

## Two-lined Chestnut Borer

Oak trees dying from the top down and exhibiting the symptoms of drought may be infested with the two-lined chestnut borer, *Agrilus bilineatus* (Weber). This insect kills or damages hundreds of red, black, white, and bur oaks in Minnesota every year.

### Symptoms and Effects

The two-lined chestnut borer causes the disfigurement or death of oaks through successive attacks on the branches and stems. Larval feeding destroys the nutrient and water conducting tissues which, in turn, kills the portion of the tree beyond the point of attack. Damage may result in the death of a single limb, half the crown, or the entire tree. If only a single limb or upper portion of the tree dies, the tree is usually re-attacked in succeeding years until the entire tree dies. When an entire tree is killed, the surrounding trees are often attacked and killed the following year, creating a pocket that may be confused with oak wilt. Tree death usually takes 1-3 years, depending upon the number of insects infesting the tree.

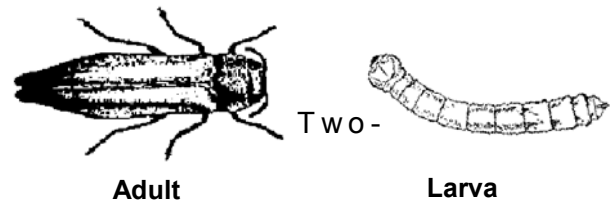
Symptoms in trees infested with the two-lined chestnut borer usually show up first in the crown of the tree in one or more lateral branches. Leaves wilt suddenly and turn uniformly brown. Removal of tree bark in the dying segment reveals the larvae or galleries that are responsible for the die-back.

Remember, oaks are also subject to oak wilt so proper diagnosis is essential to correctly choose control procedures. Oak wilt readily infects and kills red and black oaks while slowly killing white or bur oaks. Leaves on trees attacked by the borer turn brown and remain on the infested trees. On the other hand, the leaves of trees infected with oak wilt start paling at the edges and curling before turning brown and generally, drop from the trees.

Another difference is the fact that oak wilt symptoms are usually more prevalent in early summer while borer symptoms are more common during the late

summer. It is important to bear in mind that there are many exceptions to these rules, many gradations of symptoms, and the possibility that both problems exist in the same area; therefore, in urban settings the presence or absence of oak wilt should be confirmed by laboratory diagnosis.

### Life Cycle



lined chestnut borer adults are slender black beetles (1/4 -1/2 inch in length) marked with two faint white to golden colored lines down their backs. They emerge from infested trees from late May through early July by boring D-shaped holes through the bark. Peak adult activity probably occurs about mid-June. Beetles feed on the foliage of many species after emergence, but prefer oak foliage. Although the beetles are strong flyers, they apparently remain in the general vicinity of their emergence if ample foliage and suitable egg-laying sites are available.

After feeding for several days, the females move to the trunk and larger branches to lay eggs. Eggs are deposited in clusters of up to 10 eggs each in cracks and crevices in the bark. The eggs hatch in 10-14 days and the larvae (borers) burrow through the bark to feed in the tree cambium. Larvae are 1 to 1-1/4 inches long when mature, white in color, and very slender. There is a noticeable enlargement directly behind the head and two rather slender brownish projections extending outward from the last body segment.

Larval feeding continues throughout the summer consuming the layer between the wood and bark. This feeding produces zigzag lines under the bark

called galleries, which if numerous, girdle the infested portions of trees. Larvae complete their development in late August and early September, move into the outer bark and construct hibernation chambers near the bark surface. Pupation occurs in the chambers in spring and new adults emerge to renew the cycle.

Many factors, including tree vigor and local weather conditions, affect development of the two-lined chestnut borer. Because of these variations larvae of varying sizes may be found under the bark during the growing season. In Minnesota, two years are required to complete the life cycle for a portion of the borers.

### Control Strategies

Two-lined chestnut borers always exist at low densities, successfully reproducing in storm-damaged, disease-weakened trees and branches in established wood lots and residential areas. Any additional stress factors such as root damage from construction, landscaping, soil compaction or drought favor an increase in borer populations.

Building or construction in oak wood lots should be approached cautiously as heavy oak losses can generally be expected unless extreme and detailed precautions are undertaken to protect the trees. Once the symptoms of attack become visible, (i.e. dead top or branch), that portion of the tree will not recover and further attack can be expected unless action is taken.

### Cultural

Sanitation, the removal and disposal of infested wood prior to beetle emergence each spring (generally mid-May), and maintenance of tree vigor are the most important factors in the protection of oaks from two-lined chestnut borer injury. However **do not** prune oaks after early April in order to protect the tree against oak wilt infection.

Remove all wood 3 inches or larger in diameter exhibiting symptoms of attack from trees and destroy or utilize prior to May 15 each year. Cover wood piles securely from May 15 to July 15 if the wood cannot be utilized or destroyed prior to that

date. Failure to do so will allow re-infestation of adjacent trees by beetles coming from stacked wood. A heavy plastic tarp sealed around the woodpile with soil will prevent beetle escape and survival. Once the wood has thoroughly dried, the beetles will not re-infest it.

Improving or enhancing the vigor of stressed trees through fertilization, mulching and proper watering can help to reduce the tree's continued susceptibility to borer invasion.

### Chemical

As a general rule, if more than a third of the tree is infested saving the tree becomes less likely. If less than one third of the canopy is infested, saving the tree is possible but not always successful. It is also imperative to apply the cultural control strategies mentioned above.

There are currently two methods available. The first option for control is to use a systemic insecticide called Merit (imidacloprid). Merit is applied as a soil drench or injection. It is taken up through the roots and moved into the tree. The larvae are killed as they feed on the tissue that carries the insecticide. A minimum of 3 years of treatment is required to control this insect. After that time, the tree is evaluated to determine if further treatment is necessary.

The other option is to spray the tree three times in a season with a residual insecticide. Sprays are timed to coincide with the flight of the adult beetles. It is recommended that the tree be treated for a minimum of 3 years as some larvae take up to two years to emerge from the tree. Spraying trees however can be very difficult and is the least desirable of the two options. Windy or rainy weather conditions may interfere with the ability to spray the tree at a time when the insects are most vulnerable to control thereby diminishing the effectiveness of the treatments.

Your Consulting Arborist will recommend the best treatment process after assessing your site and the condition of your tree.