



Minnesota Wasp Watchers

AN UPDATE ON EMERALD ASH BORER BIOSURVEILLANCE



Cerceris fumipennis (left)

Photo credit: Philip Careless



Emerald Ash Borer, *Agilus planipennis*, (right)

THESE WASPS HELP FIND EAB

- The smoky winged beetle bandit, *Cerceris fumipennis* is a native wasp that hunts buprestid beetles including Emerald Ash Borer.



Cerceris fumipennis with buprestid prey, Photo credit: Michael Bohne, U.S. Forest Service



Cerceris fumipennis with buprestid prey, Photo credit: Floyd Conner, Queens University Biological Station

DETECTION TOOL

- Over 20 states and Canadian provinces have used the *Cerceris* wasp to locate EAB.
- Collaboration with Minnesota Department of Agriculture.

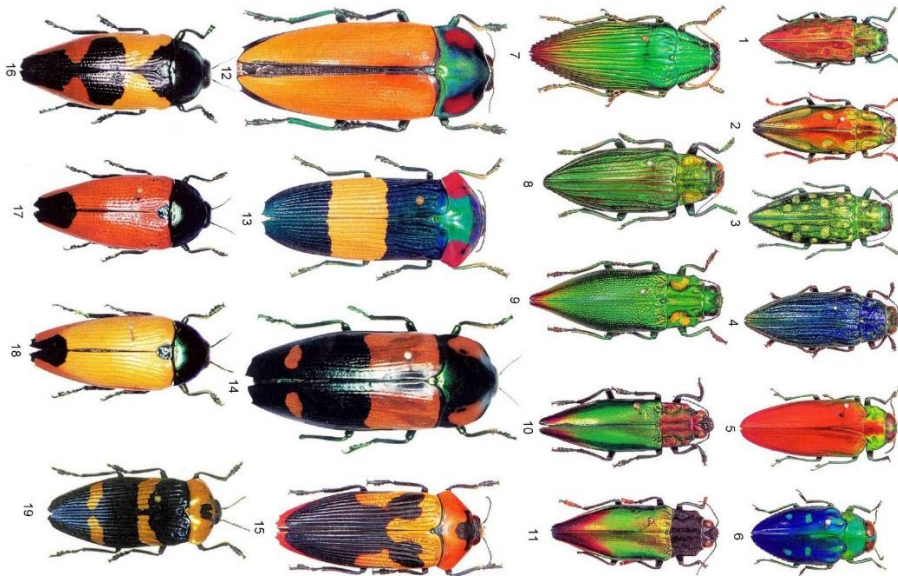


EMERALD ASH BORER (EAB)

- Order: Coleoptera (Beetle)
- Family: Buprestidae (Jewel Beetles or Metallic Wood Boring Beetles)



Emerald Ash Borer (*Agrilus planipennis*)
Photo credit: Pennsylvania Department of
Conservation and Natural Resources



Buprestidae Photo credit: <http://agus3-insect.blogspot.com>



UNDERSTANDING THIS WASP



- Solitary wasp
- Creates nest alone—for herself and her offspring.
- Hunts alone
- Stings for hunting, not defense

GROUND-NESTERS



Cerceris fumipennis nest opening, Photo credit, Jennifer Schultz, University of Minnesota Extension



Cerceris fumipennis nest opening, Photo credit, Jennifer Schultz, University of Minnesota Extension



BALLFIELDS?!?



