FOREST INVASIVE PLANTS & CONTROL

AGENDA

What is an non-native invasive species

Control options for non-native invasive species

Resources

Summary

INTRODUCTION

WHAT IS AN NON-NATIVE INVASIVE SPECIE

1) non-native (or alien) to the ecosystem under consideration and,

2) Invasive species- introduction causes or is likely to cause economic or environmental harm or harm to human health.

Not all non-native species are invasive (tomatoes).

For our talk: non-native invasive species that causes harm to the environment, economy, or human, animal, or plant health

USE OF CHEMICALS

- If you decide to use herbicides, always read the label first and follow the directions, including all precautions and restrictions.
- Don't use products for pests that are not indicated on the label and don't use more pesticide than directed by the label.
- Don't think that twice the amount will do twice the job.
- Use all protective measures when handling pesticides as directed by the label, such as wearing impermeable gloves, long pants, long-sleeve shirts, and handwashing.

FIND YOUR HERBICIDE

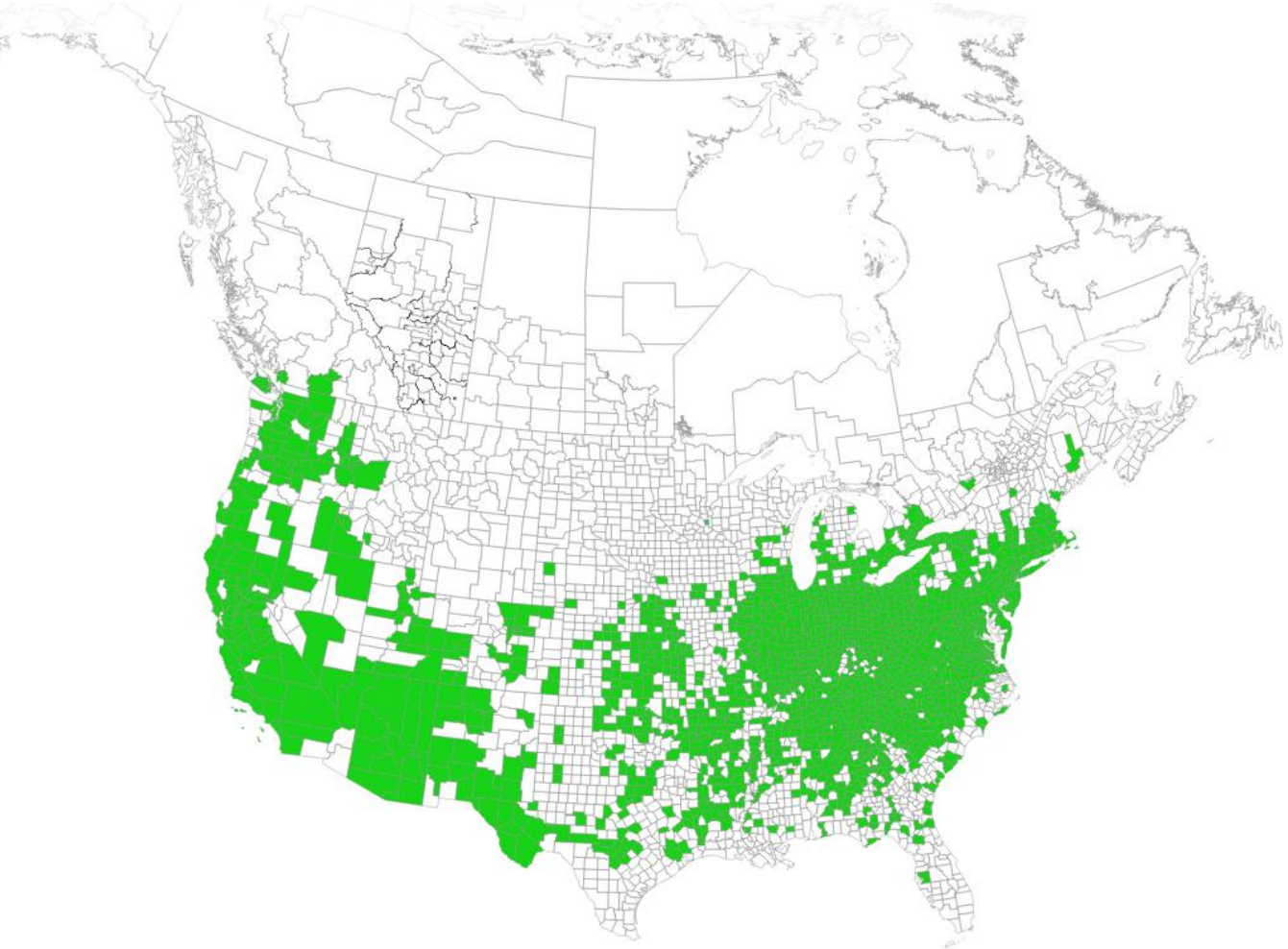
- All suggested dosage rates in this presentation came from the Midwest Invasive Plant Network:
    - https://www.mipn.org/control/
- Find your exact herbicide label here:
    - https://www.greenbook.net/
- Product dosage rates vary, so please follow the label of the product you select.

TREE OF HEAVEN

AILANTHUS ALTISSIMA

- Rapidly growing, typically small deciduous tree up to 80 ft. in height and 6 ft. in diameter.
- It has large, heart-shaped leaf scars on the twigs.
- Bark is smooth with lenticels and light grey, developing fissures as it grows older.
- Leaves and other plant parts smell like rancid peanut butter.
- Can rapidly invade fields, meadows, and harvested forests

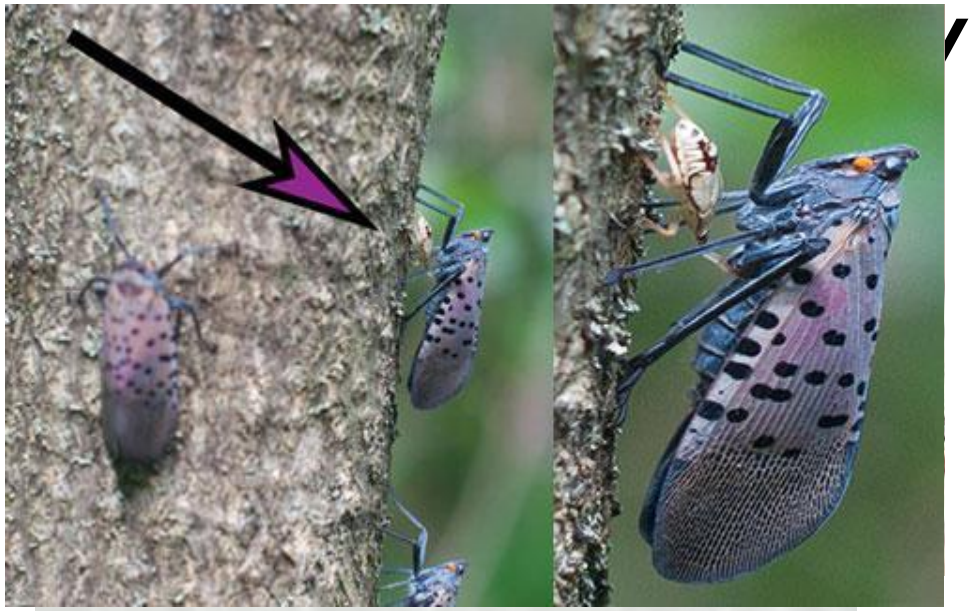
Range map



Seeds

Leaf

SPOTTED



- The Spotted Lanternfly (Lycorma delicatula) is an invasive plant hopper that is native to China and likely arrived in North America hidden on goods imported from Asia.
- The insects suck sap from stems and branches which can weaken and damage the plant. This feeding also leaves behind a sticky, sugary residue called honeydew that attracts other insects and promotes the growth of sooty mold, which can further damage the plant.

SPOTTED LANTERNFLY

- SLF feeds on a wide range of fruit, ornamental and woody trees, with tree-of-heaven being one of the preferred hosts.
- Can be spread long distances by people who move infested material or items containing egg masses.
- Juvenile spotted lanternflies, known as nymphs, and adults prefer to feed on the invasive tree of heaven (Ailanthus altissima) but also feed on a wide range of crops and plants, including grapes, apples, hops, walnuts and hardwood trees.

Spotted Lanternfly: Host Plants

- Korea: > 70 host plant species
  - 25 of them present in IA.

- Hosts:
  - ★ Tree-of-heaven
  - ★ Grape
  - Apple
  - Dogwood
  - Lilac
  - Maple
  - Oak
  - Pine
  - Poplar
  - Prunus
  - Rose
  - Walnut

★ = preferred host

TREE OF HEAVEN - CONTROL METHODS

Removal

- Pulling and digging up seedlings when soil conditions are amenable are effective single plant control. The entire root must be removed as root fragments can resprout.
- Root suckers and shoots are not good targets for pulling or digging as they are attached to an existing root system and difficult to remove.

Basal bark spray

- Imazapyr
  - (spot) 6 - 9% in oil (0.12 - 0.2 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 20 - 30% in oil (0.8 - 1.2 lb a.e./gal)
  - Any time of the year

Cut Stump

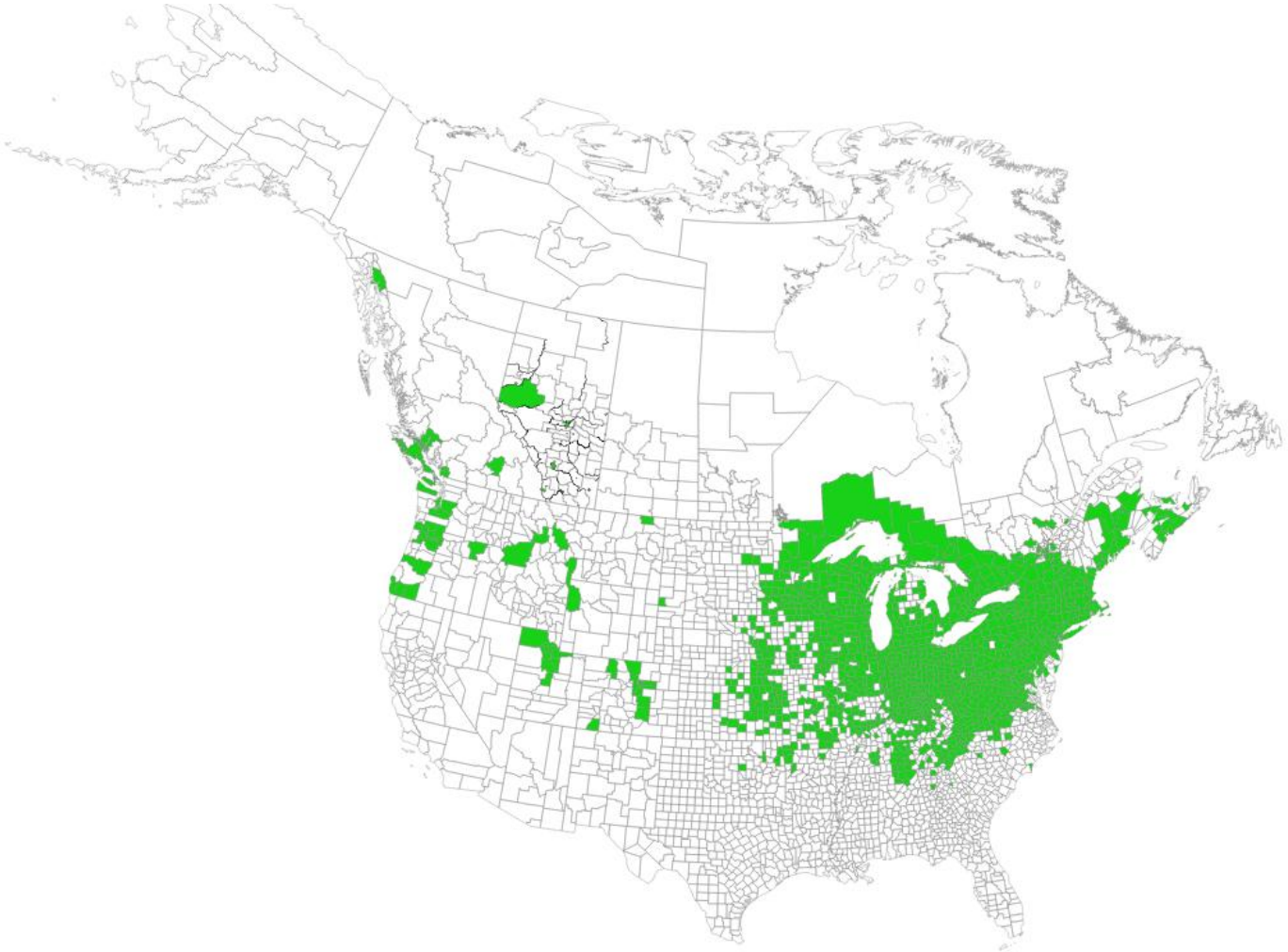
- Imazapyr
  - (spot) 6 - 13% in water (0.12 - 0.25 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 20% in oil (0.8 lb a.e./gal)
  - Any time of the year

GARLIC MUSTARD

ALLIARIA PETIOLATE

- Herbaceous, biennial forb.
- First-year plants are basal rosettes that bolt and flower in the second year.
- Plants can be easily recognized by a garlic odor that is present when any part of the plant is crushed
- Aggressive invader of wooded areas throughout the eastern and middle United States

Range map



Seeds

Leaf

GARLIC MUSTARD- CONTROL METHODS

Manipulation of the environment

- Disturbed forest canopies with increased light penetration tend to experience increased invasion of garlic mustard.
- If the canopy of a forest becomes disturbed, plant or manage species present to increase light interception and restore the canopy as quickly as possible.
- Focus other management activities around these areas of canopy disturbance.

