

## CONTROL OF INVASIVE PLANTS

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Introduction: Invasive plant species have become the pervasive issue in forest management in Southern Wisconsin. A majority of our woodlands have become infested with plants that are invasive and undesirable. Some of the most troublesome plants are not even native to Wisconsin, or North America. How did they get here? Most were brought here purposely, by humans, either as ornamentals or for some other human benefit. Why are they a problem? These plants have the potential to invade wild areas, outcompete native species, and degrade habitats. Some species may cause extensive ecological damage. In our forests, the diversity of herbaceous and woody plants is reduced when an invasive herb or shrub takes over the forest floor. Natural regeneration of trees is inhibited by this competition. Native birds, animals and insects that rely upon seasonal diversity of leaves, seeds and berries may not find that these substitute plants meet their needs.

Control of these plants is usually expensive and labor-intensive. In some cases, cost-sharing may be available for private landowners to help defray these expenses. There may also be private contractors available for hire to conduct control of invasive plants.

Following are individual pages for some of the most common invasive plants. Information is included on various control methods, including mechanical (cutting or pulling the plants by hand or with tools or power equipment), chemical (using appropriate herbicides), use of prescribed burning (with caution) or a combination of these practices.

For information on identification of these plants and on their origins and life cycles, please refer to the DNR website (<http://dnr.wi.gov/org/land/er/invasive/>), or contact your local DNR or NRCS office.

The judicious use of the right herbicide can save years of repeated mechanical control of persistent plants. Remember that it is your responsibility to use chemicals according to label directions and with caution. Keep in mind that some of the recommended herbicides have forestry or right-of-way labels rather than agricultural labels. This means that they may not be available through local farm co-ops or agricultural dealers. Information on sources for herbicides is included with this packet.

Forest Certification provides assurance that forests are being managed to the highest environmental and social standards. In Wisconsin, State-owned lands and most privately owned lands enrolled in the Managed Forest Law programs follow the certification standards set by the Forest Stewardship Council. The recommendations in this document are intended to include only those practices and pesticides considered acceptable according to FSC guidelines. You are encouraged to verify that any pesticides you may consider using are not prohibited by Forest Stewardship Council.

[http://dnr.wi.gov/topic/TimberSales/documents/FSC\\_prohibited\\_pesticides.pdf](http://dnr.wi.gov/topic/TimberSales/documents/FSC_prohibited_pesticides.pdf)

## BUCKTHORNS

Common buckthorn (*Rhamnus cathartica*)

Glossy buckthorn (*Rhamnus frangula*)

Cutting alone will not control these shrubs! Buckthorn will resprout vigorously, no matter what time of year it is cut. Cutting can be a tool to remove large, seed-bearing plants, but treatment of the cut stump with an appropriate herbicide is needed to kill the root system.

**Basal bark spraying** is the most cost-effective method to selectively remove buckthorn from an area. Individual stems six inches or less in diameter can be sprayed on the stem of the standing plant. Spray from the base of the plant to a height of 12 to 15 inches from the ground. A low pressure backpack sprayer works well for this job. This can be done anytime of year, except when snow or water (flooding) prevent spraying to the ground line. Stems six inches or more in diameter should be girdled or frilled (to expose cambium) and then sprayed. Fall and winter is a good time to do this spraying, since other plants are dormant and the leaves and bugs are gone. Keep in mind that buckthorn treated in the fall or winter may leaf out briefly in the spring while the herbicide is working its way through the plant.

### Recommendations:

#### Basal bark and cut stump spraying-

**Garlon** - Using diesel fuel, fuel oil, kerosene or a commercial bark oil diluent, mix a 12½ % solution of Garlon 4 (also sold as Tahoe 4 and Element 4, active ingredient triclopyr). For a four gallon backpack tank this would be ½ gallon of herbicide plus 3½ gallons of diluent.

**Pathfinder II** - This is triclopyr in a ready-to-use (RTU) form with soybean oil. It can be used for basal bark and cut stump treatment of buckthorn.