HUNTING BEHAVIORS



Floyd Conner

Cerceris with prey, Photo credit: Floyd Conner, www.cerceris.info



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A GLIMPSE UNDERGROUND

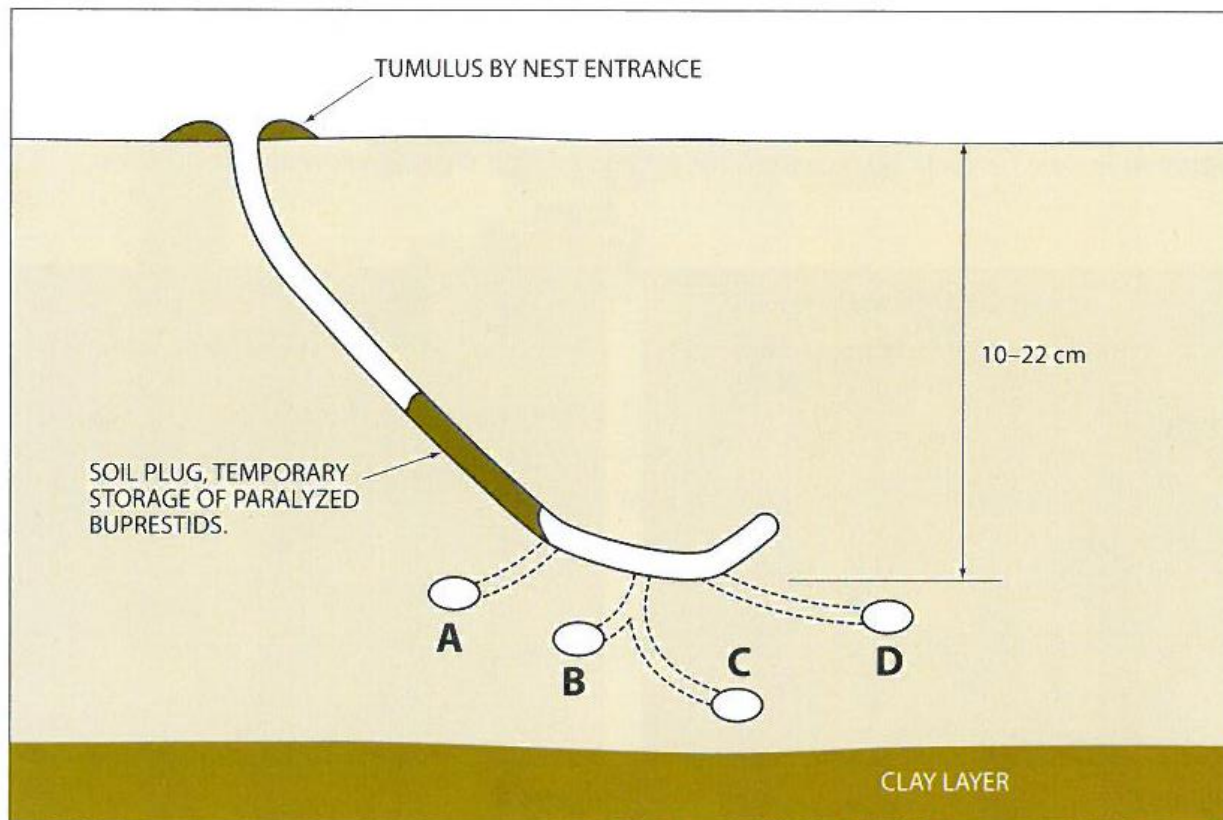


Figure 8. Diagram of a *Cerceris fumipennis* nest. A, B, C and D indicate the location of completed cells; dotted lines indicate the sections of the main burrow that were backfilled upon the completion of each cell.

Image from Booklet: "Cerceris fumipennis—A Biosurveillance Tool for Emerald Ash Borer, 1st Edition, by Philip D. Careless, Stephen A. Marshall, Bruce D. Gill, Erin Appleton, Robert Favrin, and Troy Kimoto, published by Canadian Food Inspection Agency, 2009

VOLUNTEERS HAVE TWO ROLES

- 1. Searching for new *Cerceris* nesting sites in their communities.



