Peach Tree Borer: Life History and Management Options for Western Colorado

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Damage Symptoms

The peachtree borer (crown borer), *Synanthedon exitosa*, a major pest of peaches in North America. This insect, native to North America, moved from native Prunus species to peach introduced into the region. Other stone fruits including nectarine, plum, cherry, apricot and almond are also attacked. Commercial orchards and backyard trees are both affected; trees that are not protected from the pest will be damaged or killed. Damage can be a general decline in tree health, expressed in all or part of the tree, wilting of portions of a tree, or tree death. Larvae can cause extensive damage by burrowing into the sapwood of the tree, usually at or below soil line. Masses of clear gum exude from the injured areas. The gum may be mixed with brownish frass and sawdust, which give it a dark color. Several other insect pests and diseases can cause gum to appear, but these are usually amber colored, and appear higher up on the tree. Peachtree borers usually damage trees that are more than 2 inches in diameter. In some years and areas, only one or two borers will inhabit a tree. In other years and areas, many may be present in a tree. Trees with old damage are more susceptible to repeated attacks, and subsequent invasion by fungi.

Natural History

Female peachtree borer moths have a superficial resemblance to wasps. Female moths, about 1½ inch in length, have a steel-blue body with an orange band on the fourth and sometimes fifth abdominal segment. The forewings are blue, and the hind wings are clear with a black margin. Male moths are slightly smaller than females and lack the orange band on the abdomen. There may be one or more narrow yellow to white bands around the abdomen in males. There is considerable variation in general body coloration and amount of abdominal banding in males.

Eggs are laid on the bark of the lower trunk or on soil near the tree in mid summer. Each female can lay between 200 and 1200 eggs. The eggs hatch in about a week, and the larvae burrow into the sapwood of the tree. Larvae of peachtree borers are white with brown heads, and found inside the galleries formed when they eat the wood. They feed under the bark through the summer, and move down the trunk as cold weather approaches. The partially grown larvae resume feeding in the spring. Pupation takes place under the bark, and lasts about two weeks. Moths begin to emerge in late spring, at which time mating takes place and the cycle repeats.

Management

Management strategies for the peachtree borer can take different approaches. Preventative measures can be somewhat effective in avoiding damage, but may not be feasible in large commercial orchard situations. Mechanical control of larvae may be possible for homeowners with only a few trees. Biological and natural control agents may be partially effective in controlling peachtree borer, but their use is not proven at this time. Chemical control options are varied, and widely used by commercial orchardists.

Preventative Measures

Egg laying on older trees is usually concentrated around existing wounds. Control of existing peachtree borer infestations can help reduce future problems. Avoid damaging the bark when cultivating around trees. White paint applied to the bark around the base of the trees can help seal cracks in the bark which the female moth uses for egg laying.

Mechanical control

Individual larvae may be dug out of trees with a sharp wire. Inserting the wire into a gallery may be sufficient to kill larvae. Be careful to not injure the tree, as the damage may be as severe as that inflicted by a borer larva. This type of treatment is not feasible for large plantings.

Biological control

Many species of parasitic insects are known to attack eggs, larvae and pupal stage of the peachtree borer. Vertebrate predators include mice, rats, and skunks; several arthropods such as ants, lacewings, and spiders may prey on eggs and small larvae. Total dependence on natural enemies will probably not be effective in avoiding damage. The insect parasitic nematode *Steinernema carpocapsae* has been used to successfully manage peachtree borer. This research has not been done under Colorado conditions. These nematodes are commercially available, and if control efforts are attempted they should be applied as a lower trunk drench in the spring or fall when temperatures are above 55°F.

Chemical control

Chemical control is commonly used in commercial settings when peachtree borer is a pest. The limitations of chemical control must be recognized before a program is successful:

* 1) Larvae, in general, are vulnerable to insecticide sprays only from the time they hatch until they burrow beneath the bark. This period is often less than one day. For effective control, a larva must be exposed to a toxic amount of insecticide before it burrows under the bark. Given the extended flight and egg laying period of peachtree borer, multiple sprays may be necessary.
* 2) Residual effectiveness of insecticides varies considerably with the particular compound used and environmental conditions. Producers must be aware of the characteristics and limitations of the insecticide used to time sprays so a continuous insecticidal barrier to larvae entrance to the bark is in place.
* 3) Seasonal histories of peachtree borers vary considerably. Timing of initial sprays will vary by several weeks over the diverse habitats and environmental conditions present in western Colorado.

Given these limitations, several insecticides are effective in controlling peachtree borer. They are applied as a drenching spray aimed at the base of the trees. Timing is based on adult moth emergence, which is determined by pheromone captures. Pheromone captures for the Grand Junction area are discussed in the next section. Choice of the proper insecticide is dependent on tree species, number of trees to be treated, application equipment and other variables. For commercial growers, the most effective compounds are restricted use. Insecticides labeled for use

in commercial orchards include esfenvalerate (Asana XL), azinphos-methyl (Guthion2L or 50W, Sniper 2E or 50W, others), chlorpyrifos (Lorsban 4E or 50W), endosulfan (Thiodan 3EC or 50WP, Phaser 3EC or 50W, others), or Neem extract (Azatin XL). Homeowners have choices with the active ingredients of esfenvalerate, permethrin, endosulfan, lindane and others. Always read and follow all label directions.

