

## Picture Guide to the Life Stages of the Emerald Ash Borer

Adult



**Appearance:** The emerald ash borer adult is a small, bright green beetle of the buprestid family - a family of insects sometimes known as the metallic, wood-boring beetles. The typical size for an adult EAB is between 0.3 and 0.5 inches - large for a buprestid beetle, but small by human standards. Males and females are very similar in appearance.

**Found:** Research in Michigan shows that the emergence of EAB adults begins about 450-500 growing degree days and peaks at around 1,000 GDD (base 50). In Connecticut, that corresponds to around the end of May / beginning of June for initial emergence, and late-June into mid-July for peak emergence, depending upon location and the current year's weather.

**Feeds:** On ash leaves. The adults feed for about two weeks before they mate and the females begin laying eggs. Adult feeding does little damage to the tree.

Eggs



**Appearance:** The eggs of the emerald ash borer are very small (approximately 1 mm or 0.04 inches) and are reddish-brown. They may be laid in groups or individually.

**Found:** When newly infesting a tree, EAB tends to lay eggs up in the crown of ash trees, in places where the bark is beginning to furrow. The eggs may be laid on the surface of the bark, in bark cracks and crevices or just under the outer bark of ash trees. EAB favors all North American ash trees, including white, green and black ashes. In Connecticut, the vast majority of native ash trees are white ashes.

Larva



**Appearance:** The buprestid beetles are sometimes known as flat-headed borers for the form of the larva - flat, white grubs. The emerald ash borer larva is a clearly segmented, flat-headed borer that goes through four growth stages, or instars. The life-cycle of the EAB may be one year or two years in length, depending upon the extent of the infestation (new populations tend towards a two year life cycle). Larval development is faster on stressed trees.

Larval development is faster on stressed trees.

**Found:** After the egg hatches, the larva burrow into the inner bark and cambial layer. The larva is noted for its serpentine (S-shaped) feeding galleries under the bark.

**Feeds:** On the phloem (inner bark) tissues and the cambium. Older larvae may score the outer sapwood.

Pre-Pupa



**Appearance:** The winter before it pupates, the last instar EAB larva will excavate a tiny chamber and curve back on itself into a posture that is indicative of the pre-pupal form. This form is transitional between the larval and pupal stages.

**Found:** The larva will excavate its pre-pupal chamber either approximately 0.5 inches into the outer sapwood or into the outer bark. The thickness of the bark will influence which happens. On thicker-barked trees, the pre-pupae may be found in the bark; on thinner-barked trees, they may be found in the outer sapwood.

**Feeds:** In this form, the beetle does not feed.

Pupa



**Appearance:** During the pupal stage, the larval EAB turns into the adult beetle. At each succeeding point during this stage, the features of the adult beetle become more apparent. Coloration tends to be among the last features to appear.

**Found:** Either in the outer sapwood or in the bark, depending on the thickness of the bark. On thicker-barked trees, pupae may be found in the bark; on thinner-barked trees, they may be found in the outer sapwood.

**Feeds:** In this form, the beetle does not feed.

## Signs and Symptoms of the Emerald Ash Borer

The emerald ash borer larvae feed on the phloem tissue and cambial layer of the tree, eventually destroying the tree's ability to transport sugars and killing it. How rapidly this happens is largely determined by how many larvae are feeding in the tree. It is estimated that, in a typical outbreak, trees will succumb to the emerald ash borer within 3-5 years.

As the EAB larvae feeds, it causes the localized death of the bark above where it is feeding. As the tree continues to grow, this can cause distortions and damage to the bark, including sunken areas, sloughing and splitting of the bark. These may be helpful indicators in examining trees that are not otherwise showing symptoms of an advanced infestation.

Epicormic sprouts, particularly when found along the lower trunk of the tree, are a clear indication of stress in the tree. It can also be one of the indications that a tree is infested with the emerald ash borer. An exposed EAB gallery can also be seen in this picture.

When the adult beetle emerges from the bark, it chews a characteristic D-shaped exit hole on its way out of the tree. This shape accommodates the flat back and rounded abdomen of the adult insect. D-shaped exit holes are diagnostic of metallic wood-boring beetles in general.

On ash trees, EAB galleries are unique in that they are winding and S-shaped -"serpentine". The presence of a serpentine feeding gallery just under the bark in an ash tree is a very good sign that EAB is or has been present in that tree. During inspections of suspect ash trees, the bark can be peeled back to expose any galleries that are present. On dead ash trees, this can be done easily as the bark usually simply peels right off. On living ash trees, tools such as a pocket knife, an axe or a draw-knife might be needed to remove the bark and expose any EAB galleries.

In many infestations such as the one in the vicinity of Saugerties in New York State, woodpeckers have been shearing the outer bark off of ash trees in order to find the pre-pupae in the bark. This feeding behavior exposes lighter colored bark underneath the outer bark. This lighter bark is very obvious to even ground-based observers and looks a lot like the mark the might be left if an adjacent tree had fallen and removed outer bark on its way down. The observers have noted this to be one of the most helpful clues to finding EAB-infested trees.

Additionally, woodpeckers may feed on earlier instar larvae underneath the bark of the tree by boring the typical round woodpecker holes into the bark. In the photo to the far-right, a woodpecker hole can be seen along with exposed serpentine feeding galleries.



**If you find a Suspected EAB or EAB Infested Tree, Please Contact the Connecticut Agricultural Experiment Station at 203-974-8474 or [CAES.StateEntomologist@ct.gov](mailto:CAES.StateEntomologist@ct.gov)**