CONDUCTING BIOSURVEILLANCE

- 2. Volunteers adopt a Cerceris site



MONITORING A SITE



EXAMINE THE BEETLE PREY



Minn Dept of Ag



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CERCERIS CAPTURED EAB



RESULTS: OUTREACH

- 32 presentations or trainings with over 1300 participants



CITIZEN SCIENCE ENGAGES VOLUNTEERS IN MEANINGFUL SCIENTIFIC EXPERIENCES



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RESULTS: VOLUNTEERS

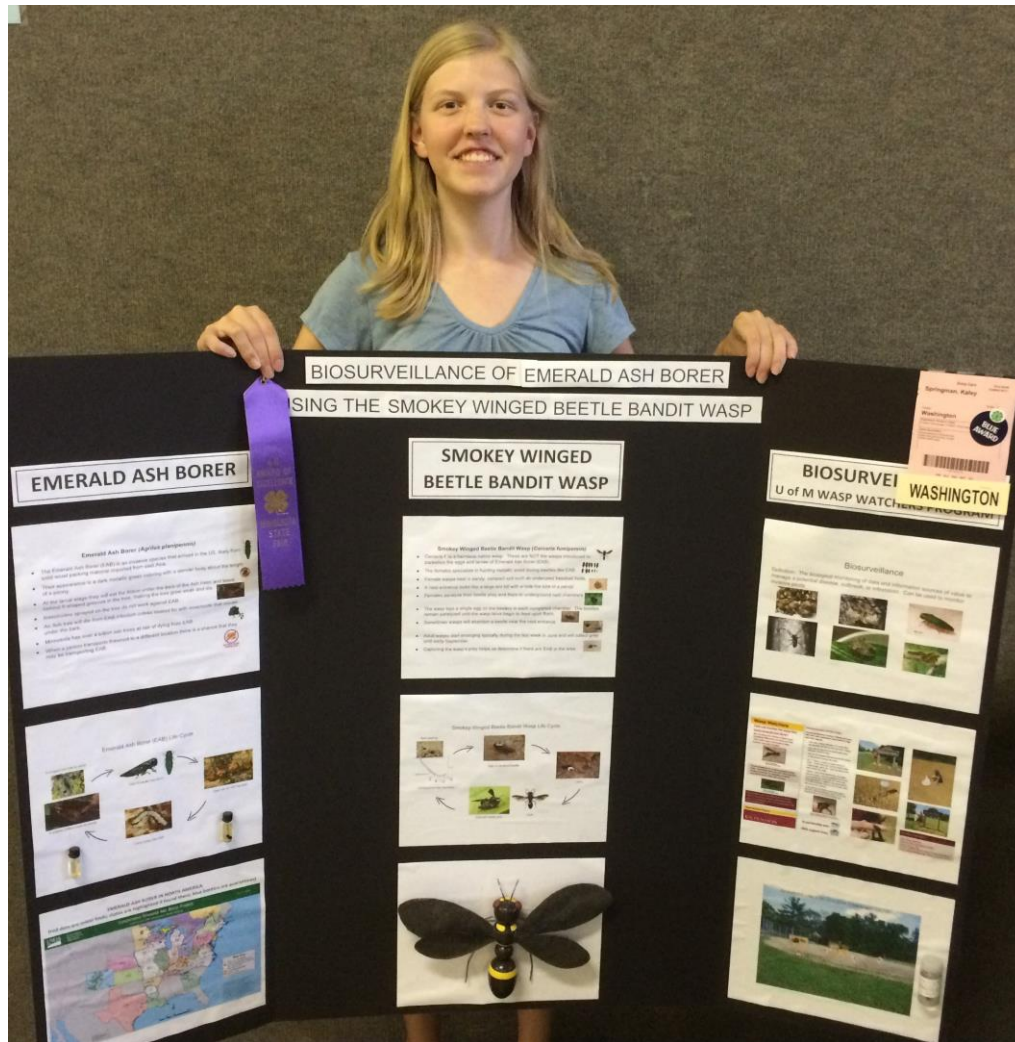
YEAR	Number of volunteers	Volunteer hours
2014	12	26
2015	51	160
2016	65	395

MEANINGFUL SCIENTIFIC EXPERIENCES

- Volunteers have expanded the known range of *Cerceris* in Minnesota (46.531 lat.)



