Emerald Ash Borer (EAB)

Agrilus planipennis


UGA1460071

What is the Emerald Ash Borer (EAB)?

A small, metallic green wood-boring beetle in the *Buprestidae* family. Native to China, Japan, Taiwan, Korea, Mongolia and the Russian Far East, it kills all ash species

Marianne Prue, Ohio Department of Natural Resources - Division of Forestry, Bugwood.org

Some EAB Tour Schedule Dates

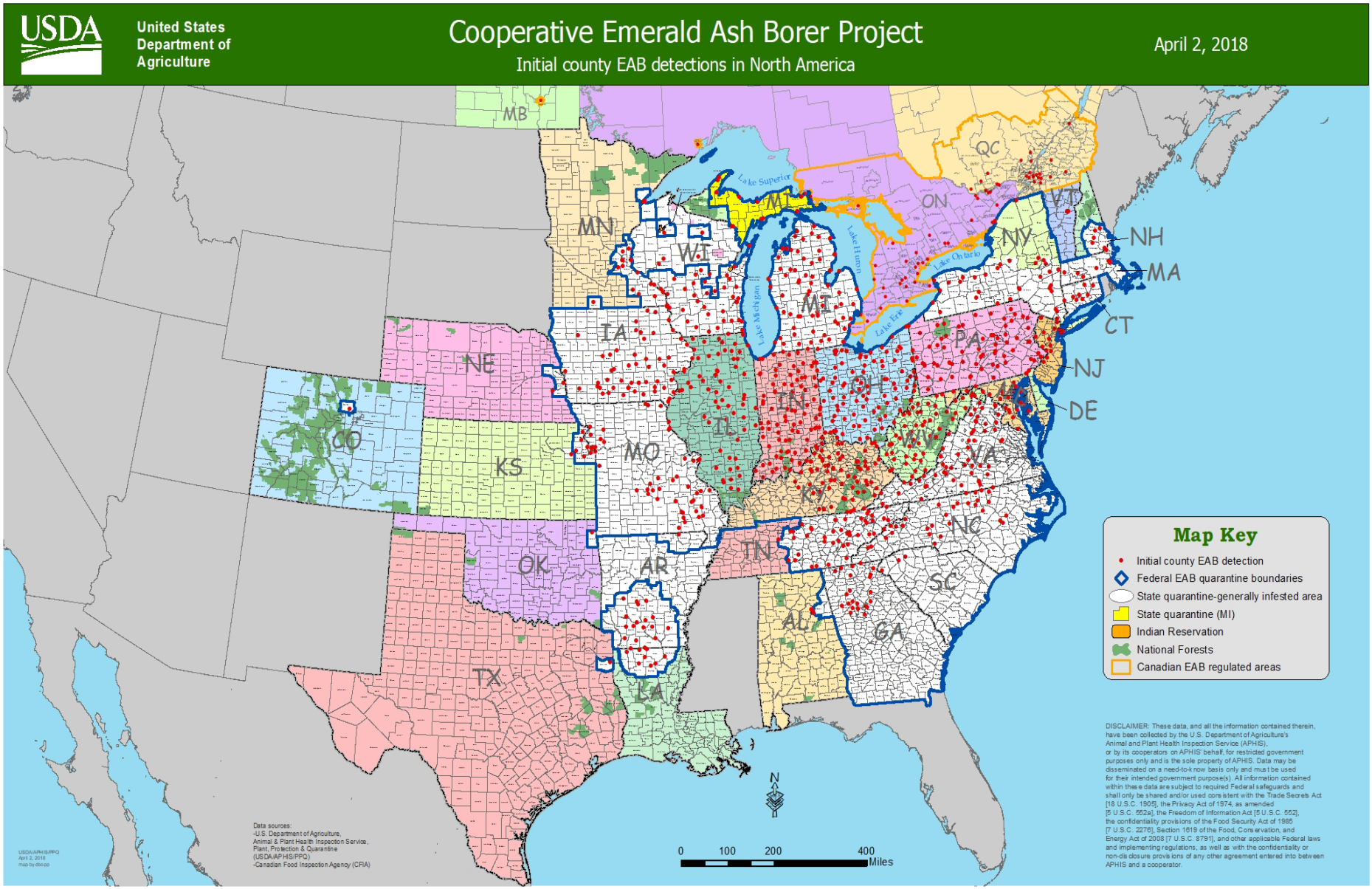
- Confirmed in 2002 in SE Michigan. Likely introduced in mid-1990s via ash-wood shipping materials.
- 2002 - Confirmed in Windsor, Ontario
- 2009 - Confirmed in Cattaraugus Co. NY
- Aug. 2017 - St. Lawrence & Franklin Counties
- 2018 - Northern Oswego Co. near Jefferson

