

European Oak Bark Beetle

Scolytus intricatus



European Oak Bark Beetle

- Small wood boring pest of oak trees.
- Native to Europe, North Africa, and the Near East.
- Other common names: bark beetle, oak bark beetle.
- A target pest on the FY2011 AHP Prioritized Pest List.
- A pest on the CAPS Priority Pest List for 2016 for Oak Commodities.



The European oak bark beetle is a small wood boring pest of oak trees. It is native to Europe, North Africa, and the Near East. Some international common names include the bark beetles and the oak bark beetle. Due to its annual impact on oak populations it is a target pest on the FY2011 AHP Prioritized Pest List as well as the CAPS Priority Pest List for 2016 for Oak Commodities.

Information sources: 1, 2, 3, 4

Global Distribution of the European Oak Bark Beetle

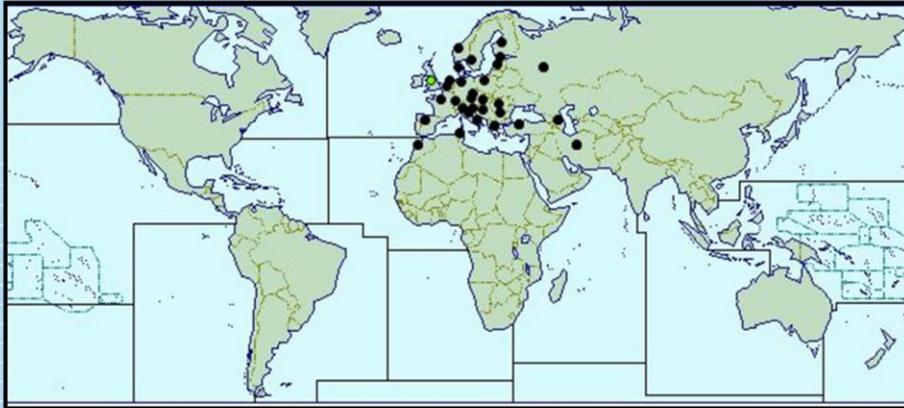


Image credits: <http://www.cabi.org/isc/datasheet/49203>

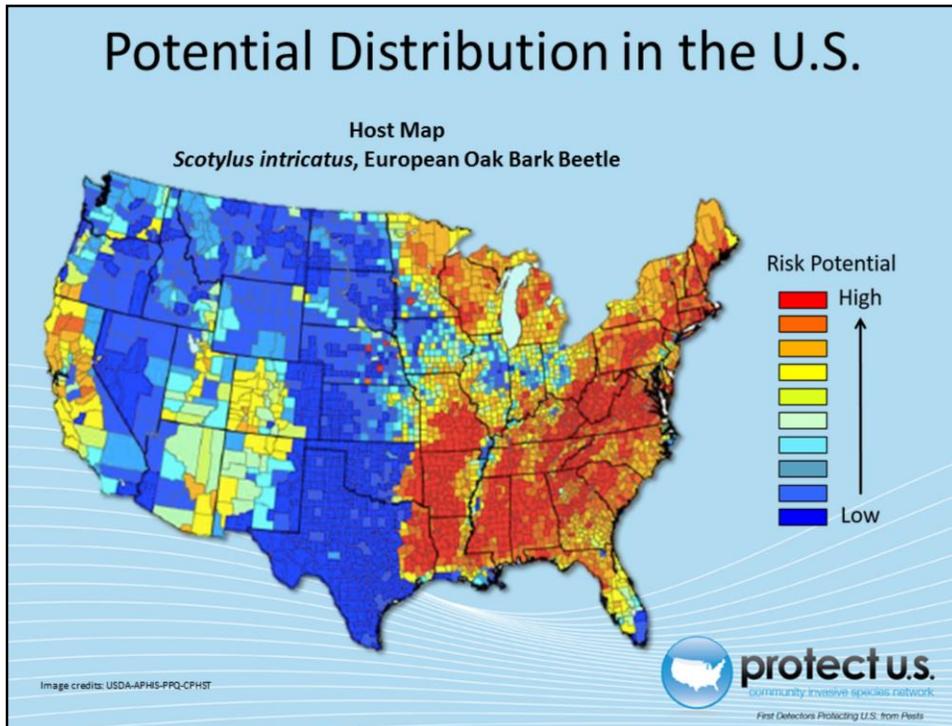


The European Oak Bark Beetle is primarily a pest in Europe, North Africa and the Near East. It has been documented in all of the following countries:

Azerbaijan, Iran, Turkey, Morocco, Tunisia, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Luxembourg, Montenegro, Netherlands, Norway, Poland, Romania, Russian, Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, England and Wales, Yugoslavia (former)

Information sources: 2

Potential Distribution in the U.S.