Removal

- Pulling or cutting the root from the stem before flowering are effective individual plant control techniques.
- Pull if soil conditions allow for the removal of the tap root. Pulling second-year plants is easier than pulling first-year rosettes.
- Alternately, cut the entire taproot with a sharp shovel or spade 1-2" below the surface.
- If flowers are present, bag material and dispose of it in a landfill to avoid potential for seed spread.

Foliar Spray

- Glyphosate
  - (broadcast) 0.75 - 1.5 lb a.e./A
  - Fall or Spring
- Imazapic
  - (broadcast) 12 fl oz/A (0.15 - 0.19 lb a.e./A)
  - Fall or Spring

BIOCONTROL

Crown-boring weevil (*Ceutorhynchus scrobicollis*)

Crown Feeding

Infestation & Wilting

JAPANESE BARBERRY

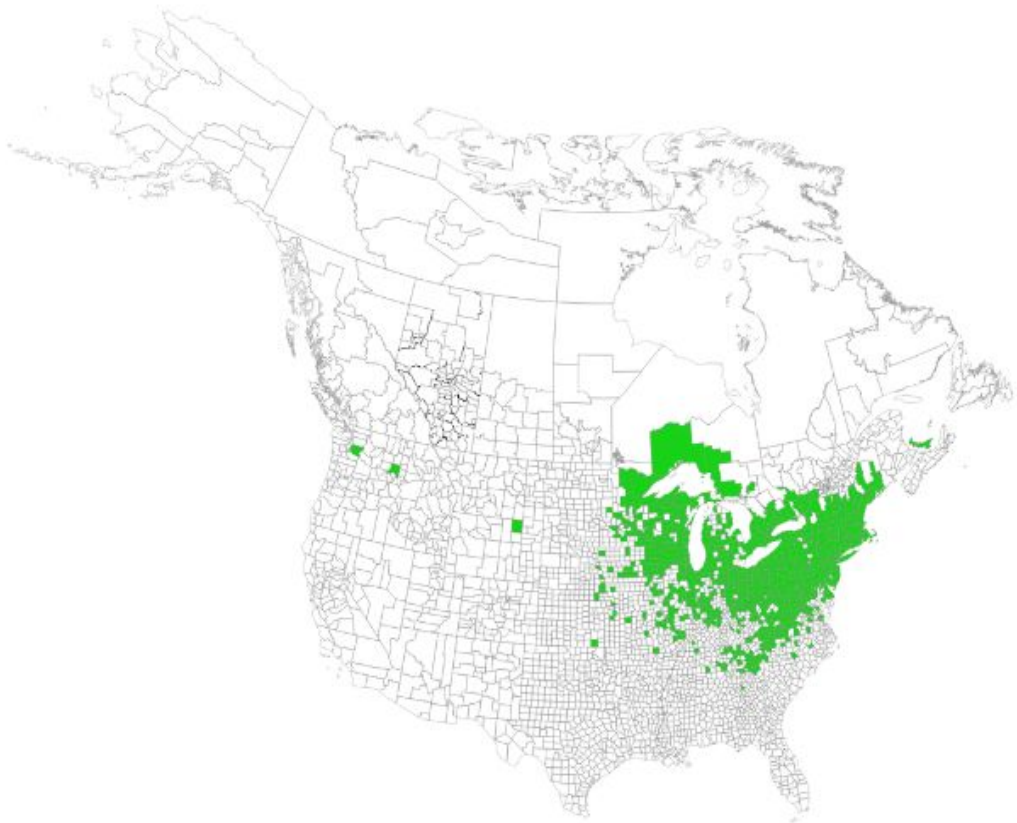
BERBERIS THUNBERGII

- Small deciduous shrub from 2-8 ft. tall.
- The thin, grooved branches have thin, straight spines.
- *Berberis thunbergii* is very shade-tolerant and can form dense stands which shade out and displace native species.
- Invades a variety of habitats from shaded woodlands to open fields and wetlands

Range map

cluding child taxa

EDDMapS



Legend
No Data
Subject reported
Subject reported from child taxa

Seeds

Leaf

JAPANESE BARBERRY - CONTROL METHODS

Removal

- Pulling or digging up small to medium sized barberry any time of the year are effective individual plant control strategies if soil conditions are amenable.
- Remove the root crown; Japanese barberry resprouts from that area. Small bushes can be pulled by hand and larger bushes can be pulled using a leverage tool.
- Larger plants may necessitate removal of soil around the plant to facilitate removal.

Basal bark spray

- Imazapyr
  - (spot) 6 - 9% in oil (0.1 - 0.2 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 20 - 30% in oil (0.8 - 1.2 lb a.e./gal)
  - Any time of the year

Cut Stump

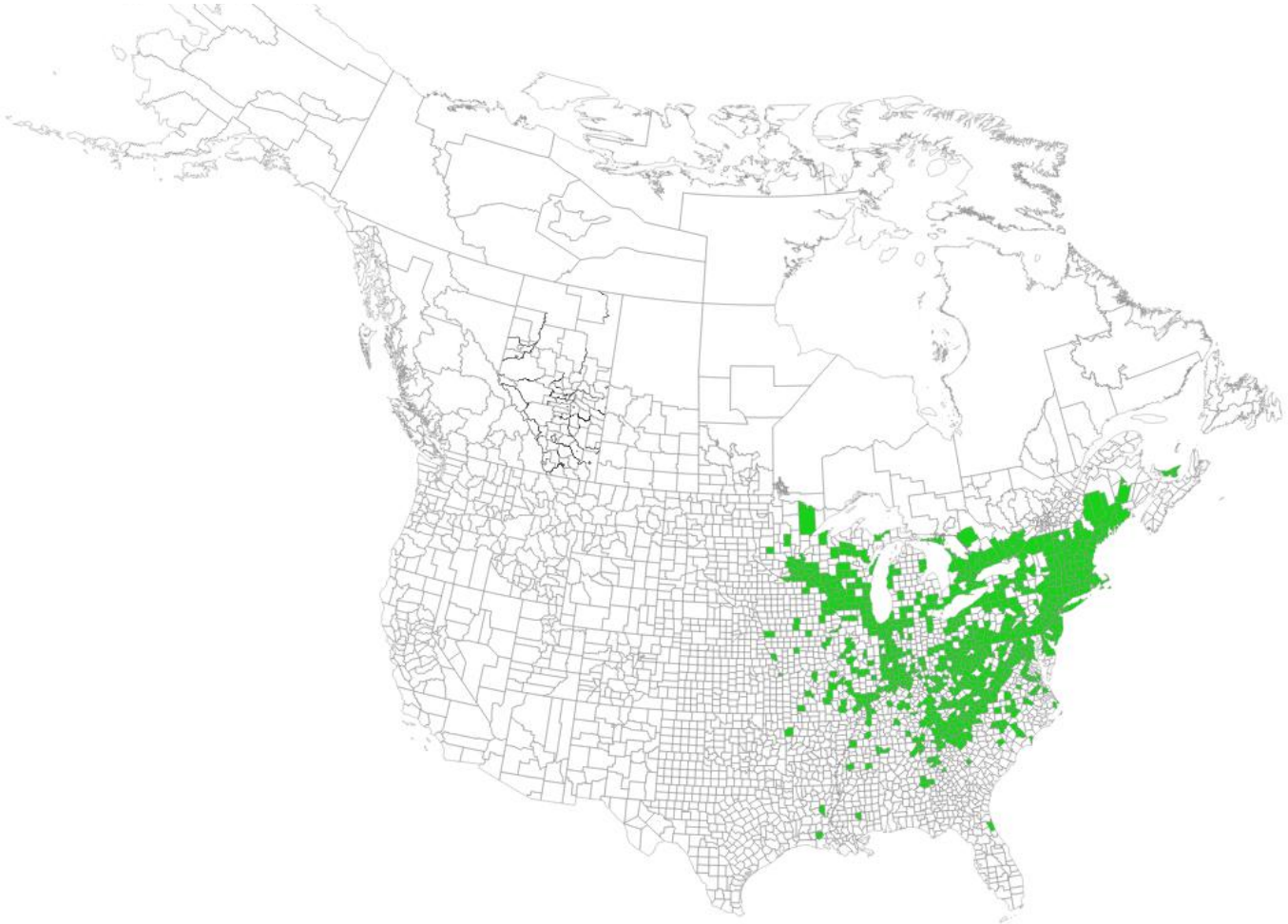
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 18 - 25% (0.5-0.75 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 25% in oil (0.8 lb a.e./gal)
  - Any time of the year

ASIATIC BITTERSWEET

CELASTRUS ORBICULATA

- Perennial deciduous, climbing, woody vine that can grow to lengths of 60 ft. and up to 4 in. in diameter.
- The striated bark is brown to dark brown.
- The smooth glabrous twigs can range from light gray to dark brown in color.
- Commonly found in old home sites, fields, and road edges.

Range map



Seeds

Leaf

ASIATIC BITTERSWEET- CONTROL METHODS

Removal

- Seedlings and small to medium sized bittersweet plants can be controlled by pulling or digging as long as the roots are removed.
- Larger plants may necessitate removal of soil near the plant base to facilitate removal.
- If seeds are present when removal is taking place, avoid movement off-site unless material can be transported without spreading seed to other locations.

Basal bark spray

- Imazapyr
  - (spot) 6 - 9% in oil (0.1 - 0.2 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 20 - 30% in oil (0.8 - 1.2 lb a.e./gal)
  - Any time of the year

Cut Stump

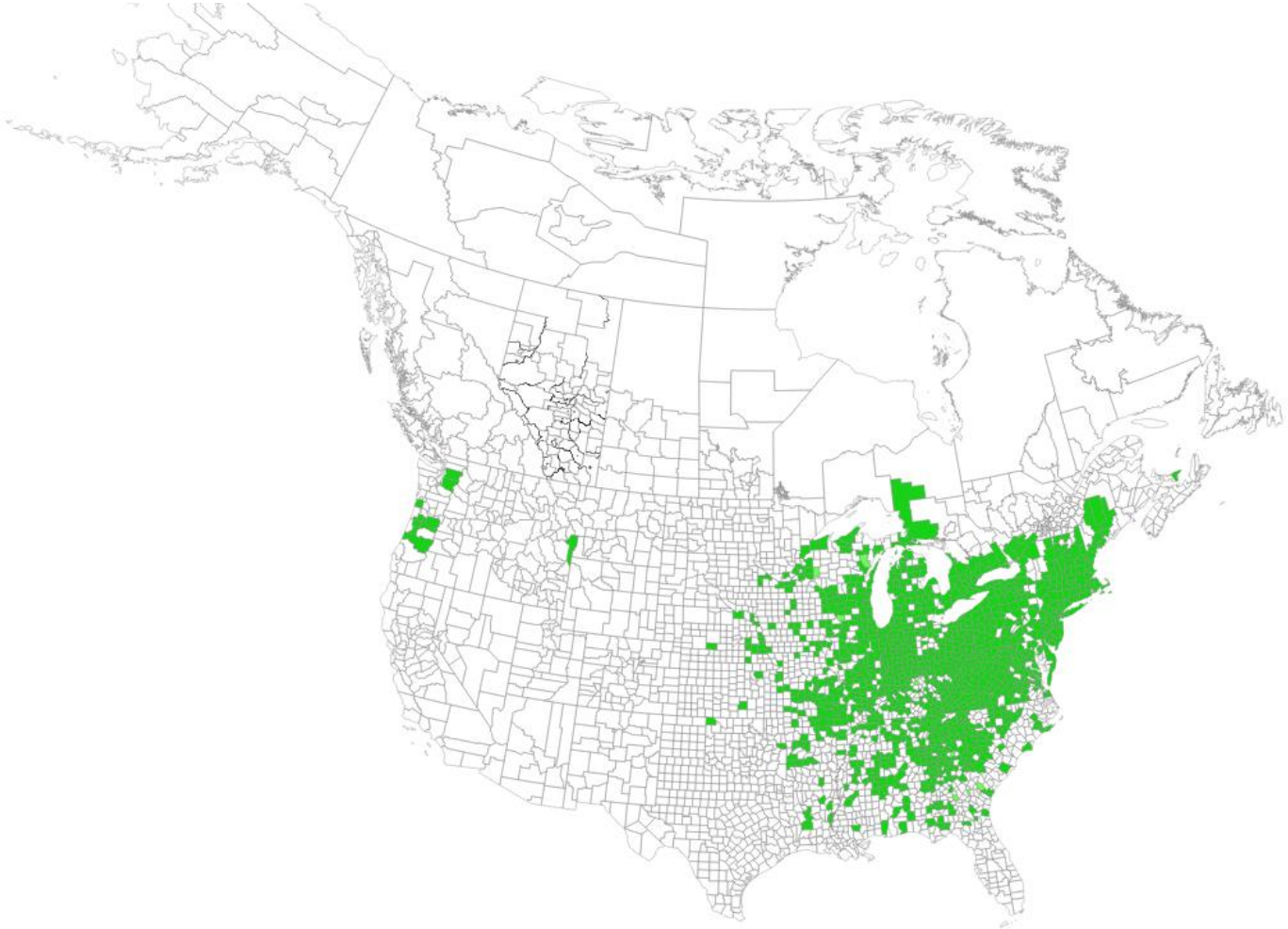
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 20 - 25% (0.6 - 0.75 lb a.e./gal)
  - Any time of the year
- Triclopyr
  - (spot) 10-20% in oil (0.4-0.8 lb a.e./gal)
  - Any time of the year

AUTUMN OLIVE

ELAEAGNUS UMBELLATE

- Deciduous shrub from 3-20 ft. in height with thorny branches.
- It is easily recognized by the silvery, dotted underside of the leaves.
- Invades old fields, woodland edges, and other disturbed areas.
- It can form a dense shrub layer that displaces native species and closes open areas

Range map



Seeds

Leaf

AUTUMN OLIVE - CONTROL METHODS

Removal

- Small plants are easily pulled from moist soil.
- Larger plants can be dug or pulled, but are rarely removed successfully.
- Any roots left in the soil will resprout and reinvade the area. If seeds are present during removal, avoid movement off-site unless material can be transported without spreading fruit to other locations.
- At least four years of treatment are typically required to eradicate a population.

