## Herbicide Comparison for Row-spraying in Roughstalk Bluegrass

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### Introduction

Roughstalk bluegrass (*Poa trivialis*) is grown for seed on over 2,000 irrigated acres annually in Jefferson County, Oregon. Roughstalk bluegrass is a short-lived perennial that tends to have less tolerance to herbicides than Kentucky bluegrass (*Poa pratensis*), which limits options for controlling grass weeds like cheatgrass (*Bromus tectorum*) and volunteer roughstalk bluegrass. Roughstalk bluegrass is much less rhizomatous than Kentucky bluegrass so applying non-selective herbicides as a directed spray between the crop rows is one possibility for controlling grass weeds in roughstalk bluegrass. However, there is a risk for crop injury if drift occurs during this type of application. The objective of this research was to compare grass weed control and crop safety from herbicides applied between the crop rows.

### Methods and Materials

A field trial was conducted in an established commercial stand of roughstalk bluegrass. Herbicide treatments were applied with a 3-point tractor-mounted shielded sprayer on November 9, 2009. Treatments were not replicated. Each plot was 20 ft wide. The field was divided roughly in half; plots on the north side of the field were 430 ft long and plots on the south side of the field were 525 ft long (Figure 1). Sprayer output was 9.7 gal/acre in a 10-inch band with 80 degree nozzles at 15 psi at 5 mph. Crop row spacing was 14 inches on top of the beds and 16 inches between beds. Winds during application varied from 3 to 10 mph.

Plots were swathed and combined with commercial-scale equipment. Seed yield was determined by catching seed in garbage cans from under the clean grain auger inside the tank of the combine on July 30, 2010. The combine was fitted to return the bottom screenings to the top of the threshed straw pile at the rear of the combine, so each plot was combined twice. First-run seed samples weighed 26 to 27 lb/bu and second-run seed samples weighed 24 to 25 lb/bu.

### Results and Discussion

Four herbicides were selected for comparison. Table 1 lists properties of these herbicides that pertain to their use for row-spraying in grass seed. Note that paraquat (Gramoxone Inteon® or Firestorm®) is not currently registered for use in grass seed.

Visual observations of crop injury and grass weed control were made March 2, 2010 (Table 1). All three treatments containing glyphosate (Roundup® Powermax) resulted in some crop injury. The injury consisted of thinner plants, probably the result of tillers killed from the systemic herbicide. Visual injury symptoms dissipated by early May, when the crop canopy closed. The single rating for grass weed control included three species: cheatgrass, rattail fescue (*Vulpia myuros*), and volunteer roughstalk bluegrass. Weed control with glufosinate (Rely® 200) alone was poor (Figure 2).

First- and second-run dirt weights were added together for the seed yield reported in Figure 1. The range of seed yield from 1,485 to 1,896 lb/acre suggests that some treatments caused substantial crop injury. However, there were two background effects that likely influenced seed

yield. The first effect is from plot location. In Figure 1, the check, Rely 200, and Rely 200 + Goal® 2 XL plots were on the western field border. It appears the farther into the field each plot was located the higher the yield. The second effect is from plot size. On the north side of the trial, plot length was 18 percent shorter than plots on the south side of the trial. Even though seed yields were adjusted according to plot size, it appears the longer run on the south yielded more than the shorter run on the north. This probably resulted from a greater per plot percentage of loss in the combine for the shorter runs.

Despite the range in seed yield among treatments, there were probably not major differences between these herbicides. A replicated trial would shed more light on possible treatment differences.

The photographs in Figure 2 provide excellent visual results of the trials.

