

HERBICIDES TO CONTROL SPROUTING ON HIGH STUMPS OF BLACK WALNUT AND GREEN ASH

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Abstract.—After thinning hardwood stands, sprouts often develop on the girdled stems or cut stumps. While sprouts may be left for wildlife, it is usually best to deaden each tree to minimized future competition for soil moisture and nutrients. By applying select herbicides to the stump, sprouting can be eliminated. This study evaluated five herbicides applied as basal bark or cut stem application to black walnut and green ash stumps 90 days after cutting. Trimec®, Crossbow®, Chopper®, Vista®, and Garlon 4® were applied in diesel oil solutions. All herbicides effectively controlled stump sprout when applied in a 3- to 4-inch-wide basal bark application around the base of the stump. Only Vista® was effective as a cut surface application to 18-inch-high stumps of both black walnut and green ash. Cut surface application showed species specific responses where Chopper was effective on black walnut but not green ash while Garlon 4® was effective on ash but not walnut.

INTRODUCTION

Eastern black walnut (*Juglans nigra* L.) and green ash (*Fraxinus pennsylvanica* L.) are two high value hardwoods planted at relatively close spacing that will requires a series of precommercial thinnings to remove inferior individuals and maintain diameter growth rates. Effectively preventing regrowth on stumps of cut trees can be accomplished by application of herbicides to the exposed cambium of cut stumps or as basal bark treatments for some tree species (Jobidon 1997). Cut surface applications of stumps require thoroughly wetting the cambium area just inside the bark for absorption and translocation of the herbicide within the stump (Miller and Glover 1991). Basal bark treatments thoroughly wet a narrow band of bark completely around the circumference of the stump using a carrier that may facilitate diffusion

of the herbicide to the cambium and any buds at the bark surface (Miller and Glover 1991). While sprouts have a wildlife benefit, it is usually best to deaden the entire stump of each tree to reduce completion for soil moisture and nutrients. This study was designed to evaluate the effectiveness of five “off-the-shelf” herbicides to eliminate stump sprouting either as delayed cut surface or basal bark applications to black walnut and green ash stumps.

METHODS AND MATERIALS

The study site is located in east-central Kansas on an alluvial site just below Tuttle Creek Reservoir. The soils are silty clay loams and very fertile with a site index of 70 to 75 feet at 50 years for black walnut. The area had been in fallow about 20 years prior to tree planting. Several experimental plantings of black walnut and one planting of green ash were established over the last 30 years. For this study we selected recently thinned plantings of 15-year-old black walnut established on 12 by 12 foot spacing with average stem diameter of 4 to 6 inches, and of 10-year-old green ash planting established on 12 by 5 foot spacing with average stem diameter of 3 to 9 inches.

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Trees marked for thinning were cut in January with a chain saw leaving an 18-inch high stump for ease of sawing. Herbicides were applied late in the dormant season (about 90 days after cutting) either as cut surface application to the top of the stumps or basal bark applications with a 3- to 4-inch wide band sprayed near ground line around the stump. Treatments included a control left untreated and low-volatile ester formulations in diesel oil at the following rates: 5 percent Trimec® (active ingredients = 0.27 percent dicamba + 1.6 percent 2,4-D + 1.59 percent dichlorprop); 5 percent Crossbow® (active ingredients = 1.72 percent 2,4-D + 0.725 percent triclopyr); 3 percent Chopper® (active ingredient = 0.86 percent imazapyr RTU); 10 percent Vista® (active ingredient = 2.62 percent fluroxypyr), and 5 percent Garlon 4® (active ingredient = 3.0 percent triclopyr). Herbicides were applied with a common garden sprayer with a nozzle adjustable from a mist to a stream. After two growing seasons, the total number of sprouts in the upper and lower half of each stump was recorded.

The study was designed in a randomized complete field design with 10 single-tree replications of 11 treatments for a total of 110 trees in both the black walnut and green ash plantings. Individual tree data for total number of sprouts were subjected to analysis of variance (SAS Version 9.1, SAS Institute, Inc., Cary, NC) followed by Duncan's New Multiple Range Test to identify when significant differences existed among treatments within species at alpha = 0.05 percent.

