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Forest Connect

Supporting Sustainable Management of Private Woodlands

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# Seasonal Control of American Beech

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American beech (*Fagus grandifolia*) is a native species that has many desirable attributes, but suffers from an insect-disease complex that results in the majority of beech trees dying. When the trees die from this complex, known as beech bark disease, the tree is stimulated to produce shoots from the roots that often result in dense patches or "beech thickets" (Figure 1). Beech that are cut using traditional practices will also typically produce thickets of root sprouts. Because deer preferentially avoid beech and browse other species, beech can become a dominant species in northeastern woods.

Figure 1. Beech that dies or is disturbed will produce root sprouts known as root suckers that can form dense thickets. The shade in the thicket is sufficient to limit the growth of other species. The presence of a thicket also suggests a history of deer impact.

Before a control effort of beech is initiated, three conditions should be considered. First, the presence of beech doesn't necessarily warrant that it be controlled or killed. Control of beech is necessary especially in situations when the owner is attempting to regenerate overstory trees, and there is sufficient density of beech stems that their shade would limit the growth of desired species. Second, if beech are already abundant, it is probable that deer are or have had a significant impact by reducing the abundance of other species. If deer impact is still high and the impact isn't controlled, then beech control won't help regenerate other desired species. Third, in northeastern woods there are scattered examples of American beech that are resistant to beech bark disease (Figure 2). These trees should be protected from herbicides, and ideally from damage to encourage their survival and perhaps propagation.

Figure 2. The three trees in the center of the picture are beech trees at least 18 inches in diameter and free from any visible sign of beech bark disease insects or fungus. These trees are within a shelterwood harvest at the Arnot Forest. Extra care was taken with herbicide treatment of diseased beech to ensure these trees remained healthy.

There are several good resources to help guide owners who are interested in managing interfering plants such as beech. These resources include general publications about the characteristics of herbicides, how to apply herbicides in forests, and strategies of integrated/forest vegetation

management. There are also several publications about the control of specific species that have application in New York. These are all available here http://blogs.cornell.edu/ccednrpublications/vegetation-management/

In addition to written publications there are several webinars about beech management, and a variety of other species and related topics. Webinars cover chemical and organic options and are archived at www.youtube.com/ForestConnect

There are many strategies and options to consider once you decide the need to control beech is warranted. The question of seasonally specific strategies will also include size specific strategies. The size of the beech stems influences what strategies will work. This article will consider the two most commonly used herbicides, and the only mechanical technique that is currently thought to be effective.

The two herbicides include those with the active ingredients glyphosate or triclopyr. The use of trade names is for convenience and not an endorsement for those mentioned or insult to those not mentioned. Glyphosate is the active ingredient in products such as Roundup and Accord XRT II. It is effective when applied to foliage or to freshly exposed wood. It will not have any effect via the bark and is not active in the soil. When applied to freshly exposed wood, glyphosate is mobile within the tree that is treated and into connected beech stems creating what is known as "flash kill." Glyphosate doesn't move to other species. Triclopyr is the active ingredient in products such as Pathfinder II, Garlon 3A and Garlon 4 ultra. Triclopyr is effective when applied to foliage, freshly exposed wood, and via the bark on stems less than 6 inched in diameter. Unlike glyphosate it is not particularly mobile from one beech tree to another beech, nor is it active in the soil.

The previously mentioned publications and webinars make reference to the importance of reading and following the label on herbicides. I strongly encourage a high level of familiarity with and adherence to the label. Notably, the target plant species must be listed on the label for the treatment to be compliant with NYS law. All products registered for use in NY have their label posted here http://www.dec.ny.gov/nyspad/products?0

## Growing Season Strategies

Beech with accessible foliage can be treated with a relatively dilute solution (e.g., 1.5%) of products such as Accord XRT II. Owners with a backpack sprayer can reasonably treat areas up to about 1 to 3 acres for beech less than 6 to 8 feet tall. Taller beech, up to approximately 15 feet can be treated with commercial forestry vegetation management equipment and sprayers. Garlon 3A and 4 ultra can be applied to foliage, but these are "restricted" and can only be applied by certified applicators. Pathfinder II is not labeled for use on beech foliage.

Figure 3. A hatchet or another tool that exposes fresh beech wood to glyphosate or triclopyr offers a cost effective method of control. Use appropriate safety practices with sharp tools, and don't use dull tools.

Beech that are too tall for foliar treatments can be treated by a variety of techniques that expose fresh wood to which glyphosate or triclopyr products are applied. This technique can be used most of the year, except when wood is frozen or during heavy sap flow. The common technique is call "hack-n-squirt" and uses a hatchet to puncture the bark at intervals around the stem and then the chemical is sprayed (Figure 3). The frequency of hatchet punctures depends on the product and the concentration, but ranges from one puncture per each three inches of diameter to a complete frill. Details are provided on

the product labels. As an example, a concentrated mixture of Accord XRT II is applied as 1 ml per puncture. Glyphosate, if enough stems are treated or enough volume is present, can flash kill from treated beech to untreated beech. Triclopyr does not typically flash. A caution with triclopyr is to follow the label restrictions on the total quantity per acre. Triclopyr forms a vapor, and if too many trees per acre are treated those vapors can accumulate under the forest canopy and damage non-target species.

