

Experimental control of smooth brome at Bryce Canyon National Park



Figure 1. Biological technicians prepared test plots for the herbicide efficacy experiment in an old roadbed at Bryce Canyon National Park. The tape marks the centerline of the plots, which were installed at 4-meter (13 ft) intervals.

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RESOURCE MANAGERS AT BRYCE CANYON

National Park have been attempting to reduce infestations of smooth brome (*Bromus inermis*), a major invasive species in this 36,000-acre Utah park. In 2009 and 2010 we treated 18 infested acres of the invasive plant species on old roadbeds that cross high-elevation sagebrush meadows near the main park road (fig. 1).

Smooth brome has most commonly been treated with a 3.5% concentration of RoundUp™ (active ingredient glyphosate). However, glyphosate, a nonselective herbicide, has had negative effects on native vegetation and scenic values, as treatment typically causes brown spots on the landscape.

In summer 2010, the Bryce Canyon Vegetation Crew decided to try a grass-specific herbicide: Fusilade II™ (active ingredient fluazifop-P-butyl). A surfactant, Induce™, was added to the Fusilade II at 0.50% concentration. With this grass-specific herbicide, we hoped to reduce impacts to nontarget vegetation and negative impacts to scenic values.

The experiment

We selected an old roadbed infested with *B. inermis* near the visitor center as the research area. A 200-meter (656 ft) line was established and 1,861-square-centimeter (288-square-inch) plots were installed every 4 meters (13 ft), for a total of 50 plots.

The crew conducted stem counts to determine the density of smooth brome and native plants. Plants originating in the plot were counted; plants originating outside the plot with overhanging foliage were not. Stem counts were conducted 7, 14, and 21 days after treatment. According to both RoundUp and Fusilade II labels (Monsanto 2010; Syngenta Professional Products 2010), complete control should be obtained by the 21st day.

We randomly assigned five treatments, as follows: (1) 3.5% RoundUp, (2) 0.25% Fusilade II with 0.50% Induce, (3) 0.50% Fusilade II with 0.50% Induce, (4) 0.75% Fusilade II with 0.50% Induce, and (5) a control in which no herbicide was used. The vegeta-

tion crew applied herbicide using 1-liter (approximately 1-quart) bottles and covered smooth brome plants with a fine mist. All herbicide application was conducted by staff with current Utah pesticide applicator licenses.

Results

The Fusilade II plots (treatments 2, 3, and 4) showed little progress by day 21. The 0.25% plots (treatment 2) had an average increase in *B. inermis* of 2%. The 0.50% (treatment 3) and 0.75% (treatment 4) plots had an average decrease in *B. inermis* of 4.5% and 6%, respectively. The 3.5% RoundUp plots (treatment 1) were most effective, with a 92.8% decrease in *B. inermis*. Overall, the control plots showed a 1% decrease in *B. inermis*.

Native species showed an increase in the Fusilade II plots, increasing by 11%, 35%, and 86% respectively in the 0.25% (treatment 2), 0.50% (treatment 3), and 0.75% (treatment 4) plots. The RoundUp plots (treatment 1) had a 10% decrease in native species. Overall, the control plots showed a 14% increase in native species.

Discussion

Fusilade II did not result in as great a reduction in *B. inermis* as did RoundUp. However, with the Fusilade II treatments, nontarget kills were reduced and native growth seemed encouraged. Fusilade II did not have the negative scenic value effect of brown spots, as happened with RoundUp.

One major detriment to this experiment, however, could have been application timing. According to the Fusilade II label (Syngenta Professional Products 2010), “best control is obtained when . . . applied to actively growing grasses.” The first application was made 8 July 2010. Smooth brome starts to

grow in early spring and flowers from May to July (Stubbendieck et al. 1997). Thus, our timing may have been too late to treat active growth. Further research with Fusilade II, timed for earlier application, should be conducted for more results.

The Bryce Canyon Vegetation Crew treats *B. inermis* May through September. The best observed results occur when infestations are foliar treated in late summer with a follow-up foliar spot treatment the following spring. Results of this study show that continued use of 3.5% RoundUp for late summer foliar treatment at Bryce Canyon will be more effective than application of Fusilade II. However, if future studies show the effectiveness of spring application of Fusilade II to be comparable to that of RoundUp, then Fusilade II may be preferable for spring treatment, as it has the advantage of causing less impact to native vegetation.

References

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