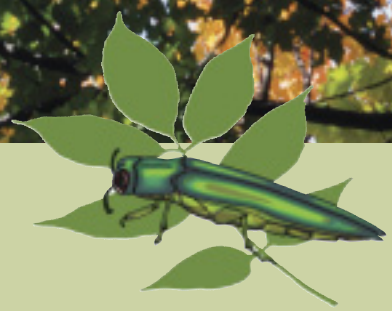
Forest Health



Invasive Plant Hit List: Bush Honeysuckle

by Jeff Stringer, John Cox, and Billy Thomas

Bush honeysuckle refers to several species; the most common to Kentucky is the Amur honeysuckle (*Lonicera maackii*). This native to northern China, Korea and parts of Japan was introduced to the U.S. in 1897. Escapes from ornamental plantings were recorded in the 1920s and promoted for conservation and wildlife uses in the 60s and 70s. This effort coupled with ornamental plantings led to range expansion from the Midwest to areas south and east.

Bush honeysuckle is spread by seed. Amur flowers in June, and the white and yellowish flowers can result in more than 1 million red seeds on mature (25-year-old), 20-foot tall plants. The seeds are consumed and spread by some species of songbirds only after other more nutritious native foods are gone. As with many invasive species, bush honeysuckle can grow and thrive over a wide range of habitats. Amur is one of the first colonizers of disturbed areas in its native China and easily can invade disturbed areas in the U.S. Unfortunately, seeds can also germinate and grow in moderately shaded woodlands. Because of this, bush honeysuckle growing in the understory in wooded areas need to be controlled prior to creating openings in the forest canopy that increases the light they receive. Bush honeysuckle also have the competitive advantage of being one of the first species to leaf out in spring, and they retain their leaves in fall later than most native species. There is also increasing evidence that Amur produces chemicals that hinder native plant growth, a condition referred to as allelopathy. Collectively, these attributes have caused Amur to have severe ecological and economic impacts where it has successfully established. Fortunately, there are no native bush honeysuckle species with which it can be confused, and all shrub-sized honeysuckle are exotic and invasive.

Photo courtesy: Chris Evans, River to River CWMA, www.forestryimages.org

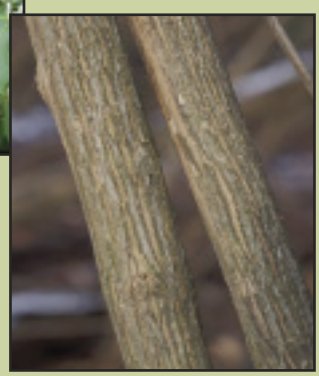


Photo courtesy: James H. Miller, USDA Forest Service, www.forestryimages.org

Bush honeysuckle is one of the first plants to leaf out and one of the last to drop its leaves; leaves are 2-3 inches long and are arranged on opposite sides of the branches. It blooms starting in May with flowers that are white to yellow and approximately 1" long; the flowers are very fragrant. The bark of bush honeysuckle is gray to tan and has tight vertical strips.

Woodlands at Risk

Because bush honeysuckle can grow under moderate light conditions and tolerate a range of soils, all of Kentucky is at risk from these species. The greatest occurrence of Amur honeysuckle is in northern and central Kentucky. Once thought to be restricted to central Kentucky soils, Amur and other species are starting to be found in eastern and western Kentucky. It is now believed that it can and will spread throughout the state.

Control

Feasible and effective control options depend upon plant size, number and location. Because bush honeysuckle can sprout prolifically from the stump, any control method must ensure that the stump is removed or deadened. Most removals will require the hand application of herbicides.

Mechanical control that removes the stump is an option, and any lateral roots left are unlikely to sprout a new plant. Small, knee-high plants can be pulled by hand. Larger plants can be removed with devices (weed wrenches and poppers) that are designed to remove shrubs. The larger versions of these devices are typically effective on bushes up to two inches in diameter, which is roughly a plant six to eight feet in height. The disadvantages of mechanical control are the significant labor times (see treatment cost section) and the size limitation.

