass-specific herbicides have been effective at controlling false-brome.
2 herbicides, Seed, Spot-spray	<ol style="list-style-type: none"> 1. Surflan in summer (august); 2. <i>Roundup</i> in fall (to avoid some natives); 3. Seed natives (November). 4. Reapplication (spot spray) with <i>Roundup</i> the following growing season. 	Two years: first year application of all treatments followed by spot spraying of <i>Roundup</i> the following spring and/or summer.	Not yet fully tested. In theory, this combination will kill standing false brome and stop germination of its seed. Pre-emergent herbicide will wear off before spring germination of native seeds.

IPM Treatments	Sequence of application	Necessary Years of Application	Success/Notes
Burn, spot-spray, spot-spray	<p>1. Burn in late summer or early fall (Burning first will remove thatch, limit seed abundance, and reduce quantity of herbicide needed to treat a given area);</p> <p>2. Spot-spray within 3-5 weeks (after resprouting starts) with Fusilade, Poast or <i>Roundup</i>. (Reapplication of herbicide as limited spot-spray will likely be needed the following year.)</p>	<p>Two years: One burn, two applications of herbicide (in two years).</p>	<p>Not yet tested.</p>
Burn, Spot-spray, Seed	<p>1. Burn in late summer or early fall (Burning first will remove thatch, limit seed abundance, and reduce quantity of herbicide needed to treat a given area);</p> <p>2. Spot-spray within 3-5 weeks (after resprouting starts) with Fusilade, Poast or <i>Roundup</i>. (Reapplication of herbicide as limited spot-spray will likely be needed the following year.)</p> <p>3. Heavy seeding of native grasses and forbs, if appropriate. (Seeding delayed until appropriate for given herbicide.)</p>	<p>1 year</p>	<p>Not yet tested.</p>