

Hemlock Woolly Adelgid

- Aphid-like
- Introduced from Asia
- First found in northeast in 1950s
- Feed on starch in needles



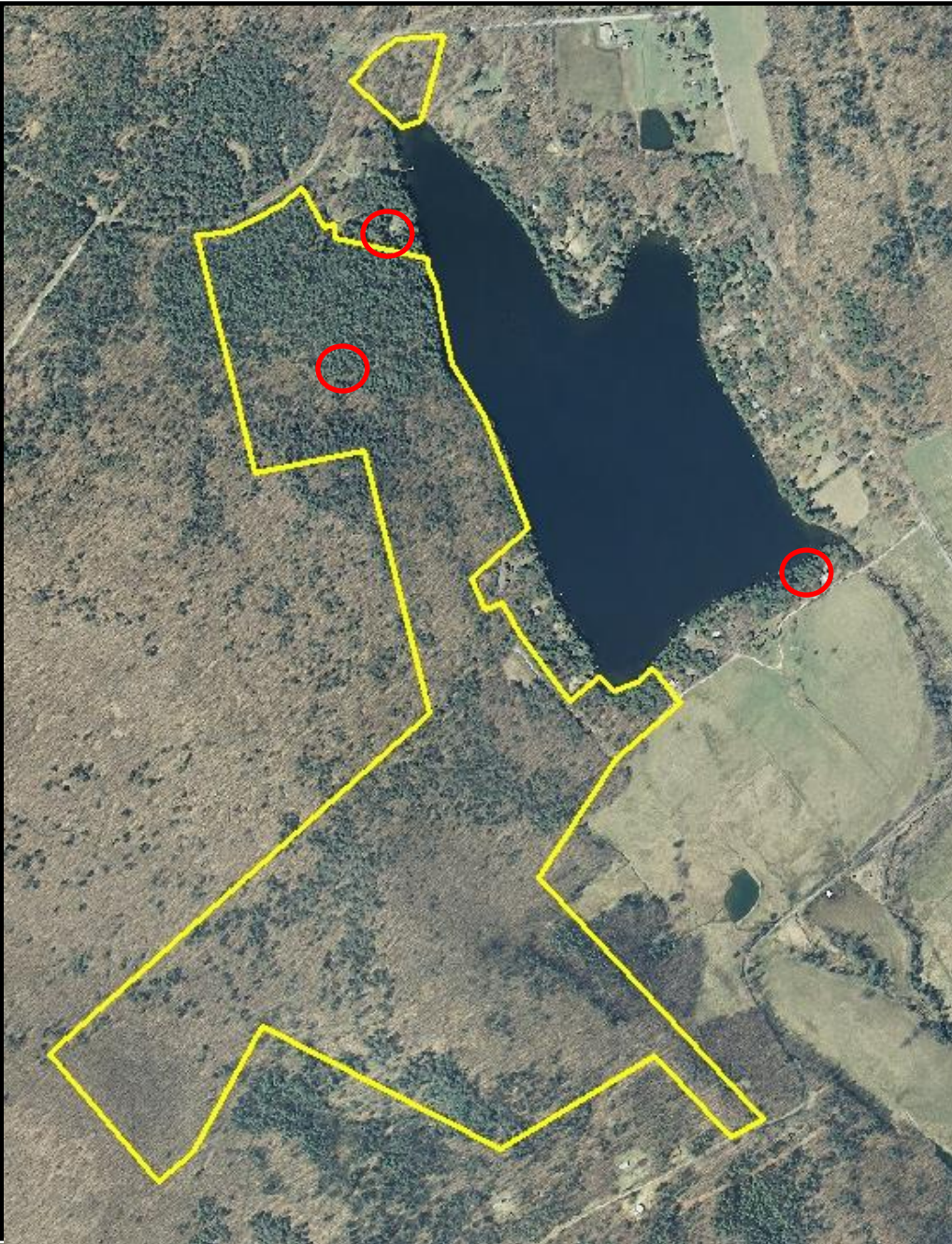
<1.5 mm long

Two Generations/Year

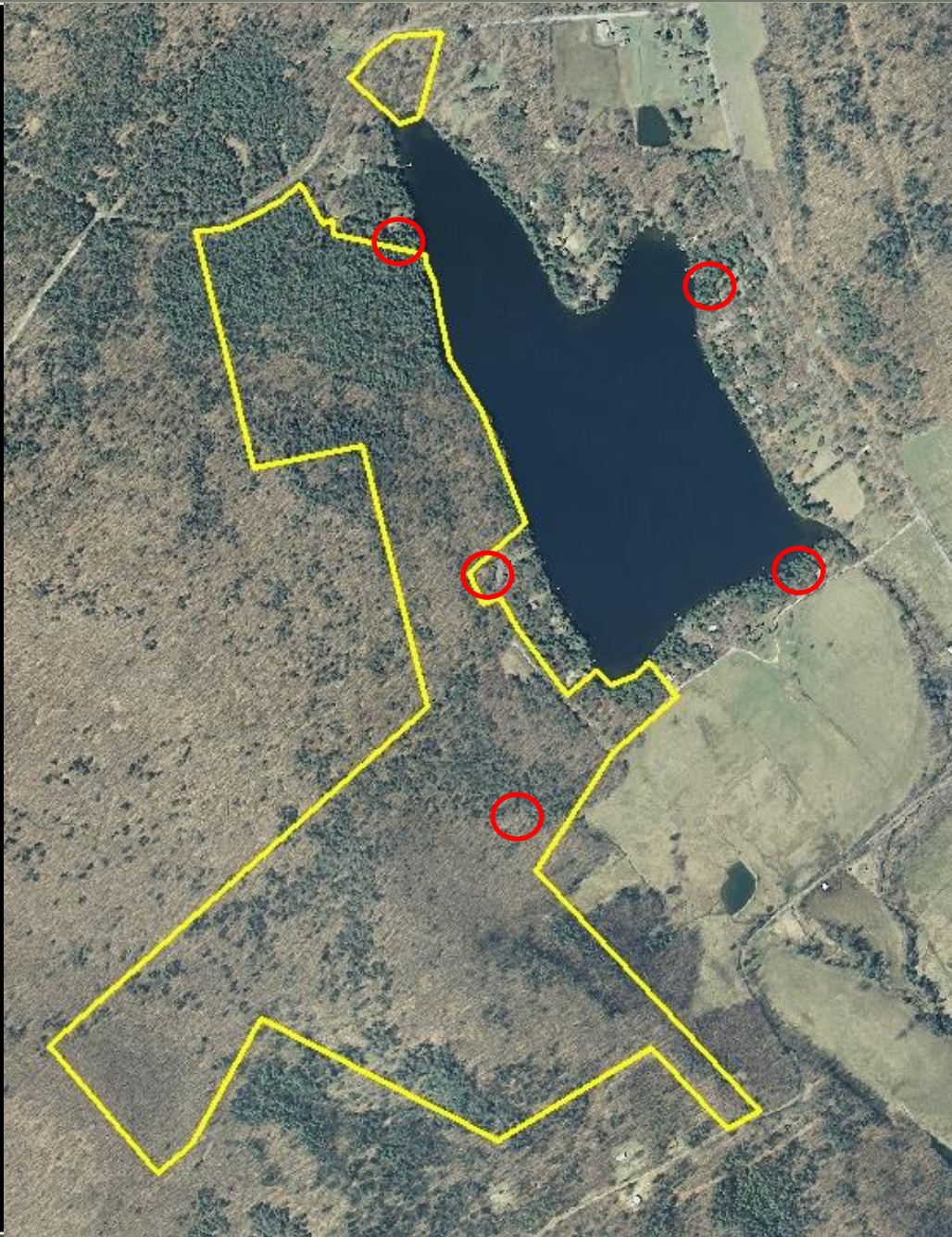


- Early spring – females lay 100-300 eggs in woolly egg sacs under branches
- Larvae (crawlers) emerge in spring – active March-June, second generation in June-July
- Can be transported by wind, birds, mammals to nearby trees at this time
- Become immobile nymphs – dormant until October or November
- Feed through winter and early spring