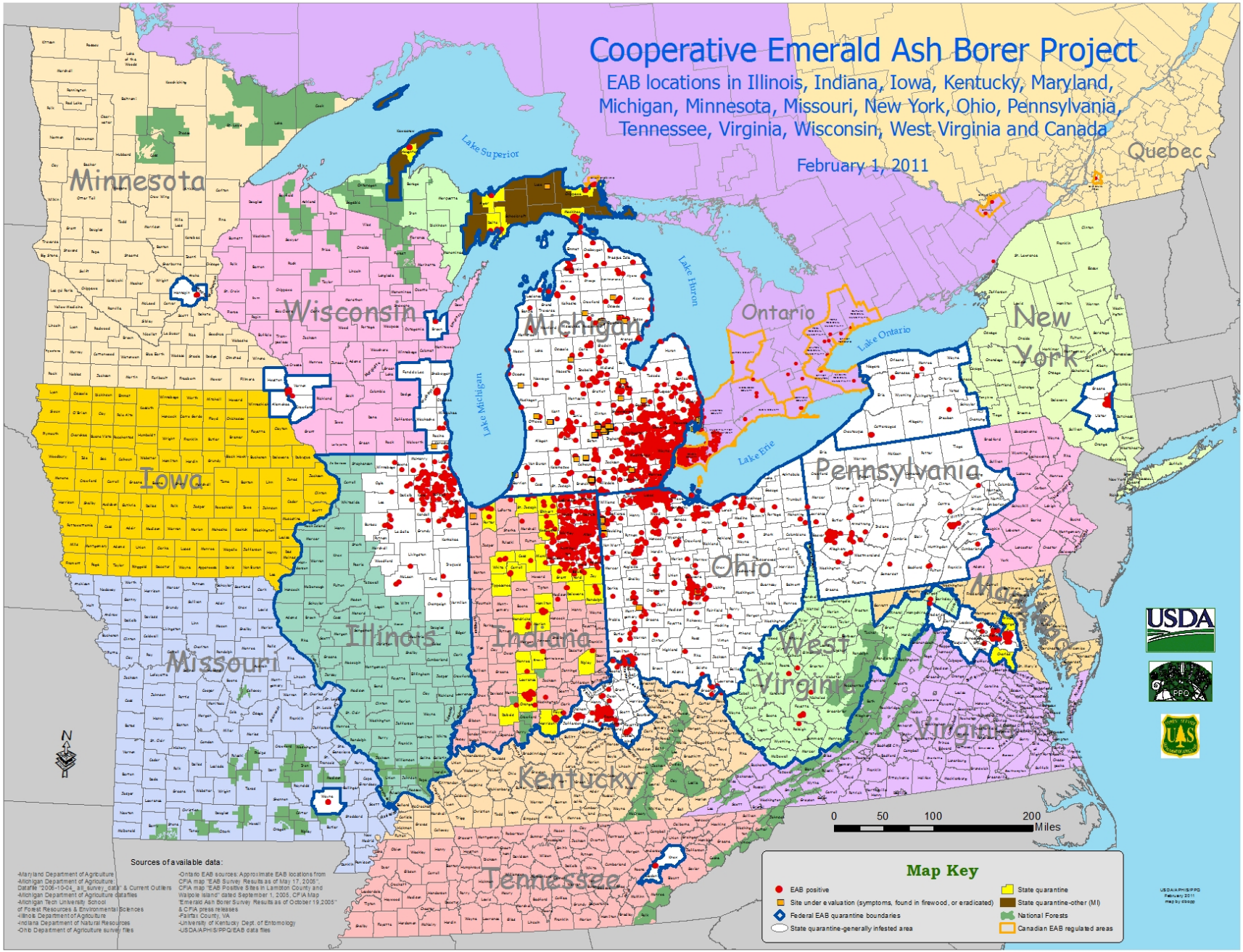
More

- Natural spread of EAB = ~ 2miles/year
- However, rapid spread through NA most likely due to:

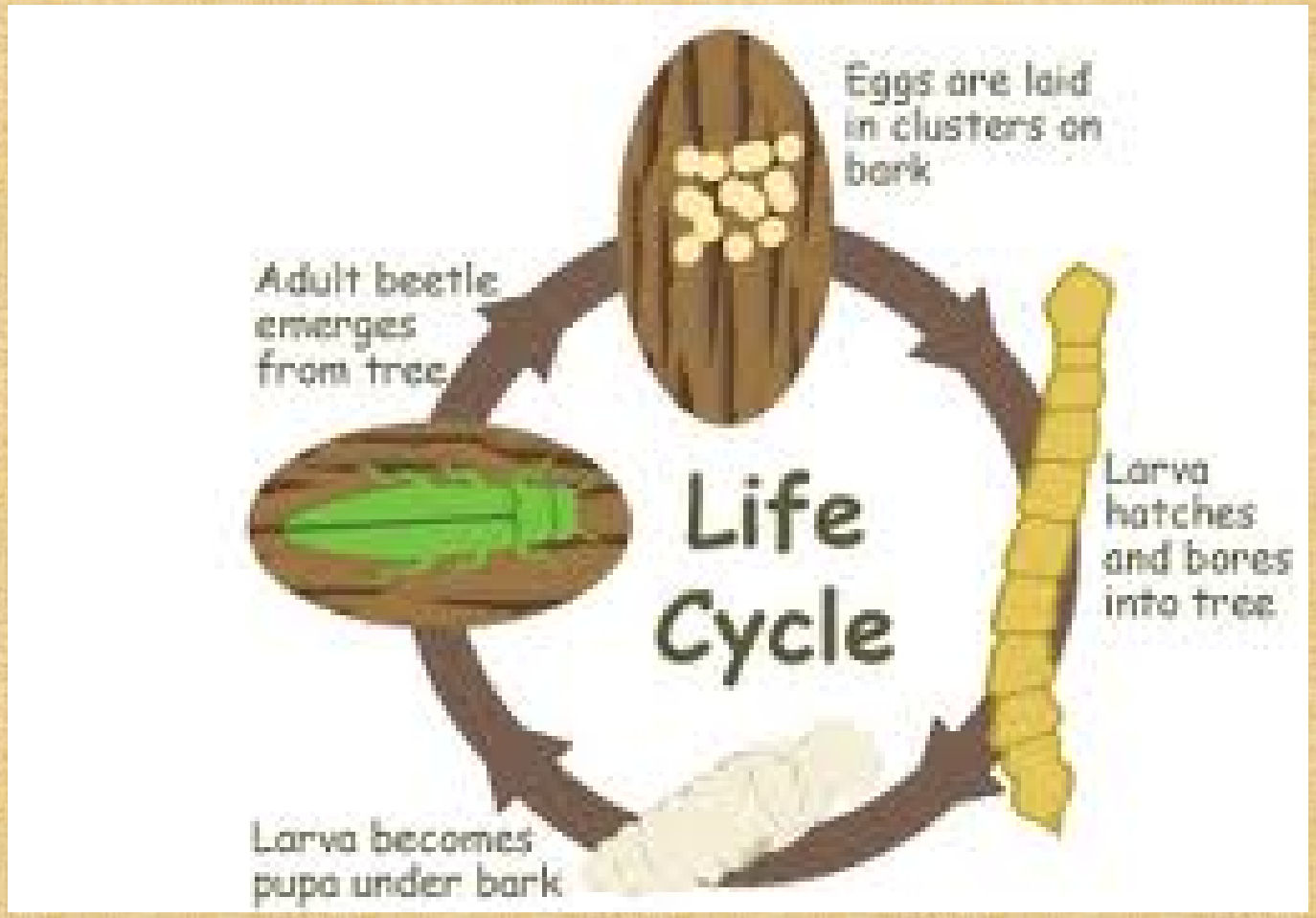
Transport of infested firewood, ash nursery stock, unprocessed ash logs, and other ash products

