



Invasive Plant ID and Ecology

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What is an invasive species?

A non-native species whose introduction causes economic or environmental harm, or harm to human health, and which can establish and spread in minimally managed habitats.



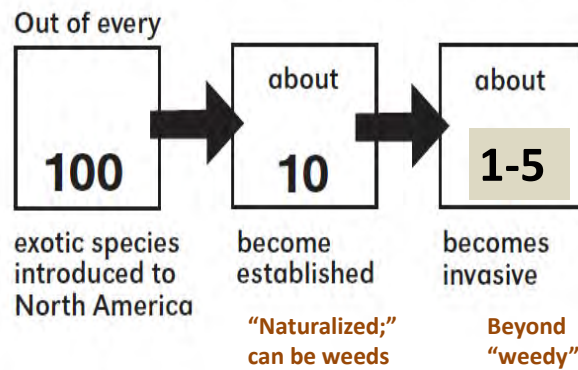
Japanese knotweed (aka bamboo) and burning bush (aka winged euonymus)

Definition is a paraphrase of ME Dept. of Ag, 2011 rulemaking

Most non-native species are not invasive

FIGURE 1.1

Number of Exotic Species That Become Invasive



that become invasive varies by taxon (plants vs insects vs other animals vs fungi, etc.).
For terrestrial plants I've seen a # as high as ~5%.

How do invasive plants get here?

60% deliberate, 11% accidental, 28% unknown

Lehan et al. 2013. Am. Journal of Botany 100(7): 1287-1293

~8% for forage 

~40% for horticulture 

~4% for "conservation" 

~7% deliberate, reason unknown
~3% medicinal

~11% accidental

- contaminants: seed, livestock, packaging (8%)
- ballast (<1%)



NEW NUMBERS - *Lehan et al. 2013. Am. Journal of Botany 100(7): 1287-1293.*

OLD NUMBERS - Marinelli and Randall 1996, Invasive Plants: Weeds of the Global Garden, P.5-6 (~50% of invasive plants in 49 states + CA provinces continental area brought for horticulture)

The same characters that make plants desirable horticultural species (pest-resistant, good ground coverage, colorful berries, tolerance of wide range/adverse conditions) are the same thing that make them successful invaders.

Some species were brought for soil stabilization (e.g., autumn olive as shown here by a roadside, Photo from LIISMA PRISM), wildlife food, windbreak/erosion control.

Some could come in multiple ways/events over time (NOT EXCLUSIVE)

How do they spread?

Seeds or fragments
NOTE we can prevent these!



GIVE INVASIVE SPECIES THE BRUSH OFF.

Clean Your Gear Before Entering
And Before Leaving The Recreation Site.



Help Prevent The Spread
Of Invasive Plants And Animals.

- REMOVE plants, animals & mud from boots, gear, pets & vehicles.
- CLEAN your gear before entering & leaving the recreation site.
- STAY on designated trails & roads.
- USE CERTIFIED or local firewood & hay.



Also: manure, mulch



- Equipment
- Horticulture
- Recreationalists – pets, gear
- Fill
- Water

Why are they so successful?

- Thrive on disturbance
- Competitive advantages:
 - Not usually eaten (lack enemies)
 - Early and late leaves
 - Abundant reproduction



Bottom left – shrubby honeysuckle in the understory, central Maine.

Damage or kill plants directly or indirectly



Bittersweet vines, even under closed canopy
Also a safety hazard when working in these areas
Other vines too

And allelopathy, e.g., garlic mustard
And changing the soil environment (microbial changes in addition to/instead of allelopathy)
Take home this pic: you can't always SEE damage taking place

Displace native trees, shrubs, and wildflowers



Invasive plants can crowd out native plants in the understory

Here, invasive honeysuckle shrubs dominating the understory in an Augusta forest. Note the early leaf emergence, giving competitive advantage

Very hard and potentially expensive to treat an infestation this dense

Damage wildlife habitat



Salt marsh over-run with Phragmites, Phippsburg

Forest dominated by hardy kiwi, Rockland

Harm food webs that depend on native plants



Also, we are only beginning to understand the effects on the food web – most native insects have only evolved to eat certain plants, and as native plants decline in the landscape, we don't know what the effects will be.