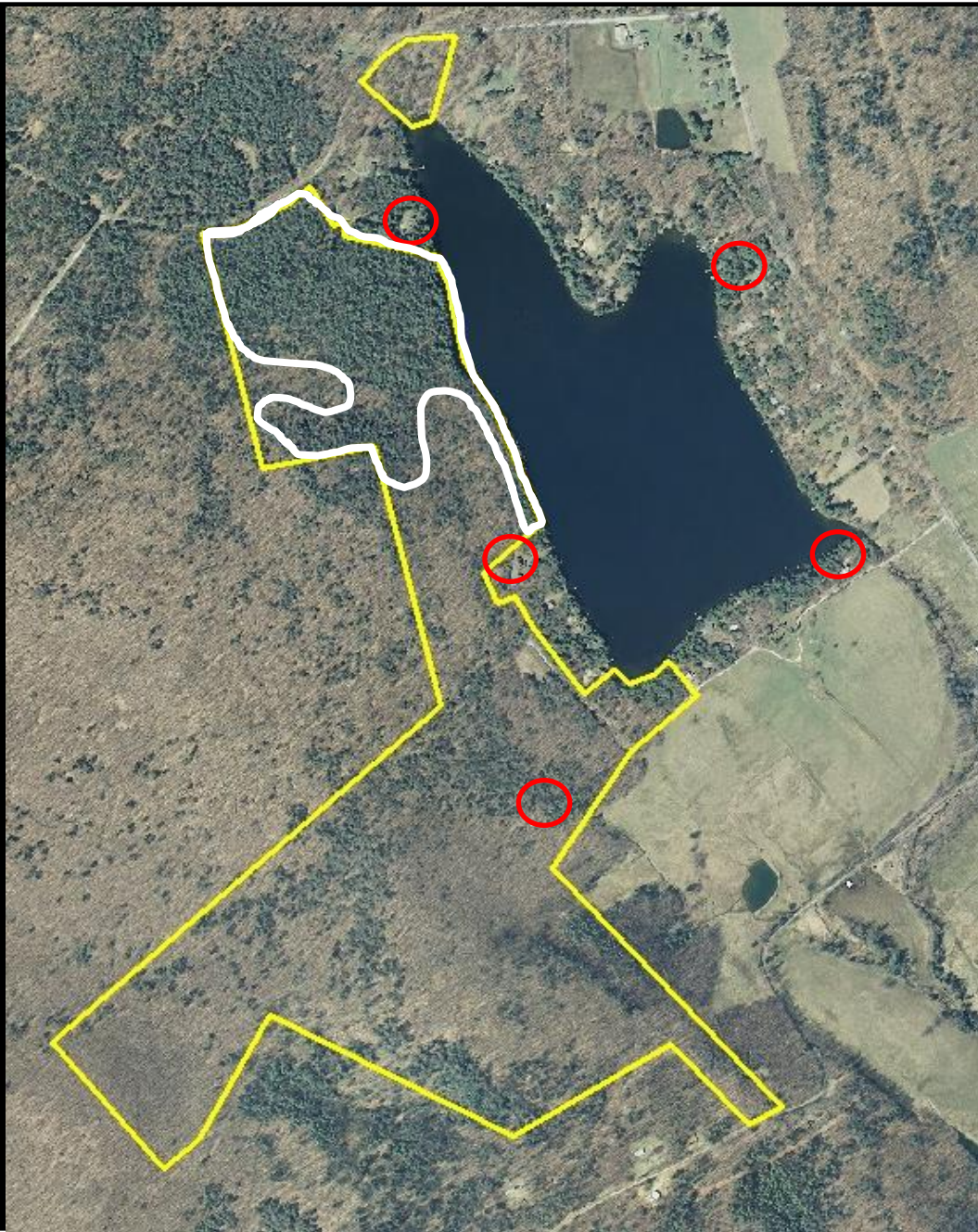




○ 2012 locations



○ 2013 locations









- Damage usually from bottom up even though adelgid throughout
- Death 4-10 yrs., 6 in this region
- Populations fluctuate until tree death occurs

Hemlock is a unique species



Shades streams
Stabilizes streambanks

Provides unique habitat structure
Creates unique microclimate

Cascading Effects



Mammals



Stream salamanders



Black-throated green warbler, Acadian flycatcher, blackburnian warbler, blue-headed vireo, and hermit thrush



Erosion and sedimentation, warmer water temperatures, and lower dissolved oxygen levels



Brook trout

Reduction in aquatic invertebrate diversity and trout abundance

Control Options

Biological Control – *Laricobius nigrinus*

- Showing promise
- Has been released in PA
- Buy time!



Control Options

Chemical	Professional	Homeowner	Water concerns	Duration
Imidacloprid -Soil drench	X	X Bayer Advanced Tree and Shrub; Merit	Yes 50 ft	7 yrs
Tablets	X	X Core Tect	Yes	7 yrs
Trunk injection	X		No	7 yrs
Dinotefuran– Basal bark spray	X		No	1 yr
Organic horticultural oils and insecticidal soaps	X		No	1 yr

Only effective control currently!

