



## The Plant Doctor's LANDSCAPE TIPS

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**Photo 1:** This oak tree is infested with the Two-lined Chestnut Borer (TLCB). Note brown foliage and overall decline. Photo credit: Dr. Robert Haack, U.S. Forest Service.



**Photo 2:** The TLCB is similar in shape and size to the Bronze Birch Borer and Emerald Ash Borer. Note the two lines on the abdomen of the insect, its namesake. Photo credit: Dr. Robert Haack, U.S. Forest Service.



**Photo 3:** The TLCB, EAB and Bronze Birch Borer are flat-headed, wood-boring beetles. Their exit holes (BBB on birch in this photo) are D-shaped due to the flat heads of the *Agrilus* species.

### TWO-LINED CHESTNUT BORER

#### INTRODUCTION:

The Two-lined Chestnut Borer (*Agrilus bilineatus*=TLCB) is a native insect to North America. It attacks stressed trees and contributes to decline and death of those trees (Photo 1). The primary hosts for the TLCB (Photo 2) are oaks, chestnuts and beech.

To put the TLCB in perspective, another native insect and relative of the TLCB is the Bronze Birch Borer (*Agrilus anxius*=BBB), an insect that attacks *Betula* species, especially introduced birch species such as European White Birch. Another relative of the TLCB is the introduced Emerald Ash Borer (*Agrilus planipennis*=EAB). All three insects are flat-headed, wood-boring beetles whose exit holes from trees are D-shaped (Photo 3). Obviously, our native oaks exhibit some tolerance to the TLCB. Yet, our native species of ash exhibit little resistance to the introduced EAB. Hence, it is easy to conclude that, through evolution (adaptation or whatever), native insects generally do not cause widespread destruction of their native host plants. Conversely, whenever a native insect encounters an introduced host plant or whenever an introduced insect encounters a native host plant, widespread destruction of host plants may occur.

The TLCB is undoubtedly a more common and significant problem in Michigan and the Midwest than many arborists and foresters realize.

#### SYMPTOMS AND INSECT CYCLE:

The TLCB typically attacks stressed trees. Stresses that favor attack by the insect include: excess moisture, construction damage, drought, compaction, soil/root disturbances, grade changes, excess fertilization, cultural practices that favor turf culture in landscapes rather than tree culture, defoliation from insects and diseases, etc. Occasionally in healthy trees, TLCB attack may be limited to broken or injured branches.

The life cycle of the TLCB is similar to the that of the EAB. Adults typically emerge in May and June and begin feeding on foliage (Photo 4). Subsequently, adults entertain romantic notions that lead to mating. The TLCB can detect stressed trees via various manners but especially from chemicals emanating from those trees. TLCB females lay eggs in rough bark areas of stressed host trees. Eggs hatch and tiny larvae bore through the bark to the inner bark tissues where they begin tunneling in a wandering manner, consuming the rich nutritious components of these plant tissues (xylem and phloem). Larvae feed from June through August, increasing in size and voraciousness. Larvae exhibit an enlarged, flat head when compared to the balance of their segmented body, reach approximately 1¼ inches, are white in color, and possess two spines at the tip of their abdomen (Photo 5). With some exceptions such as vigorous host health, egg laying late in the season or very cold conditions, the TLCB commonly completes its life cycle in the northern U.S in one year.

The first symptoms of TLCB attack are usually evident in mid-July. Because



**Photo 4:** When adult TLCB emerge, they begin feeding on its host leaves for nourishment. Photo credit: Dr. Robert Haack, US Forest Service.



**Photo 5 (left):** Larvae of TLCB are white, measure approximately 1 ¼ inches when mature and exhibit two spines at the tip of the abdomen. Photo credit: Dr. Robert Haack, US Forest Service.



**Photo 6:** An upscale mall was constructed around this 300+ year old burr oak. Among many stresses contributing to the decline of the tree, the grade was changed on three sides and resulted in frequent flooding of the area after rainstorms. The TLCB attacked the tree and assisted in its ultimate decline and death (see Photo 7).



**Photo 7:** The old burr oak in Photo 6 was totally colonized by the TLCB. These three D-shaped exit holes were readily visible on the trunk of the tree at person height. Because the upper branches of stressed trees are usually attacked first by the TLCB, the final assault of the trunk usually indicates the tree is well beyond salvage.



**Photo 8:** Armillaria root rot (white fan-like fungal mats) is often associated with trees attacked by the TLCB.

attacks begin in the upper branches, and due to destruction of the trees vascular system, the foliage becomes sparse and is stunted and discolored. Branch dieback follows. Foliage often remains attached to infested branches into the fall (Photo 1). Eventually the entire tree may be killed (Photos 6 & 7). Because of high populations of TLCB in the vicinity of the killed tree, the insect may begin attacking less stressed, healthier trees. In a forested situation or densely wooded residential site, an expanding pocket pattern of declining and dead trees may develop. Armillaria root rot is frequently associated with the decline caused by TLCB (Photo 8) and, perhaps, works in conjunction with the insect. The TLCB may be confused with oak wilt, Armillaria root rot, anthracnose and other stresses and decline factors. Thorough inspection and implementation of diagnostic procedures should assist in distinguishing between the various potential causes.

### TLCB MANAGEMENT:

Obviously, prevention is the best approach for TLCB management. Avoid any of the stresses (grade changes, injury, etc.) discussed above, that may result in attraction of the TLCB to host trees. In landscape situations, increasing the vigor of trees through moderate irrigation and fertilization may help to ward off attack by the TLCB. Trees with abundant TLCB should be destroyed by burning, burial or removal off-site; this procedure will hopefully reduce TLCB populations and subsequent attack of nearby trees.

In some instances, particularly with valuable landscape trees, temporary chemical treatments may be adopted to help trees recover from environmental, cultural or biological stresses. Similar treatments employed for EAB treatments may be employed such as trunk and foliar sprays, trunk injections and soil treatments. When using chemicals for the treatment of TLCB, be sure to follow label directions. 📄

For more information, please feel free to email David Roberts at [robertsd@msu.edu](mailto:robertsd@msu.edu) or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

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