Effective herbicide control methods include foliar spray, cut stump application, tree injection and full basal bark. However, foliar applications for small plants and cut stump treatments for large plants are generally recommended and can be used in most situations.

Foliar spray can be effective for plants less than head height unless a machine-mounted power sprayer is used. Typically power spraying is reserved for fence lines or edges of woodlands. While it is relatively fast to foliar spray, this method often results in damage to native plants, and foliar spraying should not be used if native seedlings and forbs are present. Typically, common brush herbicides such as glyphosate can be used at recommended foliar rates (for example, two percent solution from concentrated glyphosate [> 40 percent active ingredient]). Because plants often have several stems, it is important to ensure that all leaves and branches are sprayed. The early leaf-out of bush honeysuckle can widen the spraying window and help to avoid native plants.

The most common method to treat bush honeysuckle and the method of choice for larger plants is cut stump. This requires cutting of the shrub close to the ground

and application of herbicide within one to two hours of cutting. Use a full strength (greater than 40% active ingredient) glyphosate herbicide (Accord ™ is labeled for use in woodlands, agricultural brands can be used for fence rows and field edges) or other concentrated forestry chemicals such as Pathway ™ (Tordon ™ labeled for forestry use and composed of picloram and 2-4, D ™), Arsenal ™ (imazapyr), or Garlon 3a or 4 ™ (triclopyr). Spray the entire stump until runoff and any branches or stems that were cut at the ground line. This method is appropriate for larger size plants one inch or more in diameter. Also, this method should not be used in late winter or early spring prior to leaf-out, as sap rising at this time will reduce the amount of herbicide taken up by the plant.

A specialized tool (EZ-Ject herbicide lance) can be used to inject herbicide capsules directly into targeted plants. This control technique is expensive in comparison to other techniques and its effectiveness is inconsistent.
Photo courtesy: Laurie Taylor Thomas

Tree injection using the E-Z-Ject ™, a relatively new dry granular injector, has also been used. It can be more time consuming than cut stump treatments because the injector has to be lined up fairly precisely to inject a capsule, which requires maneuvering under the bush. Further, research using glyphosate capsules has shown it to be inconsistent with relatively high levels of resprouting using the recommended rate of herbicide. Doubling the rate is required to achieve good kill.

Basal bark treatments require spraying the outer bark of small trees and shrubs (less than four to five inches in diameter). The herbicide penetrates the relatively thin bark and is an effective option, but only if special chemical carriers and mixes are used. Normally, Garlon 4 is mixed in crop oil or diesel fuel to form a 25 percent Garlon 4 solution. However, this traditional basal bark mix provided inconsistent results. The current recommendation from Purdue University requires the use of Ax-it ™ basal oil (instead of diesel fuel or crop oil) and 15% Garlon 4 and three percent Stalker ™. If native species, either large or small trees, or native herbaceous plants are present and a large amount of honeysuckle must be controlled this technique is not recommended as there is a potential of Garlon 4 and Stalker poisoning native plants.

Mechanical control of bush honeysuckle can be performed anytime of the year and may be most applicable in areas where herbicides cannot be used. However, mechanical control is typically the most time consuming control technique (see Figure 2).
Photo courtesy: Billy Thomas

Mechanical removal and follow-up foliar spray can be used for severe infestations when a rotary brush hog can be driven through the woods, cutting down and effectively mulching all of the bush honeysuckle. Implement this procedure directly after the bush honeysuckle has leaved out. Follow this with a foliar glyphosate spray of the stump sprouts at or near the end of the growing season. This time lag allows for enough leaf area to be present to provide for effective control. However, this method functionally restarts the woodland regeneration, killing the bush honeysuckle and co-occurring plants (native or otherwise). It is not feasible on steep terrain but has been used by Purdue University for woodland savanna restoration with native warm-season grasses under sparse overstory trees.

