CONTROL OF PERENNIAL PEPPERWEED AND RUSSIAN KNAPWEED WITH HABITAT® AND PLATEAU® HERBICIDES

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Introduction

Russian knapweed and perennial pepperweed are deep-rooted perennial weeds that are troublesome across the Western United States. Both species are often associated with riparian areas and research has illustrated that seed germination of both species is suited to riparian and meadow environments (Larson and Kiemnec 2005). Tillage has little effect on long-term control of these weeds. Perennial pepperweed has shown greater sensitivity to chlorsulfuron than to 2,4-D or glyphosate (Young et al. 1998). Combinations of seeding competitive grass species following applications of picloram or clopyralid effectively reduced Russian knapweed stands (Bottoms and Whitson 1998). Habitat® (imazapyr) and Plateau® (imazapic) are ALS-inhibiting herbicides that are active activity on a variety of perennial species. Habitat was recently registered for use in aquatic and riparian settings, making it a candidate for controlling perennial pepperweed and Russian knapweed.

Materials and Methods

In 2004, four trials were established to evaluate Habitat and Plateau for control of Russian knapweed and perennial pepperweed. Russian knapweed trials were established adjacent to Succor Creek, south of Adrian, Oregon. One perennial pepperweed trial was established adjacent to the Snake River in Ontario, Oregon and the other near the Malheur River, west of Vale, Oregon. Treatments were Habitat (0.063, 0.094, 0.125, 0.187, 0.25, 0.375, and 0.5 lb ai/acre) and Plateau (0.125 and 0.187 lb ai/acre). Treatments were arranged in a randomized block design with four replicates. One Russian knapweed trial was treated August 31, 2004 when Russian knapweed was starting to senesce. The second trial was treated November 2, 2004. The first perennial pepperweed trial was treated June 14, 2004 while the pepperweed was in full bloom. The second trial was sprayed December 14, 2004. All treatments included methylated seed oil (MSO) at 1.25 percent v/v. Herbicide treatments were applied with a CO_2-pressurized backpack sprayer calibrated to deliver 20 gal/acre at 30 psi. Perennial pepperweed trials were evaluated June 30, 2005 and Russian knapweed trials July 8, 2005.

Results and Discussion

With summer herbicide applications, Russian knapweed control the following spring was greater than 90 percent only with 0.5 lb ai/acre of Habitat and control decreased with rates below 0.25 lb ai/acre (Table 1). Plateau rates below 0.125 lb ai/acre and Habitat at 0.125 and 0.187 lb ai/acre provided 21 percent or less Russian knapweed control. When herbicide treatments were applied to dormant Russian knapweed in November, Habitat rates above 0.25 lb ai/acre provided 99-100 percent control. Russian knapweed control declined as Habitat rates were reduced, to a low of 54 percent with 0.0625 lb ai/acre. Plateau at 0.125 and 0.187 lb ai/acre provided 67 and 87 percent control, respectively. Both Habitat and Plateau were more active on Russian knapweed when applied in the fall as compared to the summer.

For perennial pepperweed, summer application of Habitat and Plateau resulted in 95 percent or greater control the following June regardless of herbicide rate. When applied in December, perennial pepperweed control the following summer was 94 percent with Habitat at 0.5 lb ai/acre and declined at Habitat rates of 0.25 lb ai/acre or lower. Plateau provided 64 and 71 percent control at the respective rates of 0.125 and 0.187 lb ai/acre. Young et al. (1998) did not see a difference in perennial pepperweed control with different Telar® application timings, but that could be attributed to the fact that only one rate was evaluated.

Our research demonstrates that Habitat and Plateau are active on Russian knapweed and perennial pepperweed and that application timing in the summer is essential for effective control of these herbicides on these weed species. Selecting the proper application timing may allow weed control with lower herbicide rates, allowing establishment of/or selectivity for desirable plant species.

References

Bottoms, R. M., and T. D. Whitson. 1998. A systems approach for the management of Russian knapweed (*Centaurea repens*). Weed Technol. 12:363–366.

Larson, L., and G. Kiemnec. 2005. Germination of two noxious range weeds under water and salt stresses with variable light regimes. Weed Technol. 19:197–200.

Young, J. A., D. E. Palmquist, and R. R. Blank. 1998. The ecology and control of perennial pepperweed *(Lepidium latifolium* L.). Weed Technol. 12:402-405.

Table 1. Perennial pepperweed and Russain knapweed control with summer or fall applications of Habitat® and Plateau® herbicides, Malheur Experiment Station, Oregon State University, Ontario, OR, 2005.

		Weed control*			
		Perennial pepperweed		Russian knapweed	
Treatment	Rate	Summer†	Fall‡	Summer§	Fall¶
	lb ai/acre % v/v	%			
Untreated	--	-	-	-	-
Habitat + MSO	0.0625 + 1.25%	95	10	54	0
Habitat + MSO	0.094 + 1.25%	95	28	69	18
Habitat + MSO	0.125 + 1.25%	100	39	83	21
Habitat + MSO	0.187 + 1.25%	97	66	88	48
Habitat + MSO	0.25 + 1.25%	94	74	98	63
Habitat + MSO	0.375 + 1.25%	96	85	99	76
Habitat + MSO	0.5 + 1.25%	99	94	100	91
Plateau + MSO	0.125 + 1.25%	95	64	66	3
Plateau + MSO	0.187 + 1.25%	95	71	86	9
LSD (0.05)	--	9	14	8	23

*Perennial pepperweed control was evaluated June 30 and Russian knapweed control on July 8, 2005.
†Treatments were applied June 14, 2004 when perennial pepperweed was in full bloom. The research site was near the Snake River in Ontario, Oregon.
‡ Treatments were applied December 14, 2004. The research site was near the Malheur River, west of Vale, Oregon.
§Treatments were applied August 31, 2004 as Russian knapweed plants were beginning to senesce. The research site was near Succor Creek, south of Adrian, Oregon.
¶Treatments were applied November 2, 2004. The research site was near Succor Creek, south of Adrian, Oregon.