

Emerald Ash Borer

Agrilus planipennis



Photo: Leah Bauer, USDA Forest Service Northern Research Station, Bugwood.org, #5473689



COMMUNITY FIRST DETECTOR



Emerald Ash Borer

Emerald ash borer adult

- Small beetle that feeds on ash trees
- Native to East Asia
- 2002: First detection in U.S. (Detroit, MI)
- Has killed tens of millions of ash trees in U.S.
- Threat to:
 - Forests
 - Landscapes
 - Industry (flooring, furniture, sporting equipment, etc.)
 - Tourism



Infested ash tree

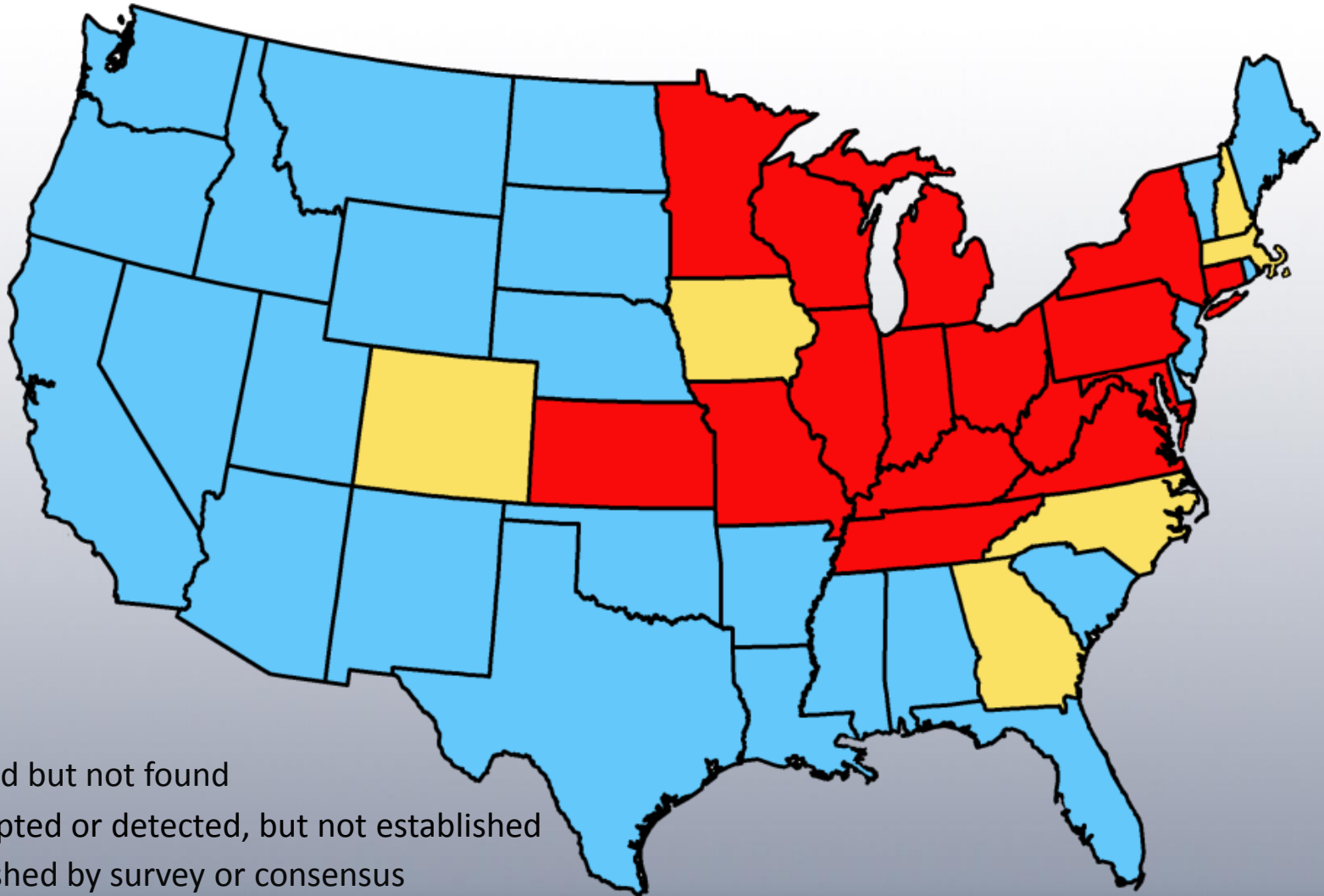
Photos: (Main) - Daniel Herms, The Ohio State University, Bugwood.org, #1523071; (Inset) - Leah Bauer, USDA Forest Service Northern Research Station, Bugwood.org, #5473689



