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# Controlling Non-Native Invasive Plants in Ohio's Forests: Autumn Olive (*Eleagnus umbellata*) and Russian Olive (*Eleagnus angustifolia*)



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Autumn and Russian olive are non-native, upright, deciduous shrubs that commonly reach heights up to 20 feet tall. Both species are widely distributed in the United States, since planting began in the mid-1800's to provide food and cover for wildlife, ornamental use, road bank stabilization, erosion control, strip mine reclamation, and shelterbelts. These shrubs form nitrogen-fixing root nodules, which allow them to grow on a wide variety of sites including nutrient-poor soils. They are among the first plants to leaf out in the spring and can grow vigorously in full sunlight, which can allow them to aggressively suppress native plants. Autumn and Russian olive are commonly found invading woodland edges, the interior of open woodlands, early successional woodlands, and abandoned agricultural fields. They do not grow well in dense forests or wet soils.

## Identification

The most prominent characteristic of both species is the silvery scaling (Figure 1) that covers the young stems, leaves, flowers, and fruits. This makes both species conspicuous from a distance.



Figure 1. Autumn olive leaves, showing silvery leaf underside.

### Leaves

**Autumn olive:** elliptical to egg-shaped; 2 to 4 inches long and ½ to 1¼ inches wide; dark green to grayish green on upper surface with dense, silvery scales on the underside. Leaves are arranged alternately along stems and have un-toothed, wavy margins.

**Russian olive:** lance-shaped or oblong; 1½ to 3¼ inches long and 3/8 to ¾ inch wide; dull gray-green above with dense, silvery scales coating both sides. Leaves are arranged alternately along stems and have un-toothed, wavy margins (Figure 2).



Figure 2. Russian olive leaves.

### Flowers

Conspicuous clusters along twigs at the base of leaves, appearing early spring to early summer. Creamy-colored to light yellow with silvery exterior; bell-shaped and aromatically fragrant (Figure 3).



Figure 3. Autumn olive flowers.

### Fruits

**Autumn olive:** ¼-inch silvery, juicy berries dotted with brown scales that ripen to red or pink when

mature in fall. Single-seeded fruit are borne on short stalks (Figure 4).

**Russian olive:** 3/8- to ½-inch long, elliptical, dry, mealy yellow-brown berries with silvery scales that become shiny when mature in late summer and fall. Fruits persist throughout the winter. Seeds remain viable in the soil for approximately three years.



Figure 4. Autumn olive fruit.

### Twigs

Silvery or golden brown, scaly when young, often thorny or with short spines at the tips (more typical of Russian olive).

### Control Methods

When trying to control or eliminate a woody, non-native invasive shrub like autumn or Russian olive, several methods may be considered. The method used depends on plant size, size of the infestation (area), and a landowner's comfort level with a particular method. For a more detailed description of the methods covered below, see OSU Extension fact sheet *Controlling Undesirable Trees, Shrubs, and Vines*, OSU Extension Forestry Fact Sheet F-45, and *Herbicides Commonly Used for Controlling Undesirable Trees, Shrubs, and Vines in Your Woodland*, F-45 Supplement-06.

**Environmental note:** Many of the following herbicides are labeled to be mixed with a penetrating basal oil, diesel fuel, or kerosene as their carrier agent. The choice to utilize a methylated, seed oil-based basal oil instead of diesel fuel or kerosene will result in a more environmentally friendly practice. However, read the label to ensure that use of a basal oil is appropriate for the herbicide you have chosen.

**Mechanical Control**

Small infestations of small plants can be pulled, dug, cut, or mowed fairly easily. Pulling or digging of small plants is most effective if done following a rain. Cutting and mowing is most effective when initiated in early summer, when stored food reserves are at their lowest. In order to achieve effective control, pulling or digging must be done so that every root is removed. While this is perhaps impossible, if it is repeated frequently, small shrubs can ultimately be eliminated once their food reserves are exhausted. The key to this type of control method is to be vigilant.

Mechanical treatment alone is usually not completely effective in controlling medium- to large-size shrubs. Simply cutting the shrub off at the base will cause prolific sprouting and increase the number of stems. An effective strategy for controlling autumn and Russian olive is to kill both the above ground portion and the root system, which eliminates the potential for sprouting. This is most effectively achieved through herbicide use.

When infestations are so dense that access to the area is difficult, landowners may elect to use mechanical means of removing large plants and vast numbers of plants. Whether using a skid steer, tractor, or some other piece of equipment to pull the shrub out of the ground, realize that some follow-up maintenance will be needed. Care needs to be taken to ensure that any damage to the residual forest stand is minimal, and a follow-up application of a foliar herbicide should

be applied when the remaining roots begin to sprout (Table 1). Also, be cautious of the timing of removal. Removing vast numbers of plants may result in a large area of disturbed soil, so care should be taken to minimize any erosion potential created when the plants are removed.

**Foliar Spraying**

Foliar spraying is a method of control in which a dilute concentration of herbicide is sprayed directly on the leaves. Herbicides need to be applied sometime after the plant is in full leaf and before the onset of fall color in order to maximize effectiveness. Herbicides are generally applied to wet the leaves but not to the point of runoff.

Exercise caution when applying foliar herbicides. This method should only be used when the target plants are within easy reach of the sprayer. Spraying directed at taller or otherwise less accessible plants can damage or kill valuable non-target plants through herbicide drift or overspray. Herbicides recommended for foliar spraying of autumn and Russian olive in a forest setting are listed in Table 1.

