Effectiveness of Glyphosate and Triclopyr on *Polygonum Cuspidatum* Control

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ABSTRACT

Japanese knotweed has had an adverse impact on Connecticut (CT) ecosystems, infrastructure, and recreation. An effective method for control is needed to maintain the integrity of many ecosystems throughout CT. The objective of this study was to understand the efficiency of glyphosate and triclopyr at controlling Japanese Knotweed. Japanese knotweed areas were identified in Wallingford, CT in 2016, and treated with a foliar application of glyphosate and a stem injection of triclopyr. These areas were observed based on their density, health, and root systems to determine which chemical control method was more effective. Our results show that the triclopyr stem injection was more effective than the foliar glyphosphate application at managing Japanese knotweed. This information is useful to landowners and some conservationists who are interested in minimizing costs and time when controlling Japanese knotweed.

INTRODUCTION

Non-native, invasive plants have adverse impacts on ecosystems, infrastructure, and recreation by outcompeting native species, and dominating landscapes in certain areas. In Connecticut (CT), 98 non-native, invasive plant species have been reported[1], many of which originating as ornamentals brought to the United States from Europe and East Asia. Japanese knotweed (*Polygonum cuspidatum*) in particular, has thrived in certain areas of CT because of the species' ability to thrive in a wide range of soil pH, salinity, temperature, shade, and water conditions. Japanese Knotweed can also grow through asphalt, which can cause damage to infrastructure and costly repairs. Chemical (herbicides) and cultural (pruning, uprooting, animal grazing) control methods are used to manage Japanese knotweed. The objective of this study was to understand the efficiency of glyphosate and triclopyr at controlling Japanese knotweed.

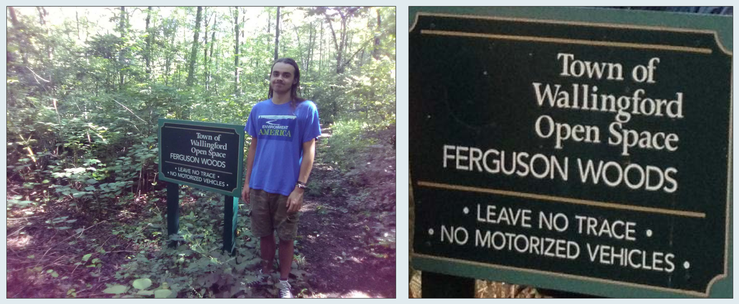

Fig. 1. Me at Ferguson Woods, Wallingford, CT. Behind me is the area of Japanese Knotweed where our study took place. On the right is the sign for the entrance of Ferguson Woods.

REFERENCES

[1]Connecticut Invasive Plant Council. 2014. Connecticut Invasive Plant List. Available at: http://cipwg.uconn.edu/wp-content/uploads/sites/244/2014/12/CT-Invasive-Plant-List-2014Scientific-Name.pdf

MATERIAL AND METHODS

Protocol

- Two overgrown areas of Japanese knotweed were identified in Wallingford, CT in 2009 (Figs 1 & 2).
- One area served as a control. The other area was visually divided in half. One half was treated with glyphosphate (Monsanto, St. Louis, MO) and the other half was treated with triclopyr (Dow Chemical Company, Midland, MI). They were treated at the time of the plants flowering.
- Personal protective equipment (PPE; long sleeve shirts, gloves, saftey glasses, long pants, closed shoe) were used when handling the herbicides.
- Glyphosate was applied as a foliar spray at 41% concentration. Triclopyr was applied as a stem injection using a squirt bottle and a knife. I cut a hole in 6 inches above the ground in the specimen then squirted the herbicide in the stem.

Analysis

- Visual assessment of the Japanese knotweed area was performed one week, three weeks, and one month after herbicide applications.
- Roots systems of plants were dug up after five weeks for visual inspection.

Fig. 2. Left Image: Japanese Knotweed area at Tyler Mill in Wallingford, CT in May 2011. After 5 years of mechanical treatment this area was eradicated. Right Image: Incursion of Japanese Knotweed at Tyler Mill in 2010. This is an example of an uncontrolled area.

Fig. 3. Rhizomes collected 2 months after the herbicide application. Left: rhizome from tryclopyr-treated plant. Right: rhizome from glyphosphate-treated plant. More living nodes were detected in the glyphosate rhizome, suggesting that glyphosate is a less effective chemical control method for managing Japanese knotweed.

RESULTS

One Month Post Herbicide Application

- The area treated with triclopyr was less dense than the area treated with glyphosate (Fig. 4). The area had fewer healthy plants, and appeared partially impaired with curling of leaves.
- The glyphosphate and triclopyr-treated area appeared to be partially impaired compared to the control area.

Root Assessment

- Rhizomes from plants treated with triclopyr appeared to have fewer living nodes than the plants treated with glyphosate (Fig. 3).

Fig 4. Japanese knotweed area in Wallingford, CT, October 2016. Left circle: triclopyr-treated plants. Right circle: glyphosate-treated plants. This photo was taken in October 2016, which was one month after the herbicide treatment.

CONCLUSIONS

Based on our results, triclopyr is more effective at controlling Japanese knotweed than glyphosate. These two herbicides are commercially available, and utilized by homeowners and conservation professionals. Our findings may be beneficial to land managers who are dealing with Japanese knotweed invasions, and these findings could help minimize costs by informing the public on effective herbicides. However, since this project was largely based on qualitative assessments and only tested two herbicides, further work on this topic should be pursued to definitively determine the most effective herbicide at managing Japanese knotweed for CT ecosystems.

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