Acknowledgements

Author:
John Harrod, Delaware Nature Society

Reference:
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Project participants:
Sue Barton, University of Delaware
Valann Budischak, University of Delaware
Jen Gochenaur, Delaware Nature Society
Faith Kuehn, Delaware Department of Agriculture
Gary Schwetz, Delaware Center for Horticulture

Photographs provided by:
Olin Allen
Dave Pro
Jim White
Susan Barton

Graphic design by:
Carrie Finnie

Funding provided by:
National Urban and Community Forestry Advisory Council (NUCFAC)

Supported by:
Delaware Center for Horticulture
Delaware Department of Agriculture
Delaware Invasive Species Council
Delaware Nature Society
Delaware Nursery and Landscape Assoc.
University of Delaware

Plants for a Livable Delaware

controlling
Backyard Invaders

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What are Invasive Plants?

Invasive plants quickly overwhelm and displace existing native plants by reducing the availability of light, water, nutrients and space. They have few, if any, natural controls to keep them in check. Ecologists now rank invasion by exotic plants, animals, and pathogens second only to habitat loss as a major threat to local biodiversity.

Invasive plants may be introduced by accident or intentionally to control erosion, provide wildlife food and habitat, or for ornamental value in gardens. Accidental introductions occur when people and goods travel worldwide. Packing material can harbor seeds or plant parts. Japanese stilt grass, now a widely escaped groundcover in woodland edges, is a prime example.

Invasive plants can be divided into two categories—(1) plants that were introduced either intentionally or accidentally but are no longer sold (i.e. multiflora rose, stilt grass) and (2) ornamental plants still grown and sold.

This brochure focuses primarily on invasive plants no longer sold. The goal is to guide home and property owners in the identification and control of aggressive invasive plants. Not only will control improve the diversity of native and non-invasive plants, but it will also improve habitat and help prevent the spread of invasive plants to neighboring areas.

Cover photo background: masses of Autumn olive dominate the vegetation in this Delaware roadside.

Controlling Invasive Plants

Through the Plants for a Livable Delaware effort, a team of scientists, naturalists, and nursery industry professionals identified mechanical and chemical control methods for some of the most aggressive and prevalent invasive plants in Delaware. These control methods are listed in this brochure under the individual invasive plant species.

Whenever possible use mechanical control (i.e. digging, cutting) as your first line of defense. Save chemicals as the last alternative, because their introduction can have long term and/or unintended effects on the environment.

Mechanical control treatment is similar in many plant species. The basic strategy for trees, shrubs, and vines is to cut off the trunk or stem and then remove and/or kill the roots. Although many species will re-sprout from the cut stump or stem, continued cutting of the new growth will eventually "starve" the roots, in most cases. Control herbaceous perennial plants by removing the entire plant, including roots, before flowering. Prevent annual plant seed production by removing plants, or by mowing or clipping flower heads before full bloom and/or seed set. Keep in mind that mowing can also control or eliminate desirable native vegetation, so consider a more selective control method for sites where desirable plants are already dominant. Invasive plants are opportunistic and take over a site by spreading much faster than local native plants, especially when soil, drainage, and light patterns are disturbed. Avoid creating excessive disturbance to plants in the immediate area.

If chemical controls are the best solution for your situation, choose an herbicide that is non-persistent in the environment. Follow the manufacturer's instructions. The recommended chemicals for invasive plant control may require assistance from a professional with a pesticide applicator's license, as some of the chemicals are restricted. Contact the of the Delaware Department of Agriculture pesticide section at 302-698-4570 for a list of certified professional applicators.

Sometimes, neither mechanical nor chemical control alone is sufficient, and a combination of controls is necessary. Mechanical control may remove only the top of the plant leaving the roots in place or chemical control may kill the plant but leave unsightly dead stems. An example of a combined control method is cutting a woody plant down to the stump and treating the stump with a systemic herbicide. Systemic herbicides move through a plant's vascular system killing the entire plant.

Before you begin removing invasive plants, it is important to have a plan in place to restore the disturbed habitat. Hedgerows and tangles of vegetation containing invasive plants often are sites of nesting birds and may be havens for small mammals. The best time to remove invasive plants from hedgerows is from September through March when birds are not nesting.

For most effective control of invasive plants covered in this brochure use a 1% solution of Roundup Pro®. In the case of Japanese knotweed, use a 2% solution of Roundup Pro®.

What do I do once I remove invasive plants?