If only a few trees are to be treated paradichlorobenzene crystals (moth crystals) are an option to fumigate larvae within their tunnels in the trunk. Crystals are applied to the soil around the base of the tree, and temporarily mounded with clean soil to confine the fumigant gas to the area where the borers are located. The crystals should not directly contact the bark of the tree. Rates vary with trunk diameter. These treatments should be applied during warm periods in the fall after peaches have been harvested. Check the label of the moth crystals to be sure that they are registered for use on peachtree borers.

Western Colorado Pheromone Trapping

Pheromones are sex attractants produced by female insects to attract males. They have a specific chemical composition. Males have sensitive sensors on their antennae that detect minute amounts of pheromone and use this to locate females. Pheromones are used to trap male moths to determine flight patterns. Pheromone trapping of peachtree borer has been conducted by commercial orchardists for many years. Trapping records extending back to 1983 exist from the Western Colorado Research Center at Orchard Mesa (WCRC@OM), 3168 B½ Rd. Captures averaged over that time are shown in Figure 1. These trap catches are from a commercial peach production setting, where peachtree borers were actively controlled. The average first emergence of peachtree borer males, according to this data, occurs during the first week of June, but flights are not heavy until about the third week of June. Significant flights continue through August, and a few moths are captured in September.

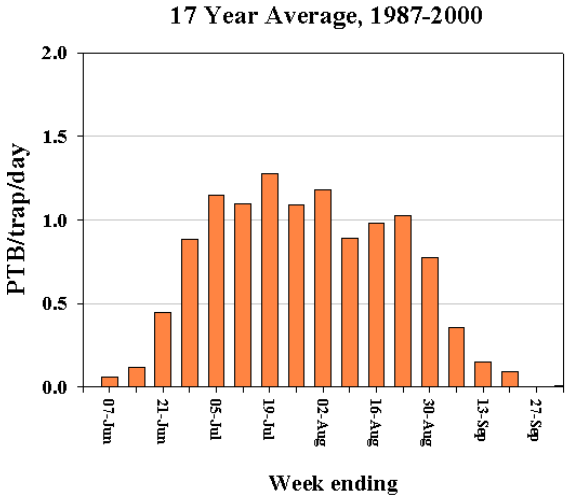

Figure 1 Average daily Peachtree borer capture in pheromone traps at the Orchard Mesa Research Center, a commercial fruit orchard.

Figure 2 shows peachtree borer captures at three Grand Junction locations in 2000. Traps were located near 1st Street and Patterson Rd., in a residential area with many backyard peach and other Prunus trees. Another trap was located at the Mesa County Fairgrounds, in an area that borders residential areas with many suitable peachtree borer host plants. The third trapping location was at the same WCRC@OM location as the long term trapping data shown in Figure 1.

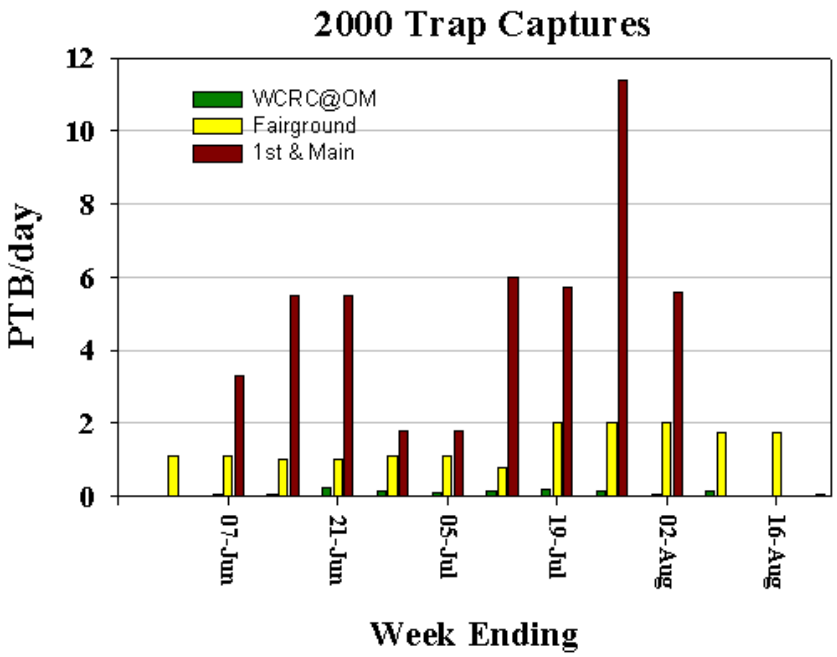

Figure 2 Peachtree borer pheromone captures at three Mesa County, Colorado locations during 2000

Two significant trends can be seen in the 2000 trapping data. First, there is great variability in the numbers of moths trapped. The number of moths captured at WCRC@OM was only about 10% of the long term average. The number of moths captured at the Mesa County Fairgrounds was about the same as the long term average, and the 1st and Patterson site had about 500% of the long term average. It is obvious that one cannot take the absolute numbers from a commercial orchard site where active control measures are being taken, and apply them to a residential setting where many trees are untreated. It appears that damage potential from peachtree borers may be much higher in backyard settings than in commercial orchards. This will vary considerably with location, depending upon the number of untreated trees in an area. The second trend is in the timing of moth emergence. There were significant flights of moths in early June at the fairground (the First street & Patterson trap was not set out until June 1), while few moths were captured at WCRC@OM until the third week of June, consistent with the long term average. Residential areas tend to be warmer because of urban effects on climate. Commercial settings are cooler because they are more wide open, without the heat sink effects of houses, traffic, pavement and other factors. If pheromones are used to time chemical applications, data from a commercial site several miles from a residential area should not be used. It would be best to use a neighborhood trap to determine spray timing and pest pressure.