Improving Control of Hedge Bindweed in Grapes: Preliminary Results

Project Leader

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Objectives

The objectives of this project are to 1) determine the feasibility of controlling hedge bindweed in vineyards using glyphosate, rimsulfuron, or hoeing mid-season – when perennial weeds are most susceptible – and 2) to disseminate our findings to New York growers.

Methods

A field experiment to test several post-emergence treatments on hedge bindweed control was conducted at the Finger Lakes Teaching & Demonstration Vineyard in Penn Yan, NY. Treatments included an untreated control and repeated applications of rimsulfuron (Matrix, 2 oz/A + AMS at 2.5% v/v), glyphosate (Roundup Weather-Max, 2.5 qt/A), and hoeing conducted by hand, but in a manner similar to a tractor-operated hoe. Treatments were implemented June 6, July 8, and August 2, 2018, with the exception that rimsulfuron was not applied on the final date. Each plot consisted of one panel between posts. Treatments were replicated four times. Prior to implementation of treatments, all plots were de-hilled and sprayed with glyphosate in May. Weed groundcover and density in the three-foot-wide herbicide strip was assessed two weeks after treatments. We also measured end-of-season weed biomass on October 27 and measured pruning weight in early January 2019. We estimated the relative cost of each treatment through use of a partial budgeting analysis following Yeh et al. (2014).

Results

The field experiment at the Teaching Vineyard demonstrated that rimsulfuron was more effective when used on hedge bindweed that had already emerged (Figure 1). Rimsulfuron appeared as effective on hedge bindweed as glyphosate, but unlike glyphosate, rimsulfuron can only be used twice in grapes. Bindweed appeared to recover from hoeing quicker than from the herbicide applications, likely reflecting their systemic activity on the bindweed roots. This effect will continue to be examined in spring of 2019. End-of-season weed biomass of hedge bindweed and all other weeds was significantly reduced by all treatments compared to the untreated control (Figure 2).

Harvest data was not recorded due to rot from wet weather, but grape pruning weights did not differ by treatment ($F_{3,56}$=1.18, P=0.32). However, in the summer, there were visible injuries from the glyphosate applications (Figure 3). There was no visible injury from the

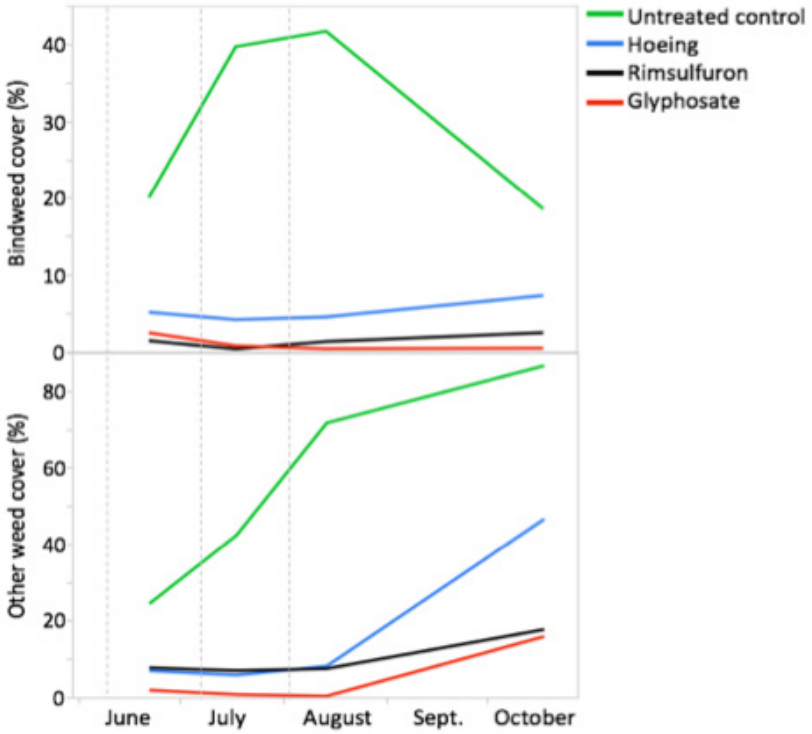

Figure 1. Percent groundcover of hedge bindweed and other weeds over the course of the season. Dashed lines represent dates when treatments were applied. All treatments were applied on these dates, with the exception that rimsulfuron was not used on the final date. The effect of treatments on weed density was similar to weed groundcover and is therefore not displayed.

rimsulfuron applications. Due to the timing of applications, it is unlikely that the grapes roots were injured by rimsulfuron since no injury was seen in aboveground.

Partial budget analysis showed that total costs for implementing each treatment were somewhat comparable (Table 1). However, the expense of the rimsulfuron herbicide and the slower tractor speed required for hoeing caused those treatments to be the most expensive.

Conclusion

While rimsulfuron was not viable as a pre-emergence control for hedge bindweed, it demonstrated excellent post-emergence control and did not cause injury to the grapes, unlike glyphosate. Removal of top-growth through hoeing was also effective, although the bindweed seemed to recover quicker than from the systemic herbicides (Figure 2). We will assess the carryover effects of the treatments in 2019. Overall, all three treatments provided control of hedge bindweed for $75 to $100 per acre, with glyphosate being the least expensive but causing the most grape injury.

