Department of
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Woodland Invasive Plant Management Series:
Autumn Olive

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Autumn olive was introduced from Asia in the 1800s and was promoted for many years for erosion control, as a windbreak, and to create wildlife habitat. Since that time, autumn olive has invaded much of eastern North America. While it is most problematic on reclaimed mining sites, it can colonize a diverse range of habitats including closed canopy forests.

IDENTIFICATION

Form:

- Autumn olive is a deciduous shrub that can grow up to 20 ft. tall.
- Large plants may resemble small trees, but typically their form has many branches arising from near the base of the plant with a spreading canopy (Fig 1).
- Twigs are silvery or golden brown, often with prominent spines.

Leaves:

- Leaves have a distinctive silvery underside. The upper leaf surfaces are dark green (Fig 3).
- Leaves are alternate, smooth, and have short petioles.
- Leaf length can vary widely, from <.5 inches to 3 inches.

Fruit and flowers:

- Autumn olive produces small clusters of fragrant tube-shaped yellowish flowers that bloom from April through May (Fig 4).
- Abundant red berries that are edible form on the plant in the fall (Fig 5).
- When examined closely, these berries are dotted with small brown to silvery scales.

Similar plants:

- Russian olive (Elaeagnus angustifolia) is a closely related invasive species (Fig. 6). While Russian olive is more common in western North America and autumn olive is more common in eastern North America, they can be distinguished by:
  - Leaves: Russian olive has narrower, lance-shaped leaves that are at least three times as long as they are wide. In addition, Russian olive leaves have silvery scales on both the upper and lower surfaces.
  - Fruit: Russian olive berries are yellow-brown when mature.

Figure 1. Autumn olive may grow up to 20 ft. tall but typically retains a shrubby, densely branching form. *Photo credit: Chris Evans, University of Illinois, Bugwood.org*

Figure 2. The twigs of autumn olive may have large spines.
Photo credit: T. Davis Sydnor, The Ohio State University, Bugwood.org

Figure 3. The silvery undersides of autumn olive leaves are a key distinguishing feature.
Photo credit: James H. Miller, USDA Forest Service, Bugwood.org

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Figure 4. Autumn olive flowers.
Photo credit: Kathy Smith, Ohio State University Extension, Bugwood.org

Figure 5. Autumn olive berries. *Photo credit: Pennsylvania Department of Conservation and Natural Resources - Forestry, Bugwood.org*

Figure 6. Russian olive, a relative of autumn olive, has leaves that are silvery on the upper surface as well as the lower surface.
Photo credit: Paul Wray, Iowa State University, Bugwood.org

Figure 7. Thorny olive is another invasive species related to autumn olive.
Photo credit: Nancy Loewenstein, Auburn University, Bugwood.org

- Thorny olive *(Elaeagnus pungens)* is another closely related invasive shrub species. This species can be distinguished by its evergreen leaves and because it typically blooms in the fall and produces fruit in the spring and early summer (Fig. 7).

RANGE AND HABITAT

Autumn olive is widely distributed across eastern North America and can tolerate many different habitat conditions (Fig 8). However, it appears most frequently in disturbed areas and early-successional habitats. In Kentucky, autumn olive is particularly common and problematic on reclaimed mining sites as it is tolerant of the poor soils and low pH soil conditions often found in these areas. It grows most vigorously in full sun but is somewhat shade tolerant.

THREAT

Autumn olive can rapidly form dense stands that outcompete and shade out native plants. One of the reasons for this is that autumn olive has a mutualistic relationship with nitrogen-fixing bacteria. This gives autumn olive access to nitrogen in environments where it is otherwise limited, providing it a competitive advantage over native plants, particularly those adapted to low-nutrient environments that do not grow as rapidly. In addition to the negative effects autumn olive has on native plant communities, it is also thought to impact wildlife.

While some wildlife might benefit from the cover it provides—and it was promoted as a wildlife species for years—it changes both habitat structure and food availability. For example, birds eat its berries which, despite being produced in large numbers, are low in nutrients compared to native plants that fruit at the same time of the year.

SPREAD

Autumn olive produces abundant seeds that are widely distributed over long distances by the birds and mammals that eat them. A large plant can produce up to 66,000 seeds each year and plants start producing fruit when they are 3-5 years old. In addition to being broadly spread by birds, autumn olive is sometimes planted in home-landscape settings due to its ornamental silver-colored leaves and tolerance of poor conditions.

MANAGEMENT

In cases where autumn olive occurs as a few scattered bushes, management approaches are focused on eradicating plants and preventing seed production. However, as is frequently observed on reclaimed mining sites, dense monocultures of tall autumn olive will require different management approaches. Regardless, highly conducive sites should be frequently monitored for new arrivals and treatments repeated as necessary.