Avoid bare ground. Promptly replant disturbed areas as soon as possible. Use native plants in natural areas and stream corridors, or non-invasive ornamentals in a yard or garden. Acquire native plant lists from the Delaware Nature Society, Delaware Native Plant Society, or the Plants for a Livable Delaware companion booklet, which lists alternatives to invasive plant species. You can also monitor natural succession of native plants to reclaim a vacant space.

Prevent potential erosion problems caused by plant removal by covering any unplanted ground with salt hay, not straw. Salt hay, unlike straw, does not contain weed seeds. Mulch flower beds to cover exposed bare soil and reduce invasive weed seedlings. Maintain the area by controlling any invasive plants that come up, reducing the competition with desirable plants.

Plants for a Livable Delaware is a campaign to identify and promote superior plants that thrive without becoming invasive.

A Livable Delaware plant must

- Possess adaptable characteristics to landscape situations (i.e. drought resistant, tolerant of poor soils, etc.)
- Pose no potential threat as an invasive plant
- Have no serious disease or insect problems
- Be hardy to Delaware

Livable Delaware Plants are identified at some garden centers, public gardens and natural areas in Delaware. They provide safe and desirable alternative to invasive plants.

Plants for a Livable Delaware

Silvery scales of autumn olive

Autumn olive with fruit

Autumn olive flowering

Problem

Autumn olive

(Elaeagnus umbellata)

Autumn olive was originally used for wildlife habitat, erosion control, and as an ornamental. It is a large shrub reaching 20 feet and is spread by seeds. It tolerates drought and poor soil, which allows it to grow in meadows and open woodlands. It creates dense shade and excludes native trees and shrubs.

Identification: The underside of autumn olive twigs and leaves are covered with small silvery scales. It has fragrant small white flowers in spring and red fruits ripening in September and October.

Control: Remove small plants and seedlings by hand. For mature plants, cut trunks and treat fresh cut trunks with a systemic herbicide. Treat new sprouts with herbicide as needed.

Problem

Multiflora rose

(Rosa multiflora)

Originally promoted for erosion control and wildlife cover, multiflora rose is a shrub that spreads by seeds, roots, and layering (the process of rooting branches, twigs or stems still attached to the parent plant). It smothers native vegetation with its dense thickets of arching or trailing thorny stems that grow up to 13 feet tall. It is found in fields, forest, meadows, and riparian areas, and is a dominant component of roadside vegetation.

Identification: Multiflora rose produces numerous fragrant clusters of white flowers in June that form small, red hips (fruits). Twigs are reddish in winter.

Control: Remove plants by digging out the crown (where roots join the stem). Cut stems can be treated with systemic herbicide to kill roots. A glyphosate-based herbicide, like Roundup Pro®, can be applied to foliage in April and May before most native plants have produced leaves.

Multiflora rose invading open space

Multiflora rose flowers

Multiflora rose stem

Multiflora rose hips

Problem

Porcelain berry
(Ampelopsis brevipedunculata)

Porcelain berry was brought to the United States as a landscape plant. It is a woody climbing vine that spreads by seed and through layering. Porcelain berry grows well in dry or moist areas, smothering shrubs and small trees in upland areas and around stream banks and pond margins.

Identification: The leaves and growth habit are similar to grapevine. Porcelain berry has small inconspicuous flowers that turn into smooth fleshy berries in shades of blue, lavender, pink, turquoise, and yellow.

Control: Remove smaller vines and roots by hand. For older plants, cut stems and treat cut trunks with a systemic herbicide.

Porcelian berry leaves

Porcelain berry fruit

Problem

Oriental bittersweet
(Celastrus orbiculatus)

Oriental bittersweet was introduced as an ornamental plant and is still sold in some places today. It is a woody climbing vine that spreads by seeds. It grows in fields, forest edges, and gaps in woodland canopys where it smothers all layers of vegetation from tall trees to small shrubs.

Identification: Small green flowers in leaf axils turn to orange fruits that split open in autumn to reveal fleshy red seeds. It has round smooth leaves and scaly bark.

Control: Remove smaller vines and roots by hand. On older plants, cut trunks and treat with a systemic herbicide to kill the roots.

Oriental bittersweet trunk

Oriental bittersweet fruit

Oriental bittersweet with unripe fruit

Japanese honeysuckle flowering

Japanese honeysuckle fruit

Problem

Japanese honeysuckle

(Lonicera japonica)

Japanese honeysuckle was introduced more than 100 years ago for erosion control and wildlife food and cover. It is a woody trailing or climbing vine that spreads vegetatively and through seeds. It grows in sun to medium shade in disturbed areas including fields and forests, and smothers shrubs and small trees.

