

# Oak splendor beetle *Agrilus biguttatus*

The oak splendor beetle bores into oaks and is an exotic organism of concern especially to Michigan because it is a close relative of emerald ash borer that has devastated Michigan's ash trees. Like emerald ash borer, oak splendor beetle is difficult to monitor and control. An establishment and spread of this insect could jeopardize Michigan's oak forests, domestic and foreign forest product industries and the nursery trade.

[Michigan risk maps for exotic plant pests.](#)

## Other common names

oak buprestid beetle, two spotted oak borer

## Systematic position

Insecta > Coleoptera > Buprestidae > *Agrilus biguttatus* (Fabricius)

## Global distribution

Europe, Middle East, Siberia, and Northern Africa.

## Quarantine status

This insect is listed as an exotic organism of high invasive risk to the United States (USDA-APHIS 2008).

## Plant hosts

Oak (*Quercus*) is the main host. Chestnut (*Castanea*) and beech (*Fagus*) are also susceptible.

## Biology

Female beetles deposit clusters of 5-6 eggs in bark crevices of the host tree. Larvae feed on the inner bark and sapwood creating zigzag-shaped galleries up to 155 cm long. Pupation occurs in the bark. Both larval and pupal stages overwinter. Adults emerge in mid-spring, leaving D-shaped exit holes on the bark surface. Shortly after emergence, adults feed on host tree leaves for reproductive maturation. Adults are strong flyers and remain active from May to July. The larval feeding can girdle the host tree resulting in dieback, thinned crowns and mortality in heavily infested trees. Typically one generation develops over a two-year period.

## Identification

- Adult: 8-13 mm long; body metallic green and slender; there are several white spots, two of them are on the interior edge of wing covers.
- Larva: Up to 40 mm long; creamy white, legless grub; first thoracic segment (just behind head) wider than other



Adult. Note two white spots on the inside edges of the wing cover (Photo: M. Zubrik, Forest Research Institute - Slovakia, Bugwood.org)



Mature larva. (Photo: L.I Nageleisen, Département de la Santé des Forêts, Bugwood.org)



Pupae. (Photo: L. Nageleisen, Département de la Santé des Forêts, Bugwood.org)

body segments; two horn-like projections on the last abdominal segment.

- Pupa: White; found in chambers within the bark.

Genus *Agrilus* is well represented in North America by approximately 180 native species (Nelson et al. 2008).

Zigzag-shaped larval galleries.  
(Photo: L.Nageleisen,  
Département de la Santé des  
Forêts, Bugwood.org)



older oaks (30-40 cm diameter) and sun-exposed south side of the trees (CFIA 2007). Sampling for oak splendor beetle is difficult (no effective attractants and trapping methods available) and damage symptoms develop slowly (Hilszczański and Sierpinski 2006).

### Economic and environmental significance to Michigan

Concerns regarding potential introductions of oak splendor beetle are great for Michigan because of the closely related emerald ash borer (*Agrilus planipennis*) that has devastated ash tree plantings in Michigan. Michigan is predicted to provide suitable conditions for establishment of this exotic beetle in both natural (deciduous and mixed forests) and urban (ornamental trees) environments (Davis et al 2005). Control measures could be costly and ineffective due to the cryptic nature of the beetle's life cycle. Establishment and spread of this insect could jeopardize Michigan's oak forests, domestic and foreign forest product industries, and nursery trade (Davis et al. 2005).

### Signs of infestation

- Zigzag, frass-filled larval galleries up to 155 mm long within inner bark.
- Dark cracks and discoloration of bark and cambial tissue may occur over the galleries.
- Twig and branch dieback, development of epicormic shoots, thinned crowns and tree mortality.
- D-shaped exit holes (2.5-4 by 2-3 mm) on the bark surface created by emerging adults.
- Woodpecker activity (Hilszczański and Sierpinski 2006).

### Management notes

The beetle often attacks stressed or recently downed trees and stumps. It preferentially oviposits on larger and

### Likely pathways of entry in Michigan

Wood products and packing materials with attached bark are likely route of entry.

There have been no interceptions recorded for this beetle at U.S. ports of entry. However, *Agrilus* spp. have been intercepted 38 times between 1985 and 2000 and at least six exotic *Agrilus* spp., including emerald ash borer, have become established in the United States. The majority of interceptions were associated with wooden packing materials (dunnage, crating) (Ciesla 2003).

\*\*\*If you find something suspicious on a susceptible host plant, please contact MSU Diagnostic Services (517-355-4536), your county extension office, or the Michigan Department of Agriculture (1-800-292-3939).\*\*\*

### References

- CFIA. 2007. *Agrilus biguttatus* (Fabricius) – two spotted oak borer. Canadian Food Inspection Agency. (<http://www.inspection.gc.ca/english/plaveg/pestrava/agrbig/tech/agrbige.shtml>)
- Ciesla, W. M. *Agrilus biguttatus*. EXFOR database. (<http://spfnc.fs.fed.us/exfor/data/pestreports.cfm?langdisplay=english&pestidval=154>)
- Davis, E. E., S. French, and R. C. Venette. 2005. Mini risk assessment: metallic beetle: *Ariglus biguttatus* Fabricius [Coleoptera: Buprestidae]. ([http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/pest\\_detection/downloads/prabiguttatuspra.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/downloads/prabiguttatuspra.pdf))
- Hilszczański, J. and A. Sierpinski. 2006. *Agrilus* spp. the main factor of oak decline in Poland. ([http://bfw.ac.at/400/iufro\\_workshop/proceedings/121-125\\_B5\\_Jacek%20Hilszczanski\\_Andrzej%20Sierpinski\\_paper.pdf](http://bfw.ac.at/400/iufro_workshop/proceedings/121-125_B5_Jacek%20Hilszczanski_Andrzej%20Sierpinski_paper.pdf))
- LaForest, J. 2009. *Agrilus biguttatus*. Center for Invasive Speceis and Ecosystem Health, University of Georgia. ([http://wiki.bugwood.org/Agrilus\\_biguttatus](http://wiki.bugwood.org/Agrilus_biguttatus))
- Moraal, L. G. and J. Hilszczanski. 2000. The oak buprestid beetle, *Agrilus biguttatus* (F.) (Col., Buprestidae), a recent factor in oak decline in Europe. Anzeiger für Schädlingkunde. (<http://www.springerlink.com/content/hg0778jq10628r25/fulltext.pdf>)
- Nelson, G. H., G. C. Walters, R. D. Haines, and C. L. Bellamy. 2008 A catalog and bibliography of the Buprestoidea of America north of Mexico, Coleopterists Society, special publication No. 4.
- USDA-APHIS. 2008. Pests of national concern for fiscal year 2009. ([http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/pest\\_detection/downloads/survey/survey-2009/Appendix-G.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/downloads/survey/survey-2009/Appendix-G.pdf))

February 2010.