- Federal and state agencies have instituted quarantines of infested areas to regulate the transport of ash products


USDA
United States Department of Agriculture
Cooperative Emerald Ash Borer Project
Initial county EAB detections in North America
April 2, 2018
MB
QC
ON
MN
WI
MI
VT
NH
NY
MA
CT
NJ
DE
PA
IA
NE
IL
IN
OH
WV
MD
CO
KS
MO
VA
KY
NC
OK
AR
TN
SC
AL
GA
TX
LA
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Map Key
Initial county EAB detection
Federal EAB quarantine boundaries
State quarantine-generally infested area
State quarantine (MI)
Indian Reservation
National Forests
Canadian EAB regulated areas
N
0 100 200 400
Miles
Data sources:
-U.S. Department of Agriculture, Animal & Plant Health Inspection Service, Plant, Protection & Quarantine (USDA/APHIS/PPQ)
-Canadian Food Inspection Agency (CFIA)
DISCLAIMER: These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act [18 U.S.C. 1905], the Privacy Act of 1974, as amended [5 U.S.C. 552a], the Freedom of Information Act [5 U.S.C. 552], the confidentiality provisions of the Food Security Act of 1985 [7 U.S.C. 2276], Section 1619 of the Food, Conservation, and Energy Act of 2008 [7 U.S.C. 8791], and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

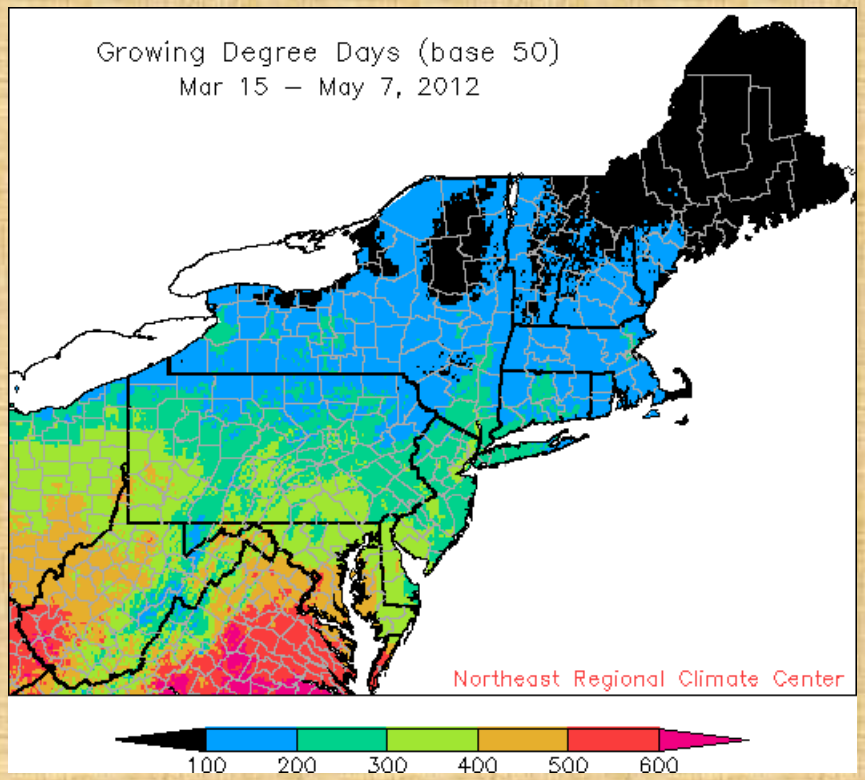

Cooperative Emerald Ash Borer Project
EAB locations in Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin, West Virginia and Canada
February 1, 2011
Minnesota
Wisconsin
Michigan
Iowa
Illinois
Indiana
Ohio
Missouri
Kentucky
Tennessee
West Virginia
Virginia
Pennsylvania
New York
Ontario
Quebec
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
N
0 50 100 200 Miles
Map Key
EAB positive
Site under evaluation (symptoms, found in firewood, or eradicated)
Federal EAB quarantine boundaries
State quarantine-generally infested area
State quarantine
State quarantine-other (MI)
National Forests
Canadian EAB regulated areas
Sources of available data:
-Maryland Department of Agriculture
-Michigan Department of Agriculture
Datafile "2006-10-04_all_survey_cat3" & Current Outliers
-Michigan Department of Agriculture datafiles
-Michigan Tech University School of Forest Resources & Environmental Sciences
-Illinois Department of Agriculture
-Indiana Department of Natural Resources
-Ohio Department of Agriculture survey files
-Ontario EAB sources: Approximate EAB locations from CFIA map "EAB Survey Results as of May 17, 2005", CFIA map "EAB Positive Sites in Lambton County and Walpole Island" dated September 1, 2005, CFIA Map "Emerald Ash Borer Survey Results as of October 19,2005" & CFIA press releases
-Fairfax County, VA
-University of Kentucky Dept. of Entomology
-USDA/APHIS/PPQ/EAB data files
USDA
PPQ