This is bad b/c many insects are already doing poorly e.g., Rusty-patched bumblebee just proposed to be listed under ESA.

Initial findings are not encouraging, e.g., monarch butterfly caterpillars can't survive on the milkweed look-alike black swallowwort.

This will ripple through higher levels of the food web in ways we don't know yet. Doug Tallamy's *Bringing Nature Home* discusses this in detail regarding insects and their specialization.

In general it is invasive plants w/o close relatives here which are the worst in this regard (least likely to be able to support native insects)

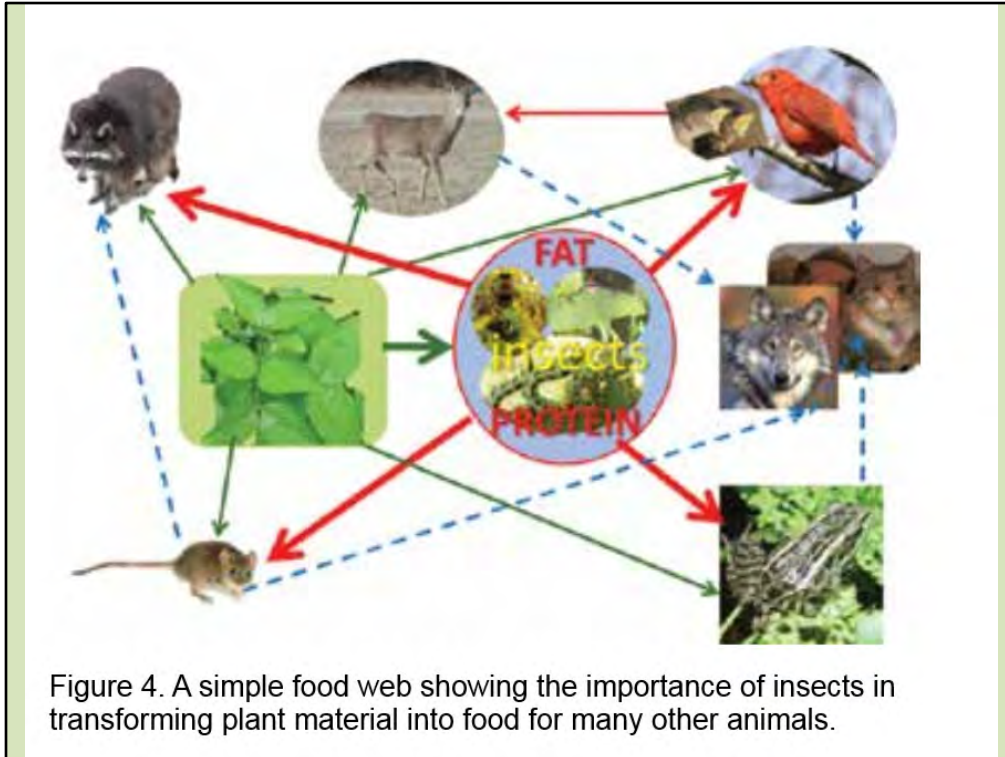


Figure from Jordan 2014, Novel ecosystems, invasion and the forgotten food web, Quarterly Newsletter of the Long Island Botanical Society, Spring edition.

Identification of invasive plants

- Plant ID requires practice
- Go outside, look at plants
- Use your free field guide
- Use native woody plants booklet
- Use [GoBotany website](#) to look at photos
- Download and use the New England Wildflowers free app*



*it's not just for wildflowers

How to use the MIPFG

Maine Invasive Plants Field Guide

PERENNIAL PEPPERWEED
(Perennial pepperwort)
Lepidium latifolium
Status in Maine: localized

SEVERELY INVASIVE

PERENNIAL PEPPERWEED
clusters of small white flowers on tall stalks of common valerian (*Valeriana officinalis*), Queen Anne's lace (*Daucus carota*), or angelica (*Angelica* spp.) may resemble perennial pepperweed, but leaves are very different.
Control methods: Plants may be difficult to hand pull, depending on depth of rootstock. Root fragments can regenerate. Sheep grazing is effective in infestations mixed with other plants. High volume foliar applications of glyphosate result in fair to poor control in dense stands; consider spring grazing or mowing dense patches and then applying herbicide to re-growth. Best application time for herbicides is flowerbud to early flowering stage. Herbicides with more residual activity, such as imazapyr, imazapic, or metsulfuron methyl can increase efficacy, but should be prescribed and applied only by a licensed applicator, with care to minimize damage to non-target plants. **Special rules apply to herbicide use in or near wetlands and waterbodies - see the section in the back of this guide titled "Use of Herbicides to Control Invasive Plants in or Near Wetlands and Waterbodies."**