Foliar Spray

- Imazapyr
  - (spot) 2 - 4% (0.04 - 0.08 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1 - 2% (0.03 - 0.06 lb a.e./gal)\
  - Apply when target species is actively growing and fully leafed out.

Cut Stump

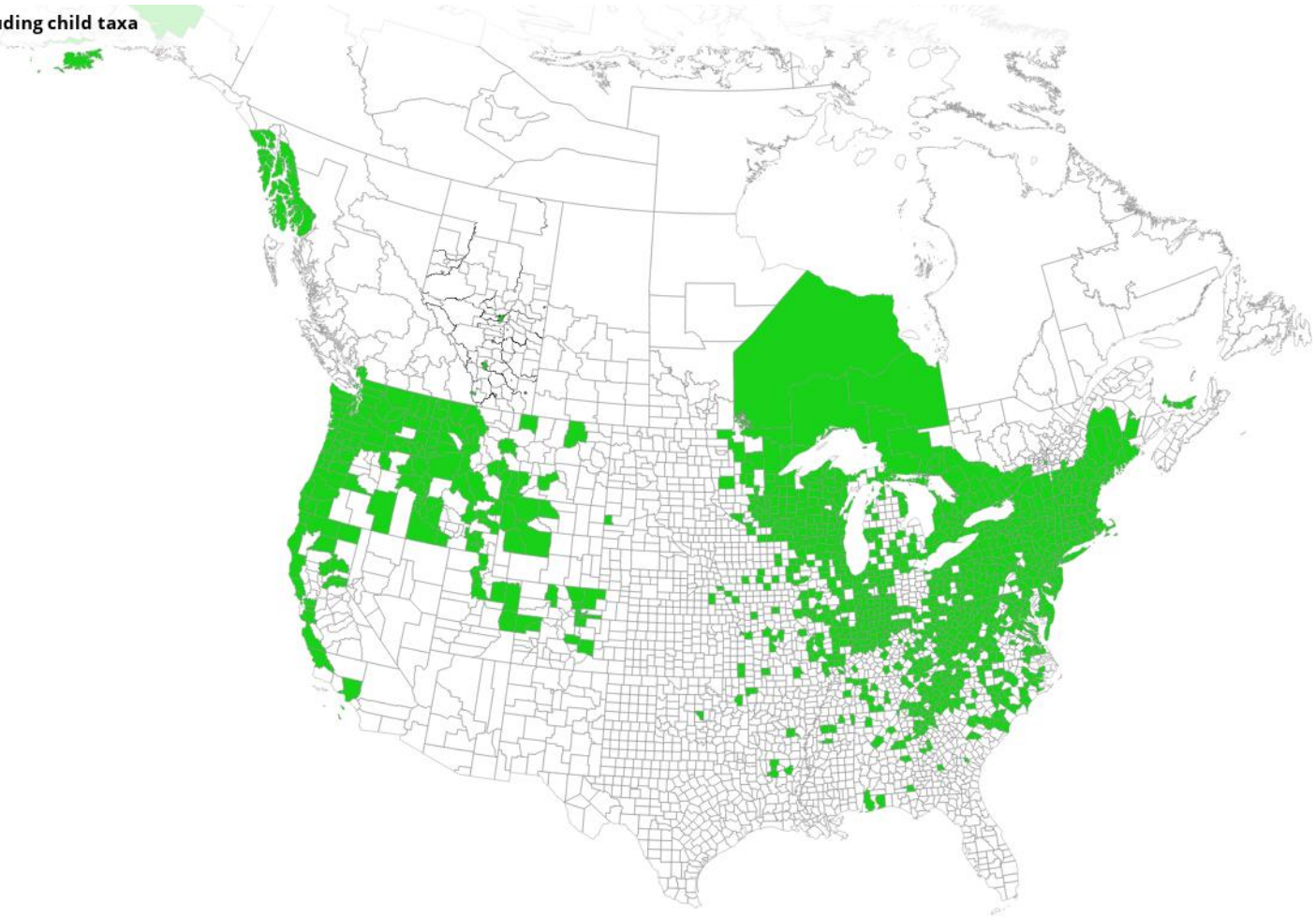
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 20 - 50% (0.3 - 0.6 lb a.e./gal)
  - Any time of the year
- Imazapyr
  - (spot) 6 - 12% in oil (0.1 - 0.25 lb a.e./gal)
  - Any time of the year

JAPANESE KNOTWEED

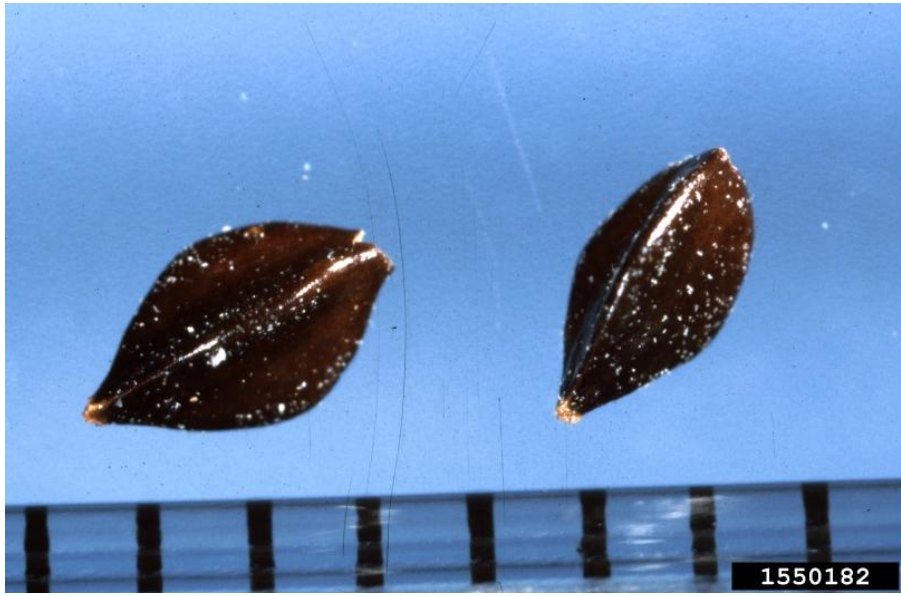
FALLOPIA JAPONICA

- Deciduous shrub reaching heights of 10 ft.
- The semi-woody stem is hollow with enlarged nodes.
- Leaves are alternate, 6 in. long, 3-4 in. wide and broadly-ovate.
- Flowering occurs in late summer, when small, greenish-white flowers develop in long panicles in the axils of the leaves.
- Commonly invades disturbed areas with high light, such as roadsides and stream banks.

Range map



Seeds



Leaf

JAPANESE KNOTWEED - CONTROL METHODS

Manipulation of the environment

- Mulching or covering with a tarp can slow the spread of knotweed.
- Tarp must have some slack in it or the plant will stretch and break the tarp.
- Watch for new sprouts beyond the edge of the mulch or tarp as knotweed sprouts readily from the rhizome.
- Populations will need to be covered for at least two years to suppress plants, but this technique will rarely eradicate populations.

Foliar Spray

- Aminopyralid
  - 7 - 14 fl oz/A (0.08 - 0.11 lb a.e./A)
  - For best results cut twice (in spring when it reaches 3', then again when plant flowers),
- Glyphosate
  - For a 3 lb a.e./gal product. 4 - 8% (0.12 - 0.24 lb a.e./gal)
  - For best results cut twice (in spring when it reaches 3', then again when plant flowers)

Cut Stump

- Glyphosate
  - For a 3 lb a.e./gal product. 20 - 25% (0.6 - 0.75 lb a.e./gal)
  - Apply any time of year when plant is actively growing
- Triclopyr
  - 20 - 25% in oil (0.8 - 1 lb a.e./ gal)
  - Apply any time of year when plant is actively growing

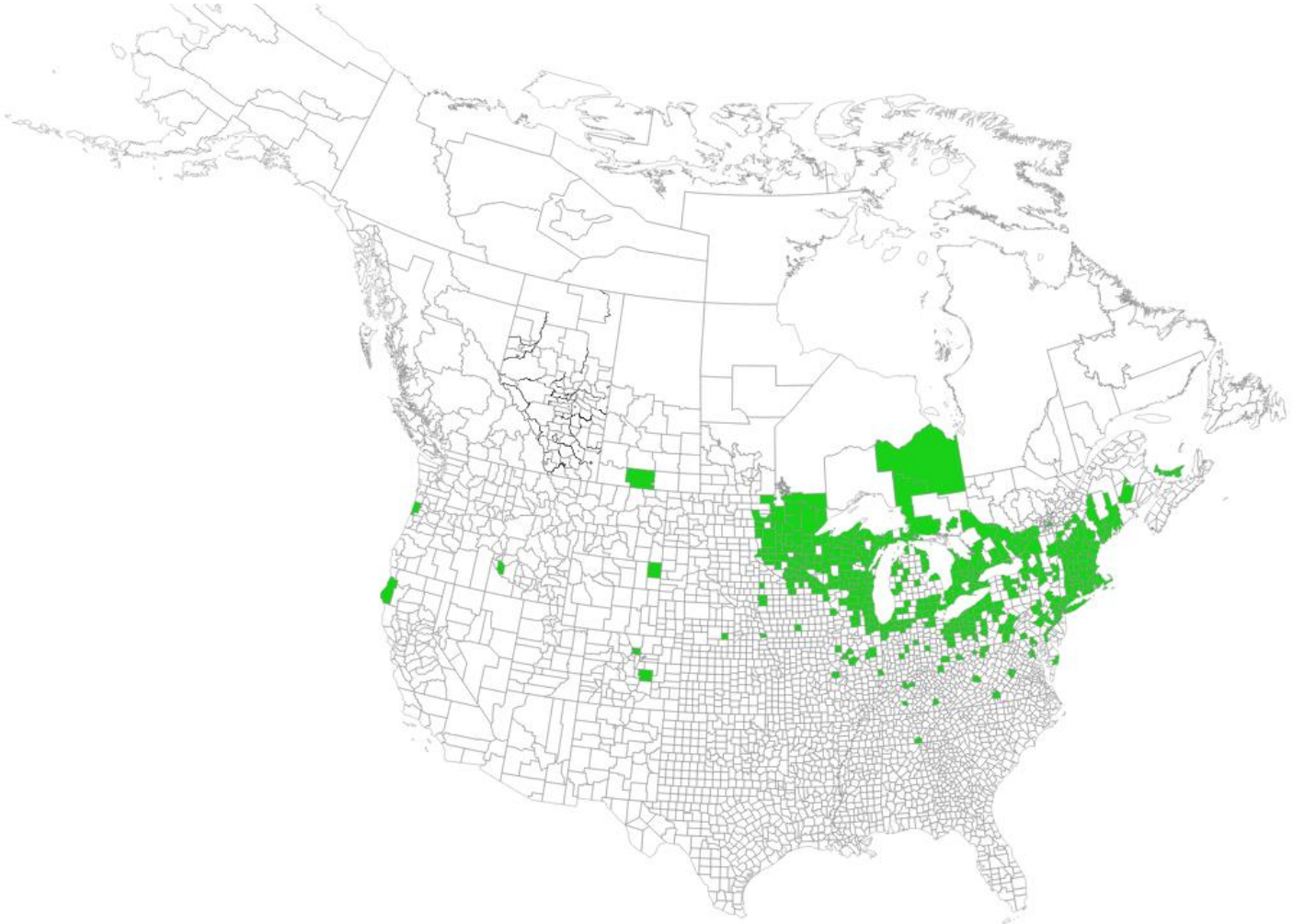
STEM INJECTION

GLOSSY BUCKTHORN

FRANGULA ALNUS

- Large shrub or small tree that can grow to heights of 30 ft.
- Its bark is gray to brown with white lenticels.
- Invades moist woodlands and disturbed areas throughout the Northeast and Midwest
- Aggressive invader that can form dense thickets which shade and displace native understory plants, shrubs, and tree seedlings

Range map



Seeds

Leaf

GLOSSY BUCKTHORN - CONTROL METHODS

Removal

- Plants <0.4" diameter are easily pulled from moist soil. Larger diameters can be dug or pulled.
- To prevent resprouting remove above-ground growth and root crown.
- Dig before plant produces seeds.