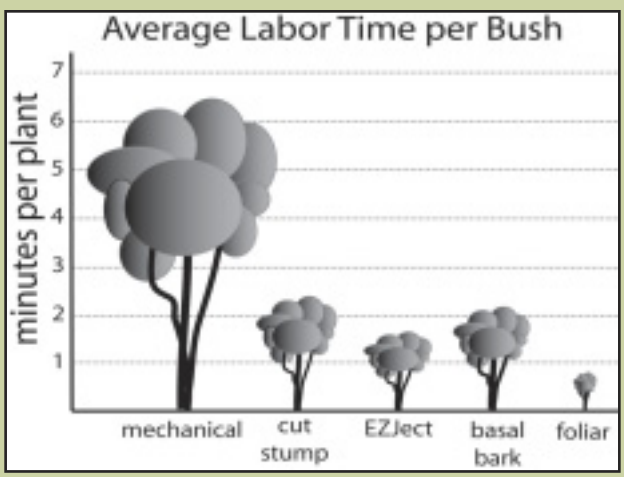


Figure 2. Average labor time to apply treatments to bush honeysuckle.

Treatment Cost

Treatment of significant infestations of invasive plants can be expensive. This is particularly true when the plants occur in wooded areas. Research at the University of Kentucky indicates an average mechanical removal time of 6.3 minutes using a Weed Wrench™ or similar device for head-high bushes. This compares to 2.1 minutes for cut stump, 1.4 minutes for basal bark, 2.2 minutes for EZ-Ject and 0.55 minutes for foliar treatments (Figure 2).[1] Herbicide treatments also include the cost of herbicide. On average the cut stump treatment used 0.18 ounces of concentrated glyphosate per plant, foliar 0.03 ounces per plant, and the EZ-Ject used 5.5 capsules per plant. If there were 500 plants per acre (a low number for infested stands) the herbicide cost would be $49.21 per acre for cut stump, $8.19 per acre for foliar and $498.87 for EZ-Ject pellets. The total cost for this stand would be $421 for mechanical (52 hours at $8 per hour), $187 for cut stump

(17.2 hours at $8 per hour [$138] and $49 for herbicide), $644 for EZ-Ject (18 hours at $8 per hour [$144] and $498 for herbicide), and $45 for foliar (4.6 hours at $8 per hour [$37] and $8.19 for herbicide).

For most situations it is recommended to use two methods of control – foliar spray for small plants (less than head height) and cut stump for large plants. Since it is almost impossible not to miss plants during an initial treatment, especially if heavily infested, a follow-up treatment should be scheduled for the next growing season. Many times the escapes are small plants that were missed or were not thoroughly treated and stumps that were not sprayed. Follow-up foliar treatments should not occur until the stumps have had time to put on a significant amount of leaf area, generally July through September.

Table 1. Control methods for bush honeysuckle (*Lonicera* spp.)

Method	Timing	Details and Cautions
hand pulling	Anytime	Plants less than 3 feet high.
mechanical puller or popper	Anytime	Plants 3 feet to head height.
herbicide[1] - foliar	April - September	Plants head height or less. Foliar applications of 2% glyphosate. Accord is labeled for use in woodlands. Use other glyphosate products for other areas.
herbicide[1] – cut stump	June – January	Plants greater than 1 inch in diameter. Thoroughly wet stump with concentrate less than 2 hrs after cutting. Example: Accord herbicide concentrate (> 40 percent active ingredient - glyphosate) spray on stump mildly diluted to facilitate spray. Glyphosate poses the least carry-over problems to native plants.
herbicide – basal bark	fall, winter, early spring	Plants greater than head height. Wet lower 18 inches of ALL stems on a plant. 15 percent Garlon 4, 3% Stalker in Ax-it basal oil. Do not use when large amounts of honeysuckle are present among or underneath native trees as carryover from large application rates of these herbicides could occur.

[1]Other herbicide brands can be used for control. The herbicides that are listed are those commonly used regionally and are labeled for use in forests (woodlands).

[1]Data from research and demonstration project "Invasive Species Reduction in Bluegrass Woodlands" UK Department of Forestry, Kentucky Division of Forestry and Lexington Fayette Urban County Government Department of Parks and Recreation, 2008.

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