

# **AMBROSIA BEETLES**

Ambrosia beetles are a diverse group of forest insects within the subfamilies Scolytinae (bark and ambrosia beetles) and Platypodinae (pinhole borers). The vast majority of ambrosia beetles attack dead or dying trees. However, some invasive ambrosia beetles, such as the redbay ambrosia beetle (*Xyleborus glabratus*) and polyphagous shot hole borer (*Euwallacea fornicatus*), have caused devastating impacts to redbay and the avocado industry across the country.

## **IDENTIFICATION AND BIOLOGY**

Ambrosia beetles within the subfamily Scolytinae can be identified by their small size (1.5 - 4 mm), their cylindrical body with a partially hidden head, and their elbowed antennae with a large round club at each end. Pinhole borers are larger (5 mm) with a more elongated shape.

Beetle infestations begin when beetles locate a suitable host tree. Females are attracted to certain tree volatiles, such as ethanol. Each female bores tunnels into the wood, known as galleries, where they cultivate a symbiotic fungus that the use as a food source. As the eggs hatch, the larvae will feed on the fungus. Once mature, the adult beetles will fly off in search of a new host tree. Under the right conditions, several life cycles can exist within a year.

### **SPREAD**

Ambrosia beetles are usually attracted to trees that are stressed or weakened. One of the most common precursors to infestation is drought, although winter storms, and poor soil or site conditions are common precursors too. Physical damage such as pruning, construction, or fire scarring can preclude infestation as well. When the tree is wounded, chemical volatiles are released and work as attractants to ambrosia beetles. Once one tree is infested, the next generation of beetles can spread to neighboring trees. Ambrosia beetles have a very broad host range and attack through mass accumulation, a slow process that lasts for months, and only a fraction of the beetles colonize the living host tissue. Most beetles arrive at hosts that have already been weakened or are dead.

#### SIGNS AND SYMPTOMS

The appearance of trees killed by ambrosia beetle may seem to be a sudden development. However, diligent monitoring can reveal early warning signs of attack. Ambrosia beetles create a small (0.5 - 1 mm) circular bore hole of which compacted white sawdust, known as "noodles" will emerge. Frass and sawdust will also accumulate at the base of the tree and in the furrows of the bark. Peeling back the bark will reveal cylindrical galleries (approximately 1-2 mm wide) with fungi that go deep into the xylem. Adults emerge from the tree using the same small initial holes as exit holes. As the galleries and fungus spread on the xylem, leaves will fade to a light pale/medium brown color, and finally to dark brown. Eventually leaves will drop off the dead tree.

#### **PREVENTION AND CONTROL**

By the time the leaves on a tree change colors, it is too late to save. The best option to reduce the attack and spread of ambrosia beetles is prevention. Preventative strategies for homeowners and managers include:

- Keep trees healthy so that their natural defenses can fend off attacks. For landscape trees this may include watering once per month during periods of drought. For trees in natural landscapes, maintaining adequate spacing can help to increase tree vigor and health.
- Sanitation: Heavily infested trees should be immediately burned, buried, or chipped to kill the beetles. Do not move unseasoned infected firewood as this may spread beetles.
- Preventative treatments with emamectin benzoate alone (systemic insecticide) or combined with propiconazole (systemic fungicide), significantly reduce the attack and colonization of some invasive ambrosia beetles. Preventative spray with permethrin reduces attacks, but applications need to be conducted during peak beetle activity. If a tree is already infected, it will not be effective. Check manufacturer labels to find a product that is permitted for use against ambrosia beetles.