Description: Perennial, multi-stemmed herb, 1-5' tall.
Leaves: Basal leaves are stalked, up to 12" long and 3" wide. Stem leaves are significantly smaller, alternate, and lanceolate to oblong. Edges are entire to weakly serrate. Sessile or stalked. **Flowers:** Small, 4-petaled white flowers occur in dense clusters near stem tips from summer to fall.
Fruit: Very small pods, 1/4" long; each pod contains 2 seeds.
Roots: Base of stem is semi-woody; roots form woody crown at soil surface. Roots can both creep and grow deep, depending on soil type. New plants can arise from small sections of root.
Native range: Southeastern Europe, Southwestern Asia.
How it arrived in U.S.: Contaminant in agricultural seeds.
Reproduction: Mostly by seed, but also vegetatively by root fragments.
Habitat: Commonly found in meadows, wetlands, streams and river shores, sandy beaches, dunes, and salt marshes. Tolerates a wide range of soil types and moisture, including flooding. Studies indicate it can act as a salt pump, pulling up salt ions from deep soil layers and depositing them on the surface. Changes in topsoil salinities can dramatically alter species composition and diversity.
Similar native species: None.
Similar non-native species: Other weedy mustards, though in general they are much smaller. Superficially, the

herbs & grasses

MIPFG-2019

You have a suspicious plant. Look through the cards for that type of plant (tree, shrub, herb/grass, vine) and compare photos.

If you think you may have a match, look at the Description section to match the details. Check similar native and non-native species.

See also MNAP Web Gallery for more photos of most common and most harmful spp
And see GoBotany for look-alike photos

There is a glossary if there is vocab you don't know.

How to purchase additional copies



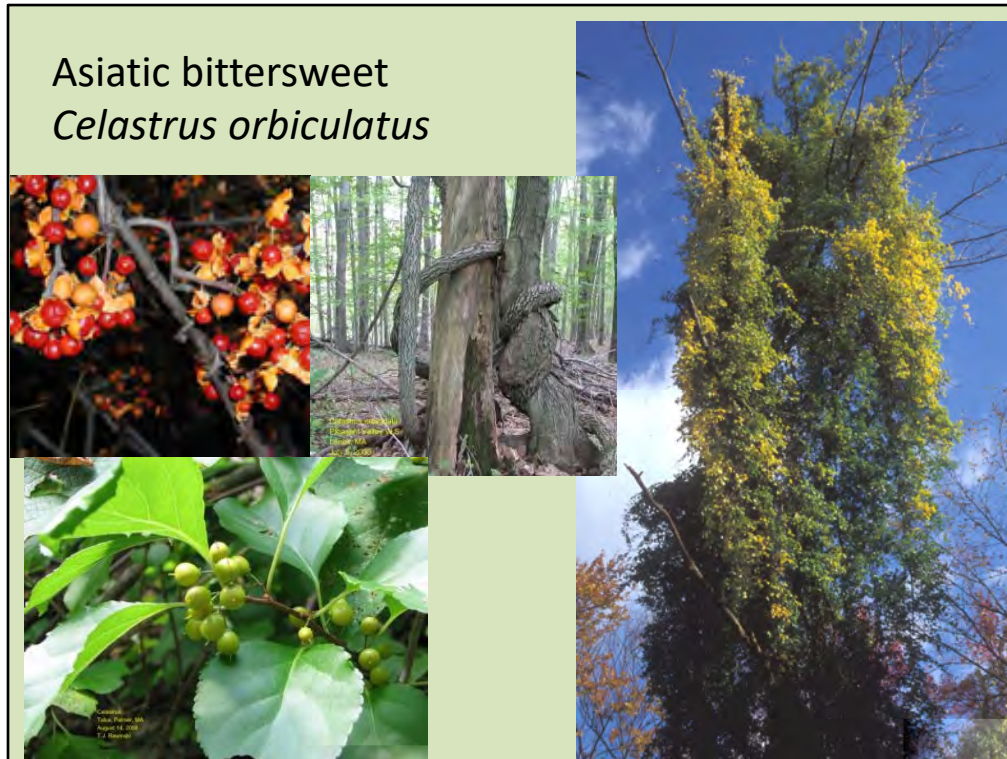
- MNAP website
- [A few local bookstores, COVID-19 permitting]