Foliar Spray

- Triclopyr
  - (spot) 1 - 2% (0.1 - 0.2 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1 - 2% (0.03 - 0.06 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.

Cut Stump

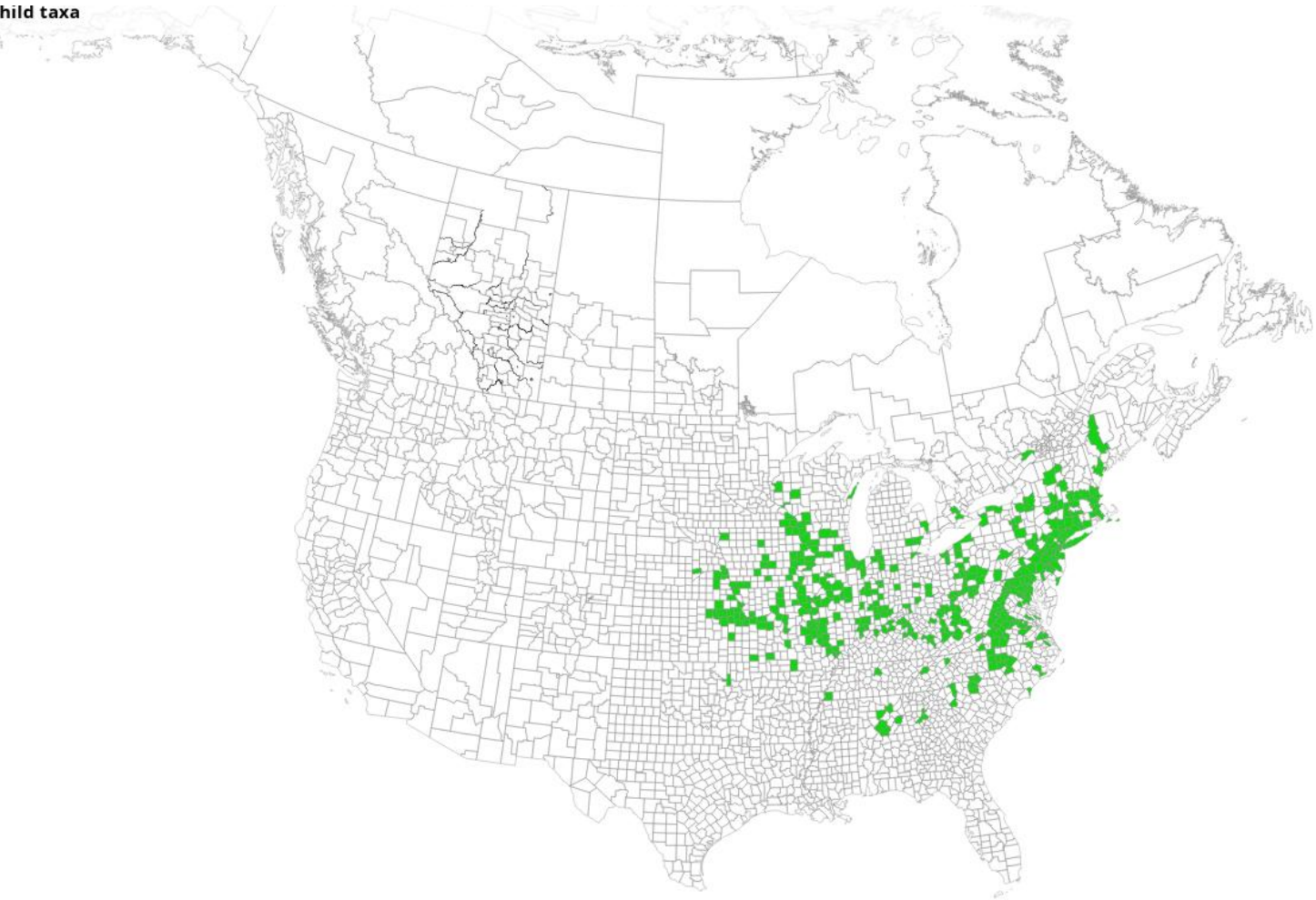
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 20 - 50% (0.6 - 1.5 lb a.e./gal)
  - Any time of the year
- Imazapyr
  - (spot) 6 - 9% in oil (0.1 - 0.2 lb a.e./gal)
  - Any time of the year

JAPANESE HOP

HUMULUS JAPONICUS

- Annual, climbing, or trailing vine that is native to eastern Asia.
- This vine has 5-lobed leaves (generally), downward-pointing prickles on the stem, and bracts at the base of the petioles.
- Vines can grow to 35 ft. in one growing season, allowing them to infest large areas crowding and out-competing native vegetation

Range map



Seeds

Leaf

JAPANESE HOP - CONTROL METHODS

Removal

- When acting as an annual it can be pulled any time of the year. When acting as a perennial, the most effective time to pull is in late spring or early summer as the root is smaller and easier to pull.
- In either case, remove as much of the root and vine as possible, since the plant can reroot from both roots and stems.
- If the vine has climbed a tree, belowground removal only is required. If seeds are present during removal, avoid movement off-site unless material can be transported without spreading seed.
- Three years of removal are typically needed to eradicate an infestation.

Foliar Spray

- 2,4-D
  - (spot) For a 3.8 lb a.e./gal product. 0.5 - 2% (0.02 - 0.08 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Triclopyr
  - (spot) 1 - 2% (0.04 - 0.08 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.

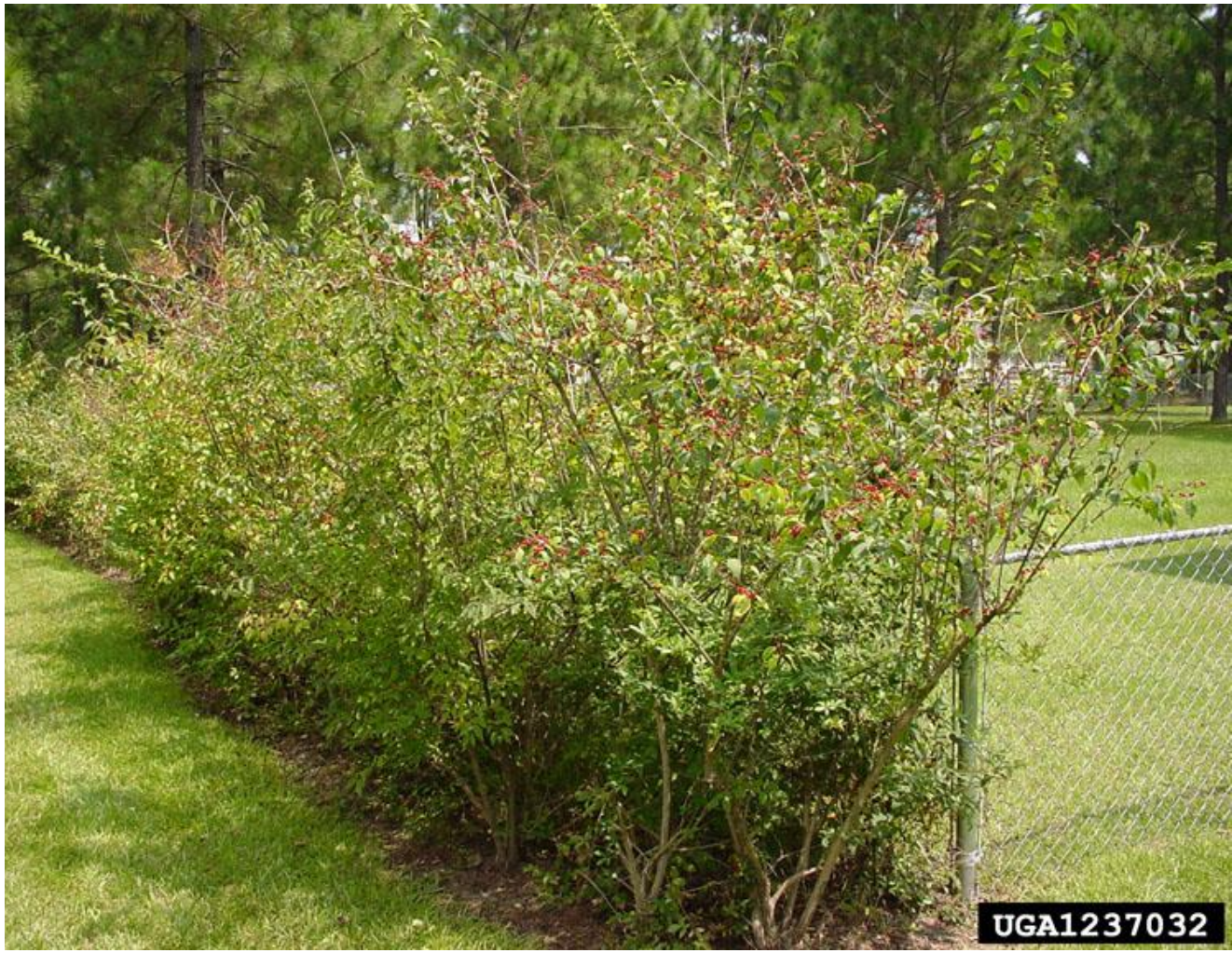
Mowing

- Mowing or cutting many times a year can control newly established populations after 3 years but established populations will only be suppressed.
- Use a mower that bags cut material or rake and bag cut material after mowing. Dispose of cut material in a landfill or burn to avoid potential for above ground tissue resprouting.

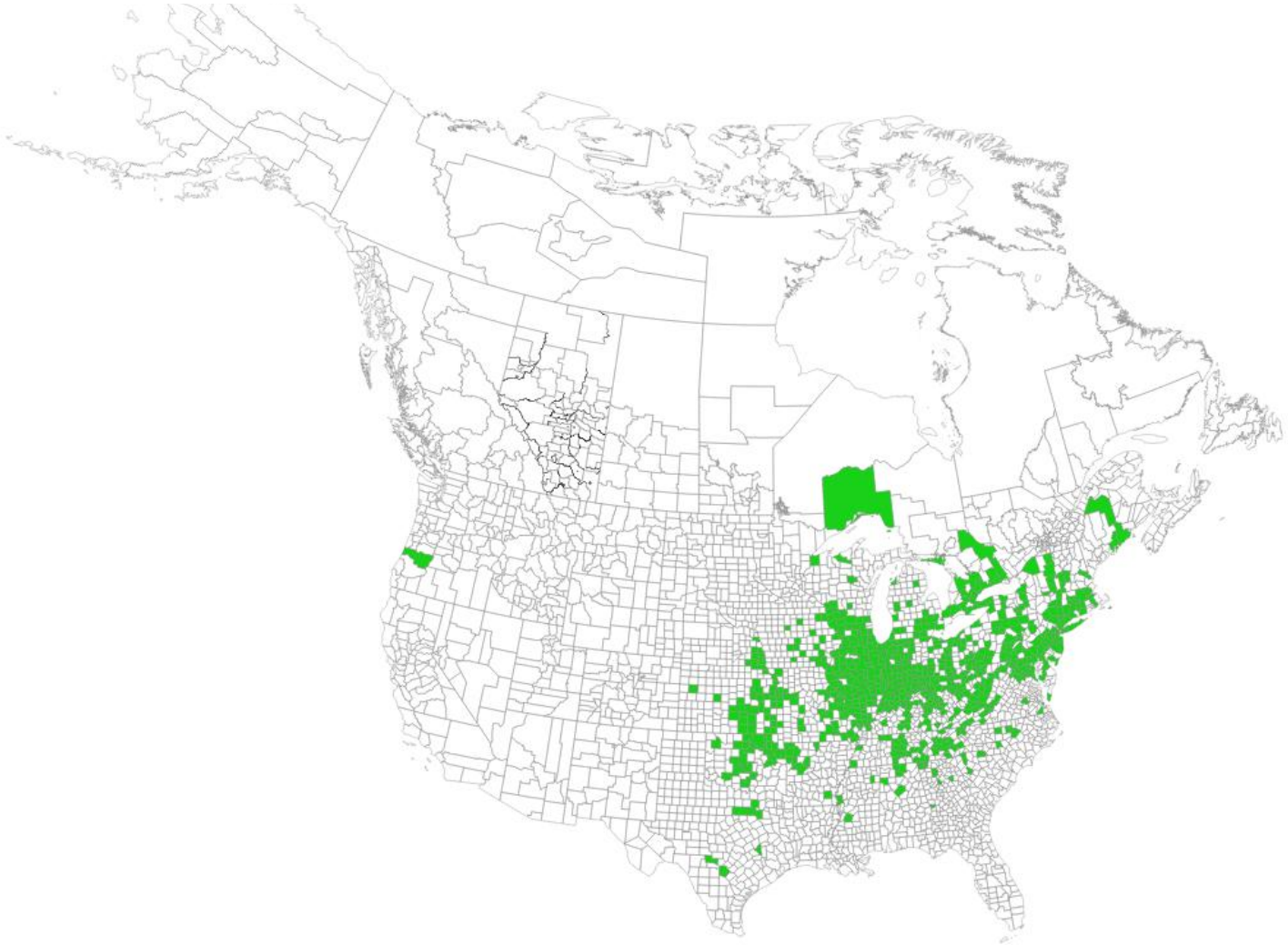
AMUR HONEYSUCKLE

LONICERA MAACKII

- Woody perennial shrub that can grow up to 16.5 ft. in height.
- Can form large stands that prevent native shrubs and herbaceous understory plants from growing.
- The fruits persist on the branches into the winter when birds feed on them.
- In the spring, *Lonicera maackii* is one of the first plants to leaf out, giving it a competitive advantage.