<table>
<tr><td colspan="3">Rest of grower field</td></tr>
<tr><td colspan="2">← 430 ft →</td><td>← 525 ft →</td></tr>
<tr><td colspan="2">Gramoxone Inteon (4 pt/A) +<br>R-11 (non-ionic) (2 pt/100 gal)</td><td rowspan="2">← North</td></tr>
<tr><td colspan="2">Dirt wt. yield = 1,896 lb/A</td></tr>
<tr><td colspan="2">Goal 2XL (1.5 pt/A) +<br>R-11 (non-ionic) (2 pt/100 gal)</td><td>Goal 2XL (1.5 pt/A) +<br>Roundup PowerMAX (1.5 pt/A)</td></tr>
<tr><td colspan="2">Dirt wt. yield = 1,735 lb/A</td><td>Dirt wt. yield = 1,813 lb/A</td></tr>
<tr><td colspan="2">Roundup PowerMAX (1.5 pt/A)</td><td>Roundup PowerMAX (1.5 pt/A) +<br>Rely 200 (5.3 pt/A)</td></tr>
<tr><td colspan="2">Dirt wt. yield = 1,485 lb/A</td><td>Dirt wt. yield = 1,671 lb/A</td></tr>
<tr><td>Check</td><td>Rely 200 (7.2 pt/A)</td><td>Rely 200 (5.3 pt/A) +<br>Goal 2XL (1.5 pt/A) +<br>R-11 (non-ionic) (2 pt/100 gal)</td></tr>
<tr><td colspan="2">(not harvested)</td><td>Dirt wt. yield = 1,511 lb/A</td></tr>
<tr><td colspan="3">Field border</td></tr>
<tr><td colspan="3">[1]All treatments included Interlock drift retardant at 4 fl oz/acre.</td></tr>
</table>

**Figure 1.** Field plot orientation and dirt weight seed yield of roughstalk bluegrass treated with herbicides on November 9, 2009 applied as a directed spray between the crop rows near Madras, OR, 2009-2010.[1]

**Table 1.** Injury to roughstalk bluegrass and control of grass weeds with herbicides near Madras, OR on March 2, 2010.

| Treatment [1,2] | Product | Rate | Roughstalk bluegrass | Grass weeds[3] | Plant systemic | Soil residual | Currently registered |
|---|---|---|---|---|---|---|---|
| | | per acre | % injury | % control | | | |
| Glufosinate | Rely 200 | 1.5 lb ai | 0 | 75 | No | No | Yes |
| Glyphosate | Roundup Powermax | 0.84 lb ae | 20 | 98 | Yes | No | Yes |
| Oxyfluorfen | Goal 2XL | 0.38 lb ai | 0 | 99 | No | Yes | Yes |
| Paraquat | Gramoxone Inteon | 1.0 lb ai | 10 | 98 | No | No | No |
| Glufosinate + Oxyfluorfen | Rely 200 + Goal 2XL | 1.1 lb ai + 0.38 lb ai | 0 | 99 | --- | --- | --- |
| Glufosinate + Glyphosate | Rely 200 + Roundup Powermax | 1.1 lb ai + 0.84 lb ae | 10 | 99 | --- | --- | --- |
| Glyphosate + Oxyfluorfen | Roundup Powermax + Goal 2XL | 0.84 lb ae + 0.38 lb ai | 10 | 99 | --- | --- | --- |

[1]Applied November 9, 2009.

[2]Rely 200 contains glufosinate-ammonium at 1.67 lb ai/gal, Roundup Powermax contains glyphosate at 4.5 lb ae/gal, oxyfluorfen contains oxyfluorfen at 2 lb ai/gal, Gramoxone Inteon contains paraquat at 2 lb ai/gal.

[3]Grass weed species include cheatgrass, rattail fescue, and volunteer roughstalk bluegrass.