#### Foliar treatments -

**Garlon** - Use a solution of 2% triclopyr (such as Garlon 4 Ultra), with water and a surfactant during the growing season. This method will kill all broadleaf plants and non-target plants can be damaged or killed due to drift. This method is most appropriate for a large number of seedling buckthorn plants (i.e. seedbank origin plants).

#### Mechanical Methods -

**Pulling** - Small plants (less than ½ inch in diameter) can be pulled out by hand. This works especially well when the soil is moist. Larger plants (½ to 1½ inch diameter) can be pulled using a mechanical device (e.g. "Weed Wrench") or by hand digging. Beware that excessive soil disturbance may cause erosion and may encourage germination of seed origin buckthorn and other weed species!

**Prescribed Fire** - Smaller plants (seedling to 1 inch) can be killed by spring or fall burns, but larger plants usually survive. Fire is best used in fire-adapted communities such as prairies and savannas. Burning should only be done using the advice of an expert consultant and following local ordinances and permit processes!

## HONEYSUCKLES

Exotic Bush Honeysuckles - *Lonicera tatarica*, *Lonicera morrowii*, *Lonicera x bella* and others

Cutting alone will not control these shrubs! Bush honeysuckles will resprout vigorously, no matter what time of year they are cut. Cutting can be a tool to remove large, seed-bearing plants, but treatment of the cut stump with an appropriate herbicide is needed to kill the root system. Foliar or cut stump treatments have proven to be the most effective control methods for honeysuckle. If you choose to use the foliar spraying method, early spring spraying is recommended. Honeysuckle is one of the first plants to leaf out in the spring. Spraying prior to the emergence of native shrubs and ground plants is the safest time to spray to avoid impact to native species. Remember that treatments should be repeated for 3 to 5 years in order to control new plants emerging from the seed bank in the soil.

### Recommendations:

#### Foliar treatments -

**Escort XP** (metsulfuron methyl) - Mix a stock solution of 2 ounces of Escort XP per gallon of water and use 10 ounces of the stock solution per 3 gallons of water to mix each tank as needed. This solution needs to be agitated regularly.

**Glyphosate** - Use a 5% **glyphosate** (Roundup, Accord) solution for foliar treatment of honeysuckle, but beware of non-target plants (including grasses).

#### Cut stump treatments -

**Escort XP** at 1 ounce per gallon

**Glyphosate** - Use a 50% solution of glyphosate and water on fresh cut stumps.

#### Mechanical Methods-

**Pulling** - Since the plants are fairly shallow-rooted, this can work well. Small to medium-sized plants can be dug or pulled, especially when the soil is moist. Larger plants can be pulled using a mechanical device (e.g. "Weed Wrench" or mattock) or by hand digging. Beware that excessive soil disturbance may cause erosion and may encourage germination of seed origin honeysuckle and other weed species!

**Prescribed Fire** - Small plants can be killed by spring or fall burns, but larger plants usually survive. Fire is best used in fire-adapted communities such as prairies and savannas. Burning should only be done using the advice of an expert consultant and following local ordinances and permit processes!

## MULTI-FLORA ROSE

### Rosa multiflora

These shrubs are just plain nasty to deal with! It's easy to see how they got their nickname of "the living fence". Mowing with heavy equipment can be effective, if followed up with chemical treatment of the cut stumps and/or resprouts. Be careful of thorns that may puncture tires! Hand cutting with a chainsaw or brush cutter is not for the faint of heart and may require a suit of armor for the operator! Chemical methods can be effective, but remember that each plant can produce up to 500,000 seeds per year, so follow-up treatments will be needed. Basal bark spraying requires applying herbicide to the bases of the stems to 12 to 15 inches above the ground. Getting to the bases of the plants can be a challenge for large, spreading plants.

#### **Recommendations:**

##### **Foliar treatments -**

**Escort XP** (metsulfuron methyl) - Mix a stock solution of 2 ounces of Escort XP per gallon of water and use 5 ounces of the stock solution per 3 gallons of water to mix each tank as needed. This solution needs to be agitated regularly.