EAB – one year life cycle



When to look for emerging EAB adults

450-500 GDD



Flowering Black Locust

Adult EAB emerge when GDD are 450 and above - coincident with flowering of black locust – *Robinia pseudoacacia*

EAB Life Cycle

- Adult EAB feeds along leaf margins
- Females feed 1-2 weeks before laying eggs
- Average female EAB may lay 60-100 eggs, placing eggs singly in bark crevices or under bark flaps on trunk or branches

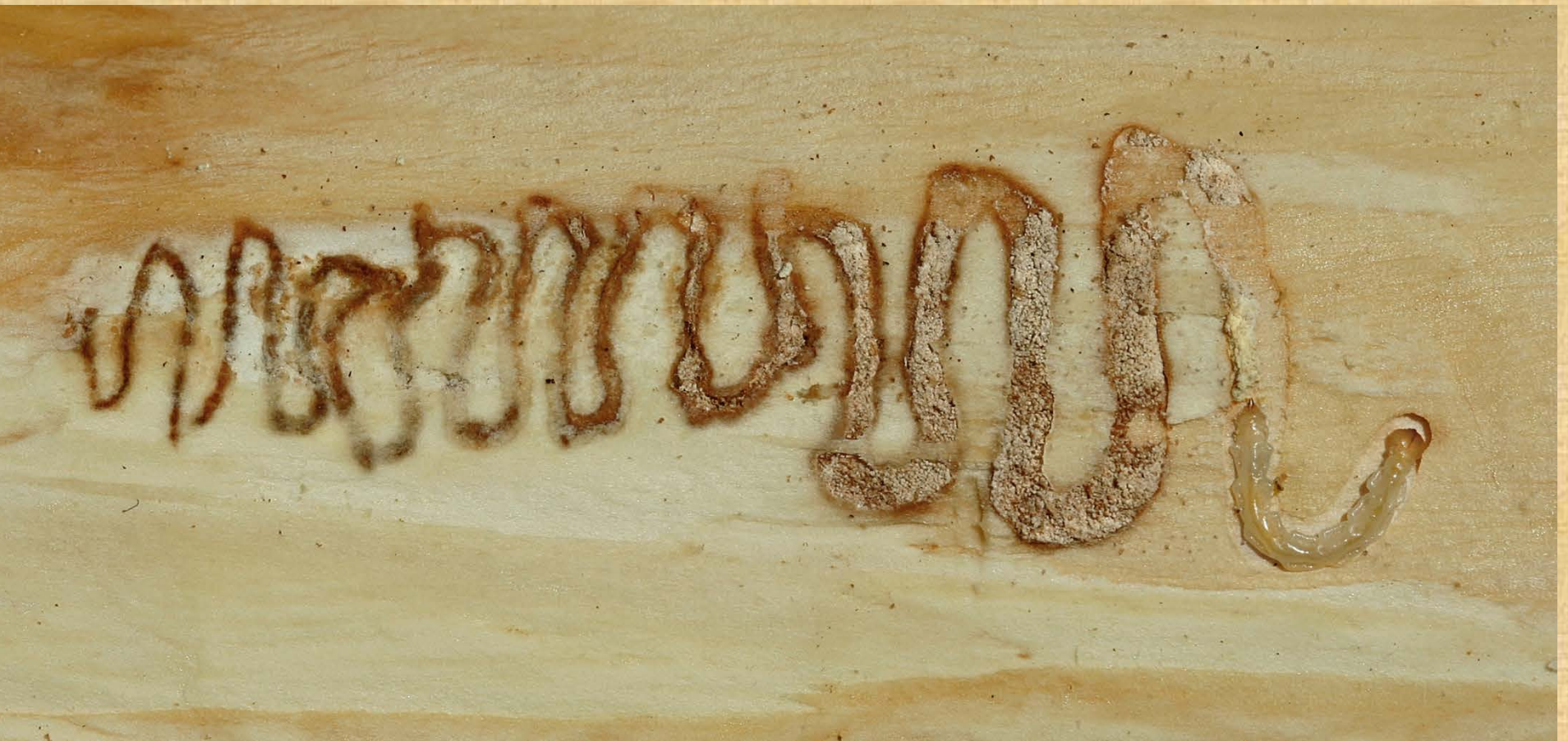
EAB eggs and “nested bells” larvae

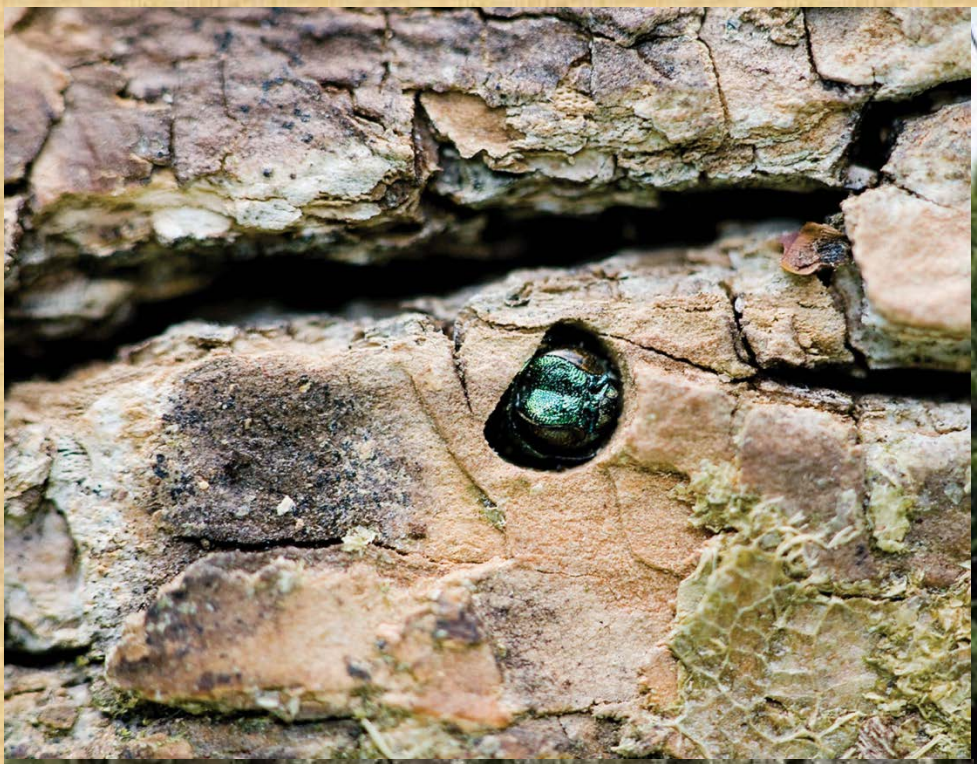
Beetle larva feed in the phloem (inner bark – the “pipeline”) and the cambium (the growing part of the trunk between the phloem and sapwood), effectively girdling the tree