Is the
adelgid
present on
my
property?

YES

Is the
infested tree
within 50 ft
of water?

YES

1. Treat with insecticidal soaps or horticultural oils - for smaller trees only
2. Hire licensed pesticide applicator (trunk injection or basal bark spray)

NO

Monitor trees
every winter
and spring

NO

1. Treat on your own (soil drench or tablets)
2. Hire licensed pesticide applicator (soil drench, trunk injection, or basal bark spray)

Cultural Controls for Trees Around the Home



- Mulch to maintain soil moisture
- Water during periods of extended drought (apply about 1 inch / week around drip line)
- Do not apply nitrogen fertilizers, which enhance adelgid survival and reproduction
- Limit movement of hemlock products such as logs, firewood, and seedlings from infested areas into areas that are not yet infested
- Remove bird feeders near hemlocks

Cultural Controls for Trees Around the Home

- Clip and burn heavily infested hemlock branches
- Avoid disturbing shallow roots with heavy equipment
- Avoid changing the grade (slope of the land) near hemlocks



Emerald Ash
Borer (EAB) :
Has killed over 70 million
trees in neighboring states

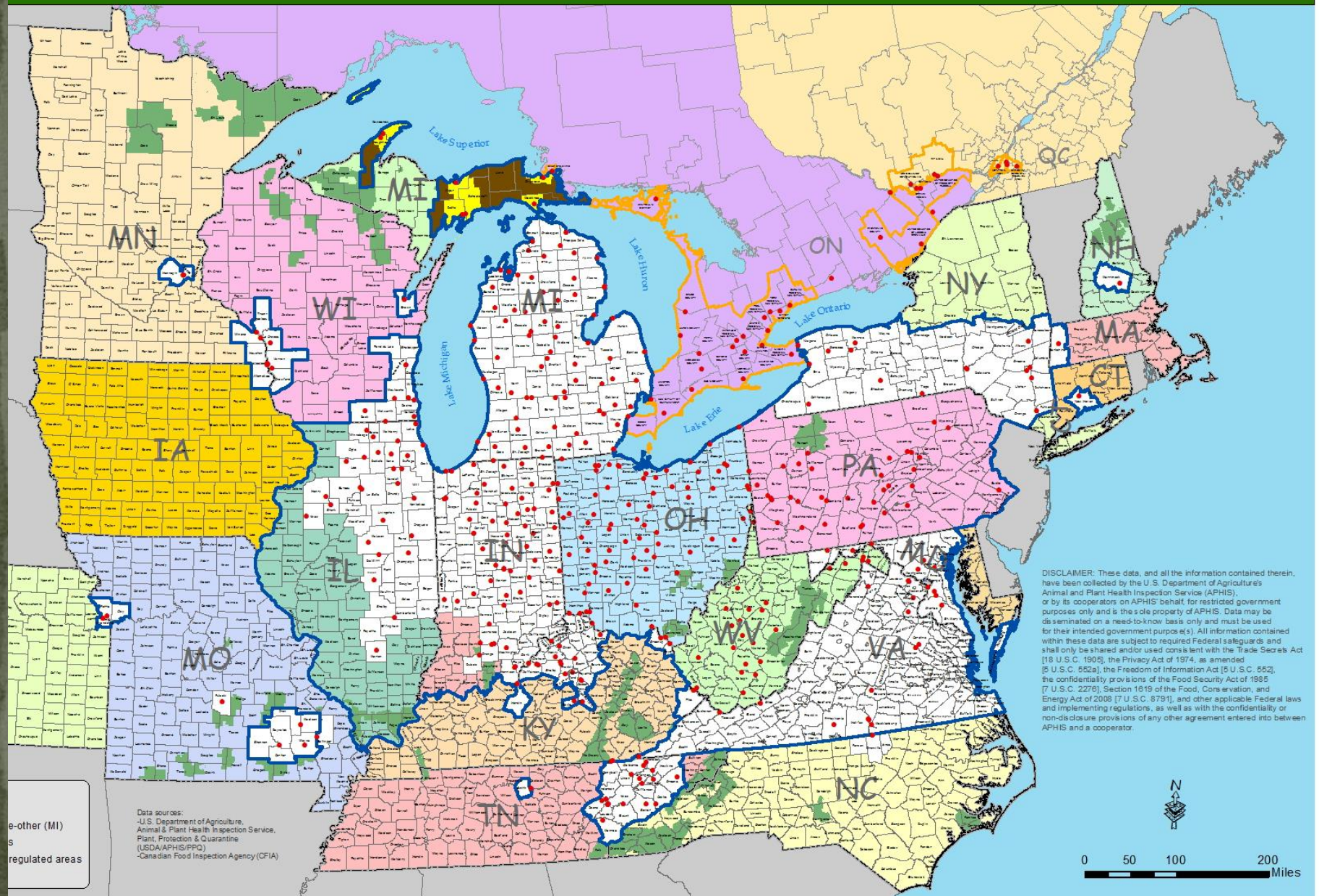


UGA1241011

Cooperative Emerald Ash Borer Project

Initial county EAB detections in North America

July 1, 2013



EAB Life Cycle



David Cappaert, Michigan State University, forestryimages.org

Adults lay eggs in mid to late June

Eggs laid on bark surface, cracks

Creamy white turning to amber

Hatch in 7 to 10 days



David Cappaert, Michigan State University, Bugwood.org

Larval galleries under bark

EAB Life cycle

Emergence holes – D-shaped



Toby Petrice, USDA Forest Service,
Bugwood.org

EAB Life Cycle



Adult – female lives 21 to 25 days