RESULTS

Black Walnut

Many stumps had sprouts after 1 year, but this number was reduced substantially during the second year. After 2 years, the percentage of stumps with no sprouts increased and ranged from 30 to 100 percent (Table 1). We achieved an acceptable level of stumps without sprouts with basal bark application by all five herbicides after the second growing season, however, only Chopper® and Vista® had acceptable levels as cut-

Table 1.—Percent of stumps without live sprouts and mean number of live sprouts 2 years after applying five herbicides to cut surface or basal bark treatment to 18-inch-high stumps of black walnut and green ash.

Herbicide	Rate (% a.i.)	Application method	Black walnut		Green ash	
			Mean number sprouts per stump ^a	% stumps without live sprouts ^b	Mean number of sprouts per stump ^a	% stumps without live sprouts ^b
5% Trimec in oil (dicamba + 2,4-D + dichlorprop)	0.27 + 1.62 + 1.59	Cut surface	4.1 c	30	1.8 b	50
		Basal bark	0.4 a	80	0 a	100
5% Cross bow in oil (2,4-D+ triclopyr)	1.72 + 0.725	Cut surface	1.0 b	50	2.4 b	50
		Basal bark	1.0 b	70	0.3 a	70
3% Chopper in oil (Imazapyr RTU)	0.86	Cut surface	0 a	100	7.2 c	0
		Basal bark	0 a	100	0.1 a	90
10% Vista in oil (Fluroxypyr)	2.62	Cut surface	0.4 a	70	1.5 b	70
		Basal bark	0 a	100	0 a	100
5% Garlon 4 in oil (Triclopyr)	3.0	Cut surface	0.8 b	60	0.2 a	90
		Basal bark	0 a	100	0.1 a	90
Control	None	None	3.8 c	30	>10 d	0

^a Values in the same column followed by the same letter are not significantly different at $p \geq 0.05$.

^b **Bold type** indicates acceptable control.

surface treatments. Trimec as a cut surface application had the same number of live sprouts after 2 years as the control treatment without any herbicide. Based on the mean number of live sprouts after 2 years, Chopper® and Vista® as cut surface applications were more effective than Crossbow® or Garlon 4®. We found no significant differences between the number of sprouts on the upper and lower halves of herbicide-treated walnut stumps. In addition, we did not observe any symptoms of chemical injury or flashback to the residual trees in part because of the wide distances between trees.

Green Ash

Green ash stumps also had many sprouts after the first year and again the number of stumps with sprouts was reduced substantially after the second year. After 2 years, the percentage of stumps with no sprouts ranged from 0 to 100 percent (Table 1). Stumps in the control treatment without any herbicide all had sprouts and averaged more than 10 live sprouts on each stump after the second year. With basal bark application of any of the five herbicides, we achieved an acceptable level of stumps without sprouts after the second growing season; however, only Vista® and Garlon 4® yielded acceptable levels as cut-surface treatments. Based on the mean number of live sprouts, Chopper was less effective as a cut surface application than Crossbow® and Trimec®. As with walnut, we found no differences in the number of sprouts originating in the upper and lower halves of green ash stumps.

DISCUSSION

When thinning hardwood plantings by cutting, it is easier and safer to cut trees leaving a tall stump than cutting near the groundline, especially if the sawyer can delay application of herbicides to control stump sprouting as a separate operation. Delayed application of all five herbicides to stumps following thinning was effective when applied as basal bark treatments for both black walnut and green ash. A similar result was

found when treating stumps of Siberian elm (*Ulmus pumila* L.) using the same herbicides and application methods (Geyer 2003). The five herbicides used in this study were also effective when sprayed around recently cut stumps at the ground line, however, only Chopper® and Garlon 4® were effective as cut surface treatments 18 inches above the ground line.

Effectiveness of delayed cut surface applications can be species dependent as Chopper was effective on black walnut but not green ash while Garlon 4® was effective on ash but not walnut. In an earlier study, Walter et al. (2004) found Garlon 3®, but not Banvel® or Roundup®, was effective on black walnut as a cut surface application. While Vista® was effective on black walnut and green ash as both a basal bark and cut surface application, it was ineffective as a cut surface treatment on elm (Geyer 2003).

CONCLUSIONS

All herbicides tested in this study can be applied up to 90 days after cutting during the dormant season to control sprouting on high stumps of walnut and green ash when applied as a basal bark treatment (3- to 4-inches wide herbicide band around the stump near the ground line). When sprayed on the cut surface of the stump (18 inches above the ground), Chopper® and Vista® were effective on black walnut, while Vista® and Garlon 4® were effective on green ash. While sprouting can be reduced during the first year after treatment, it took 2 years to fully evaluate the effectiveness of each herbicide treatment.

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