Range map



Seeds

Leaf

AMUR HONEYSUCKLE - CONTROL METHODS

Removal

- Immediately after leaf or flower formation is the most effective time to remove plants.
- Small to medium sized honeysuckles can be controlled by pulling or digging plants as long as the root crown is removed.
- Small bushes can be pulled by hand and larger bushes can be pulled by using a leverage tool.
- Larger plants may necessitate removal of soil near the plant to facilitate removal.
- If fruiting, avoid movement off-site unless material can be transported without spreading fruit to other locations.

Foliar Spray

- picloram + 2,4-D
  - (spot) 0.5 - 1% (picloram: 0.003 - 0.005 lb a.e./gal + 2,4-D: 0.01 - 0.02 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1 - 4% (0.05 - 0.18 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.

Cut Stump

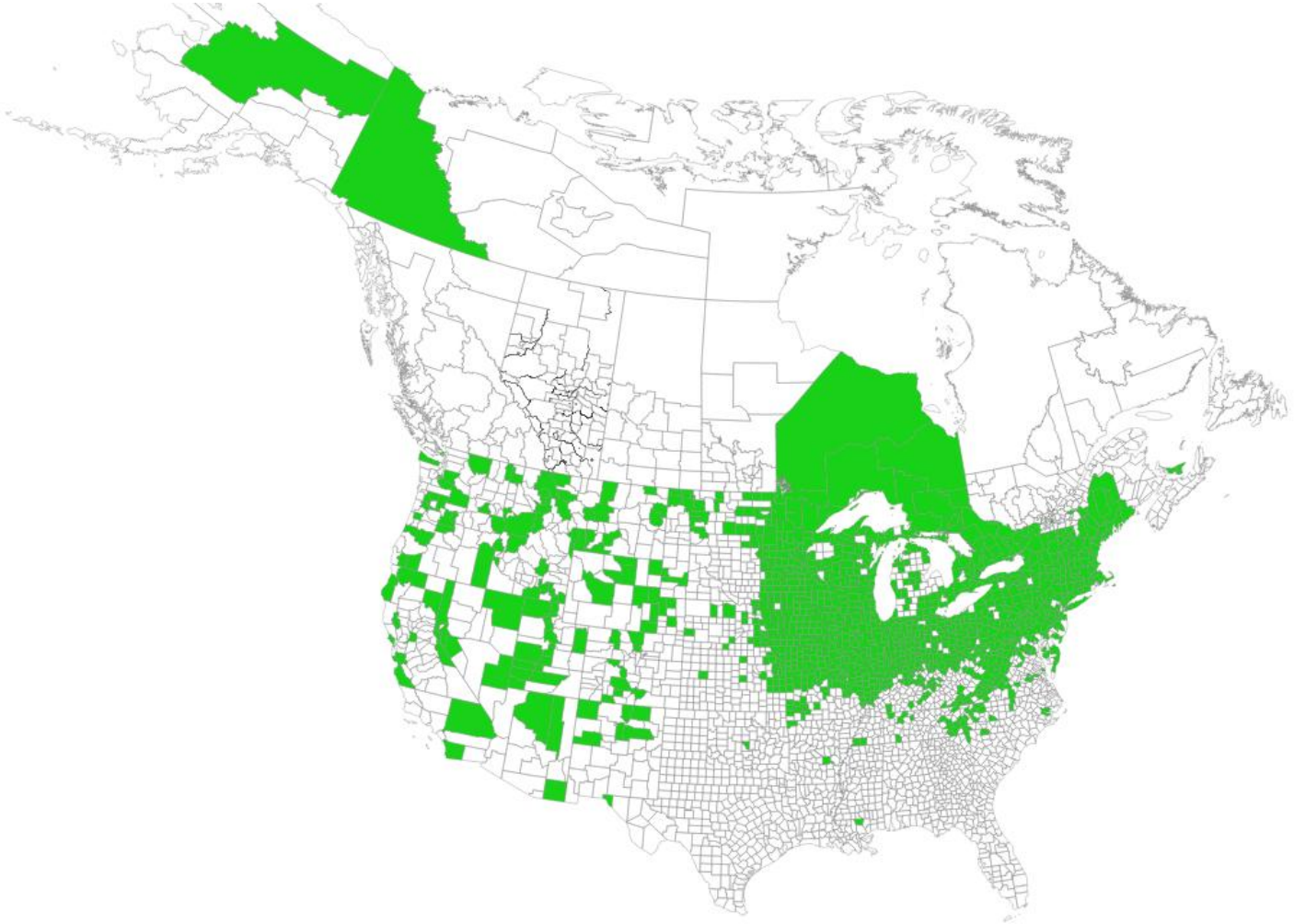
- Glyphosate
  - (spot) For a 3 bl a.e./gal product. 18 - 25% (0.5 - 0.75 lb a.e./gal)
  - Any time of the year
- Imazapyr
  - (spot) 5% in oil (0.1 lb a.e./gal)
  - Any time of the year

WILD PARSNIP

PASTINACA SATIVA

- Biennial/perennial herb that looks and smells similar to cultivated parsnip and can grow up to 4 ft. (1.2 m) in height.
- Native to Eurasia and occurs in sunny areas with varying degrees of soil moisture.
- Contact with this plant can cause skin to become photosensitive; exposure to sunlight can cause severe blistering

Range map



Seeds

Leaf

WILD PARSNIP - CONTROL METHODS

Removal

- Pulling or cutting the root from the stem are effective individual plant control techniques.
- Pull if soil conditions allow for the removal of the tap root.
- Alternately, cut the entire taproot with a sharp shovel or spade 1-2" below the surface.
- If flowers are present, bag material and dispose of it in a landfill to avoid potential for seed spread.

Foliar Spray

- 2,4-D
  - (spot) For a 3.8 lb a.e./gal product. 1% (0.038 lb a.e./gal)
  - Apply to rosettes in fall or spring, bolting, or flowering plants.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1.5 - 2 % (0.05 - 0.06 lb a.e./gal)
  - Apply to rosettes in fall or spring, bolting, or flowering plants.

Mowing

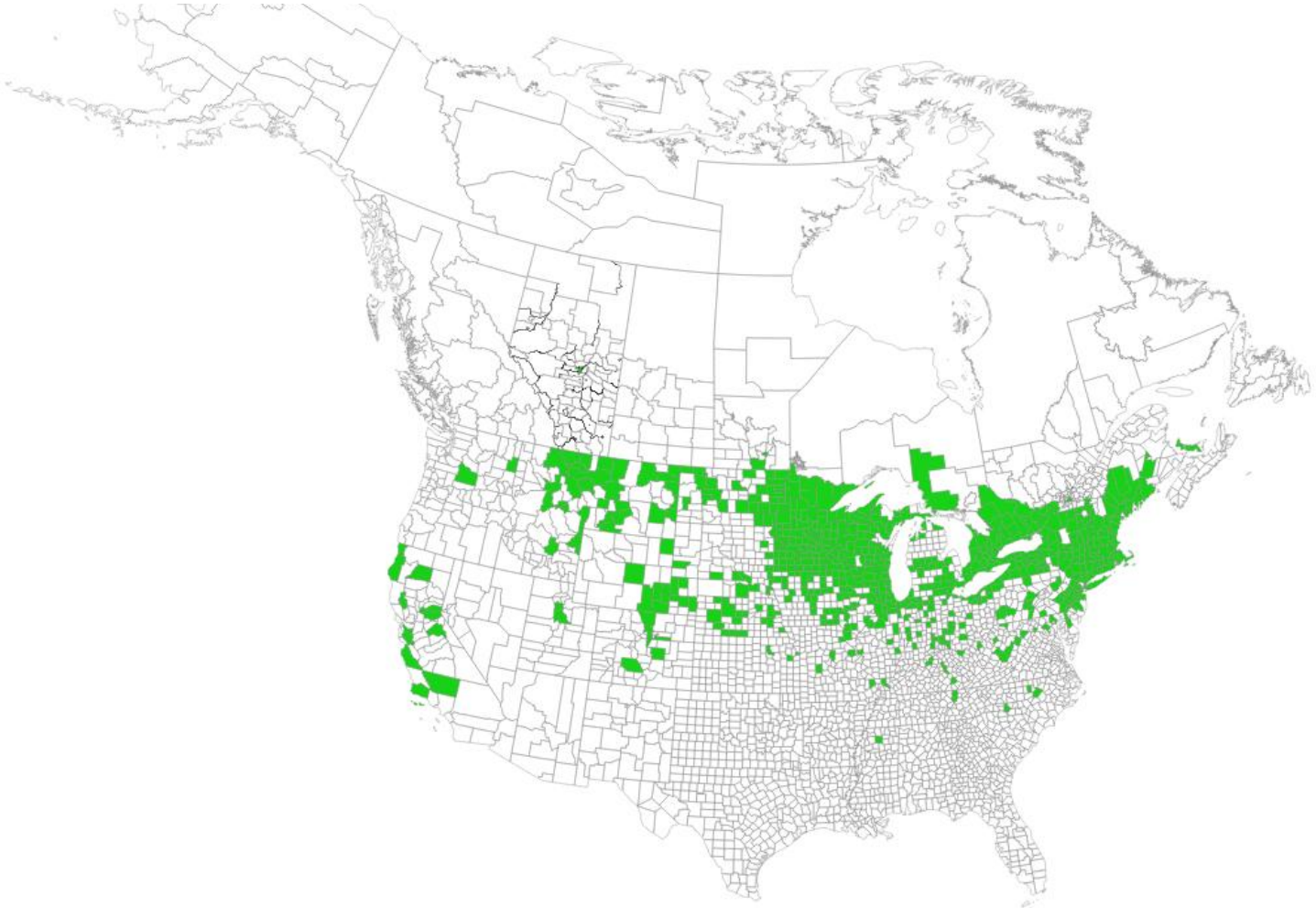
- Mowing can be effective if timed after the emergence of flower heads, but before seeds enlarge.
- Plants may resprout and still flower, but rarely produce viable seed.
- Monitor populations and repeat mowing if concerned about seed production.
- Care must be taken not to mow when mature seeds could be present as this will spread the seed.
- There may be a flush of parsnip after the first mowing as vegetative parsnip is stimulated to bolt, but after 5 years of mowing the population will be reduced.

COMMON BUCKTHORN

RHAMNUS CATHARTICA

- Deciduous shrub or small tree that can grow to 25 ft. (7.6 m) in height.
- The bark is dark gray and the inner bark is orange (easily seen when the tree is cut).
- Twigs are usually tipped with a sharp spine.
- Invades forests, prairies, and savannas in the Midwestern United States and can form dense thickets crowding out native shrubs and understory

Range map



Seeds

Leaf

COMMON BUCKTHORN - CONTROL METHODS

Removal

- Plants <0.4" diameter are easily pulled from moist soil. Larger diameters can be dug or pulled.
- To prevent resprouting remove above-ground growth and root crown.
- Dig before plant produces seeds.

Foliar Spray

- Triclopyr
  - (spot) 1 - 2% (0.04 - 0.08 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1 - 2% (0.03 - 0.06 lb a.e./gal)
  - When target species is actively growing and fully leafed out.