Larval feeding ends in fall. Pupation takes place late spring

Signs of EAB

- “D” shaped exit holes
- “S” shaped galleries under the bark





Vertical splits, and “Blonding”

Symptoms of EAB

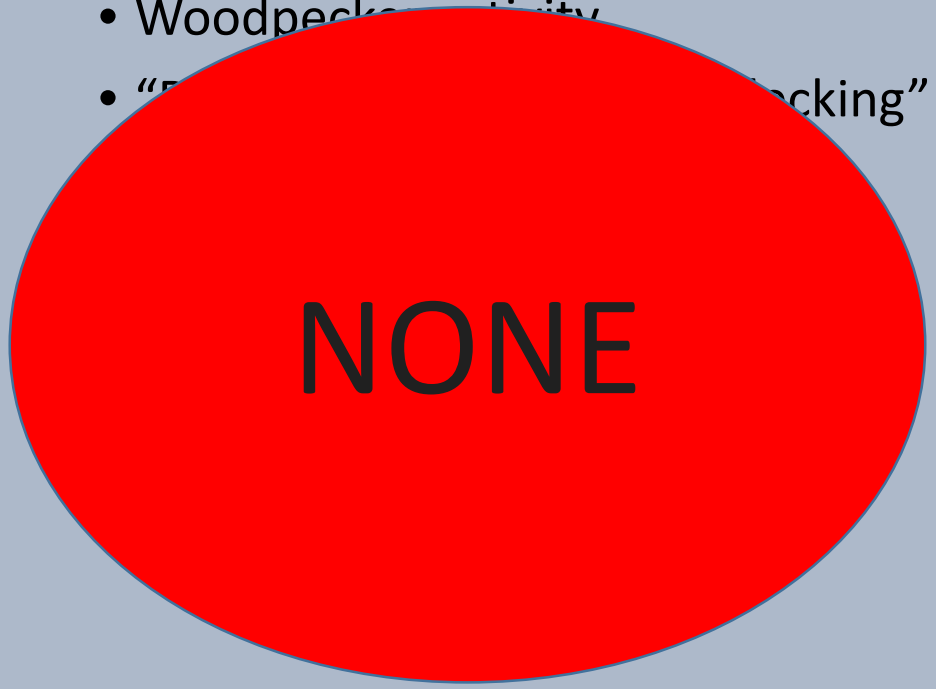
- Suckering from the base and stem (epicormic shoots)
- Dieback in the canopy
- Excessive woodpecker activity

James W. Smith, USDA APHIS PPQ, Bugwood.org

Steven Katovich, USDA Forest Service, Bugwood.org

Signs and Symptoms of EAB Infestation

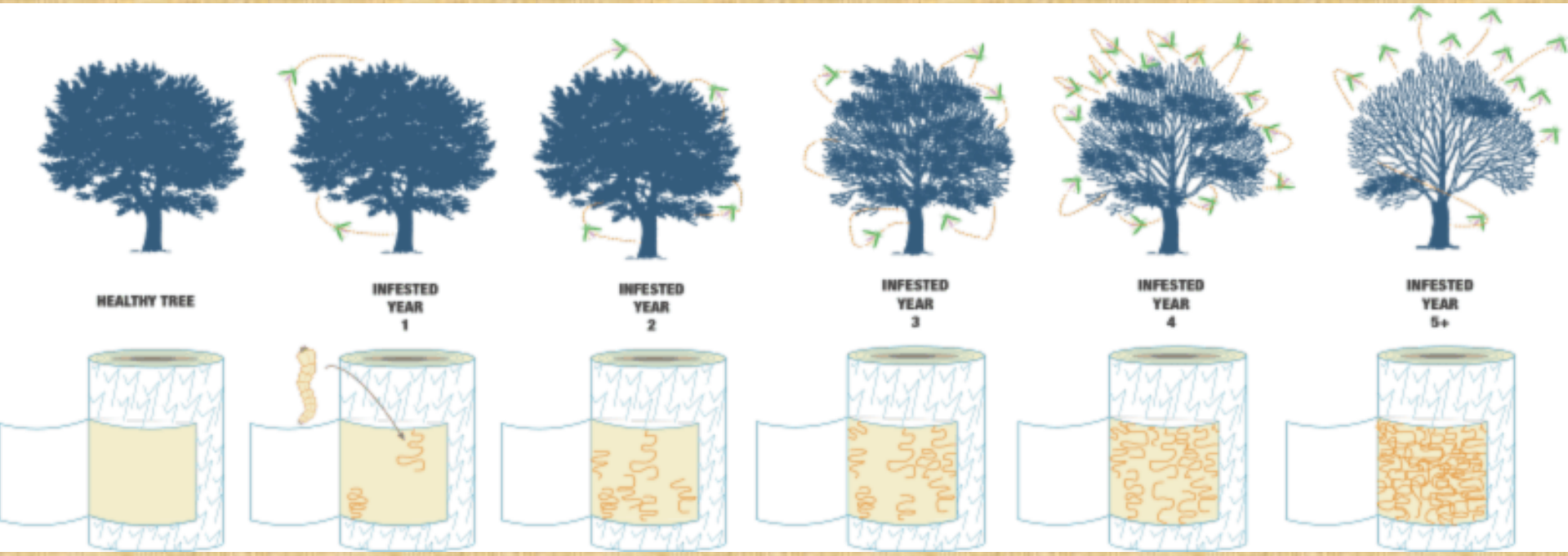
- Woodpecker activity
- "[illegible]ecking"