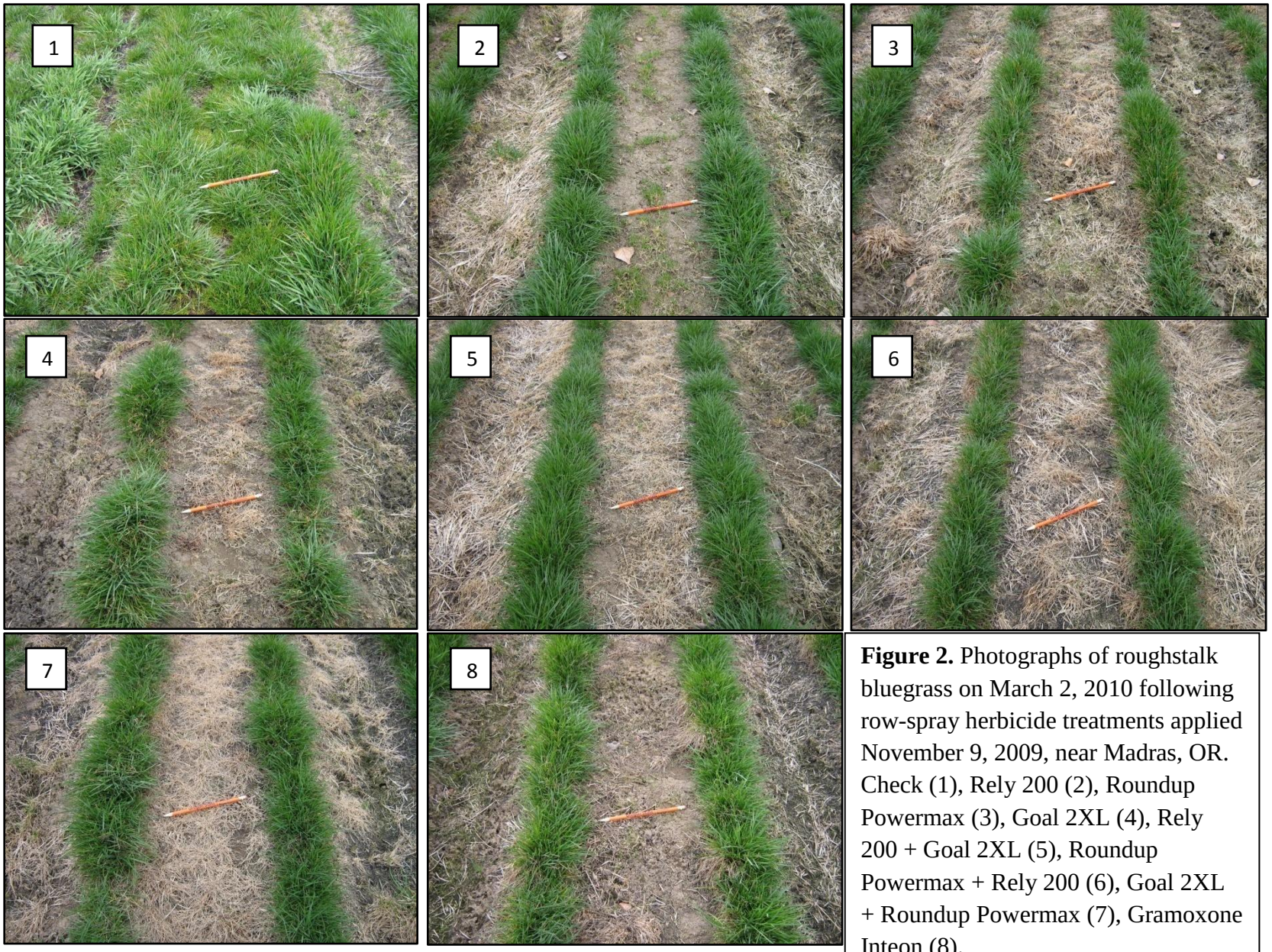


**Figure 2.** Photographs of roughstalk bluegrass on March 2, 2010 following row-spray herbicide treatments applied November 9, 2009, near Madras, OR. Check (1), Rely 200 (2), Roundup Powermax (3), Goal 2XL (4), Rely 200 + Goal 2XL (5), Roundup Powermax + Rely 200 (6), Goal 2XL + Roundup Powermax (7), Gramoxone Inteon (8).