Disclaimer

Read pesticide labels prior to use. The information contained here is not a substitute for a pesticide label. Trade names used herein are for convenience only; no endorsement of products is intended, nor is criticism of unnamed products implied. Laws and labels change. It is your responsibility to use pesticides legally. Always consult with your local Cooperative Extension office for legal and recommended practices and products.

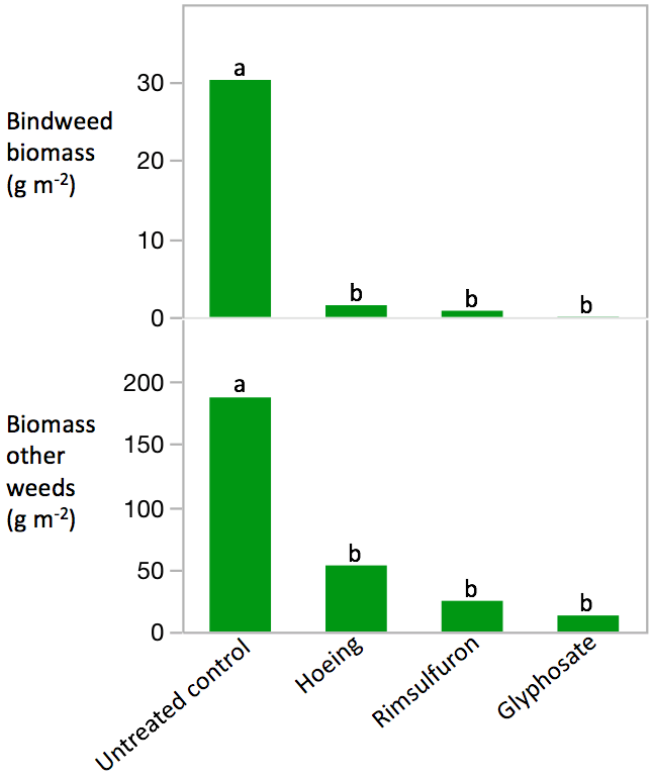

Figure 2. Weed biomass in late October, 2018. Rimsulfuron had been applied twice, while hoeing and glyphosate had been applied three times.

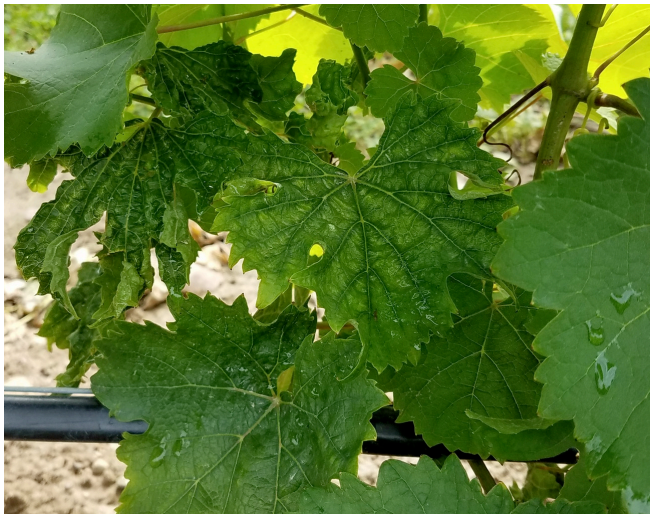

Figure 3. Injury to grape leaves from glyphosate.

Treatment	Labor	Equipment	Herbicide	Total
		USD A^{-1}		
Hoeing	$47.67	$49.79	$0.00	$97.45
Rimsulfuron	$19.56	$18.87	$62.00	$100.43
Glyphosate	$29.33	$28.31	$17.50	$75.14

Table 1. Partial budget analysis demonstrating treatment costs. Labor was calculated at $20 h^{-1} with a grape hoe operating at 1.5mph and the sprayer at 3.0mph. Hourly equipment rates were estimated from Yeh et al. (2014).

Literature Cited

Yeh AD, Gómez MI, White GB (2014). Cost of Establishment and Production of *V. Vinifera* Grapes in the Finger Lakes Region of New York, 2013. Cornell University. Ithaca, NY.

Appendix

Impact statement: This project has demonstrated that repeated mid-season applications of rimsulfuron, glyphosate, or hoeing may increase costs $75 to $100 per acre, but can effectively control hedge bindweed.

Publications

Brown B, Walter-Peterson H, Caldwell D (in press). Improving control of hedge bindweed in grapes: Preliminary results. New York State Integrated Pest Management Program Project Report.

Presentations

Brown B, Walter-Peterson H, Caldwell D. Managing perennial weeds in a vineyard setting: Preliminary results. Lake Erie Regional Grape Program Summer Grower Conference. 8/15/18. 50 attendees.

Brown B. Weed control in grapes. Processor Field Representative Meeting. 5/3/18. 30 attendees.

Brown B. Lake Erie Regional Grape Program Podcast #69, Bryan Brown IPM Interview. Available at https://www.youtube.com/watch?v=V-M3dCsdys4. Uploaded 5/16/18. 29 views

Upcoming

Brown B, Walter-Peterson H, Caldwell D. Controlling hard-to-kill weeds in grapes. Lake Erie Regional Grape Program Winter Grower Conference. March 13, Fredonia, NY.

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