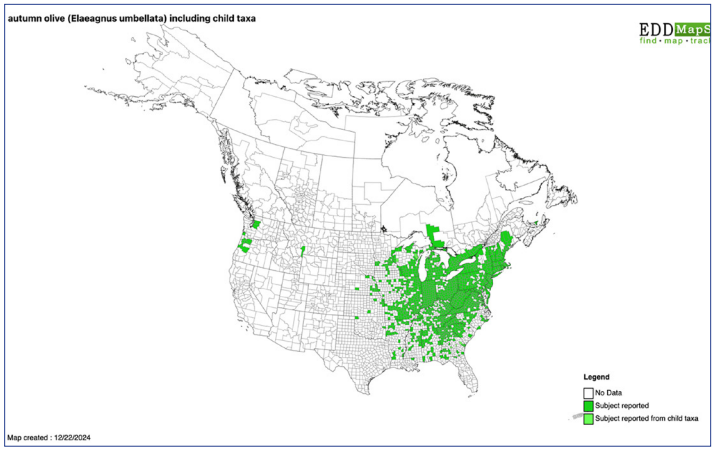

Figure 8. Map of autumn olive distribution. *Photo credit: EDDMapS. 2024. Early Detection & Distribution Mapping System. The University of Georgia Center for Invasive Species and Ecosystem Health. Available online at http://www.eddmaps.org/; last accessed December 23, 2024.*

Seedlings and small shrubs (less than six to eight feet tall):

Hand Pulling and Cutting:

- Small seedlings can be pulled up manually, which is most easily done when soil is moist. However, this will only be effective if the complete root system is removed; otherwise, autumn olive will re-sprout rapidly. Mowing, cutting, burning, or grazing the above-ground portion of trees alone is typically ineffective as plants will rapidly re-sprout and grow back even denser than they were initially.

  However, these practices can be beneficial in keeping seedlings from growing larger and reducing seed production. Regular cutting, burning, or grazing by goats (repeated multiple times during each growing season) may weaken plants and kill them over time.

Foliar Spray:

- Foliar herbicide spray with a backpack sprayer is ideal for plants that cannot be pulled up manually, and preferred timing is April to October. Use recommended rates for foliar application (e.g. leaf surfaces until runoff) and follow all recommended safety precautions. Backpack sprayers with cone nozzles are commonly used for this application.

  Most herbicides will be more effective if a surfactant is added to the mixture (see Table 1 for more information). Broadcast foliar treatment, especially in combination with other methods such as bush-hogging or burning, can be an effective management strategy for large populations where desirable plants will not be affected.

Large Shrubs or Small Trees:

Cut Stump Treatment:

- Cut stump treatments (Fig.11), where trees are cut down and herbicide is applied to the cut stump, can be effectively employed for much of the year. Cut the stem and apply any of the listed herbicides as the label specifies for cut stump treatment. Typically, herbicides are applied with a backpack sprayer or handheld spray bottle. For water-soluble herbicide mixtures, stumps should be treated when freshly cut (the sooner the better) to facilitate efficient uptake by the plant. Allowing the cut surface to dry will reduce herbicide effectiveness.

Figure 9. Foliar spray
Photo credit: Steve Manning, Invasive Plant Control, Bugwood.org

Table 1. List of some commonly used herbicides for autumn olive[1]

Active Ingredient	Common Brands	Treatment	Cautions
glyphosate	Roundup™, Accord™, and others[2]	foliar, cut stump (fresh), hack and squirt	• Make sure that you follow label directions. • Mix and apply the chemical in the proper manner and at the recommended times. • Protect your eyes during mixing and application (where necessary) and check label for personal protective equipment and other precautions.
triclopyr-amine	Garlon 3a™	foliar, cut stump (fresh), hack and squirt	
triclopyr-ester	Garlon 4™	basal bark, cut stump (fresh and dry)	
Picloram/2,4-DTM	Pathway™	foliar, cut stump (fresh), hack and squirt	
[1]Other herbicide brands and formulations can be used for autumn olive control. The herbicides that are listed are those that have widespread use in forestry settings.			