COMMUNITY FIRST DETECTOR



Distribution



-  Sampled but not found
-  Intercepted or detected, but not established
-  Established by survey or consensus

Map courtesy of Pest Tracker, National Agricultural Pest Information System (NAPIS) and USDA APHIS quarantine announcements



COMMUNITY FIRST DETECTOR



Susceptible Plants

- Specific to ash trees (*Fraxinus* spp.), including:
 - green ash
 - black ash
 - white ash
 - pumpkin ash
 - blue ash
- Kills stressed and healthy trees

Healthy green ash tree



Photo: Joseph O'Brien, USDA Forest Service, Bugwood.org, #5038082



COMMUNITY FIRST DETECTOR

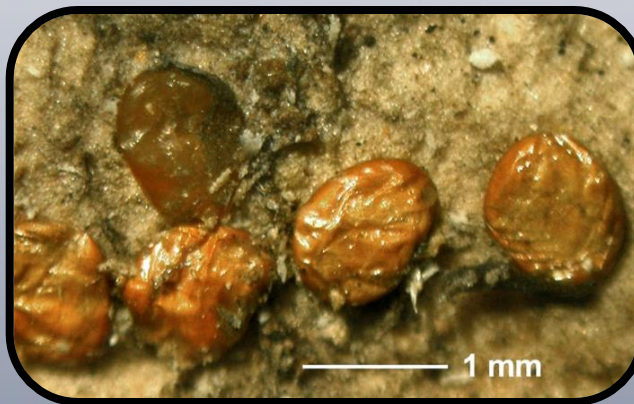


Identification: Eggs

Eggs laid on tree bark



Eggs are white when first laid, then turn amber



Cluster of eggs

Photos: (Top Left) - Debbie Miller, USDA Forest Service, Bugwood.org, #5449381; (Top Right) - Debbie Miller, USDA Forest Service, Bugwood.org, #5449377; (Bottom) - David Cappaert, Michigan State University, Bugwood.org, #9009033



COMMUNITY FIRST DETECTOR



Identification: Larvae

- White and dorso-ventrally flattened
- Visible dark brown mouthparts
- 10 bell-shaped abdominal segments



Dark spines (urogomphi)
on posterior tip



Photos: (Main) - David Cappaert, Michigan State University, Bugwood.org, #1460071; (Inset) - Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org, #5016063



COMMUNITY FIRST DETECTOR



Identification: Overwintering Larvae, Prepupae, and Pupae



Overwintering "J-shaped" larvae or prepupae



Pupa in pupal chamber in white ash tree



Pupa next to pupal chamber in white ash tree



Maturation of J-shaped larvae/prepupae to adult

Photos: (Left) - Houping Liu, Michigan State University, Bugwood.org, #5449382; (Top Left) - Kenneth R. Law, USDA APHIS PPQ, Bugwood.org, # 5471795; (Top Right) - Kenneth R. Law, USDA APHIS PPQ, Bugwood.org, # 5471797; (Bottom) - Debbie Miller, USDA Forest Service, Bugwood.org, # 5449379



COMMUNITY FIRST DETECTOR



Identification: Adults

- Bright, metallic, coppery green color
- Dorsal surface of abdomen is iridescent red
- Serrate antennae, arise from just below the eyes



Photo: David Cappaert, Michigan State University, Bugwood.org, #2106098 and #2100048 and Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org, #5382310



COMMUNITY FIRST DETECTOR



Eggs

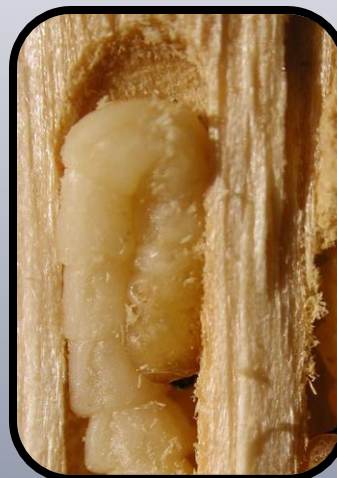


Larva



Life Cycle

Overwintering
Larvae/Prepupae



Pupa



Adults



Photos: (Clockwise from Top) - David Cappaert, Michigan State University, Bugwood.org, #9009033; Debbie Miller, USDA Forest Service, Bugwood.org, #54493778; Houping Liu, Michigan State University, Bugwood.org, #5449382; Kenneth R. Law, USDA APHIS PPQ, Bugwood.org, # 5471797; David Cappaert, Michigan State University, Bugwood.org, #9009032