Cut stump

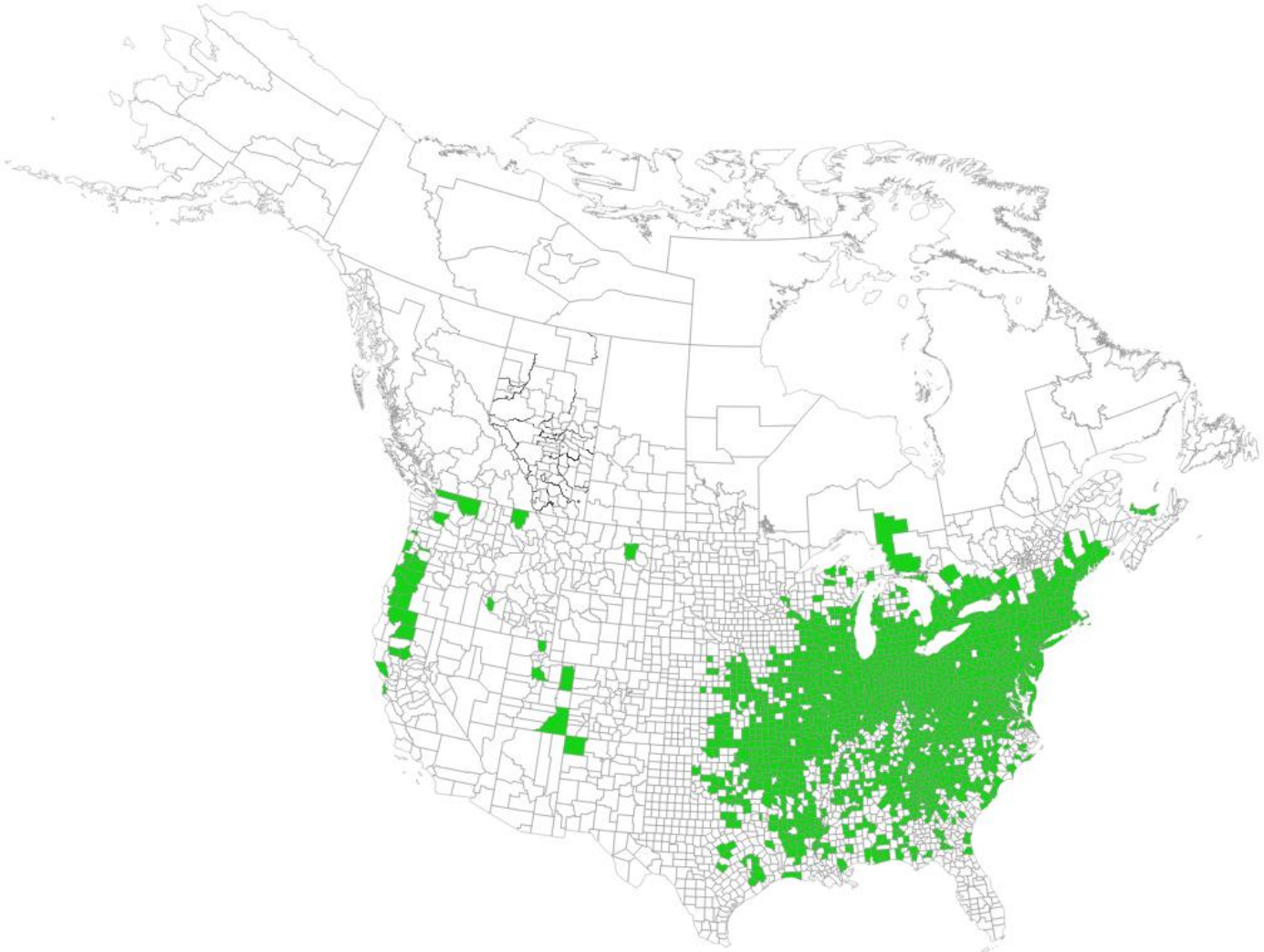
- Triclopyr
  - (spot) 20 - 30% in oil (0.8 - 1.2 lb a.e./gal
  - Apply any time of year.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 20 - 50% (0.6 - 1.5 lb a.e./gal)
  - Apply any time of year.

MULTIFLORA ROSE

ROSA MULTIFLORA

- A multistemmed, thorny, perennial shrub that grows up to 15 ft. (4.6 m) tall.
- The stems are green to red arching canes which are round in cross-section and have stiff, curved thorns.
- Forms impenetrable thickets in pastures, fields, and forest edges.
- It restricts human, livestock, and wildlife movement and displaces native vegetation

Range map



Flower

Leaf

MULTIFLORA ROSE - CONTROL METHODS

Removal

- Pulling or grubbing are effective individual plant treatment if soil conditions allow for the removal of the root crown.
- Plants will resprout from root crowns if they are left in the ground.
- Consider topsoil depth and site topography.
- Removal of top soil should be followed by the instillation of erosion control structures and reseeding with desirable species as soon as possible.

Foliar Spray

- Imazapyr
  - (spot) 0.5 - 1% (0.01 - 0.02 lb a.e./gal)
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 1 - 1.5% (0.03 - 0.05 lb a.e./gal)
  - When target species is actively growing and fully leafed out.

Cut stump

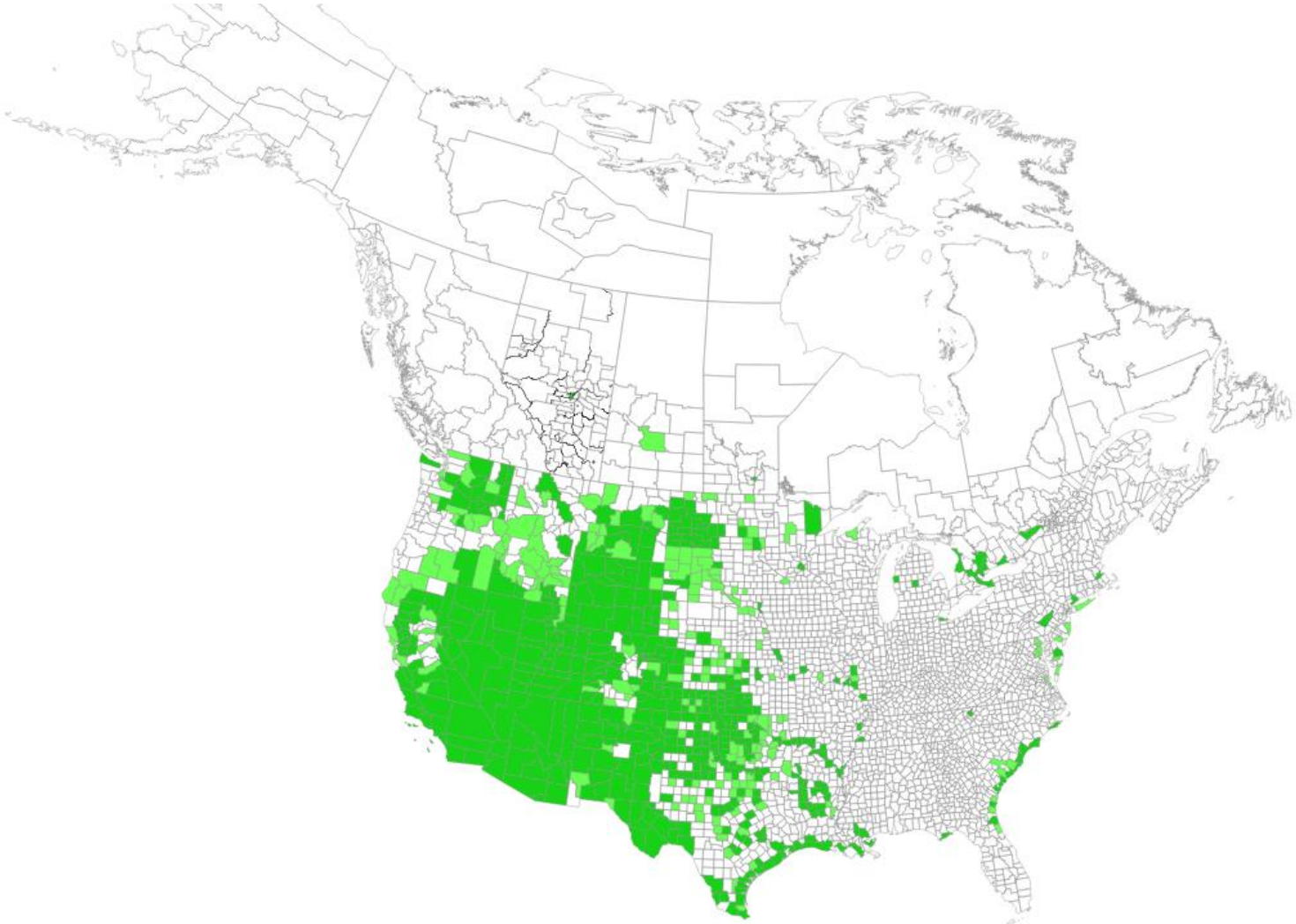
- Triclopyr
  - (spot) 20 - 25 % in oil (0.8 - 1 lb a.e./gal)
  - Apply any time of year.
- Glyphosate
  - (spot) For a 3 lb a.e./gal product. 10 - 20% (0.3 - 0.6 lb a.e./gal)
  - Apply any time of year.

SALT CEDAR

TAMARIX SPP.

- A deciduous shrub that can grow up to 15 ft. in height.
- The bark is smooth and reddish on younger plants, turning brown and furrowed with age.
- Invades streambanks, sandbars, lake margins, wetlands, moist rangelands and saline environments.
- It can crowd out native riparian species, diminish early successional habitat and reduce water tables, thus interfering

Range map



Seeds

Leaf

SALT CEDAR - CONTROL METHODS

Removal

- Digging or hoeing can be used to target individual plants in relatively small areas.
- Some commercially available hand implements are practical for uprooting small saltcedar plants; however, a shovel or hoe is most commonly used.
- The root crown and associated layered roots must be entirely removed from the soil
- Uprooted material should be stacked into piles and dried before burning or mulching.

Foliar Spray

- Imazapyr
  - 1 % (1 gallon per 100 gallons of water with 0.25 percent surfactant and a blue indicator dye).
  - Apply when target species is actively growing and fully leafed out.
- Imazapyr + Glyphosate
  - 1/2 to 1 gallon + 1/2 to 1 gallon (1–2 pounds + 2–4 pounds per 100 gallons of water with 0.25 percent surfactant and a blue indicator dye).
  - When target species is actively growing and fully leafed out.

Cut stump

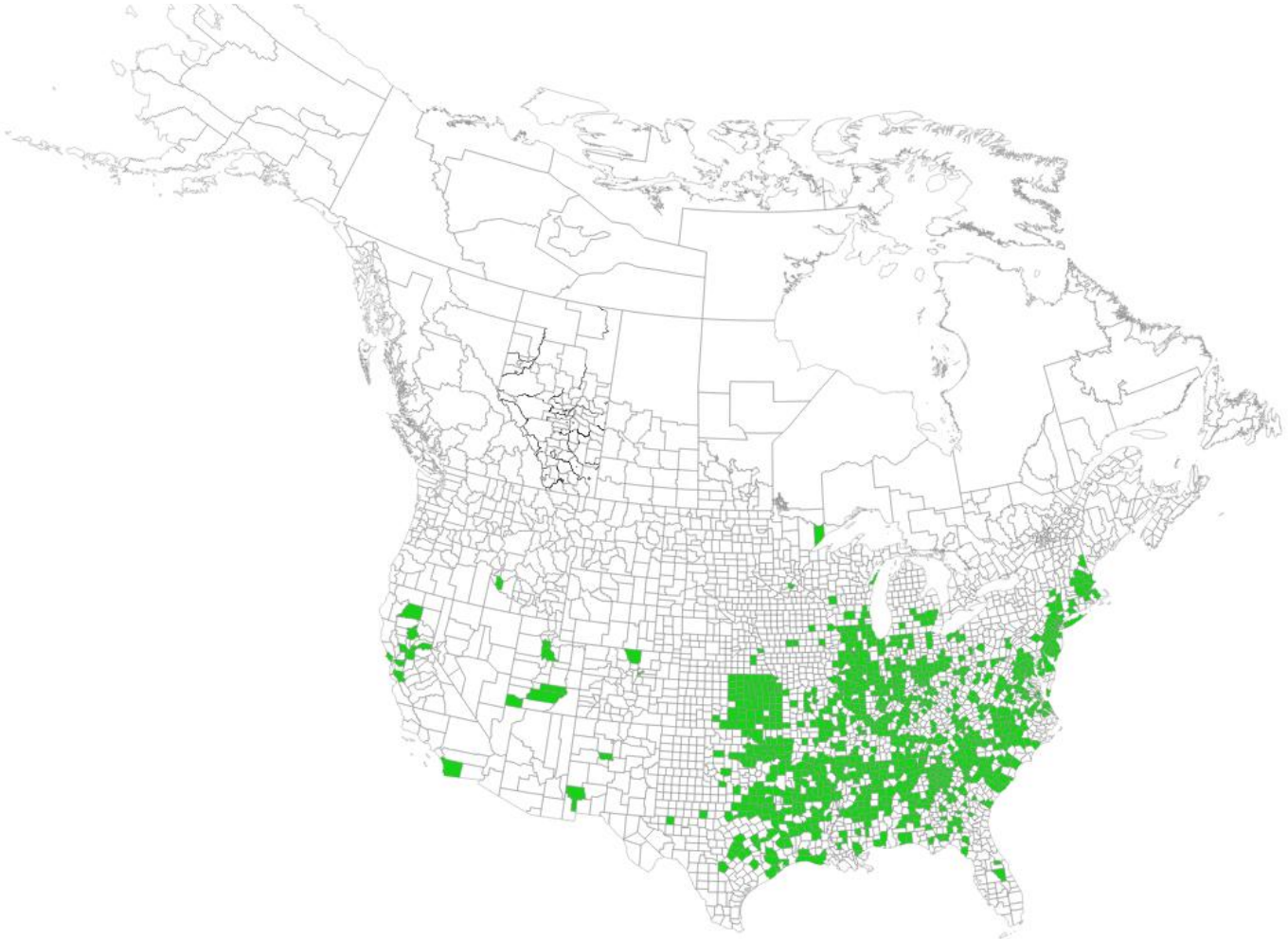
- Triclopyr
  - 50:50 mixture of triclopyr and crop oil with a blue indicator dye.
  - Apply any time of year.

