

EMERALD ASH BORER LIFE CYCLE

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ABSTRACT

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), native to several Asian countries, was discovered in southeastern Michigan and nearby Ontario in June of 2002. EAB was identified as the cause of extensive ash (*Fraxinus* spp.) mortality in approximately 2,500 mi², and surveys revealed 6–7 million ash trees are dead and dying. Apparently EAB was inadvertently introduced approximately 5–10 years ago in infested solid wood packing materials or dunnage. In 2003, isolated EAB infestations were found throughout Michigan, northern Ohio, Maryland, and Virginia as a result of transportation of infested nursery stock, firewood, and ash timber. Limited information and literature are available for EAB because it is a minor pest in Asia. Below is a brief description of the EAB life cycle, compiled from our 2002–2003 EAB field and laboratory studies.

Emerald ash borer eggs are approximately 1 mm in diameter, gradually changing from white to amber in color after being laid on the bark. Larvae hatch directly into the bark, and tunnel until reaching the cambial region where they feed, etching a serpentine gallery in the phloem and outer sapwood. Based on measurements of sclerotized larval structures, we identified four distinct larval stages. Last-instar larvae enter the sapwood or outer bark during late summer and fall, and excavate a pupation chamber where they overwinter as prepupae; diapause is facultative. Pupation generally occurs in late spring, although larvae too small to prepupate before winter may overwinter as larvae under the bark and complete development the following summer. EAB pupae are exarate (naked), and gradually develop to adults in the pupation chamber. When mature, the adults chew out of the tree through exit tunnels that had been initiated by the last-instar larvae. Adults emerge from distinct D-shaped exit holes in the tree bark and are capable of immediate flight upon emergence. EAB adults feed on ash foliage throughout their lives, and are most conspicuous on hot sunny afternoons (3–6 P.M.), hovering about ash tree trunks, landing to mate or oviposit. Eggs are laid between layers of bark and in bark crevices. In 2003, the peak oviposition period was late June to early July, and most eggs were enclosed by mid-July.