COMMUNITY FIRST DETECTOR



Damage

Bark splitting



Crown dieback



Epicormic shoots



Photos: (Left) - Michigan Department of Agriculture, Bugwood.org, #1241005; (Center) - Daniel Herms, The Ohio State University, Bugwood.org, #1523075; (Right) - Daniel Herms, The Ohio State University, Bugwood.org, #1523071



COMMUNITY FIRST DETECTOR



Damage

Woodpecker
damage



D-shaped
exit holes



Larval
galleries



Photos: (Left) - David Cappaert, Michigan State University, Bugwood.org, #1372001; (Center) - David Cappaert, Michigan State University, Bugwood.org, #5110034 and Debbie Miller, USDA Forest Service, Bugwood.org, #5449376; (Right) - Edward Czerwinski, Ontario Ministry of Natural Resources, Bugwood.org, # 1439009



COMMUNITY FIRST DETECTOR



Monitoring and Management

Prevention is critical!

- Monitoring:
Detection of infestation symptoms; use of panel traps
- Cultural control:
Regulation of movement of ash wood materials; removal of infested trees



Photo: Kenneth R. Law, USDA APHIS PPQ, Bugwood.org, # 5471804



COMMUNITY FIRST DETECTOR



Monitoring and Management

- Chemical control:
Use of trunk injections, soil drenches, protective cover sprays being explored
- Biological control:
Three parasitoid species approved for release in U.S.



Trunk injection

Photo: David Cappaert, Michigan State University, Bugwood.org, #9009080



COMMUNITY FIRST DETECTOR

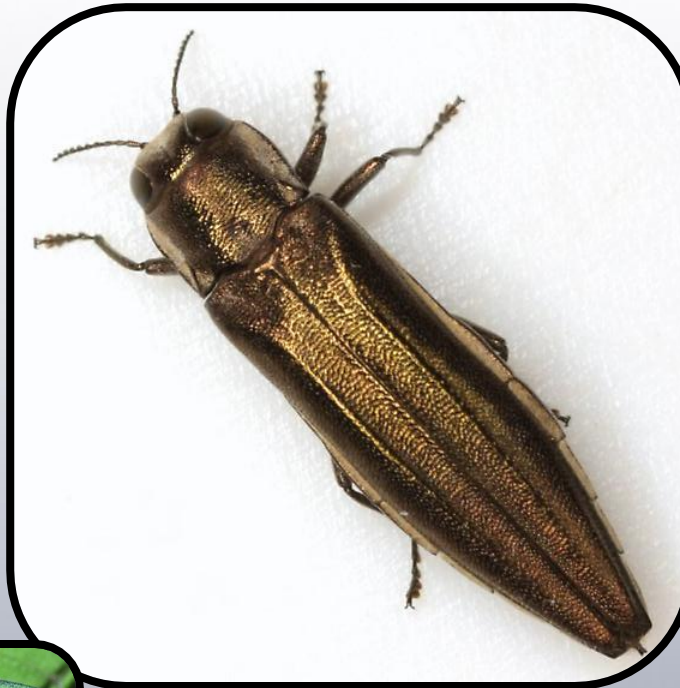


Look-alike Species

Agrilus planipennis



Agrilus macer



Temnoscheila virescens



Photos: (Left) - Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org, #5016065 and David Cappaert, Michigan State University, Bugwood.org, #2100048; (Center) - Mike Quinn, TexasEnto.net, bugguide, (<http://bugguide.net/node/view/290204>); (Right) - WonGun Kim, bugguide, <http://bugguide.net/node/view/259686>.