ORNAMENTAL PEAR

PYRUS CALLERYANA

- It is a deciduous tree that can grow up to 60 ft. (18 m) in height and 2 ft. (0.6 m) in diameter
- Produces sterile fruits because they do not self-pollinate.
- They have been widely planted throughout the United States since the early 1960s as ornamental.
- New cultivars of *Pyrus calleryana* were bred to reduce the tree's tendency to split in snow or high winds.
- Many new cultivars of *Pyrus calleryana* hybridize and produce fertile fruit

Range map



Seeds

Leaf

ORNAMENTAL PEAR - CONTROL METHODS

Removal

- Remove small trees by hand when the soil is moist, with care taken to remove the entire root.
- Medium to large trees should be cut down and stumps treated immediately with herbicide to prevent re-sprouting

Foliar Spray

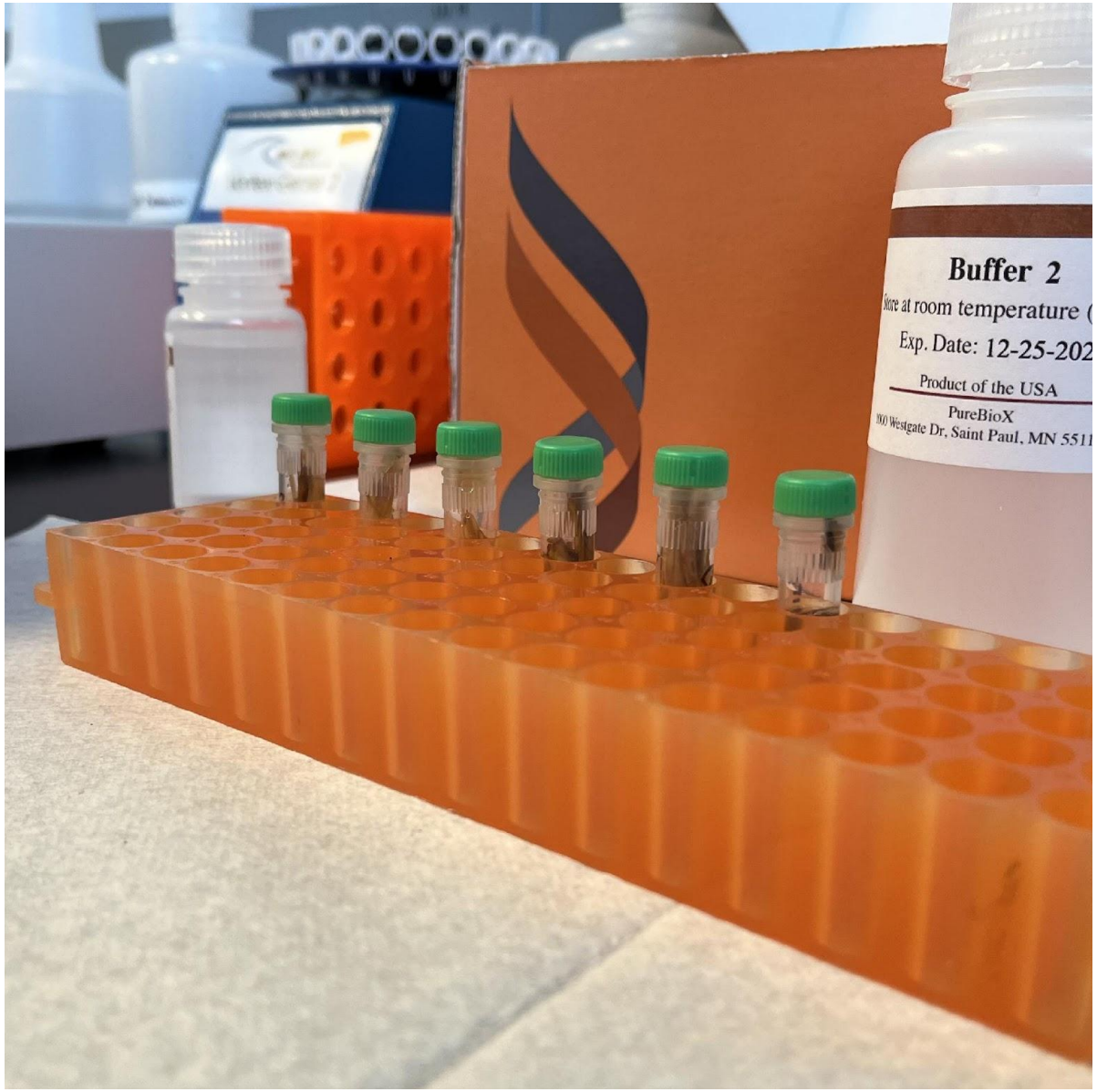
- Triclopyr
  - 1.5 quarts/acre
  - Apply when target species is actively growing and fully leafed out.
- Glyphosate
  - 3 quarts/acre plus 2 quarts/acre
  - When target species is actively growing and fully leafed out.

Cut stump

- Triclopyr
  - 20%, 1:4 in basal oil
  - Apply any time of year.
- Glyphosate
  - 50%, 1:1 mix with water
  - Apply any time of year.

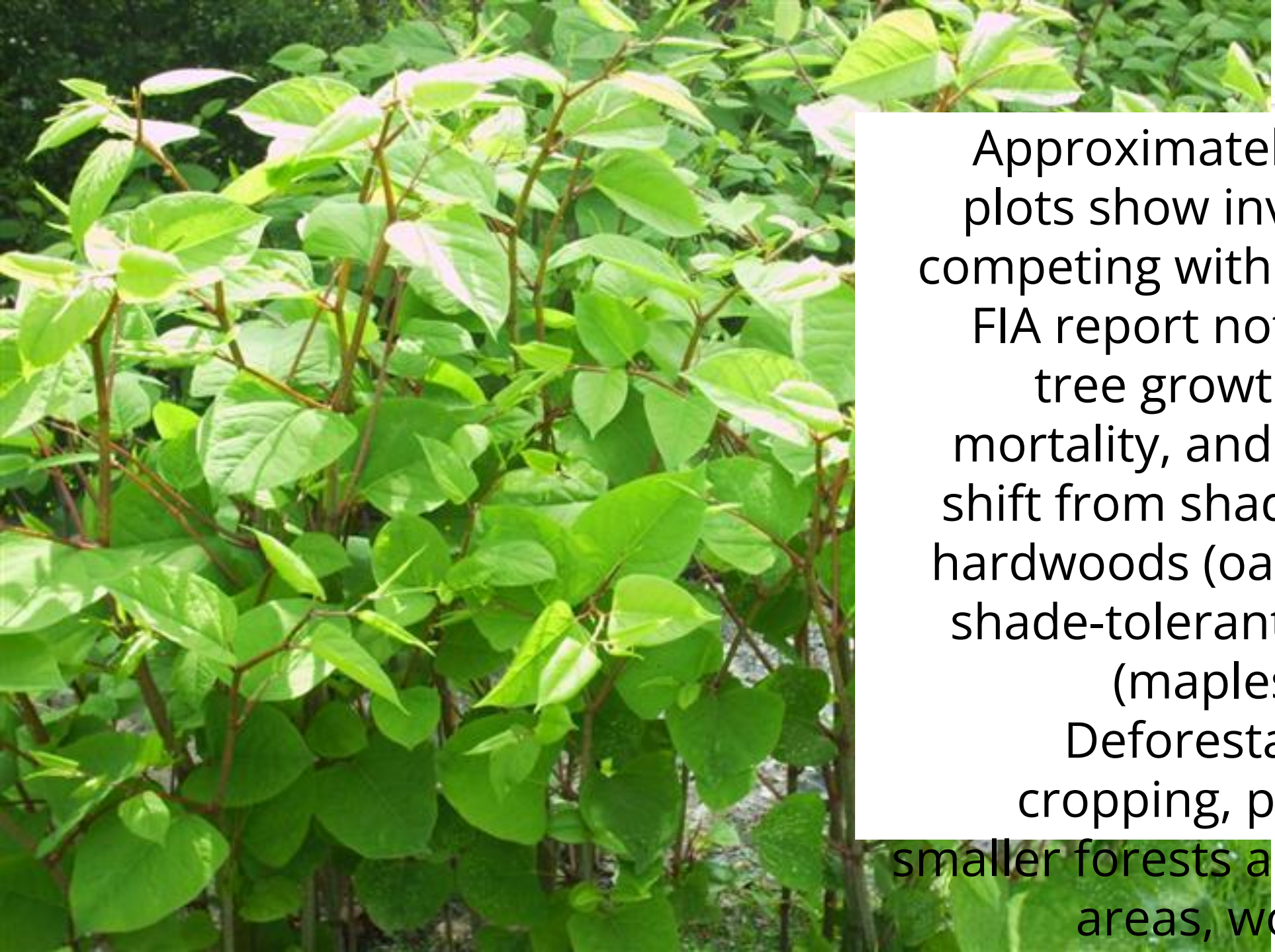
OAK WILT RAPID TESTS

- LAMP (loop-mediated isothermal amplification) primers targeting existing DNA regions known to be unique signatures of Bretziella fagacearum.
- Combined the DNA amplification and detection steps into one without the need for a separate downstream detection
- Used a pH-based detection method where a positive result can be easily detected by visible color change of a pH indicator
- One step DNA detection kit can be freeze-dried and thus shipped without relying on costly cold-chain transport

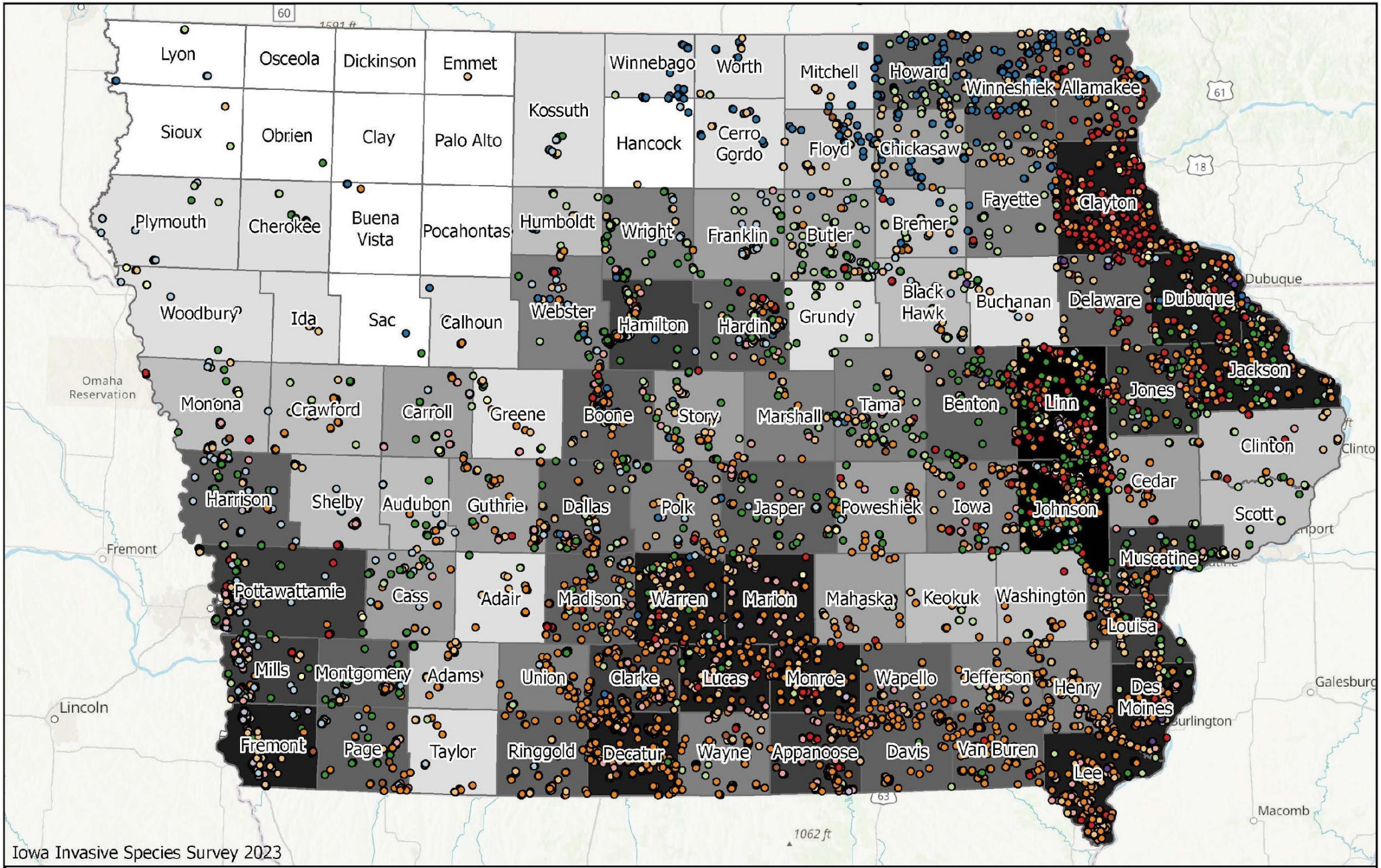


KEY OAK WILT MANAGEMENT FINDINGS

- Once infected, oak wilt can kill an otherwise healthy red oak tree in 3 to 8 months.
- Girdle-herbicide method reported an overall success rate of 55 percent in containing oak wilt spread. In clusters of four or fewer infected trees, the success rate was up to 81 percent effective.
- Early detection and rapid response are critical for containing oak wilt spread.
- In certain landscapes, the girdle-herbicide can serve as a viable, cost-effective alternative to traditional methods like the vibratory plow.