YOUTH INVOLVEMENT

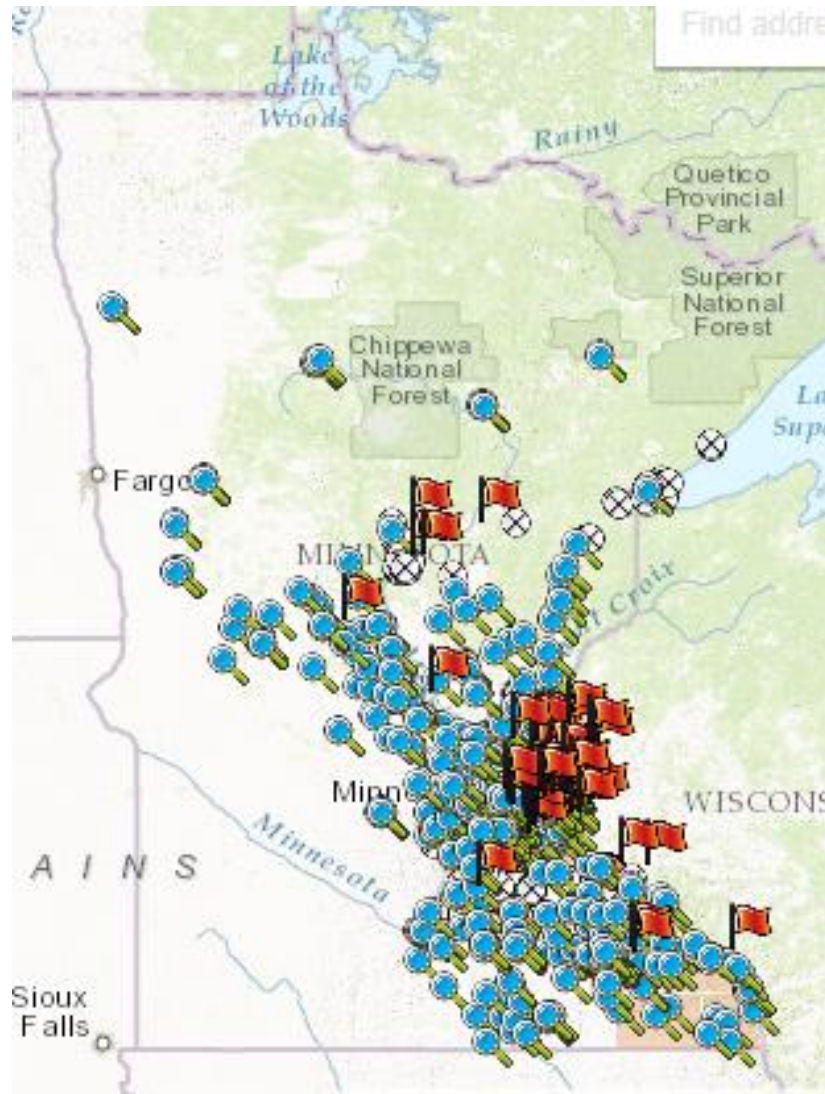


RESULTS: CERCERIS SEARCH

YEAR	Number of sites searched	Accumulated total number of sites with Cerceris nests
2014	45	15
2015	87	31
2016	219	59



