

# **RUSSIAN KNAPWEED CONTROL AS INFLUENCED BY HERBICIDES AND MOWING**

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## **Introduction**

Russian knapweed is an invasive perennial weed that thrives in rangeland and other non-cultivated sites. It forms dense colonies that survive because of a large root system. Fall-applied herbicides have been effective in controlling Russian knapweed. Research on other perennial invasive weeds has shown that mowing prior to herbicide application increases control. One possible reason for increased control with mowing is that the removal of plant biomass may allow more of the herbicide to reach the soil surface where it is more likely to be taken up by the plant. This research investigated the use of the Brown Brush Monitor™ (Brown Manufacturing Corp., Ozark, AL) for mowing and herbicide application compared to herbicides sprayed without mowing.

## **Methods**

Trials were established at a Russian knapweed infested site near the Snake River, south of Nyssa, Oregon to evaluate Tordon (picloram) and Transline (clopyralid) applied alone or following mowing with a Brown Brush Monitor. The Brown Brush Monitor incorporates a mower and sprayer into one machine. It removes the above-ground plant material, discharging it to the side of the machine, and then sprays the herbicide from a boom mounted under the rear of the mower deck. Spray-only applications were made with a CO<sub>2</sub>-pressurized backpack sprayer calibrated to deliver 20 gal/acre at 30 psi. Plots that were mowed and sprayed measured 15 ft wide by 30 ft long while spray-only plots were 10 ft wide and 30 ft long. Treatments were replicated four times in a factorial design with herbicide and mowing completely randomized within each replication. Treatments with the Brown Brush Monitor were made October 31, 2001 and spray-only treatments were made on November 1, 2001. Russian knapweed response to treatments was determined by visually evaluating control and measuring shoot height and shoot density. Evaluations were made August 5, 2002 and June 26, 2003.

## **Results and Discussion**

Herbicide applied alone or following mowing in the fall of 2001 provided excellent control of Russian knapweed (Table 1). Visual control on August 5, 2002 was slightly higher when Transline was applied following mowing compared to Transline alone. However, in 2003 there was no difference. Close to 2 years after treatment, both

herbicides, regardless of mowing, were still providing 93 percent or greater Russian knapweed control. Herbicides with or without mowing and mowing alone reduced Russian knapweed height compared to the untreated control in 2002 and 2003. It is interesting that Russian knapweed plants were shorter in the mowed treatment even 2 years after mowing. This response might be related to soil moisture, competition for light, or soil temperature differences where the biomass was removed by mowing compared to the untreated plots. Mowing alone did not reduce Russian knapweed density. Herbicide treatments with or without mowing reduced Russian knapweed densities in both years. Russian knapweed densities appeared to be stable across years in the mowed-only and untreated plots. While only small differences in Russian knapweed control were apparent among treatments, mowing appeared to enhance recovery of the perennial grasses that were present. Grass populations were not uniform enough to evaluate, but visible differences in grass growth were apparent between mowed and unmowed plots.

Table 1. Russian knapweed control, height, and density in response to herbicides applied alone or in combination with mowing, south of Nyssa, OR. Malheur Experiment Station, Oregon State University, Ontario, OR, 2003.

Treatment*	Rate	Russian knapweed†					
		Control		Height‡		Density	
		8-5-02	6-26-03	8-5-02	6-26-03	8-5-02	6-26-03
lb ai/acre	-----%-----		-----inches-----		-----no/ft²-----		
Untreated	--	0 c	0 b	20 a	23 a	11 a	14 a
Mowed	--	0 c	0 b	14 b	19 b	11 a	13 a
Tordon	0.5	93 a	95 a	11 c	15 c	0 b	1 b
Tordon + Mowing	0.5	94 a	96 a	11 c	14 c	0 b	1 b
Transline	0.38	87 b	94 a	10 c	14 c	0 b	1 b
Transline + Mowing	0.38	91 a	93 a	14 b	16 bc	1 b	1 b

\*Treatments that were mowed were applied on October 31, 2001 while spray-only treatments were applied November 1, 2001.

†Within columns, numbers followed by the same letter are not significantly different according to LSD at (P = 0.05).

‡In plots where control was high, Russian knapweed height is based on the few plants that survived.