Identification: Japanese honeysuckle has white fragrant flowers that age to a yellowish color and semi-evergreen oval leaves. Round black berries develop in late summer.

Control: Remove smaller vines and roots by hand. Mow twice a year, in July and September, to limit vegetative spread. Spray plants with a glyphosate-based herbicide, like Roundup Pro®, in mid-November to early winter when honeysuckle still has green leaves and other plants are dormant.

Problem

Garlic Mustard

(Alliaria petiolata)

Garlic mustard is a biennial (lives two years, normally producing flowers and seeds the second year) herb that was introduced for food and medicinal purposes. Spreading by seed, it grows in shaded woods or on roadsides, displacing native wildflowers.

Identification: Toothed, heart-shaped leaves smell like garlic when crushed. During the first year small rosettes grow close to the ground. In the second year it sends up 1-3' flower stalks with delicate 4-petaled white flowers.

Control: Remove plants by hand during flowering in June and early July to prevent seed production. Destroy flower stalks to prevent seed from forming on plants cast aside. Large patches can be mowed close to the ground while in full bloom to prevent seed development. Spray year one rosettes with a glyphosate-based herbicide, like Roundup Pro®, in mid-November to early winter when other plants are dormant and garlic mustard is still green.

Garlic mustard flowering

Garlic mustard in natural area

Garlic mustard rosettes

Canada thistle with seeds

Canada thistle flowering

Problem

Canada Thistle

(Cirsium arvense)

Canada thistle is an herbaceous perennial that is considered one of the most tenacious agricultural weeds by Canada and the U.S. It grows in full sun in dry, disturbed areas and agricultural fields. Spreading by seeds and roots, it crowds out native meadow vegetation.

Identification: Canada thistle has numerous small purple flower heads on 1' to 5' plants with prickly leaves. The seeds are dandelion-like, white feathery tufts.

Control: Cut or mow down plants in late June when the plant is beginning to flower to prevent seed production. Targeted application of a glyphosate-based herbicide, like Roundup Pro®, or a broadleaf specific herbicide, like Stinger™ or Confront®, is effective. Multiple applications may be necessary.

New growth of Canada thistle

Problem

Japanese Knotweed

(Polygonum cuspidatum)

Japanese knotweed was introduced as an ornamental plant and has been used for erosion control. Knotweed regenerates easily from small vegetative pieces and seeds, quickly forming dense thickets. It is an herbaceous perennial that can grow to over 10' tall and is commonly found in sun or medium shade near water sources and waste areas.

Identification: Japanese knotweed has a hollow stem and large, oval leaves with pointed tips and square bases. Long, lacy clusters of tiny white flowers appear at the end of summer.

Control: Pulling young plants is effective with repeat visits to remove re-sprouts from stem fragments and root pieces. Cutting back in June followed by an application of a glyphosate-based herbicide, like Roundup Pro®, during September and early October is effective. Cutting and covering with black weed plastic may kill small infestations. Control should be repeated over several years to be fully successful.

Japanese knotweed

Japanese knotweed flowering

Japanese knotweed mass

Lesser celandine flowering

Lesser celandine on forest floor

Problem

Lesser Celandine

(Ranunculus ficaria)

Lesser celandine, which was introduced as an ornamental plant and is still commercially available, is an herbaceous perennial also known as fig buttercup. It is predominantly found in moist, forested floodplains. Lesser celandine emerges in early spring before most native spring ephemerals (plants, such as jack-in-the-pulpit, that emerge, bloom and die back during one season). Spreading primarily through bulblets and tubers, it crowds out ephemerals by creating a dense carpet across the ground.

Identification: Lesser celandine grows to 5 inches and has shiny kidney shaped leaves. It looks similar to the native marsh marigold (Caltha palustris) which grows to 24 inches and does not produce tubers or form a continuous carpet of growth.

Control: Remove the entire plant and as many tubers as possible by hand digging for small infestations. For large areas, systemic herbicides formulated for wet areas, like Rodeo™, should be applied in late winter-early spring when it emerges and before other vegetation is showing green. Add a surfactant to help the herbicide adhere to the leaves.

Problem

Stilt Grass

(Microstegium vimineum)

Stilt grass is an annual that probably escaped from its use as a packing material. It grows in full sun to deep shade, crowding out native wildflowers and grasses. Stilt grass prefers moist conditions and spreads vegetatively and by seed, especially in disturbed areas.