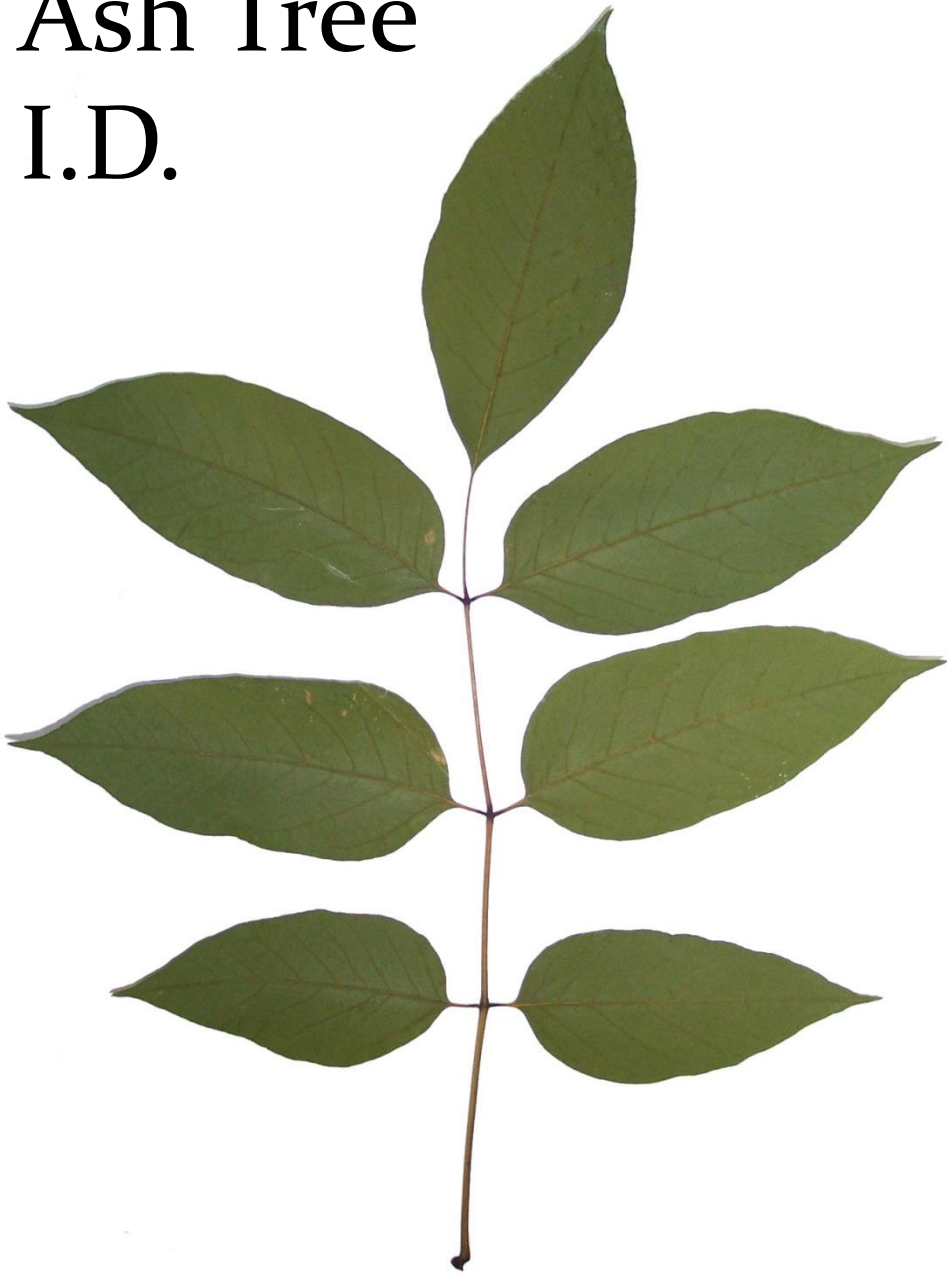
2-3 week maturation feeding on leaves

Female lays 60 to 90 eggs



Ash Tree

I.D.





Opposite branching



Braided bark





Visual Signs & Symptoms

Varies with Pest Pressure

- Tier I: Early infestation
 - Bark Splitting
 - Woodpecker foraging
- Tier II: Mid level infestation
 - Woodpecker foraging
 - Canopy thinning
 - Epicormic sprouting
- Tier III: Heavy infestation
 - Canopy thinning
 - Woodpecker foraging
 - Epicormic sprouting



Signs & Symptoms

Bark splitting



Signs & Symptoms

Bark splitting



Signs & Symptoms

Woodpecker foraging



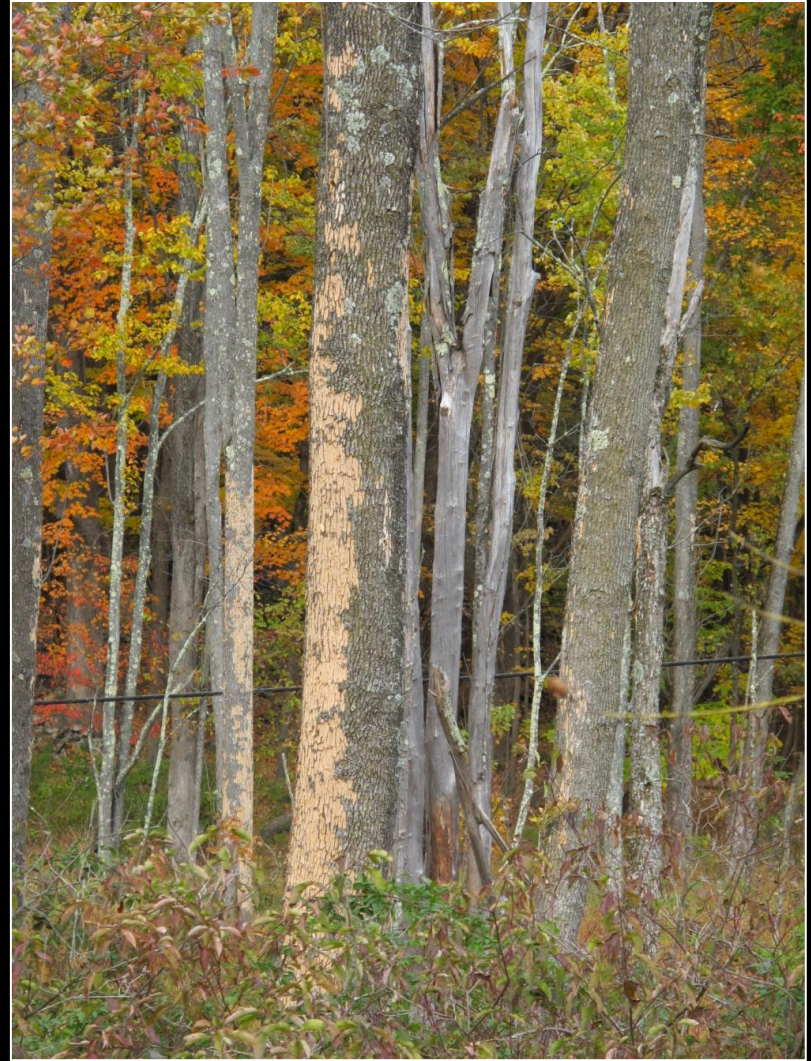
Signs & Symptoms

Woodpecker foraging



Signs & Symptoms

Woodpecker foraging



Signs & Symptoms

Starts infesting branches in the upper crown



Signs & Symptoms

**Epicormic branching,
or water sprouting**



**Tree death
generally takes 2-3
years**