Maine Audubon – Falmouth

Wild Bird Supply - Freeport

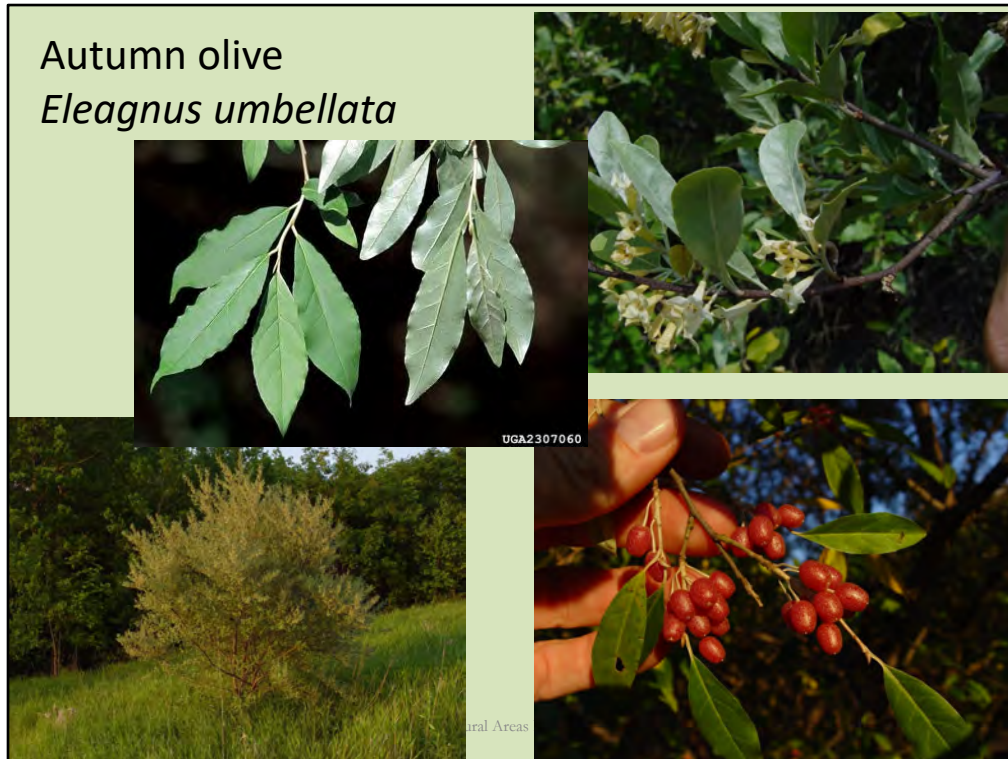
Gulf of Maine - Brunswick

Widespread in Maine



REBECCA

Native, American bittersweet only found in dry woodland hillsides in southwestern maine, plus a record in Skowhegan



N-fixer so has competitive advantage in nutrient-poor soils

Single shrub can produce 80 lbs of fruit/year

Black locust
Robinia pseudoacacia



Canopy tree

Thorny

Large compound leaves with entire leaflets

Dangling clusters of flowers in early summer, very fragrant

Seeds are brown pods

Black swallowwort & pale swallowwort
Cynanchum louiseae & *C. rossicum*



REBECCA

Herbaceous vine

Primarily wind dispersed, toxic to wildlife and livestock, allelopathic
Common and aggressive in immediate coastal areas, prefers full sun