**Glyphosate** - Use 3 ounces **glyphosate** (Roundup, Accord) per gallon of water for foliar treatment, but beware of non-target plants (including grasses).

**Garlon** - Use 2 to 3 ounces of **Garlon 4** (or Tahoe 4 or Element 4), active ingredient triclopyr, plus surfactant per gallon of water. Remember that the foliar applications must be made during periods of active plant growth.

##### **Basal bark and cut stump spraying-**

**Garlon** - Using diesel fuel, fuel oil, kerosene or a commercial oil diluent, mix a 12½ % solution of Garlon 4, Tahoe 4, or Element (active ingredient triclopyr). For a four gallon backpack tank this would be ½ gallon of herbicide plus 3½ gallons of diluent. This mixture can be used for basal bark spraying and cut stump treatment.

**Glyphosate** (Roundup, etc.) - A 10 - 20% solution of glyphosate can be applied to the cut stems or canes.

##### **Mechanical Methods-**

**Mowing** - Mowing with a large brush mower is effective, but non-selective. Beware of thorns and tires.

**Prescribed Fire** - Plants can be killed by persistent spring or fall burns, but this is often not practical. Fire is best used in fire-adapted communities such as prairies and savannas. Burning should only be done using the advice of an expert consultant and following local ordinances and permit processes!

## BLACK LOCUST

### *Robinia pseudoacacia*

This tree is not native to Wisconsin, but was planted extensively and thus has become naturalized, spreading by underground stems, often forming dense, thorny thickets. Annual mowing may slow the spread of a thicket into a grass community (such as a prairie). Basal bark and cut stump spraying seem to be the most selective and cost-effective control methods for black locust. The extensive, interconnected root systems allow the herbicide to be spread effectively over a large area.

#### **Recommendations:**

##### **Basal bark and cut stump treatments-**

**Garlon** - Using diesel fuel, fuel oil, kerosene or a commercial oil diluent, mix a 12½ % solution of Garlon 4, Tahoe 4 or Element 4 (active ingredient triclopyr). For a four gallon backpack tank this would be ½ gallon of herbicide plus 3½ gallons of diluent. Apply to basal bark or cut stumps.

**Transline** - Mix 6 ounces of Transline (active ingredient clopyralid) per gallon of oil diluent (such as Bark Oil) and apply to basal bark.

##### **Cut stump treatments-**

**Transline** - Mix 6 ounces of Transline (active ingredient clopyralid) per gallon of water and apply to cut stumps within 30 minutes of cutting. For cuts older than 30 minutes, add Bark Oil.

**Milestone VM**- Mix 4 oz of Milestone per gallon of water and treat freshly cut stumps (no longer than 30 minutes after cutting!)

**Glyphosate** - Use a 20% active ingredient solution to treat stumps immediately after cutting.

##### **Foliar treatments -**

**Transline** - Mix 16 ounces of Transline per 50 gallons of water (plus a surfactant) and apply to actively growing foliage.

**Milestone VM** - Mix 7 oz of Milestone per 50 gallons of water with an appropriate surfactant (such as "Tactic") and apply to actively growing foliage.

**Glyphosate** - Mix a 4% solution with water and apply to actively growing foliage. Remember that glyphosate is non-selective, so avoid spray or drift to desirable plants.

##### **Mechanical methods-**

**Mowing or Cutting** - Don't bother cutting unless you can follow up with herbicide treatment of the cut stumps. Mowing only works where you can continue to mow indefinitely. Mowing also tends to promote seed germination. Girdling will kill individual stems, but encourages the formation of suckers.