Emerald Ash Borer
Host range in New York State

- White ash (*Fraxinus americana*) – most common ash in NY. Prefers rich, well-drained soils. "Baseball bat" wood
- Green ash (*F. pennsylvanica*) – prefers moist bottomlands and stream banks. Cabinetry & furniture production
- Black ash (*F. nigra*) –prefers stream banks, wet areas. Wood used in basketry; culturally very significant to First Nations peoples.

Early infestations often go unnoticed!



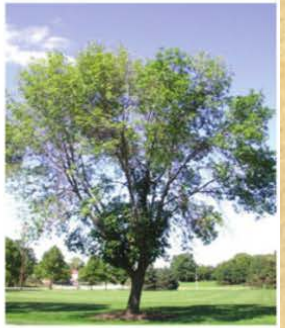
0%

10%

20%

30%

40%



50%

60%

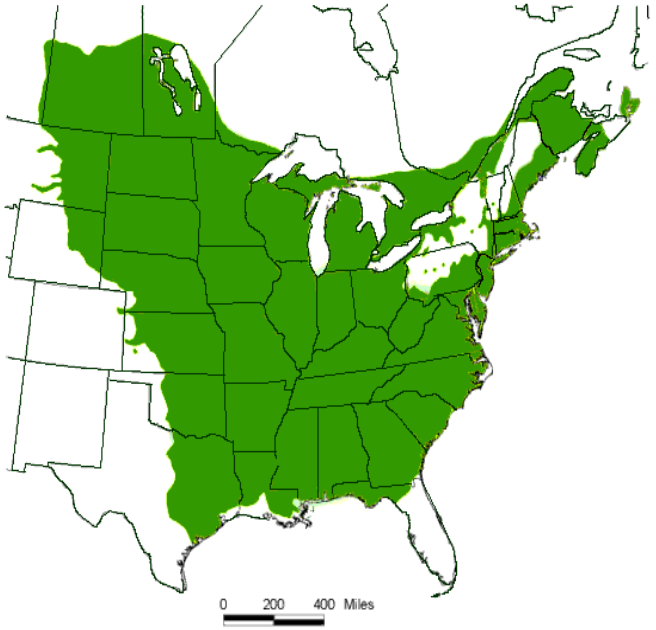
70%

80%

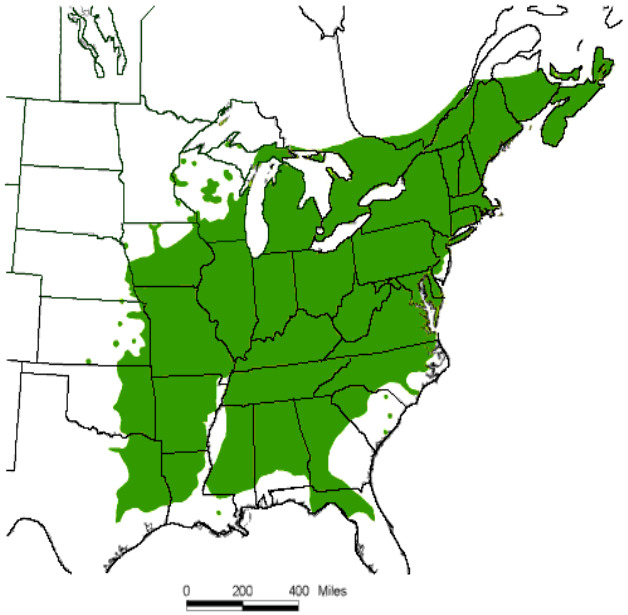
90%

100%

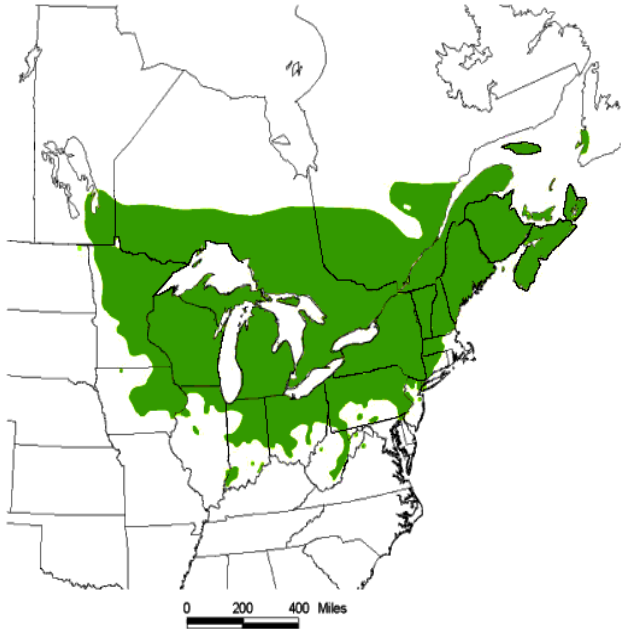
Native Range of Green Ash



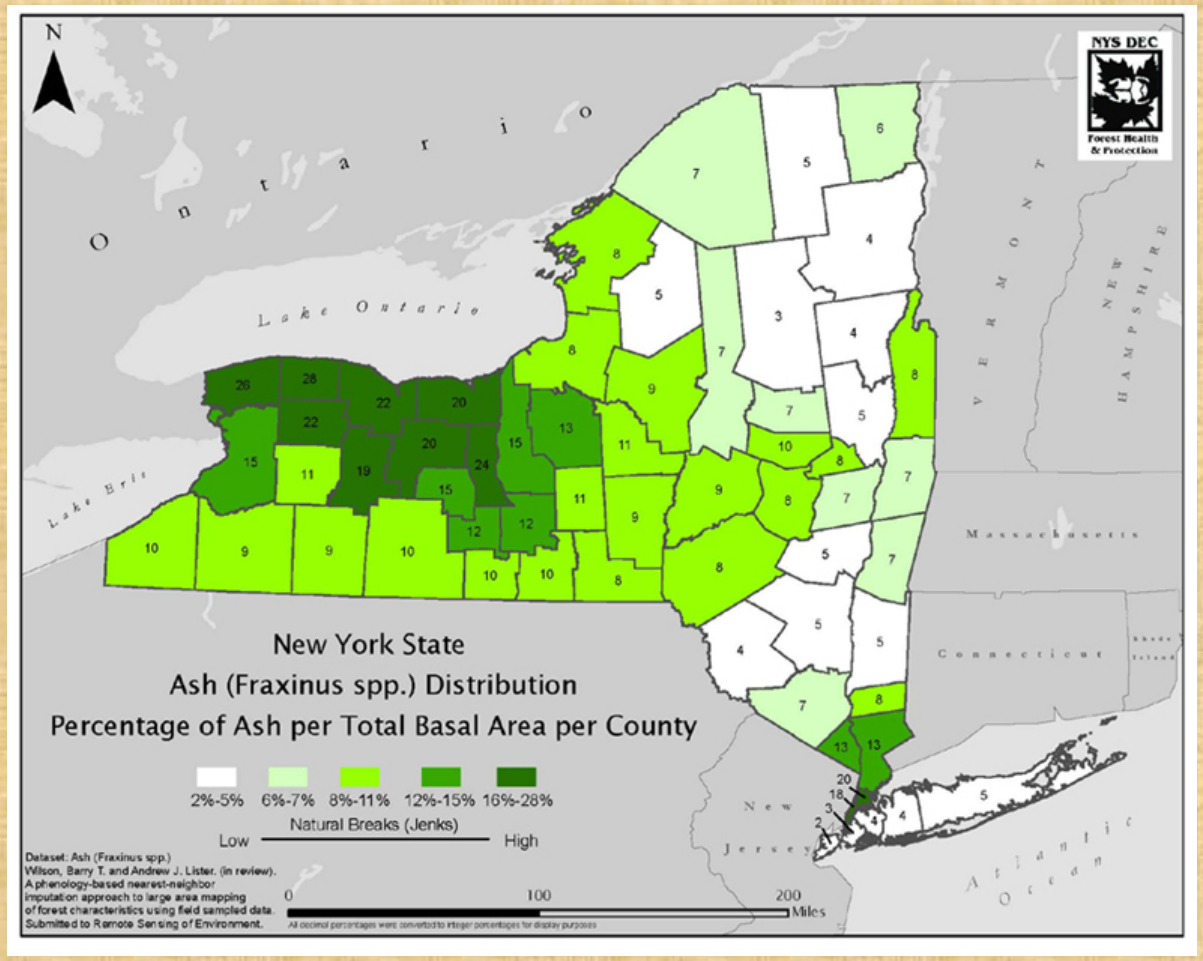
Native Range of White Ash



Native Range of Black Ash



Ash distribution in NYS by county



Ash tree (*Fraxinus spp*) ID – opposite branching & bark

Pinnately compound leaf and samaras

Ash Tree Identification

Key Ash Tree Characteristics

Opposite Branch Arrangements
Buds, Leaves and Branches are directly across from one another

Pinnately Compound Leaves
Leaf made of leaflets arranged in a line with one terminal leaflet. 5-11 leaflets per leaf

Feb 1, 2012
Photographers: David Cappaert, Michigan State University, Bugwood.org; Keith Kanoti, Maine Forest Service, Bugwood.org; Joseph O'Brien, USDA Forest Service, Bugwood.org; Robert Vidéki, Dominion Pft - Bugwood.org

Diamond Patterned Bark
Ridges and furrows form diamond shapes in older bark (green & white ash)