Burning bush aka winged euonymus
Euonymus alatus



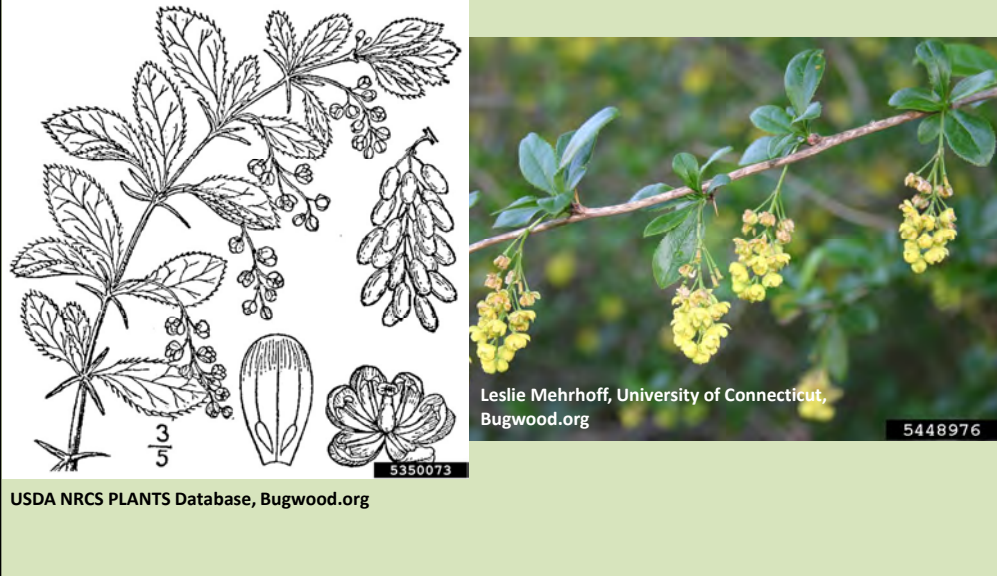
REBECCA

Reproduces by seed and by suckering

Somewhat shade-tolerant

Will be browsed if deer are really hungry – this photo is in CT where deer densities are really really high

Common barberry aka European barberry
Berberis vulgaris



- Commonly has 3 spines/node vs Japanese commonly has 1
- Leaves have teeth
- Racemes of yellow flowers
- More upright shrub vs Japanese barberry more low-sprawling

Common buckthorn
Rhamnus cathartica



Larger stems have orange under-bark

Emodin is a metabolic by-product that has been found to have a negative effect on amphibian breeding success in the midwest



Does not provide adequate nesting habitat for some of our rare salt marsh songbirds eg
Salt Marsh Sharp-tailed sparrow, Nelson's sparrow

February daphne
Daphne mezereum



Photo courtesy of Arthur Haines

Whorled leaves

Purple flowers early in year; Bright red fruits along stem under top leaves

Shade-tolerant, shown here in understory of Vassalboro woodlot ☺

All parts toxic if eaten, sap can cause skin rash in some people



REBECCA

Biennial herb: 1st year – basal rosette of leaves. 2nd year – taller, flowering stem

Most seeds only viable for 1 year, but b/c it makes so many seeds, some of which can last longer, hard to get rid of

Seeds easily moved along trails and waterways by people and animals

Leaves do smell like garlic, esp. when crushed

Known to invade floodplain forests in Maine



How many of you recognize these 2 species? Major forest threats



Mice like the barberry thickets, and ticks are found there in higher densities than in the surrounding, uninfested forest

