

ARTHROPOD ASSOCIATES OF THE EMERALD ASH BORER (AGRILUS PLANIPENNIS) IN NORTHERN ILLINOIS

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The emerald ash borer (EAB) is a phloem feeding wood boring insect that kills its host by destroying the vascular system of the tree. As with any opportunistic organism, competition for limited resources is a major factor population dynamics. One area of EAB biology that needs further investigation is to identify and quantify the impact of other Arthropod species associated with EAB tree colonization and what impact, if any, these species have on the phloem resource within a given ash tree.

Beginning in the winter of 2007, a study was initiated to address the above questions with the following objectives:

- To identify what arthropods are commonly found in healthy ash trees
- To identify the arthropod complex ("EAB associates") associated with EAB infested trees
- To determine what impact, if any, competition from EAB associates might have on the available phloem resource and development of EAB life stages

Bolts from healthy and EAB infested trees were collected from 18 central and northern Illinois counties during 2007-2011. The bolts were placed in rearing containers and held under ambient conditions. All Arthropods were allowed to emerge and then were placed in glass vials with 70% alcohol for future identification. At the end of the rearing season, the bolts were peeled and the relative percentage of EAB and non-EAB galleries were visually estimated (nearest 5%) for each bolt. Available phloem surface area was estimated by measuring the diameter of each end of the bolt and the length of the bolt.

In 2008, the eastern ash borer (EABB) consumed just over half (53%%) of available phloem in non-EAB infested ash trees. A reversal occurred for 2009 and 2010. Ash trees suspected and/or known to be infested with EAB experienced little if any colonization by EABB with 43% of available phloem consumed by EAB larvae. These preliminary results suggest that trees not infested with EAB are primarily colonized by the eastern ash bark beetle (EABB) (*Hylesinus varius*) along with a few ash clearwing borers (*Podosesia syringae*) and members of the Buprestidae and Cerambycidae beetle families. In contrast, EAB infested trees have minimal gallery formation by EABB. Based on the results presented here, it appears that there is very little direct competition between EAB and EABB for the available phloem resource.

The red-headed ash borer was present in all sampling years, but not in large numbers and is not considered a major phloem competitor. It is found associated with dead wood (firewood) and does not typically infest living phloem tissue.

The only significant predator collected was a very small number (<1% of total insects collected) of clerid beetles (Cleridae). This family of beetles includes common predators of bark beetles.

Hymenopteran belonging to the Eurytomidae, Ichneumonidae, and Pteromalidae made of 28%, 29%, and 31% of all insects reared from ash tree logs, respectively. The remaining 12% of insects collected included members of the Braconidae, Eupelmidae, and Torymidae Hymenopteran families. All of the aforementioned Hymenopteran families are known to contain parasitoids of wood-boring insects, but their effect on EAB population dynamics is not well known.

Implications of the effect of EABB and EAB phloem feeding and its relationship to resource allocation and competition will be discussed.