**Prescribed Fire** - Prescribed fire tends to stimulate sprouting.

## GARLIC MUSTARD

### Alliaria petiolata

This herbaceous (non-woody) plant can spread rapidly in both sun and shade. Stands can become so dense that native plants on the forest floor can be shaded out in just a few years. Garlic mustard plants also release chemicals harmful to a soil fungus that hardwood trees depend on for growth and survival. This plant is a biennial, meaning each plant has a two-year growth cycle. The first year it is a small plant, 2" to 6" tall with rounded to kidney-shaped leaves with scalloped edges. The second year the plant grows quickly to a height of 1' to 4', producing small white flowers from late April to early June. The plants die once the seeds are dispersed (100+ per plant!) in July or August. Any control method will need to be repeated for several years in order to deplete the seed bank in the soil.

### **Recommendations:**

#### **Herbicide treatments-**

**Glyphosate** - Use a 3% solution mixed with water as a foliar spray. Because glyphosate is nonselective, spraying in October or in early spring when most other plants are dormant will avoid injury to nontarget plants.

**Garlon (triclopyr)** - foliar treatment with 2 to 3% Garlon or Crossbow (as directed for mustard control) should also be targeted for late fall or early spring to avoid damaging nontarget plants.

**Oust XP** - Apply at 1.5 oz per acre for heavy infestations. This will also kill newly germinating plants, so beware of nontarget species. Mix a stock solution of 2 oz Oust (active ingredient sulfometuron methyl) in 1 gallon of water. Then mix 7.5 oz of the agitated stock solution per 3 gallons of spray solution.

#### **Mechanical methods-**

**Pulling** - Hand pulling can be effective for small infestations or where a large workforce is available. If flowering has begun, pulled plants must be bagged and removed from the site. Tamping the soil after pulling will discourage seed germination.

**Cutting or mowing** - Cutting flowering plants at ground level has proven to be very effective. Remove the cut plants from the area to prevent further seed dissemination.

**Prescribed Fire** - First year plants are killed by fire, but the bare soil enhances the survival of the seedlings that germinate after the fire. Fire is best used in fire-adapted communities such as prairies and savannas. Three to five years of burning are required, often with additional hand pulling and/or cutting. Burning should only be done using the advice of an expert consultant and following local ordinances and permit processes!

## BOXELDER

Boxelder, ash-leaved maple (*Acer negundo*)

Although this tree is native to Wisconsin, it is often invasive due to its prolific seed production, its shade tolerance and its ability to send up many vigorous resprouts when cut. Cutting can be a tool to remove large, seed-bearing plants, but treatment of the cut stump with an appropriate herbicide is needed to kill the root system. Boxelders are dioecious, meaning the individual plants are either male or female. From about August through much of the winter you can identify the female trees by the clusters of seeds (called keys, samaras or those "winged helicopters"). If you are concerned about controlling the spread of these trees into nearby fields, prairies or open land, you should concentrate your initial efforts on controlling the seed production of the female trees. Either cut or girdle these trees first to stop the spread of seeds. Basal bark spraying is the most cost-effective method to selectively remove boxelder from areas where they are mixed with desirable trees. Individual stems six inches or less in diameter can be sprayed on the stem of the standing plant. Spray from the base of the plant to a height of 12 to 15 inches from the ground. A low pressure backpack sprayer works well for this job. This can be done anytime of year, even when snow prevents spraying to the ground line, as long as you can spray the 12 -15 inch band below the first branch (called stem banding). Stems six inches or more in diameter should be girdled or frilled (to expose cambium) and then sprayed. Where fields have been invaded by boxelder, the treatment to eliminate the trees will depend on their size. For small trees less than 2 feet tall, foliar spraying with a broadleaf herbicide will selectively kill the boxelder without harming grasses. Be aware that other broadleaved plants (forbs, shrubs and trees) will also be killed. If the trees are larger, more than 2 feet tall but less than 1½ inches in diameter, a "brush hog" style mower can be used to cut the trees, followed by spraying with a broadleaf weed killer when the trees resprout from the cut stubs. For large trees (greater than 2 inches in diameter), the trees will need to be hand cut and stump sprayed or basal bark sprayed (6 inches in diameter and less). If you need to do this work once, it's unlikely you will let it get to that point again.