Identification: Narrow, elongated leaves are alternately spaced along the fine, sprawling stems that resemble miniature bamboo. Stilt grass can be differentiated from other grasses by the presence of a silver stripe on the midrib of the grass blade.

Control: Remove plants by hand. For large areas, mow in August /September while the plant is in flower to prevent seed production. Monocot (i.e. grasses, sedges, yuccas) specific herbicides may be used in August for extensive infestations when mechanical methods are impractical and when the nearby desirable species are broadleaved plants. Pre-emergent herbicides, applied in early spring, will prevent stilt grass seeds from germinating.

Stilt grass shoots

Stilt grass seed

Stilt grass leaves

Mile-a-minute fruit

Mile-a-minute triangular leaf and barbs

Mile-a-minute with one season's growth

Problem

Mile-A-Minute

(Polygonum perfoliatum)

Mile-a-minute is an herbaceous annual vine that blankets and smothers native vegetation with its rapidly growing trailing stems. It spreads by seed and grows in disturbed, moist areas in sun or part shade. It has been observed overtopping kudzu and Japanese honeysuckle.

Identification: Mile-a-minute has triangular leaves and funnel shaped sheaths that wrap around the stem. It possesses sharp downward pointing barbs, lending to its other common name devil's tear-thumb. It produces a spike of small green flowers followed by round blue berries.

Control: This plant is easily removed by hand in July and August before the seed sets. Use pre-emergent herbicides in the early spring to reduce mile-a-minute seed germination in areas of known infestation.

Problem

Japanese Hops

(Humulus japonicus)

Japanese hops is an herbaceous annual vine that is still currently sold for ornamental and herbal purposes. It is primarily a weed of abandoned fields and open disturbed areas, and rapidly climbs or trails along the ground displacing native vegetation.

Identification: Japanese hops is covered with small velcro-like barbs that are turned downward on the stem. Its leaves can cause dermatitis in sensitive individuals. It looks similar to wild cucumber, which has tendrils and does not have barbs.

Control: Pull plants anytime before September to prevent seed production. When pulling the plants, attempt to remove as much of the rootstock as possible to reduce resprouting. Spot applications of a glyphosate-based herbicide, like Roundup Pro®, prior to flowering, should damage the plant enough so it will not be able to flower and set seed. Japanese hops seed is typically exhausted in three years. The first two years of control will be the most time-consuming. After that, the number of plants will drop dramatically.

Japanese hops leaves

Japanese hops vine

Japanese hops

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Other Threatening Alien Species

In addition to the highly invasive plants pictured in this brochure, the following list of plants, provided by the Delaware Invasive Species Council, are known invasive species. Restricted and invasive plants are equally problematic; however, they have a more localized distribution in Delaware. Some are still sold in many nursery and garden centers. Alternatives to some of these invasive plants still grown and sold can be found in the Plants for a Livable Delaware companion booklet.

Widespread and Invasive

- **Norway maple**
  Acer platanoides
- **Common reed**
  Phragmites australis
- **Hydrilla**
  Hydrilla verticillata
- **Morrow's honeysuckle**
  Lonicera morrowii
- **Sweetautumn clematis**
  Clematis terniflora
- **Privet**
  Ligustrum species
- **European sweetflag**
  Acorus calamus
- **Wineberry**
  Rubus phoenicolasius

Restricted and Invasive

- **Japanese barberry**
  Berberis thunbergii
- **Periwinkle**
  Vinca minor
- **Burning bush**
  Euonymus alata
- **Bradford pear**
  Pyrus calleryana 'Bradford'
- **Marsh dewflower**
  Murdannia keisak
- **Purple loosestrife**
  Lythrum salicaria
- **Reed canarygrass**
  Phalaris arundinacea
- **Amur honeysuckle**
  Lonicera maackii
- **Tartarian honeysuckle**
  Lonicera tatarica
- **Tree of heaven**
  Ailanthus altissima
- **Spotted knapweed**
  Centaurea biebersteinii

Restricted and Potentially-Invasive

- **Butterfly bush**
  Buddleia davidii

Plants for a Livable Delaware companion brochure lists great alternatives to some widely planted invasive species. Pick up a copy at your Delaware Cooperative Extension office (New Castle County, 302-831-2506; Kent County, 302-730-4000; Sussex County, 302-856-7303); The Delaware Department of Agriculture, 1-800-282-8685; The Delaware Center for Horticulture, 302-658-6262; or the Delaware Nature Society, 302-239-2334.