Figure 4. Basal bark treatments use an herbicide in a carrier such as water or oil that can penetrate the bark and chemically girdle the tree. See the PSU publication on basal bark applications for full details.

Beech that are less than 6 inches can be treated by triclopyr using a basal bark treatment (Figure 4). Here, the product is mixed in water (Garlon 3A) or oil (Garlon 4 ultra, or premixed as Pathfinder II) and sprayed on the lower 20 inches of the tree. Basal bark results in a chemical girdling of the treated stem. The resources listed above include a fact sheet by Dave Jackson of PSU about basal bark treatments.

Beech stems above approximately 4 to 6 inches diameter can be treated with cut stump (AKA cut surface) treatments. Cut stump is simply felling the tree and immediately applying the chemical mixture to the fresh surface (Figure 5). Similarly, beech 1 to 3 inches in diameter can be cut with a brush saw and stump treated. For maximum flash kill treat as many beech stumps as is practical using a glyphosate-based product with the active ingredient strength at least 25% and as high as 50%. For minimal or no flash kill, use a triclopyr product. Glyphosate treatments can be delayed for up to 72 hours after felling with reasonably good results.

Figure 5. Cut-stump treatments usually use a glyphosate product and apply it to the outer 2 inches of the stump's surface immediately after cutting the tree. Use appropriate caution and training for tree felling.

Low-stumping is a relatively new technique with limited research to describe its optimal applications. This technique is intended for use only in July and August and assumes that all beech, that means 100% of the beech, are cut as close to ground level as possible (Figure 6A, 6B). This intensive treatment presumably capitalizes on the energy reserves of the tree being located above ground, and thus a depleted roots system with little capacity to form root sprouts. Uncut beech, or treatment during other times of the year may limit the success of this method.

### Fall and Winter Treatments

Although some foliage may be present, most has stopped or significantly limited physiological activity, and thus is unresponsive to foliar treatments. This concern can begin in late summer if there is a late season drought. One rule of thumb is that foliar treatments should be ceased when raspberry foliage starts to change color.

Hack-n-squire and injection methods using glyphosate or triclopyr are effective for control of the treated tree until the wood freezes. Little research has compared glyphosate's flash kill effectiveness in summer versus fall treated beech.

Cut-stump treatments are also possible, and flash kill has been shown to be effective on connected root sprouts well into middle November. In summer and fall, cut-stump treatments can be applied to previously cut beech by resurfacing the stump and applying concentrated glyphosate. For stumps that are one to two growing seasons old, there was 100% control of the stump, 50% control

of root sprouts one year after the initial harvest and 70% control of root sprouts two years after the initial harvest. Root sprout control diminished with time since the initial harvest.

Basal bark treatment are effective in the fall and winter. Treatment with Garlon 4 ultra that is mixed in oil, or the premix of this as Pathfinder II, is possible all winter unless snow covers the base of the stem or cold temperatures limit the ability of the oil-based products to flow.

Low-stumping should not be applied at this time of year. The trees have begun to store energy reserves in the root system, and cutting will stimulate the development of root sprouts.

*Figure 6A. Following treatment, the increase of sunlight on the soil and the potential of soil disturbance may stimulate the germination of buckthorn seeds. Pictured are new germinants of common buckthorn following cutting of the overstory.*

Figure 6B. Following treatment, the increase of sunlight on the soil and the potential of soil disturbance may stimulate the germination of buckthorn seeds. Pictured are new germinants of common buckthorn following cutting of the overstory.

## Late Winter and Spring Treatments

As with the fall and winter treatments, foliar applications are not possible. However, many of the non-native invasive species (e.g., multiflora rose, bush honeysuckle, and Japanese barberry) have early development of leaves, and this provides an opportunity for selective control with foliar treatments using glyphosate that avoids collateral damage.

In winter the wood is often frozen and treatments to exposed wood via hack-n-squirt or cut-stump will have variable though often poor effectiveness in control of the treated stem, and almost no flash kill. When the wood thaws in the spring, exposed wood treatments will be more effective than winter treatments, but heavy sap flow may limit full effectiveness relative to summer and fall treatments.

Basal bark treatments are effective throughout this time. In the resources listed above, the basal bark fact sheet by PSU provides full details for the effectiveness of different concentrations of Garlon 4 (triclopyr) on beech and other species in spring versus summer treatments.

As with fall and winter seasons, low-stumping should not be applied during this time of year.

For additional information on woodland management go to:
www.ForestConnect.com & www.CornellForestConnect.ning.com

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