Trees have an Upright, Oval Shape

Stout Twigs support prominent Brown Buds

Single Samara Fruit
Seed surrounded by a dry, oar shaped wing

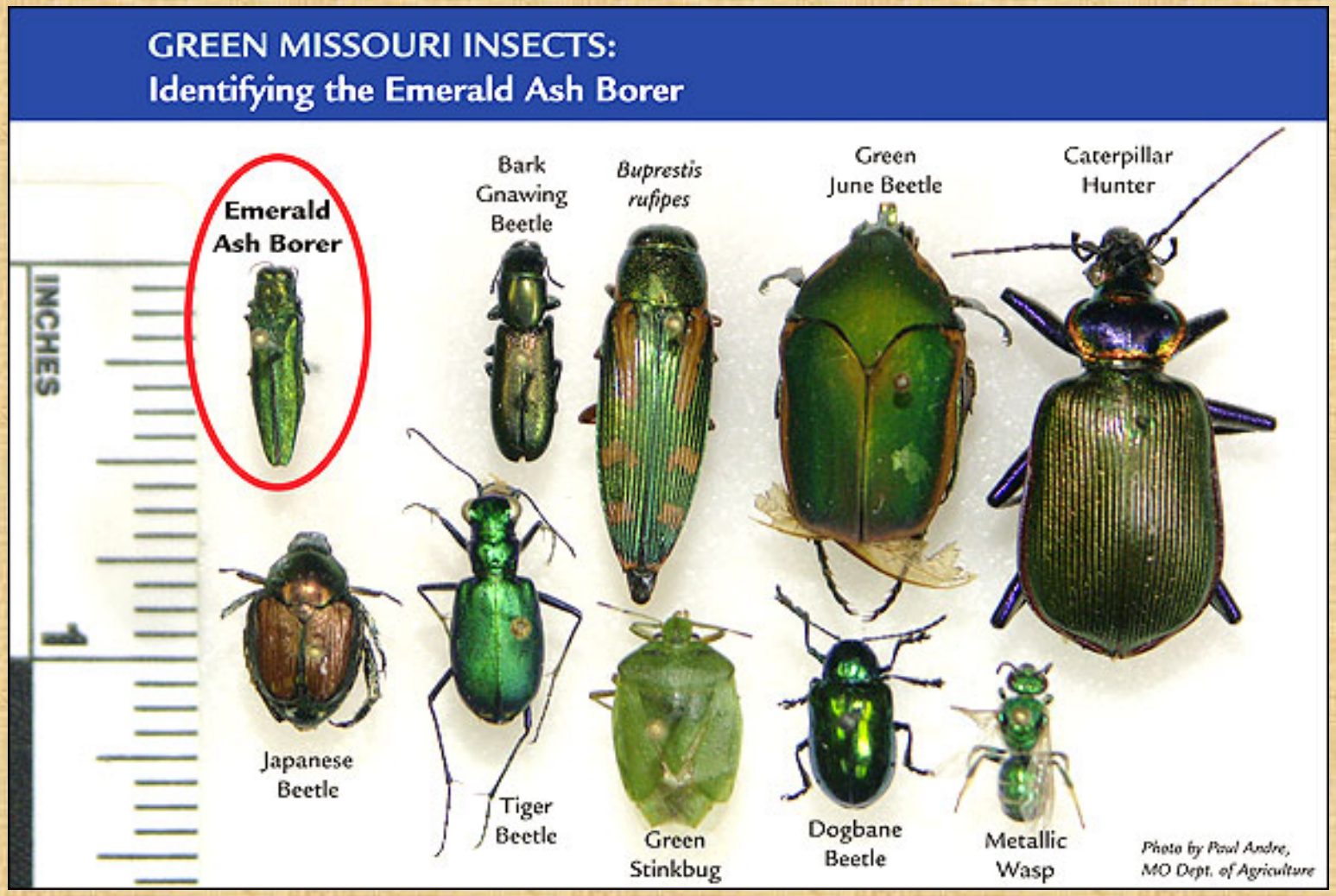
Some lookalikes and their key differences:

Norway Maple: Simple (not compound) lobed leaves, paired samara
Box Elder: Purplish twigs, lobed terminal leaflet, paired samara
Elderberry: Shrub, purple berries, large, white flowers
Walnut, Hickory, Mountain-Ash: Alternate branching

For more Emerald Ash Borer information and links go to http://nyis.info/eab

Mountain Ash (*Sorbus spp*) – <u>not</u> affected by EAB

“Look-alikes” - other Green Insects



Commonly mistaken for EAB - Six-spotted tiger beetle – a good guy!

Call NYS DEC EAB HOTLINE
1-866-640-0652

What's the Issue?

- 1 in 14 trees in New York is an ash tree—900 million ash in total!
- Thousands of ash line our trees, shade our parks and fill our public spaces
- Thousands more dot our home landscapes
- Millions can be found in our woodlots and along our rivers and streams

EAB puts all of these trees in danger!

What are the Concerns?

- Ash trees break down very quickly once they die, potentially dropping large limbs in public areas or on personal property.
- These trees become hazard trees extremely quickly.
- Trees are costly to treat and remove.

Pennsylvania Department of Conservation and Natural Resources - Forestry Archive,

Community Questions

- Are your ash trees identified?
- Who owns them?
- Whose responsibility is it to treat or remove potentially risky ash trees?
- Will you treat or remove your community's trees?

Michigan Department of Agriculture, Bugwood.org

Can you afford to manage them?

Can you afford not to?

Community Cost Examples

Deforest, Wisconsin: population 8,500

- **455** ash trees in urban forest (13% of total)
  - 330 are under 6” in diameter, decreasing the removal cost (average $700-$800 per tree)
- Village estimated removal cost:

$75,000- $100,000

Village of DeForest web site: http://www.vi.deforest.wi.us/

“Detection Trees” & SLAM

- “Detection Trees” are made by girdling the tree
- Girdled trees produce extra chemical volatiles that attract female EAB to lay eggs in the bark
- These trees are cut down & sampled for larvae the following winter
- All part of SLAM (**SL**ow**A**sh**M**ortality) initiative
- DEC’s SLAM significantly delays loss of ash trees & subsequent costs to communities for their removal and replacement

Monitoring & Detection of EAB

Purple prism monitoring traps

***Cerceris fumipennis* - biosurveillance**

Cerceris fumipennis Wasp

Trap (Sentinel) Trees

18 December 2017: trap tree near Massena NY

More than 40% of EAB discoveries come from individuals reporting the insect!

Firewood – primary means of spread!

Learn how to detect and report invasive species observations

- iMapinvasives trainings: June 13th (rain date 6/14) St. Lawrence University Field Station, Canton. June 18th (rain date 6/19) SUNY Oswego Rice Creek Field Station. **To register contact** **megan.pistolese@tnc.org**