



ak disorder: Twolined chestnut borer

C. F. KOVAL and M. F. HEIMANN

Oak trees that are dying from the top down or exhibiting drought-like symptoms may be infested with the twolined chestnut borer. Thousands of red, black, white, and bur oaks have been killed or damaged by this insect, *Agrilus bilineatus* (Weber), in Wisconsin.

Symptoms and effects

The twolined chestnut borer causes disfigurement or death of oaks through successive attacks on branches and stems. Symptoms of a twolined chestnut borer infestation usually appear first in the crown of the tree or in one or more side branches. Leaves wilt suddenly and turn uniformly brown (figure 1). If you remove bark in the dying segment of a tree infested by borers, you will find larvae or their tunnels, known as galleries (figure 2).

The larvae of twolined chestnut borer damage oaks by feeding on nutrient- and water-conducting tissues. This kills the portion of the tree beyond the point of attack. Such damage may lead to 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 borers usually attack the tree again in succeeding years until the entire tree dies. Tree death usually takes 1–3 years, depending upon the number of insects attacking the tree. When an entire tree is killed, the borers will often attack and kill surrounding trees the following year, creating a pocket that may be confused with oak wilt.



Figure 1. Twolined chestnut borer is killing this oak tree. When the house was built, construction injury left the tree stressed and vulnerable.

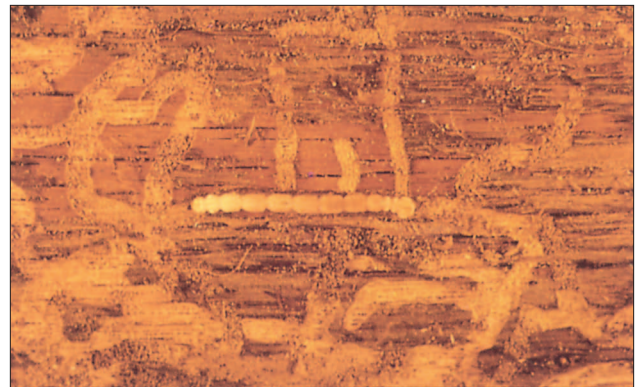


Figure 2. This twolined chestnut borer larva is shown among its tunnels, or “galleries,” in oak wood (enlarged to 1½ times the actual size).

Because oak wilt also attacks various oak species, proper diagnosis is essential for correct control procedures. Oak wilt readily infects and kills red and black oaks but kills white and bur oaks only occasionally.

Leaves of oak wilt-infected trees turn pale, tan, or bronze at the tips and the edges. Often there is a sharp demarcation on the leaf between necrotic tissue and green tissue. Then, in most cases, they drop from the trees, although some may persist. Leaves on trees attacked by the borer also turn brown, but they remain on the infested trees. Another difference between these disorders is that oak wilt symptoms occur more often in early summer, while borer symptoms develop during late summer.

Of course, there are many exceptions to these rules and many gradations of symptoms, and there is always the possibility that both problems will exist in the same area. Thus, in urban settings, the presence or absence of oak wilt should be confirmed by laboratory diagnosis. See Extension publication *Oak Disorder: Oak Wilt* (A1693) for more information.

Life cycle

Twolined chestnut borer adults are slender black beetles, $\frac{1}{4}$ – $\frac{1}{2}$ inch long, with two faint, golden lines down their backs (figure 3). They emerge from infested trees between late May and early June by boring D-shaped holes through the bark. Peak adult activity usually occurs about mid-June. Beetles feed on the foliage of many tree species after emergence, but they prefer oaks. 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, females move to the trunk and the larger branches to lay eggs. They deposit eggs in clusters of up to 10 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's cambium—the layer between the wood and the bark. Larvae are white, slender, and 1– $\frac{1}{4}$ inches long when mature. There is a noticeable enlargement directly behind the head, and two slender, brownish projections extend outward from the last body segment.