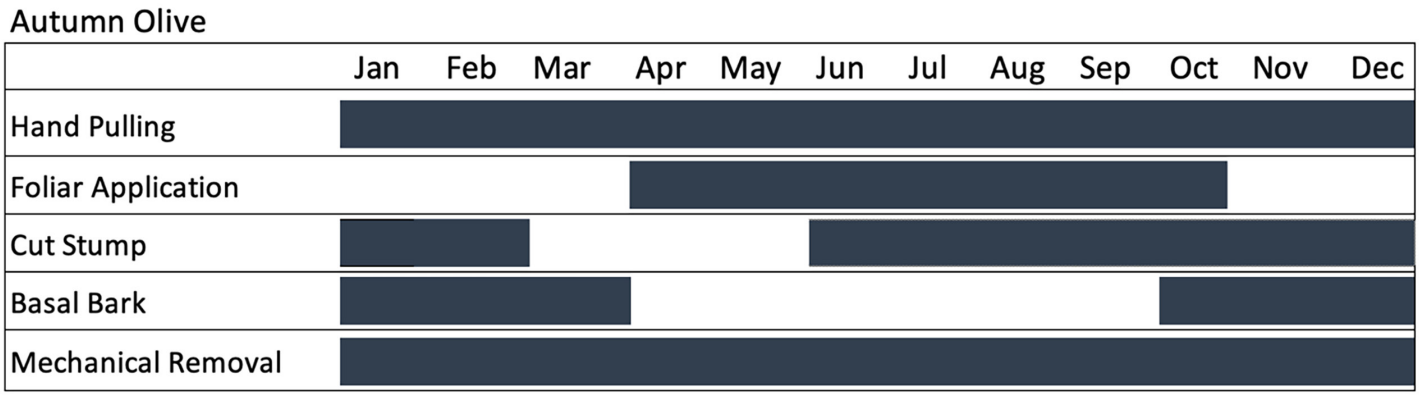

Figure 10. Timeline for autumn olive management practices.[1]

[1]A note that this is a general calendar of recommended autumn olive management practices based on plant development at different times of year. Since timing varies in different locations (and in different years), it may not apply precisely to autumn olive in your specific location.

The time window is much wider for applying oil-soluble herbicides, anytime between cutting and resprouting. In settings where non-target effects of herbicide are a major concern, care must be taken to ensure that the herbicide is applied only to the cut surface. This can be accomplished by adjusting spray nozzles so they spray only a narrow stream and reduce the spray pressure, or by painting herbicide onto cut stumps with a dauber (e.g., Buckthorn Blaster). This method should not be used in late winter or early spring prior to or at leaf-out, as sap rising at this time will reduce the amount of herbicide taken up by the plant. Because clumps can be thorny, take care when using this method and wear eye protection.

Basal Bark Spray:

- Basal bark treatments can be effective in controlling autumn olive and can be applied much of the year, as long as the ground is not frozen or temperatures are not so high that herbicide volatilization is a concern. Basal bark treatment typically uses a mixture of triclopyr ester formulation and basal oil, which should be applied to the entire circumference of the lower 12 inches of the stem. Because clumps can be thorny, take care when using this method and always wear eye protection.

Mechanical removal plus foliar spray of resprouts:

- If autumn olive is growing in a monoculture and no other desirable plants are nearby, you may consider cutting and/or bulldozing as an effective method for removing large swaths of the plant. In this method, mechanical removal (Fig.12) (for example with a Bush Hog, bulldozer, skid-steer, and forestry mulching attachment) is followed several months later with a foliar spray of the stump sprouts at or near the end of the growing season (around late fall). This time lag allows for enough leaf area to be present to provide for effective control. If initial mechanical removal is not followed with herbicide, autumn olive will rapidly resprout to form a dense thicket.

Follow-up:

- After initial management, follow-up visits are needed to ensure that treated shrubs die and new seedlings do not establish. Re-establishment can happen quickly, and a combination of management practices may be required to completely kill all plants.

Figure 11. Cut stump treatment
Photo credit: Ellen Crocker, University of Kentucky

Figure 12. Mechanical removal
Photo credit: Chris Evans, University of Illinois, Bugwood.org

NATIVE ALTERNATIVES TO AUTUMN OLIVE

- Wild plum, *Prunus americana*: Small tree with white flowers in the spring, wildlife eat fruit, may spread clonally.
- Sumacs, *Rhus sp.*: Small tree that spreads clonally, nice fall color, erosion control, red fruit favored by birds.
- American hazelnut, *Corylus americana*: Small tree, nice fall color, wildlife eat nuts.
- Winterberry, *Ilex verticillata*: Shrub with ornamental fruit that attracts birds.
- Inkberry, *Ilex glabra*: Evergreen shrub that spreads clonally and appreciates moist-wet soil.
- Spicebush, *Lindera benzoin*: Shrub with yellow flowers in the spring, wildlife eat fruit.

Figure 13. Wild Plum, *Prunus Americana's* small white flowers. *Photo credit: Adobe Stock*

RESOURCES

If you have questions on invasive plant identification or management, contact:

- Your local Kentucky Division of Forestry forester: https://eec.ky.gov/Natural-Resources/Forestry/Documents/2018%20reorg%20field%20office%20contact.pdf
- Your county extension agent: http://extension.ca.uky.edu/county
- Kentucky Invasive Plant Council: https://kyinvasiveplants.wildapricot.org/

If you are looking for assistance in managing your invasive plants, contact:

- A consulting forester: https://kacf.org/
- A technical service provider: https://www.nrcs.usda.gov/wps/portal/nrcs/main/ky/technical/cp/tsp/
- Your local Natural Resource Conservation Service agent. The service has several cost-share programs that support invasive plant management: https://offices.sc.egov.usda.gov/locator/app

REFERENCES

https://www.fs.fed.us/database/feis/plants/shrub/elaumb/all.html#65

This publication is a part of the Woodland Invasive Plant Management Series designed to provide information on the identification and management of invasive plants in forests and other natural areas for professionals and landowners.

This series is edited by Drs. Ellen Crocker and Jacob Muller, University of Kentucky, Forestry and Natural Resources.

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