

Chemical Control of Terrestrial Invasive Plants

Techniques and Options for Chemically Controlling Terrestrial Invasive Plants

Control or management of invasive plants should include consideration and integration of the four categories of control techniques: mechanical, cultural, biological and chemical. Chemical control, most commonly herbicide application, can often be used with other techniques to effectively control invasive plants. To determine if chemical control of invasive plants is warranted, it is important to:



- 2. Determine the level and size of the infestation
- 3. Develop a strategy for managing the infestation over time, based on landowner goals
- 4. Understand when a licensed applicator and permits may be needed to accomplish goals

Characteristics of Invasive Plants

Invasive plants are non-native species that invade natural communities, develop self-sustaining populations and cause economic or environmental harm or harm to human health. While many plants are considered weeds, as used here, "invasive plant" is a legal term for plants that meet the above criteria and are subject to regulations about their sale, transport and disposal.

Many invasive plants tolerate a wide range of environmental conditions, allowing them to thrive in a variety of habitat types. For example, glossy buckthorn successfully invades both sunny and shady sites and tolerates both wet and dry conditions.

It is important to understand the specific characteristics of target plant(s) to determine the appropriate management strategy. For example, because Japanese knotweed spreads vegetatively by rhizomes and sprouts from fragments of root and stem material, mowing is an ineffective management strategy that can worsen the problem. Instead, knotweed is often controlled using repeated cutting in combination with chemical application. Invasive plant species information is widely available online and through state and Extension agencies.

Assessing the Infestation

Assessing an invasive plant infestation will help guide strategies for control. Examine the invasive plants present, including the specific species, the ratio of native to invasive plants, size of the plants, density of stems (a few plants vs. a whole property invaded), size/extent of infestation, location within the landscape and the availability of financial and time resources. These characteristics will influence whether mechanical, cultural, biological or chemical control – or a combination – will be most effective.

Small infestations with a few stems may be easily controlled with mechanical techniques followed up with monitoring over time. Dense, well-established infestations may require control that incorporates chemical and mechanical







techniques, with monitoring over time. Management sites surrounded by a heavily invaded landscape will require a larger investment of time and resources than a site where nearby infestations are minimal.

Developing Your Strategy

Determine whether control is practical, costeffective and ecologically feasible. Control may not be warranted for species that cause minimal interference with landowner goals and may be impractical and costly for large infestations. In some cases, waiting until a practical solution or adequate resources become available may be the best option. With any invasive plant management project, monitoring and follow-up control techniques will likely be necessary. Three to five years of active management and monitoring are typical to ensure effective control and depletion of seed reserves in the soil.

Chemical Control Methods

Chemical control can be a cost-effective method for invasive plant management, particularly in extensive or dense infestations. Like any method of control, the application of herbicides should be carefully considered and part of a strategy that incorporates an integrated approach to control and monitoring of invasive plants. Chemical control can be beneficial to reduce or stop the resprouting of treated plants when mechanical control is impractical, not effective or would cause excessive soil disturbance, and when used as part of a broader control strategy, such as preparing a site for mechanical or cultural controls. There are situations where chemical control might not be appropriate or desirable, such as near ecologically sensitive areas or where landowner preference is to avoid herbicide use.

A variety of application techniques and chemicals are available. The technique and herbicide used depend on the target species, the size of the infestation, proximity



A small, low density patch of glossy buckthorn suitable for foliar herbicide application with a small handheld spray bottle.



Herbicide application licensing and training is available through UNH Extension's Pesticide Safety Education Program.

to water resources and the timing of the application. Many situations may require a licensed herbicide applicator. Licensed applicators are equipped to assess and develop a plan to safely apply the least quantity of herbicide necessary to control invasive plants effectively. It is recommended to consult with a professional before starting a control project to ensure sensitive areas are not impacted and all relevant legal restrictions and requirements are met.

The herbicide label is considered law in New Hampshire. The instructions on the label are a legal document that ensures the herbicide is applied correctly and safely. Not following the label instructions can cause environmental or human harm and puts the applicator in a liable situation for any damages caused. Herbicide type, concentration, target species and application method will be detailed on the herbicide label. In New Hampshire, the plant species and specific setting being treated must be indicated on the label for control to be legal. It is important to use the proper herbicide at the correct concentration in the appropriate setting. Following concentration specifications on the herbicide label minimizes the amount of herbicide applied.