Larvae continue feeding throughout the summer, eating in the cambium. This feeding produces zigzag galleries under the bark, which, if numerous, girdle the infested portion 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 these chambers in spring, and new adults emerge to renew the cycle.

The development of the twolined chestnut borer depends on many factors, including tree vigor and local weather conditions. Therefore, larvae of varying sizes may be found under the bark during the growing season. In Wisconsin, 2 years are required to complete a life cycle for most of the borers.

Control

Twolined chestnut borers usually exist at low densities, often in storm-damaged, diseased, or otherwise weakened trees in woodlots and residential areas. Any additional stresses, such as root damage due to construction, landscaping or soil compaction, allow borer populations to increase. Prolonged or severe drought, or insect-caused defoliation can also significantly weaken trees, making them susceptible to borer attack.

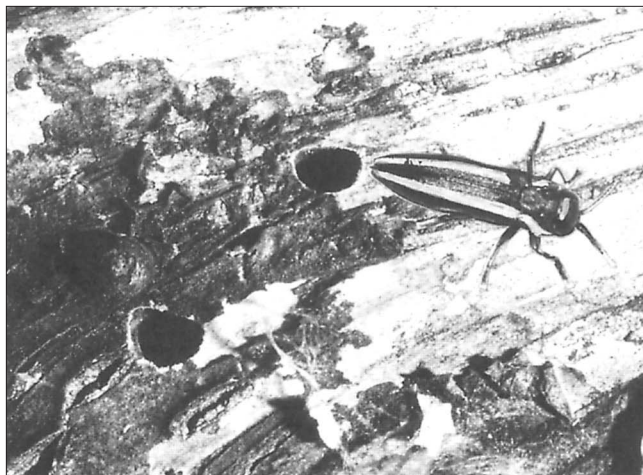


Figure 3. This adult twolined chestnut borer has emerged from a typical exit hole (enlarged to $2\frac{1}{2}$ times its actual size).

Prevention

Use extreme caution when building in oak woodlots; otherwise severe oak losses will likely occur (figure 1). When planning construction in oak woodlots, follow these precautions:

- (1) Use flagging tape or cord to rope off areas of potential damage; if possible, exclude all construction activity from these areas.
- (2) Avoid digging for basements and trenching for underground utilities in central areas of the root system—that is, within the tree’s drip line.
- (3) Avoid soil compaction by excluding heavy equipment from root system areas.
- (4) Do not change the soil level near the trunk.
- (5) Avoid changing the grade or the water drainage patterns because either may subject the root system to unusual flooding or drying patterns.
- (6) Avoid damaging the bark of the trees when using tools or heavy equipment.

Cultural

The most important preventative measures to take are: removing and disposing of infested wood prior to beetle emergence each spring (about May 15), and maintaining tree vigor. Remove all wood at least 3 inches in diameter that exhibits symptoms of borer attack, and destroy or use it before May 15. Securely cover any remaining wood from May 15 to July 15. A heavy plastic tarp held down with soil can keep the beetles from escaping. Leaving wood piles uncovered will allow reinfestation of adjacent trees by beetles coming from the woodpile. Once the woodpile has dried thoroughly, the beetles will not reinfest the area.

Fertilizing and watering oaks in the spring also can reduce borer invasion.

Chemical

In most situations, you should not treat borer-infested oaks with chemicals. Insecticides have not prevented borer attack except where thorough sanitation measures are also employed. In addition, special application equipment is needed to ensure proper application to the bark and the larger branches of mature oaks.

Insecticide use may be justified on select valuable trees as long as proper sanitation measures are used and steps are taken to ensure tree vigor. Consult a professional arborist to help you choose control measures for your situation.

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Authors: C.F. Koval is professor emeritus of entomology and M.F. Heimann, O.S.F., is distinguished outreach specialist of plant pathology College of Agricultural and Life Sciences, University of Wisconsin-Madison and University of Wisconsin-Extension, Cooperative Extension. Produced by Cooperative Extension Publications, University of Wisconsin-Extension.

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