Japanese knotweed
Fallopia japonica



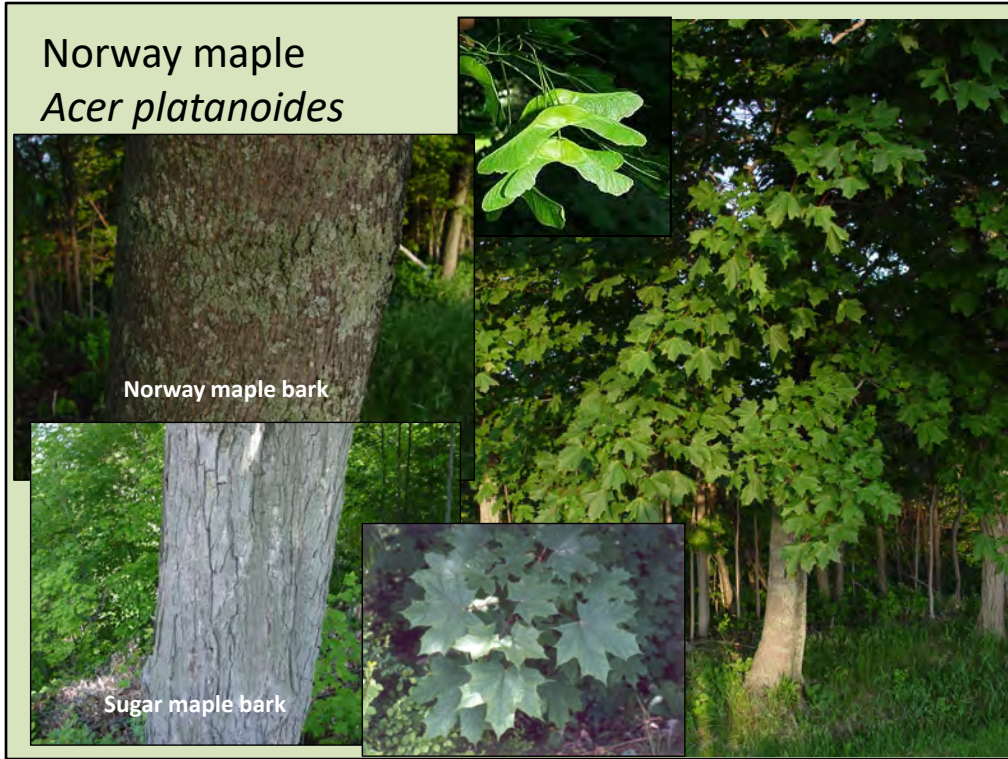


REBECCA

1 million seeds/plant a year! Seeds viable 20 years.

Spread by humans (primary) and birds. Was promoted as living fence.

Fringed petiole = useful ID character



REBECCA



Opposite leaves, pointed at tips
Bit more leathery than honeysuckle
Clusters of flowers and fruits vs pairs in honeysuckles
Widely planted for hedges

Shrubby honeysuckles
Lonicera morrowii and others



hollow
stem pith



© Gary Fewless/University
of Wisconsin-Green Bay



We do have a native honeysuckle, but it's less robust, not hairy on the leaves, flowers are radially symmetrical, pith solid-white

Localized or Not Yet Detected in Maine



Phytophototoxic!

Odor of cut stems = pungent, CAUTION!

Truly giant plant, flowering stems 8'-15'

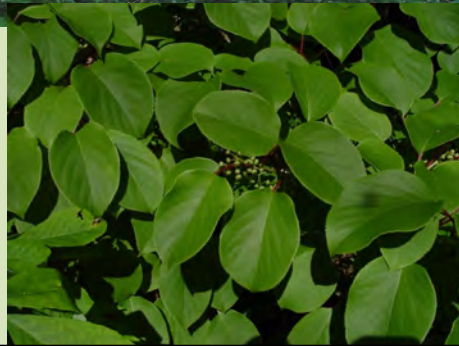
Monocarpic perennial, can live for 3-5 years before reaching maturity and flowering

Giant knotweed
Fallopia sachalinensis



Larger cousin of Japanese knotweed
Leaves heart-shaped at base (cordate)
Leaves larger and more long-tapering than Japanese knotweed

Hardy kiwi
Actinida arguta



REBECCA

Woody vine

Dioecious, so both male and female plants must be present to produce fruit.

Some debate/unknowns about how invasive this it, but Pics at R are from a site in Rockland where this plant is obviously behaving very invasively.

It has been promoted as a human food source...

Japanese honeysuckle
Lonicera japonica



Chuck Barger, University of Georgia, Bugwood.org

UGA5302048



Woody vine, can climb or trail

Fruits are black/purple at maturity

Mile-a-minute weed
Persicaria perfoliata

Leslie Mehrhoff, Univ. of CT, Bugwood.org



UGA5273091

Arthur Haines,
GoBotany

Annual, herb vine

Very aggressive, real problem in open areas, old fields

Leaves alternate, triangular, with round leaf-like ocrea around stem at base of petiole

Flowers are in clusters, small, white, inconspicuous, fruits are clusters of small blue fruits with dark glands on surface

