Shothole Borer

Ryan S. Davis, Arthropod Diagnostician, and Michael Caron, Extension Horticultural Agent

WHAT YOU SHOULD KNOW

• Shothole borers can cause damage to ornamental and fruit trees in Utah and adults are present from spring to early fall.
• Stressed or injured trees are more prone to attack.
• Insecticides are typically not recommended for control of shothole borer.
• Removal of infested trees can prevent spread.

Shothole borers (Fig. 1) are bark beetles that may attack stressed or injured trees. They have a wide host range, including all fruit trees grown in Utah, quince, loquat, serviceberry, wild cherry, chokecherry, mountain ash, hawthorn and elm. In Utah, apple, cherry, pear, and hawthorn are preferred hosts. Shothole borers rarely attack healthy trees, but can be a problem in ornamental plantings under drought stress or in poorly maintained orchards.

FEEDING HABITS AND INJURY

Adult shothole borers preferentially attack old and/or stressed trees. Attacks are evident upon careful inspection of the tree. Vigorous trees will have a noticeable clear substance coming out of small beetle entrance holes, and less vigorous trees will usually have the presence of boring dust (frass) in the bark crevices. Shothole borers kill branches and trees by feeding in the sapwood, eventually killing the phloem. Eventually branches and stems become girdled stopping the transport of nutrients up and down the tree causing branch or tree death.

Typical injury involves the presence of entrance and exit holes, yellowing, wilting, and dead leaves. When the larvae develop into adults and exit the tree, they leave many uniform-sized holes, from which the shothole borer gets its name (Fig. 2). In the sapwood, the presence of galleries produced by the adult and larvae indicate shothole borers (Fig. 3).

In Utah, there are two-to-three generations per year. Regardless of the number of generations, adults fly continuously from March/April to fall, so trees may be attacked at any time.
LIFE HISTORY

Adult - Spring/Summer Dispersal, Infesting, and Damaging Stage

- Tiny, brown-black beetles reaching a max of 2.9 mm (Fig. 1).
- Fly from infested trees/branches to other weakened or stressed trees or branches causing a progression of symptoms in one or multiple trees.
- Fly from spring to fall to infest new trees and branches.
- Bore into trees and construct a short parental egg gallery in the sapwood.

Egg

- Laid along the main parental gallery.
- Upon hatching, larvae tunnel outward through the phloem layer (Fig. 3).

Larva - Immature Damaging and Overwintering Stage

- Small, creamy-white; legless with dark brown mouthparts (Fig 4).
- Construct galleries perpendicular to the parental egg gallery (Fig. 3).
- Bore into and overwinter about 16 mm into the sapwood.
- Pupate in small cells in wood in the spring.
- Galleries sometimes wind and overlap in a heavily populated host.

CONTROL

Because shothole borers preferentially attack stressed or injured trees, management strategies aimed at minimizing these conditions are important. Insecticides are typically not recommended for shothole borer.

Monitoring

Monitor for shothole borers by looking for: entrance or emergence holes, frass (sawdust), clear sap coming from holes (Fig 5.), branch dieback, and wilting leaves.

Trees that are kept healthy and stress free through proper deep watering and fertilization, are able to withstand attacks. Soil should contain adequate moisture to a depth of about 20 inches. Soil moisture can be tested by pushing a long screw driver or slim metal rod into the soil. The metal will easily penetrate moist soil, and will stop when dry soil is reached. Deep watering should be done once a week during hot summer months (July, August) and less frequently in the cooler months. Other non-chemical control practices include the following.

Cultural, Mechanical, and Sanitation Practices

- Use white tree wrap from December to April, or paint tree trunks with a 50% white latex paint/50% water solution to avoid winter injury.
- Replace old, diseased, injured, weakened, or stressed trees.
- Prune dead or dying branches.
- Remove and burn, chip, solarize, or debark infested branches, stumps or trees.
Chemical Control

Insecticide applications for shothole borer are generally not recommended. Additionally, there are no products available that include shothole borer on the label. However, chemical products may be used IF the tree or tree type (fruit, or ornamental trees) is listed on the label. Possible products to try as a trunk spray include carbaryl, bifenthrin, permethrin, and spinosad. Systemic insecticides (e.g., imidacloprid) are not effective against shothole borer. Since shothole borer adults are active through the growing season, an ongoing spray program targeting the adults may be implemented. Properly timed and applied insecticides will kill bark beetles as they chew through the insecticide-soaked bark, preventing successful attack. Sprays should only be used if there is a current/ongoing issue with shothole borer, and not as a regular preventive.

Spring insecticide applications should occur once temperatures are consistently over 50°F. At this temperature, many bark beetles continue development under the bark or emerge to find new host trees. Avoid sprays when flowers are in bloom and bees are active.

PHOTOS

1 Natasha Wright, Florida Department of Agriculture, Bugwood.org.
2 Jack Kelly Clark, University of California Statewide IPM Project.
3 Chris Schnepf, University of Idaho, Bugwood.org.