COMMUNITY FIRST DETECTOR



Look-alike Species

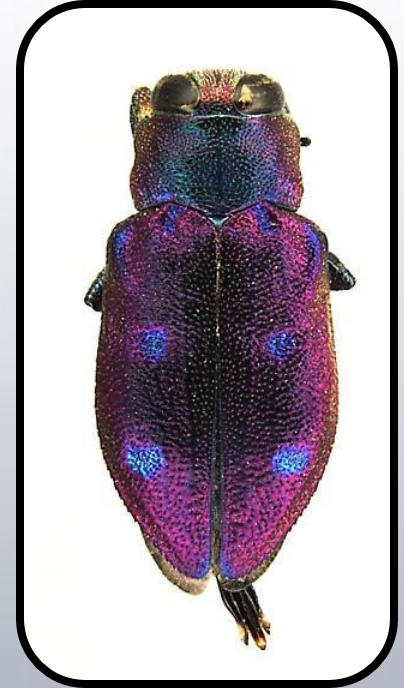
Agrilus planipennis



Buprestis decora



Chrysobothris azurea



Photos: (Left) - Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org, #5016065 and David Cappaert, Michigan State University, Bugwood.org, #2100048 (Center) - Scott Nelson, bugguide, <http://bugguide.net/node/view/175260>; (Right) - Joshua P. Basham, <http://bugguide.net/node/view/595910>.



COMMUNITY FIRST DETECTOR



Authors

Smriti Bhotika, Ph.D.

Postdoctoral Associate, Department of Entomology
and Nematology, University of Florida

Ashley Poplin, M.S.

Graduate Student, Department of Entomology and
Nematology, University of Florida



COMMUNITY FIRST DETECTOR



Editors

Stephanie Stocks, M.S.

Assistant-In, Extension Scientist, Department of
Entomology and Nematology, University of Florida

Matthew D. Smith, Ph.D.

Postdoctoral Associate, Department of Entomology and
Nematology, University of Florida



COMMUNITY FIRST DETECTOR



Reviewers



COMMUNITY FIRST DETECTOR



Collaborating Agencies

- U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS)
- Cooperative Agricultural Pest Survey Program (CAPS)
- Florida Department of Agriculture and Consumer Services (FDACS)
- National Plant Diagnostic Network (NPDN)
- Sentinel Plant Network (SPN)
- Protect U.S.
- University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)



COMMUNITY FIRST DETECTOR



Educational Disclaimer and Citation

- This presentation can be used for educational purposes for NON-PROFIT workshops, trainings, etc.
- Citation:
 - Bhotika, S., Ph.D., Poplin, A., M.S., 2014. Emerald Ash Borer, *Agrilus planipennis*, March 2014.



COMMUNITY FIRST DETECTOR



References

National Agricultural Pest Information System (NAPIS). Purdue University. "Survey Status of Emerald Ash Borer - *Agrilus planipennis* (All years)." Published: 12/10/2013. <http://pest.ceris.purdue.edu/map.php?code=INAHQJA&year=alltime>. Accessed: 12/13/2013.

Nicolay, A.S. and H.B. Weiss. 1918. "A Review of the Genus *Buprestis* in North America." Journal of the New York Entomological Society, col. 26, no. 2. accessed 2/2/2014

<http://www.jstor.org/stable/25003805?seq=6>

Parsons, G. L. 2008. Emerald ash borer, *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae): A guide to identification and comparison to similar species. Department of Entomology, Michigan State University.

http://www.emeraldashborer.info/files/eab_id_guide.pdf

Paiero, S.M., M.D. Jackson, A. Jewiss-Gaines, T. Kimoto, B.D. Gill, and S.A. Marshall. 2012. Field Guide to the Jewel Beetles (Coleoptera: Buprestidae) of Northeastern North America. Canadian Food Inspection Agency. access 2/3/2013 –

http://www.biodiversityinfocus.com/pdfs/Jewel_Beetle_Field_Guide_English.pdf



COMMUNITY FIRST DETECTOR



References

Skelley, P. E., and M. C. Thomas. Pest alert: Emerald ash borer, *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae). FDACS DPI.

<http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Plant-Industry-Publications/Pest-Alerts/Emerald-Ash-Borer>

Spense, D. and J. Smith. 2011. Emerald ash borer: A potential future threat to ash trees in Florida. EDIS, UF IFAS Extension. Publication # FOR284.

<http://edis.ifas.ufl.edu/fr346>

United States Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS). 2010. “Emerald ash borer”.

http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/background.shtml

USDA-APHIS/ARS/FS. 2012. Emerald ash borer, *Agrilus planipennis* (Fairmaire), biological control release and recover guidelines. USDA-APHIS-ARS-FS, Riverdale, Maryland.

<http://www.emeraldashborer.info/documents/EAB-FieldRelease.pdf>



COMMUNITY FIRST DETECTOR

