

Herbicide, Mechanical Treatments, and Constant Monitoring Reduce Japanese Knotweed in Fairmount Park (Pennsylvania)

Joe Berg, Senior Ecologist, Biohabitats, Inc., 15 West Aylesbury Road, Timonium, MD 21093, 410/337-3659, Fax: 410/583-5678, joe@biohabitat.com; Tom Witmer, Restoration Manager; and Mark Focht, Program Administrator, Fairmount Park Commission, Natural Lands Restoration and Environmental Education Program, Memorial Hall/West Park, P.O. Box 21601, Philadelphia, PA 19131-0901

Japanese knotweed (*Polygonum cuspidatum*) is one of the more problematic species in Philadelphia's Fairmount Park system, an approximately 8,900-acre (3,560-ha) network of neighborhood and regional stream valley parks (ER 17(1&2):8-14). Frequent flooding of streams in the park creates unshaded areas of rich mineral soil that favor the establishment of Japanese knotweed propagules. Once established, these plants spread rapidly through rhizomes, forming large, monotypic clones along the stream banks. These clones often extend into the forested floodplains where they displace native shrubs, tree seedlings, and herbs.

As part of the overall strategy of Fairmount Park Commission's Natural Lands Restoration and Environmental Education Program (NLREEP), we evaluated the literature on knotweed control and developed a comprehensive management strategy that includes: 1) a foliar application of 2 to 4 percent glyphosate solution after flowering, 2) repeated mowing and/or physical removal of root crown and rhizome, 3) a relatively high-density planting of 1,200 to 2,000 native trees and shrubs per acre (3,000-5,000/ha), and 4) long-term monitoring and spot treatments to kill or remove any existing knotweed.

When applying glyphosate, we have found that it is best to remove any old plant material before the initial herbicide application in early spring. This is accomplished either by mulch-mowing or by collecting and transporting the cut plants to a landfill or other safe site. By doing so, we ensure that the new season's growth receives a thorough wetting and the maximum amount of the herbicide's active ingredient. We then thoroughly wet all Japanese knotweed stems that are present in the treatment area. Two weeks following the initial application, we monitor the treated areas and treat the plants that we inadvertently missed. Following the initial application, we allow the knotweed to regenerate before making a second herbicide application in the late spring or early summer. We then apply a third glyphosate application in the early fall and remove any above-ground knotweed prior to establishing a native plant community. We have found that the cost of herbicide application is inexpensive, about \$7.00 per 1,000 ft².

Mechanical treatments, along with or in place of the herbicide application, have been especially effective in mixed plant communities or in areas where only a few knotweed plants have become established. Physical control includes repeated cutting of above ground stems during the growing season, excavation of the root crown (which contains much of the plant's stored energy reserve), and removal of rhizomes. We have found that simply removing below-ground plant material is not a successful strategy, since it takes very little root material to generate a new knotweed colony. Therefore, we apply

herbicide to regrowth or continue to cut above-ground growth until the remaining root reserves have been exhausted. Both Fairmount Park staff and volunteers coordinated by Park staff have participated in the mechanical removal of Japanese knotweed.

The oldest NLREEP knotweed control project in the Fairmont Park system was implemented in 1999 on an approximately 1,500-ft (492-m) stream bank in Tacony Creek Park that had a nearly 100-percent cover of knotweed. A combination of glyphosate application, installation of a black fabric weed barrier, followed by diligent physical removal efforts have resulted in a nearly knotweed-free area. In spring 2001, we planted the stream bank with a diverse native plant community. To prevent the establishment of new knotweed colonies, we covered a portion of the bank with a coir fabric that traps knotweed seeds as they are deposited on the site by floodwaters.

Since our initial control effort, staff of the NLREEP have treated approximately 163 acres of knotweed-infested park lands. We remain concerned, however, about the long-term effectiveness of our efforts and realize that if the environmental conditions that support the growth and spread of Japanese knotweed do not change, our strategy may not be effective or may become cost prohibitive over time.

The NLREEP is funding a study by the Philadelphia Academy of Natural Sciences to investigate an adaptive management approach for controlling Japanese knotweed. The results from this study should be released in late spring to early summer of 2002 (Bram personal communication). The conclusions of this study will be considered in combination with field observations of treated areas to refine Fairmount Park's approach to Japanese knotweed control.

REFERENCE

Bram, M. 2001. Personal communication. December 12.