WASP WATCHERS MAP

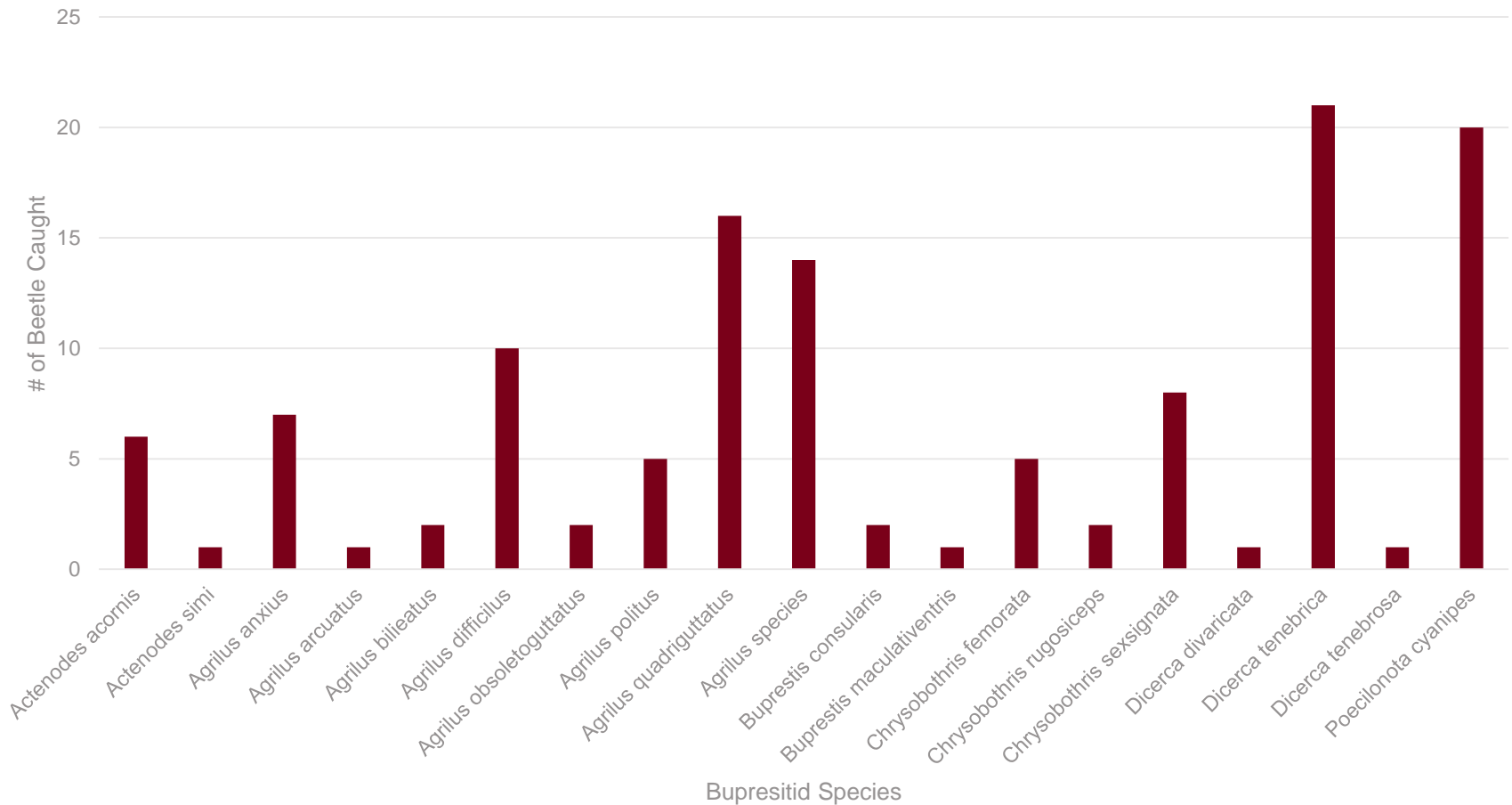


RESULTS: BEETLES

YEAR	Number of biosurveillance sites	Number of beetles collected
2014	6 sites	65 beetles
2015	17 sites	95 beetles
2016	21 sites	204 beetles

CERCERIS PREY SPECIES DIVERSITY

Cerceris Prey Species Diversity 2014-2015



BEETLES OF INTEREST:

- Agrilus (7 species)
 - Bronze birch borer (*Agrilus anxius*) (7)
 - Birch
 - Two-lined chestnut borer (*Agrilus bileatus*) (2)
 - Red and white oak



Photo credit: Whitney Cranshaw,
Colorado State University,
Bugwood.org Bronze birch borer



Photo credit: Two lined chestnut borer



TOP 5 PREY SPECIES

- **Dicerca**
 - Flatheaded poplar borer (*D. tenebrica*) (21 found)
 - Pine and aspen
- **Poecilonota**
 - Eastern poplar buprestid (*P. cyanipes*) (20 found)
 - Poplar, locust, willow



Photo credit: Dave McShaffrey, bugguide.net
Dicerca tenebrica, Flatheaded poplar borer (pine and aspen)



Photo credit: Mike Quinn, bugguide.net
Poecilonota cyanipes, Eastern poplar buprestid (poplar, locust, willow)

TOP 5 PREY SPECIES

■ Agrilus

- *A. quadriguttatus* (16 found)
- Flatheaded locust borer
A. difficilis (10 found)
 - Locust

■ Chrysobothris

- *C. sexsignata* (8 found)



Steven Valley, Oregon Department of Agriculture, Bugwood.org



Kansas Department of Agriculture, Bugwood.org



Pennsylvania Department of Conservation and Natural Resources-Forestry, Bugwood.org



BUPRESTID SPECIMENS

- Beetle specimens from volunteer efforts have been added to the permanent University of Minnesota Insect Collection



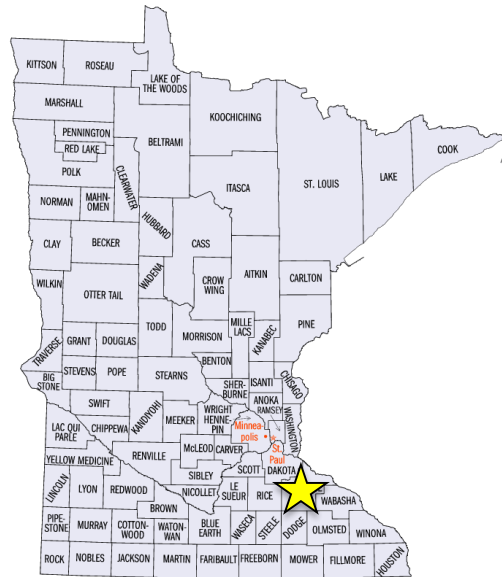
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TAXONOMIC/GEOGRAPHICAL DATA

- In 2015, a volunteer captured a beetle considered to be the first documented find of that particular species.
- *Actenodes simi* found in Goodhue County

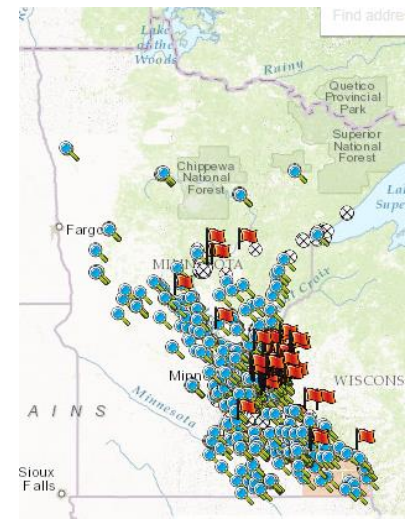


Mike Quinn, TexasEnto.net



CHALLENGES

- Climate—heavy rain
- Northern range for *Cerceris*
- Small colonies
- Well maintained ballfields in urban core





Thank you!

z.umn.edu/waspwatchers

www.cerceris.info

My email: schultzj@umn.edu,

Jennifer Schultz

