

LIFE CYCLE OF THE EMERALD ASH BORER IN MICHIGAN

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Abstract

In 2002, following the discovery of emerald ash borer (EAB), *Agrilus planipennis*, in Michigan, we began research on its biology and rearing. From field and laboratory studies of EAB in Michigan, we learned their eggs are ca. 1 mm in diameter, gradually changing from white to amber in color after being laid between layers of bark and in bark crevices on ash trees (*Fraxinus* spp.). Larvae hatch in about a week and tunnel directly through the bark to 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 larval stages. In late summer and fall, fourth-instar larvae enter the sapwood or outer bark and excavate a pupation chamber where they overwinter as prepupae; diapause is facultative. Pupation generally occurs in late spring, although larvae too young to prepupate in the fall spend the winter *in situ* and complete development the following summer.

EAB pupae are exarate (naked) and gradually develop to adults in the pupation chamber. In the laboratory at constant 24°C, maturation time of an EAB pupa to a functional adult is ca. 25 d. When mature, adult EAB chew out of the tree through tunnels initiated by the larva during excavation of the pupation chamber. Adults emerge through the characteristic 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, hovering about ash tree trunks, and landing to mate or oviposit. In the laboratory, EAB adults mate soon after emergence, however, they maturation feed for ca. 3 weeks on ash foliage before oviposition starts. EAB adults can live for several weeks. In 2003, the peak oviposition period was late June to early July, and most eggs were eclosed by mid-July.