Several other herbicides—including Tordon 101 and Banvel—have been used successfully to control autumn olive by foliar spraying, but because of the potential for significant damage to non-target species due to the active ingredients in these herbicides, they have limited use in a forest setting.

**Table 1. Foliar herbicides recommended for control of autumn and Russian olive.**

Common Name	Example Brand Names	Comments <sup>1</sup>
glyphosate	Roundup herbicides, Accord herbicides, and other herbicides containing at least 41% glyphosate	Apply solution of 2% herbicide (vol/vol) in water when leaves are green; add a surfactant if not in herbicide.
2,4-D + triclopyr	Crossbow	Apply solution of 1.5% herbicide (vol/vol) in water.
triclopyr	Garlon 3A	Apply solution of 2% herbicide (vol/vol) in water; use non-ionic surfactant.
	Garlon 4, Garlon 4 Ultra, Tahoe 4E, Remedy	Apply solution of 1% herbicide (vol/vol) in water; surfactant may be used.
imazapyr	Arsenal	Apply solution of 1% herbicide (vol/vol) in water + non-ionic surfactant.

### Basal Spraying With Herbicide

A basal application for autumn and Russian olive refers to the spraying of a labeled herbicide mixed with an oil-based carrier on the lower 12–18 inches of the main stems. The herbicide is sprayed, ensuring that the main stems are wet but not to the point of runoff. Basal bark treatments should only be applied when the areas to be treated are dry and not frozen. The basal bark treatments recommended in Table 2 should be applied during the dormant season. Due to the spreading growth habit of autumn and Russian olive, access to the lower stem portions of the shrub is not always easy to achieve. Care should be taken to ensure that the chemical being applied is reaching the lower stem portions of the shrubs and not merely being applied in its general vicinity.

### Cut-Stump Herbicide Treatment

Cut-stump treatments are very effective for controlling many undesirable woody shrubs (Table 3), and they work well on autumn and Russian olive. This method involves cutting the shrub off close to the ground and applying an herbicide to the cut surfaces (and sometimes the bark) with a spray bottle, paintbrush, roller, or wicking device. Treatments made late in the growing season (July–September) or during the dormant season are the most effective. Always apply to stumps that are dry and not frozen.

Whether to use an oil- or water-soluble herbicide depends on the timing of the herbicide application after the cut. Herbicides carried in water should be applied to the outer third of the top of the stump **within minutes** of making the cut.

Utilize an oil soluble herbicide when planning to cut, then return later to treat the stumps. Apply the oil-soluble herbicide to the entire top and sides of the cut stump, but not to the point of excessive runoff.

### Summary

Label recommendations should always be followed to maximize the potential for successful control. At a minimum, monitor treated shrubs for two years to determine if complete control has been achieved. Shrubs that re-sprout or are not completely killed by the first treatment will warrant a follow-up treatment.

Herbicides, like all pesticides, are approved (labeled) for specific uses by the Environmental Protection Agency. Approved uses and application methods are listed and described on the pesticide's label. The herbicides listed in this fact sheet were appropriately labeled at the time of publication. Because pesticide labeling may change at any time, you should verify that a particular herbicide is still labeled for your intended use. At the time of this writing, copies of most herbicide labels and Material Safety and Data Sheet (MSDS) could be obtained online at the Crop Data Management System web site ([www.cdms.net/manuf/manuf.asp](http://www.cdms.net/manuf/manuf.asp)). Others are available through the individual manufacturer's web site. Ohio State University Extension and the Ohio Division of Forestry do not endorse any of the products mentioned and assume no liability resulting from the implementation of these recommendations.

<sup>1</sup>Comments are not intended to be a substitute for the herbicide labels. To ensure the safe and effective use of the herbicides recommended in this publication, read the label and MSDS.

**Table 2. Herbicides recommended for basal spraying of autumn and Russian olive.**

Common Name	Example Brand Names	Comments <sup>1</sup>
triclopyr	Garlon 4, Garlon 4 Ultra, Tahoe 4E, Remedy	20% Garlon 4 + 10% penetrate (e.g. Cide-Kick II) in diesel oil, fuel oil, kerosene, or basal oil (penetrate not needed with basal oil).
	Pathfinder II	Apply full strength as would an oil-carried herbicide.
imazapyr	Chopper, Stalker	8–12 oz. in a gallon of diesel oil or penetrating oil.
2,4-D + triclopyr	Crossbow	4% Crossbow in diesel oil, fuel oil, or kerosene.

**Table 3. Herbicides recommended for cut-stump treatment of autumn and Russian olive.**

Common Name	Example Brand Names	Comments <sup>1</sup>
glyphosate	Roundup, Accord, and others; (choose product with 20% active ingredient)	Apply 20% glyphosate mixed in water to outer third of cut stem/stump surface immediately after cutting (timing is critical).
triclopyr	Garlon 3A, Tahoe 3A	Apply full strength.
	Garlon 4, Garlon 4 Ultra, Tahoe 4E, Remedy	20% in basal oil, fuel oil, diesel, or kerosene.
	Pathfinder II (a ready-to-use product)	Apply full strength.
imazapyr	Chopper, Stalker	Apply 8–12 oz. in a gallon of penetrating oil or diesel oil.
2,4-D + triclopyr	Crossbow	Apply 4% Crossbow in diesel oil, fuel oil, or kerosene.
picloram + 2,4-D	Tordon RTU, Pathway	Apply full strength.
	Tordon 101	Apply Tordon 101 diluted 1:1 with water.



Figure 5. Autumn olive shrub.  
 Credit: James H. Miller, USDA Forest Service, [bugwood.org](http://bugwood.org)

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