2016-2017 Dormant Stem Brush Control Trial

Introduction

One of the challenges of vegetation management on right-of-ways is the rapid growth of woody plants. While mechanical (mowing) and chemical options are available during the growing season to manage woody vegetation, dormant-stem herbicide applications are another option outside the growing season that extend the spray season. The herbicides are applied to brush vegetation while there are no leaves on the deciduous plants. The herbicide treatment is applied to the branches and trunks and the herbicide moves into the plant by penetrating the thin bark layer. The most effective timing is from about six weeks prior to bud break and up to the beginning of bud break. Applications must be made when the bark, stems, and branches are dry. This trial was established to compare the efficacy of some herbicide combinations for controlling brush species.

Materials and Methods

A trial was established in an area of mixed brush regrowth near Nortonville in western Kentucky along the Western KY Parkway. Four treatments plus a control, listed in Table 1, were applied on March 8, 2016 before bud break at 50 GPA using a TeeJet® Boomless tip mounted on the rear of an ATV. Plots were 40 ft long X 12 ft wide and were arranged as a RCBD with 4 replications. The woody vegetation was 5-6 ft high at application. The species in the plots included tulip poplar, sweet gum, winged elm, smooth sumac, devil's walking stick, and blackberry. There was also Japanese honey suckle, giant reed, and other herbaceous plants in the plots.

The same four herbicide treatments were applied along the Parkway in four large demonstration plots near the State Police station and salt dome on February 26, 2016. The shoulders of the east and westbound lanes from mile markers 38.7 to 42.1 were used. A roadside sprayer with an articulated boom was used to apply the products to the brush. However, we were unable to collect rating data on these as the Parkway was undergoing pavement grinding and resurfacing during the season and it was not safe to do so.

All the herbicide mixes included basal oil *(Low Odor Arborchem Basal Oil from Arborchem Products Co, Mechanicsburg, PA)* to help get the herbicide through the bark and surfactant to emulsify the oil with the water carrier. All the mixes also included different rates of Garlon 4 Ultra (triclopyr) which does not have residual soil activity. The components with some soil activity are the dicamba in BK800, aminopyralid in Milestone, aminocyclopyrachlor + imazapyr + metsulfuron in Viewpoint, and metsulfuron in Patriot (Table 1).

The small plots were rated visually 57 (5/3/2016), 72 (5/18/2016), 114 (6/29/2016), 205 (9/28/2016), and 422 (5/3/2017) days after treatment (DAT). Data collected were % woody stem leaf out and % herbaceous cover 57 DAT and % leaf out and % green cover from woody

vegetation which was split into lower and upper canopy cover 72 DAT. For the 114 and 205 DAT ratings, % bareground, % herbaceous cover, and % woody lower and upper canopy cover (overlapping canopy at this point) data were collected. The following spring at the 422 DAT rating, % herbaceous cover, % woody lower and upper canopy cover plus % woody stem leafout data were collected. Data were analyzed using ARM software and treatment means were compared using Fisher's LSD at $p = 0.05$.

Results and Discussion

The spray coverage or, rather, the lack of coverage was evident in the large and small plots after leaf out. This illustrated the importance of good coverage for the most efficacious control results.

At the first rating, 57 DAT, all the herbicide treatments had less % leaf out (2-7%) on the woody stems than the control plots (Table 2). In many of the plots, small seedlings were evident. At 72 DAT, all the herbicide treatments still had less leaf cover from the woody vegetation than control (Table 2).

Later in the season (114 DAT), the Garlon + Milestone and Patron + Garlon + Patriot treatments (Treatments 2 and 4) had more bare ground than the control (Table 3). At this time, the lower woody canopy cover was the same as the control for the BK800 + Garlon and Garlon + Viewpoint treatments (Treatments 1 and 3) while the upper canopy cover was the same as control for the Patron + Garlon + Patriot treatment (Treatment 4). By the time of the last assessment (205 DAT), the herbaceous cover, which was predominantly grasses, was greater than the control in the Garlon + Milestone and Garlon + Viewpoint treatments (Treatments 2 and 3) (Table 3). The Garlon + Milestone and Patron + Garlon + Patriot treatments (Treatments 2 and 4) still had more bareground than control and these treatments plus the Garlon + Viewpoint treatment (Treatment 3) still had less lower canopy cover than control.

