

Questions and Answers: Biological Control for Emerald Ash Borer

For several years, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS) has used the emerald ash borer’s (EAB) natural enemies—tiny stingless wasps known as parasitoids—as biological control agents to help manage infestations. The goal of APHIS’ EAB program is to help maintain ash trees as part of the North American landscape and biological control significantly contributes to this goal.

What is biological control?

Biological control, or biocontrol, uses natural enemies such as parasitoids, predators, pathogens, or antagonists to reduce plant pests or diseases. Biological control can be a practical and an environmentally sound method for pest control. The biological control agents used against EAB include four tiny stingless wasp species—the largest is about the size of a typical mosquito.



SPATHIUS AGRILI



SPATHIUS GALINAE



OBIUS AGRILI

Why is biological control used against EAB?

Soon after the EAB was first detected in the United States, APHIS, the Agricultural Research Service, and the U.S. Forest Service began looking for natural enemies to fight the infestation. We conducted research in EAB’s native range in China and found three biological control agents—*Spathius agrili*, *Tetrastichus planipennisi*, and *Oobius agrili*. Several years later we also found *Spathius galinae* in Russia. These four wasp species specifically hunt and kill EAB, which helps reduce the number of EAB infesting and killing ash trees. Three species attack EAB larvae and one targets EAB eggs.



SPATHIUS GALINAE



SPATHIUS AGRILI



OBIUS AGRILI



TETRASTICHUS PLANIPENNISI

- *Spathius agrili* has a long egg-laying organ or ovipositor that helps it attack EAB larvae in many different sized ash trees. This wasp penetrates through tree bark and lays up to 20 eggs on an EAB larva. The hatching wasp larvae feed and develop on the EAB larva, resulting in its death.
- *Spathius galinae* also attacks EAB larvae like *Spathius agrili* does, but what makes this wasp different is that it can tolerate colder climates, which makes it an optimal biological control agent for releasing in the northern states.
- *Tetrastichus planipennisi* also attacks EAB larvae, but the female lays eggs inside EAB larvae where the wasp larvae grow and eventually kill their host. Because of its shorter ovipositor, *Tetrastichus* targets larvae in ash trees with a diameter of five inches or less.
- *Oobius agrili* is the smallest of the wasps and targets EAB eggs. When this wasp locates an EAB egg in tree bark, it injects an egg inside the host egg, where it will hatch, grow, and kill the EAB egg.

Do the wasps bother people, pets, or other creatures?

The wasps are attracted to EAB, not people or pets. The wasps may incidentally attack other *Agrilus* species that are similar to EAB, but such incidental attacks are very rare and will not disrupt their populations.



When and where have wasps been released in the United States?

APHIS first released wasps in Michigan in 2007. Since then, we have worked with biological control partners to release more than eight million wasps in 30 states and the District of Columbia—and recovered their offspring in 22 states. This means the wasps are establishing, reproducing, and more importantly, attacking and killing EAB. You can see where wasps have been released by visiting www.aphis.usda.gov/plant-health/eab.

How effective are the wasps at killing EAB?

The most recent study that was conducted in Michigan and several northeastern states showed that the wasps are killing 20-80% of EAB in ash trees up to eight inches in diameter. The study documented that more EAB are being attacked by the wasps which is resulting in less EAB attacking ash trees, and that ash trees are regenerating in these areas because wasps are being released. You can read the study online by visiting https://www.fs.fed.us/foresthealth/technology/pdfs/FHAA-ST-2017-02_Biocontrol_role_EAB_regeneration.pdf

Will biological control eventually eradicate EAB?

The wasps alone will not eradicate EAB. They can be used in an integrated pest management plan to help control the pest and benefit our landscapes.

How does APHIS determine where to release wasps?

Each year, APHIS estimates wasp production to determine the number of release sites it can support. Then release sites are selected based on biological control criteria and EAB program priorities outlined in the EAB Biocontrol Release Guidelines. You can read the guidelines online by visiting https://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/downloads/EAB-FieldRelease-Guidelines.pdf

How are wasps released?

Once the release areas are identified, APHIS ships the wasps to our biological control partners who release them in the preapproved and selected area(s). Wasps are released according to the Biological Control Release and Recovery Guidelines, see link included above. APHIS begins shipping wasps in the spring and continues until early fall.

Is it safe to release wasps since they are non-native insects?

Before the wasps were released, research in China and in the United States revealed that the wasps prefer EAB over other insects. No adverse effects were found or raised through the environmental assessment process. You can read the documents and public comments by visiting <https://www.regulations.gov/docket?D=APHIS-2014-0094>.

Can native insects be used to fight EAB instead?

While there are EAB parasitoids and predators in the United States, such as the native stingless wasps *Atanycolus* and *Cerceris fumipennis*, and woodpeckers, these native enemies do not attack EAB at levels high enough to make a difference on infestations.

How can I become a biological control partner?

If you are a public landowner or land manager in an area where EAB is infesting ash trees, you can send email containing information about the property where you would like to release wasps. If the property is selected, we will contact you by email. Please send the email to EAB.Biocontrol.Program@USDA.gov and include the following information in the body of the email:

1. Property owner/manager name;
2. Property owner/manager email address;
3. MapBio number issued through www.mapbiocontrol.org;
4. Name of the county where the property is located;
5. And the latitude and longitude of the property.

Can the stingless wasps be purchased?

No. The EAB program is providing stingless wasps to states and selected partners to release in EAB-infested public areas. Additionally, the stingless wasps are difficult to produce which limits their availability.

Where can I find more information on the EAB program and the use of biological control?

More information is available online, please visit www.aphis.usda.gov/plant-health/eab.

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