Common Herbicides Used in Invasive Plant Management

Glyphosate and Imazapyr are commonly-used, non-selective herbicides that will kill or damage any type of plant they contact. Triclopyr is a selective herbicide that only affects dicots (broadleaf plants including many of our invasive plants). Triclopyr will not damage monocots (grasses, orchids, lilies). New Hampshire law requires that anyone applying pesticides on property that they do not own, as part of their business or not, must be certified (licensed) as a commercial pesticide applicator. Licensing is required regardless of the pesticide being applied, or whether the applicator gets paid for the service or not. Unlicensed individuals are only allowed to use herbicide on their own property.

In some cases, herbicides may be classified as "restricted" and only available for use by licensed applicators. Most herbicides are classified as general use, including overthe-counter homeowner-type herbicides these herbicides require an applicator license to apply on land not owned by the applicator. There are twenty-three unique categories of pesticide license in New Hampshire, each defined by the type of site to which pesticides are applied. More information about herbicide application licensing and training is available through **UNH Extension's Pesticide Safety Education** Program (extension.unh.edu/programs/ pesticide-safety-education).

Common Chemical Application Techniques

Foliar Mist or Spraying

Foliar mist (or "spraying") is one of the most common techniques of herbicide application. This technique uses a mist blower or sprayer to apply a low concentration of herbicide onto the surface of living leaves where it is absorbed into the plant. This technique is best used when the foliage of the plant is relatively accessible, and the target invasive species are not mixed in with desirable species. Monocultures of invasive plants with high stem densities are most effectively treated with foliar application. Conversely, individual invasive plants may be easily targeted by foliar application with a small handheld spray bottle. Large infestations will likely require a backpack sprayer or an ATV-mounted sprayer that can travel across the treatment site. Foliar mist or spraying works best when plants are actively growing. Applying too early in the growing season may be ineffective. The spray or mist should completely wet the leaves and be applied on a day with little wind and no rain in the forecast.



Post-foliar mist application on multiflora rose in an old field. Note the dead, gray stems.



Cut-stem treatment with recently cut stems being painted with blue dyed herbicide solution.

Basal Bark Treatment

Basal bark treatment involves applying a low volume of herbicide solution sprayed to the base (bottom of the stem) of a woody plant. This is a common technique used on small- or medium-sized shrubs and trees where overhead foliage is not easily accessible. The herbicide solution includes a surfactant or an oil carrier that allows for the herbicide to be absorbed through the bark into the plant. This technique can be used during the growing season and well into the fall or early winter. Basal bark treatment is best for small- and medium-sized stems. For large stems, cutstem or frill treatments will be more effective.

Cut-Stem and Frill Treatments

Cut-stem and frill treatments involve cutting the woody plant stem completely (cut-stem) or partially (frill treatment) and applying a more concentrated herbicide solution to the freshly exposed wood. This technique can be used in similar situations as basal bark treatment. The herbicide solution is painted on the cut stump using a brush or sponge, or it is injected into the frill using a special injector tool. Herbicides should be applied to the exposed wood immediately following cutting so to avoid dry-out before treatment. Cut-stem and frill techniques are most effective when applied in late summer and fall. To track treated plants, a colored dye may be added to the herbicide so treated stems can be easily distinguished from untreated stems. Stumps should be cut low to the ground (6" to 12") but not so low that you cannot see them. Maintaining a short stem also allows for another cutting should resprouting occur and the treatment need to be repeated.

Learn More

For resources and information on invasive plants in New Hampshire, visit: www.nhinvasives.org

For guidance on dealing with invasive plants on your property, contact your UNH Extension County Forester at: www.extension.unh.edu/countyforesters

For professional help dealing with invasive plants you can access the directory of NH Licensed Foresters at: www.extension.unh.edu/resource/directorylicensed-foresters

For a list of licensed applicators contact the NH Department of Agriculture, Markets & Food at: 603-271-3550 or www.agriculture.nh.gov/ divisions/pesticide-control

Photo Credits

1. Steve Manning, Invasive Plant Control, Bugwood.org

About the Author

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UNH Forestry Information Center

Educational materials and assistance about forest stewardship topics to landowners and the general public.

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