### Recommendations:

#### Basal bark and cut stump spraying-

**Garlon** - Using diesel fuel, fuel oil, kerosene or a commercial bark oil diluent, mix a 10% solution of Garlon 4, Element 4 or Tahoe 4 (active ingredient triclopyr). For a four gallon backpack tank this would be 0.4 gallon of Garlon or Tahoe 4 plus 3.6 gallons of diluent. **Pathfinder II** is triclopyr in a ready-to-use (RTU) form. It can be used for basal bark and cut stump treatment of boxelder.

**Crossbow** - This is a mixture of triclopyr and 2,4-D. Mix it as a 25% solution with an oil-based diluent for basal bark or cut stump treatment.

**2,4-D** - This is available under several brand names, sometimes mixed with Dicamba, and is available at most hardware and farm supply and garden stores. Make sure you use the ester formulation for cut stump or basal bark treatment. Keep in mind that you may need to conduct follow-up treatment as this active ingredient is less effective than triclopyr.

#### Foliar treatments -

**Garlon** - Use a solution of 2% triclopyr, with water and a surfactant during the growing season. This method will kill all broadleaf plants and non-target plants can be damaged or killed due to drift. This method is most appropriate for a large number of seedling boxelders (i.e. field invasion from fencerow trees).

**Crossbow** - Mix a 4% solution with water as a foliar spray during the growing season. Watch out for non-target plants.

#### Mechanical Methods -

**Mowing or Cutting** - Depends on the size of the trees. See recommendations in the paragraph above.

**Girdling** - Chainsaws can be used to cut or girdle larger trees. When girdling trees, make **two** rings, at least one inch deep, and three inches apart, completely encircling the tree. The girdle cuts need to be treated with an appropriate herbicide to kill the root system.

**Prescribed Fire** - Smaller plants (seedling to 1 inch) can be killed by spring or fall burns, but larger plants usually survive. Fire is best used in fire-adapted communities such as prairies and savannas. Burning should only be done using the advice of an expert consultant and following local ordinances and permit processes!

## **STOCK SOLUTION RECIPES FOR MIXING ESCORT AND OUST FOR SMALL APPLICATIONS**

Oust and Escort are used in very small concentrations - literally ounces per acre. Therefore it is necessary to mix your spray solution from a more concentrated stock solution to avoid over-applying these herbicides.

**Escort or Oust Stock Solution Recipe:** (courtesy of Rick Schulte, Crop Production Services)

Fill gallon container with 1/2 water

Add 2 oz **Escort XP** or **Oust XP**

Shake container

Add 4 oz **Ammonia**

Shake container— watch for color change

Add 16 oz **Activator 90 surfactant**

Add remaining water to 1 gallon - Shake container

### **For Escort XP**

→ If you are spraying multiflora rose or wild parsnip, use 5 oz of Escort stock solution per 3 gallons of water.

→ If you are spraying honeysuckle, buckthorn, barberry or black locust, use 10 oz of Escort stock solution per 3 gallons of water.

### **For Oust XP**

Mix 5 oz of the stock solution per 3 gallons of spray solution for 1 oz per acre.

## Possible Sources for Forestry/Right-of-Way Herbicides

This is not to be construed as an endorsement or recommendation by the DNR for any business or firm, nor is exclusion implied as criticism.

### CPS (Crop Production Services)

888-495-8840

ProSource One

800-327-9066

507-932-5026

Prochem, LLC

888-968-7192

Hammil Farm Center

Milton, WI

608-868-4326

(Garlon)

Dvorak Landscape Supply

Janesville, WI

608-757-0561

(Garlon)

## Possible Sources for Backpack Sprayers

Ben Meadows Co.

1-800-241-6401

[www.benmeadows.com](http://www.benmeadows.com)

Forestry Suppliers, Inc.

1-800-647-5368

[www.forestry-suppliers.com](http://www.forestry-suppliers.com)

Gempler's

1-800-382-8473

[www.gemplers.com](http://www.gemplers.com)