Next spring (422 DAT) there were no differences in the herbaceous cover and the Garlon + Milestone, Garlon + Viewpoint, and Patron + Garlon + Patriot treatments (Treatments 2, 3, and 4) had less upper canopy cover than the control (Table 5). The treatment that stood out was Garlon + Milestone (Treatment 2) which provided less lower canopy cover and woody stem leafout than control. Many of these stems were dead and dry. It can take time for treatment differences to become evident with perennials.

All the treatments gave good initial results in brush suppression but many of the plants still leafed out from buds outside the spray pattern and continued to grow. Assessments the following season provided information on how many of these plants actually died and how efficacious the herbicide mixes were.

Table 1. Herbicide treatments, active ingredients and application rates for Dormant Stem Brush Control Trial.

Trt. No.	Product(s)	Rate per acre	Active Ingredient(s)	ai Application Rate (per acre)
1	BK800 Garlon 4 Ultra Basal Oil Surfactant	1.5 gal 0.5 gal 2 gal 1 gal	2,4-D + 2,4-DP + dicamba triclopyr	2.84 lb ae + 1.41 lb ae + 0.71 lb ae 2 lb ae
2	Garlon 4 Ultra Milestone Basal Oil Surfactant	2 gal 7 fl oz 2 gal 1 gal	triclopyr aminopyralid	8 lb ae 1.8 oz ae
3	Garlon 4 Ultra Viewpoint Basal Oil Surfactant	1 gal 12 oz 2 gal 1 gal	triclopyr aminocyclopyrachlor + imazapyr + metsulfuron	4 lb ae 2.7 oz + 3.8 oz + 0.9 oz
4	Patron 170 Garlon 4 Ultra Patriot Basal Oil Surfactant	6.9 pt 1 gal 3 oz 2 gal 1 gal	2,4-D + 2,4-DP triclopyr metsulfuron	1.47 lb ae + 0.75 lb ae 4 lb ae 1.8 oz
5	Untreated Control			

Table 2: Brush Control Trial Results in 2016 (part 1)

						Woody Vegetation Cover		
			% Leaf Out	% Herbaceous Cover	% Leaf Out	% Green Cover	% Lower Canopy	% Upper Canopy
Trt. No.	**Product(s)**	**Rate per acre**	**57 DAT[1]**		**72 DAT**			
1	BK800 Garlon 4 Ultra Basal Oil Surfactant	1.5 gal 0.5 gal 2 gal 1 gal	7 b[2]	3	9 b	20 b	11 b	9 b
2	Garlon 4 Ultra Milestone Basal Oil Surfactant	2 gal 7 fl oz 2 gal 1 gal	2 c	9	3 b	11 b	8 b	3 b
3	Garlon 4 Ultra Viewpoint Basal Oil Surfactant	1 gal 12 oz 2 gal 1 gal	5 bc	1	9 b	16 b	5 b	11 b
4	Patron 170 Garlon 4 Ultra Patriot Basal Oil Surfactant	6.9 pt 1 gal 3 oz 2 gal 1 gal	3 bc	2	8 b	14 b	6 b	8 b
5	Untreated Control		100 a	2	100 a	100 a	53 a	48 a

[1] DAT = Days after treatment

[2] Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05.

Table 3: Brush Control Trial Results in 2016 (part 2)

					Woody Vegetation Cover				Woody Vegetation Cover	
			% Herb[1] Cover	% Bare	% Lower Canopy	% Upper Canopy	% Herb Cover	% Bare	% Lower Canopy	% Upper Canopy
Trt. No.	**Product(s)**	**Rate per acre**	**114 DAT[2]**				**205 DAT**			
1	BK800 Garlon 4 Ultra Basal Oil Surfactant	1.5 gal 0.5 gal 2 gal 1 gal	39	4 b[3]	53 a	20 b	23 bc	4 b	53 ab	21
2	Garlon 4 Ultra Milestone Basal Oil Surfactant	2 gal 7 fl oz 2 gal 1 gal	35	15 a	23 b	26 b	36 ab	18 a	34 b	13
3	Garlon 4 Ultra Viewpoint Basal Oil Surfactant	1 gal 12 oz 2 gal 1 gal	29	3 b	38 ab	25 b	48 a	5 b	35 b	13
4	Patron 170 Garlon 4 Ultra Patriot Basal Oil Surfactant	6.9 pt 1 gal 3 oz 2 gal 1 gal	29	6 ab	29 b	34 ab	25 bc	8 ab	36 b	31
5	Untreated Control		11	0 b	54 a	58 a	13 c	4 b	56 a	28

[1] Herbaceous Cover

[2] *DAT = Days after treatment*

[3] *Means within a column followed by the same letter are not different according to Fisher's LSD at P < 0.05*