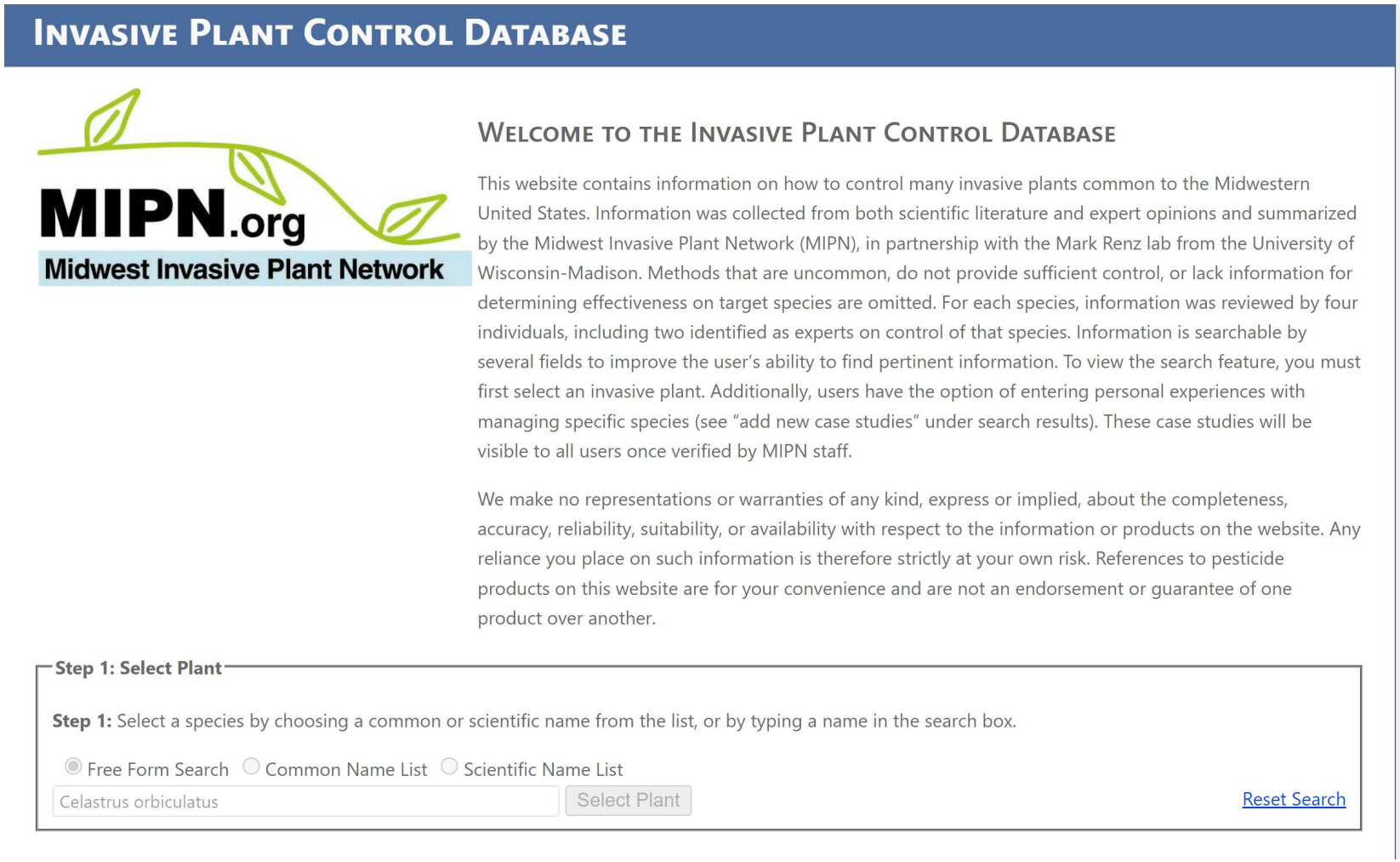
Approximately 95% of FIA plots show invasive plants competing with natives. The FIA report notes declining tree growth, rising tree mortality, and the ongoing shift from shade-intolerant hardwoods (oak/hickory) to shade-tolerant hardwoods (maples/ironwood). Deforestation for row cropping, particularly in smaller forests and fencerow areas, worsens these


Lyon
Osceola
Dickinson
Emmet
Kossuth
Winnebago
Worth
Mitchell
Howard
Winneshiek
Allamakee
Sioux
Obrien
Clay
Palo Alto
Hancock
Cerro Gordo
Floyd
Chickasaw
Plymouth
Cherokee
Buena Vista
Pocahontas
Humboldt
Wright
Franklin
Butler
Bremer
Fayette
Clayton
Woodbury
Ida
Sac
Calhoun
Webster
Hamilton
Hardin
Grundy
Black Hawk
Buchanan
Delaware
Dubuque
Monona
Crawford
Carroll
Greene
Boone
Story
Marshall
Tama
Benton
Linn
Jones
Jackson
Harrison
Shelby
Audubon
Guthrie
Dallas
Polk
Jasper
Poweshiek
Iowa
Johnson
Clinton
Cedar
Scott
Pottawattamie
Cass
Adair
Madison
Warren
Marion
Mahaska
Keokuk
Washington
Muscatine
Louisa
Mills
Montgomery
Adams
Union
Clarke
Lucas
Monroe
Wapello
Jefferson
Henry
Des Moines
Fremont
Page
Taylor
Ringgold
Decatur
Wayne
Appanoose
Davis
Van Buren
Lee
Omaha Reservation
Fremont
Lincoln
Dubuque
Galesburg
Macomb
1062 ft
Iowa Invasive Species Survey 2023

USE OF CHEMICALS

- If you decide to use herbicides, always read the label first and follow the directions to the letter, including all precautions and restrictions.
- Don't use products for pests that are not indicated on the label and don't use more pesticide than directed by the label.
- Don't think that twice the amount will do twice the job.
- Use protective measures when handling pesticides as directed by the label, such as wearing impermeable gloves, long pants, and long-sleeve shirts. Change clothes and wash your hands immediately after applying pesticides.
- For more specific details on the application of herbicides, please visit
  - Midwest Invasive Plant Network
    - https://www.mipn.org/control/

MIPN- DATABASE SEARCH



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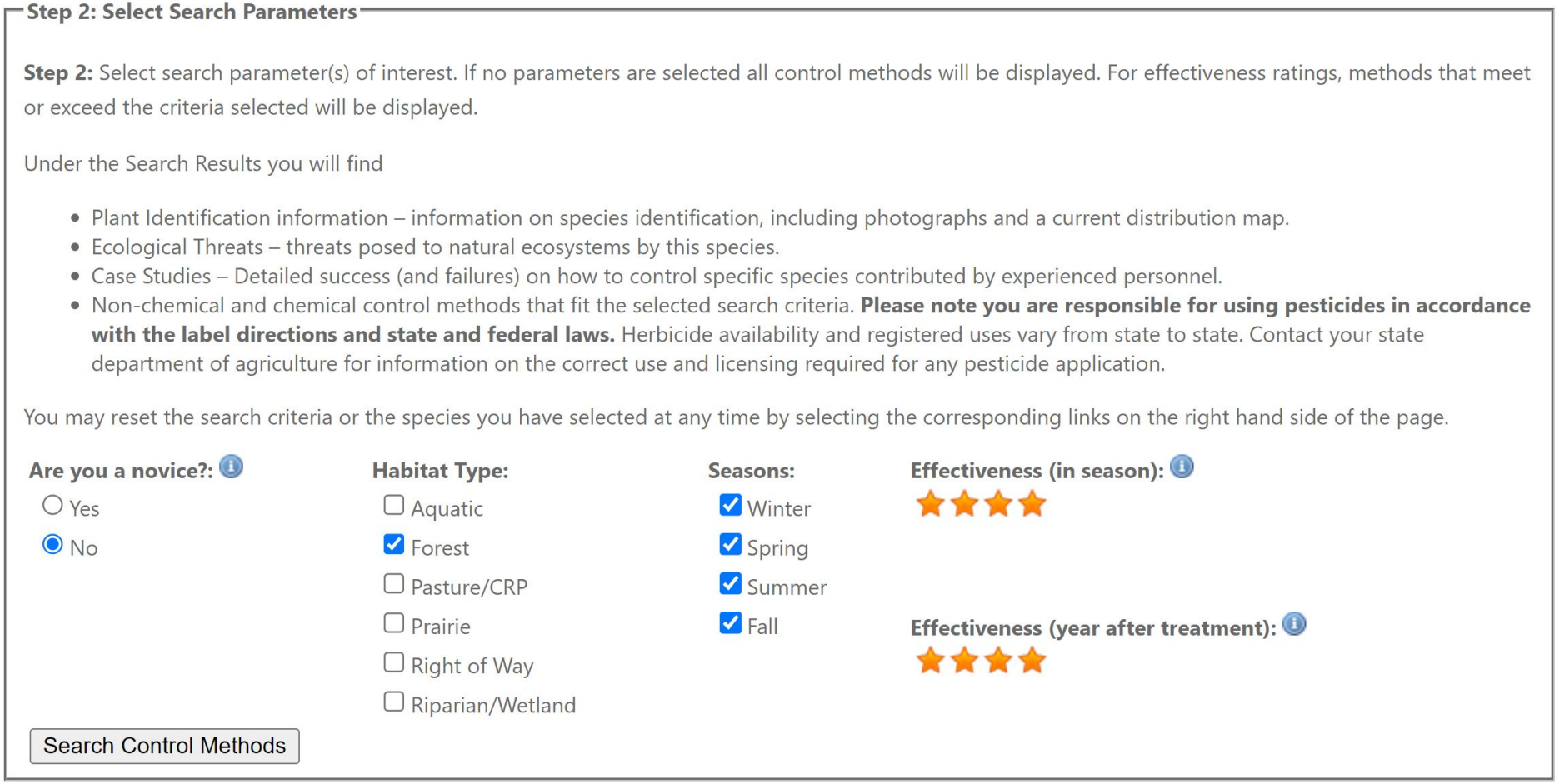

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Chemical controls

New (Type)	Ingredients	Directions
Type - Foliar **User Type -** Professional **Effectiveness -** in season ★★★★ year after treatment ★★★☆	**Active Ingredient (A.I.):** imazapyr **Common product name:** Arsenal; Stalker (Aquatic: Habitat; Imazapyr 2sl)	**Rate -** (broadcast) 64 - 96 fl oz/A (1 - 1.5 lb a.e./A) (spot) 1.5 - 2% (0.03 - 0.04 lb a.e./gal) **Timing -** Apply when target species is actively growing and fully leafed out. **Caution -** Use aquatically labeled product if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury.
Type - Cut stump **User Type -** Professional **Effectiveness -** in season ★★★★ year after treatment ★★★☆	**Active Ingredient (A.I.):** imazapyr **Common product name:** Stalker (Aquatic: Habitat; Imazapyr 2sl)	**Rate -** (spot) 5% in oil (0.1 lb a.e./gal) **Timing -** Apply any time of year. **Remarks -** Products containing this active ingredient can have different instructions for mixing. Labels will recommend mixing the product in water or oil based carrier (e.g. basal bark oil). Consult the label to determine the appropriate carrier. **Caution -** Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground as imazapyr is not selective and can remain in the soil for several months to over a year depending on application rate. Overspray or drift to desirable plants should be avoided, as even minute quantities of the spray may cause severe injury to plants.

THANK YOU

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REFERENCES

Iowa DNR Forest Health Monitor
https://iowadnr.maps.arcgis.com/apps/webappviewer/index.html?id=9d901351b2e04bf680a9f4d79ba64d0d

Early Detection and Distribution Mapping System (EDDMapS)
https://www.eddmaps.org/

Forestry Images
https://www.forestryimages.org/

Midwest Invasive Plant Network
https://mipncontroldatabase.wisc.edu/Default.aspx