Ornamental jewelweed,
Himalayan balsam
Impatiens glandulifera



Grows in wet areas, can form dense stands that crowd out native vegetation
Can be a very tall plant, up to 2m
Opposite or whorled leaves, long-tapered, serrated



REBECCA

On the Right, pic from PA

Very variable, alternate leaves, some are really deeply lobed, others less so
5-parted, white-green flowers

Weird fruits with raised dots on surface



REBECCA

Can form dense carpet in the woods, crowding out native plants

Alternate 2-4" leaves along stem

Midrib is silvery-white with hairs

Stems turn reddish in fall, late seeder

2020 detections in York and Georgetown ☹️ - EDRR species



REBECCA

Small to large tree, huge (1-4'), alternate, pinnately compound leaves

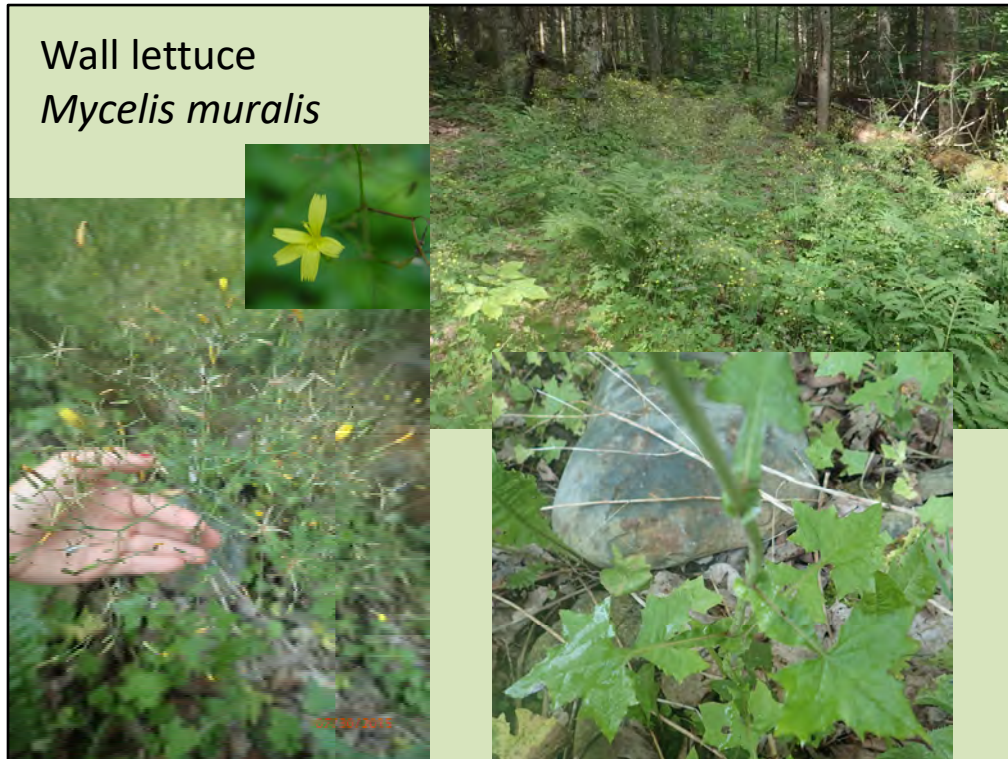
Not very shade-tolerant

Glandular "nodes" on bumps at base of leaflets

Bark like skin of cantaloupe

Broken leaves and twigs with "rancid peanut butter" smell

Dioecious – females have large clusters of dry samara fruit



Tall 2-3' Annual herb shade-tolerant
Open inflorescence of many many 5-parted, ½" flowers – become tiny, wind-dispersed
dandelion-like seed heads, easily carried on pant legs, animals, soil
Leaves are deeply lobed, toothed, and clasp the stem
Can form dense stands in forest understory



Thank You!

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 DEPARTMENT OF
Agriculture Conservation & Forestry

Purple loosestrife
Lythrum salicaria



Wetland plant mostly, in ditches but also invades natural areas
Grow in clumps
30-50 plants can grow from a single rootstalk
Spikes of purple-pink flowers in July and August

Yellow iris
Iris pseudacorus



Grows in salt, brackish, and freshwater wetlands, can form dense stands that crowd out native vegetation
Much more robust/larger than our native blue-flag iris