The European Oak Bark Beetle is not known to occur in the United States. The map depicts the availability of preferred hosts in the United States. The red shows a high density of preferred hosts while the blue corresponds with a low density of these hosts. The higher density of hosts predicts a higher risk for the establishment of this pest in the United States. The eastern U.S. and some parts of the West coast are at a much higher risk. If established, this pest could be detrimental to oaks in the United States.

Information sources: 2

Pest of Oaks and Other Trees



Image credits: oak (*Quercus* spp.) L. - Karan A. Rawlins, University of Georgia - Bugwood.org, #5408630; sessile oak (*Quercus petraea*) (Mattuschka) Liebl. - Robert Vidék, Doronicum Kft. - Bugwood.org, #5395787; English oak (*Quercus robur*) L. - Haruta Ovidiu, University of Oradea - Bugwood.org, #2168001



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The European oak bark beetle is a major pest of oak trees. The pest has also been found on other trees but it prefers oak hosts.

Major hosts:

- Castanea sativa* (Sweet chestnut),
- Corylus colurna*,
- Quercus* spp. (Oak),
- Quercus coccifera* (Kermes oak),
- Quercus dalechampii* (Dalechamp's oak),
- Quercus ilex* (Holly oak),
- Quercus petraea* (Durmast oak),
- Quercus robur* (Common oak)

Other hosts:

- Aesculus* spp. (Buckeye),
- Aesculus hippocastanum* (Horse chestnut),
- Ainus glutinosa* (European alder),
- Betula* spp. (Birch),
- Betula celtiberica* (Iberian white birch),
- Betula pendula* (Common silver birch),
- Betula pubescens* (Downy birch),
- Betula verrucosa* (European white birch),
- Carpinus* spp. (Hornbeam),
- Carpinus betulus* (European hornbeam),
- Castanea* spp. (Chestnut),
- Castanea vesca* (Sweet chestnut),
- Corylus* spp. (Hazelnut),
- Fagus* spp. (Beech),
- Fagus moesiaca*,
- Fagus orientalis* (Oriental beech),
- Fagus sylvatica* (Common beech),
- Ostrya* spp. (Hop-hornbeam),
- Ostrya carpinifolia* (Hop-hornbeam),
- Parrrotia persica* (Persian parrotia),
- Populus* spp. (Poplars),
- Populus alba* (White poplar),
- Populus tremula* (European aspen),
- Quercus canariensis* (Algerian oak),
- Quercus castaneaefolia* (Chestnut-leaf oak),
- Quercus cerris* (European turkey oak),
- Quercus frainetto* (Italian oak),
- Quercus hartwissiana*,
- Quercus lusitanica* (Lusitanian oak),
- Quercus polycarpa*,
- Quercus prinus* var. *tomentosa*,
- Quercus pubescens* (Downy oak),
- Quercus pyrenaica* (Pyrenean oak),
- Quercus rubra* (Northern red oak),
- Quercus virgiliana* (Italian oak),
- Salix* spp. (Willow),
- Sorbus* spp. (Mountain Ash),
- Tilia cordata* (Small-leaf lime),
- Ulmus* spp. (Elms),
- Ulmus carpinifolia* (English elm),
- Ulmus laevis* (European white elm),
- Zelkova carpinifolia* (Caucasian zelkova)

Information sources: 1, 2

Damage



Image credits: European oak bark beetle (*Scolytus intricatus*) [Ratzeburg, 1837] - Gyorgy Csoka, Hungary Forest Research Institute - Bugwood.org, #1231198; European oak bark beetle (*Scolytus intricatus*) [Ratzeburg, 1837] - Jan Liska, Forestry and Game Management Research Institute - Bugwood.org, #2112029; European oak bark beetle (*Scolytus intricatus*) [Ratzeburg, 1837] - Petr Kapitola, Central Institute for Supervising and Testing in Agriculture - Bugwood.org, #4554035



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Visible damage can be noticed on infected hosts. Trees can exhibit general signs of decline such as dieback as well as symptoms associated with a fungal pathogen that European oak bark beetle can transmit. A unique sign is the small galleries created by feeding larvae in the host bark. Furthermore, sometimes exit holes are visible where adults left the inner tissues to search for another hosts. Also, this damage makes the tree more susceptible to secondary pest and pathogens.

Information Sources: 1

Disease Vector

- Fungi
 - *Ceratocystis piceae*
 - *Ophiostoma roboris*



Image credits: Ceratocystis wilts (Ceratocystis spp.) Ellis & Halst. - Andrej Kunca, National Forest Centre - Slovakia - Bugwood.org, #5379683



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The European oak bark beetle is a known vector of at least two different fungi, *Ceratocystis piceae* and *Ophiostoma roboris*. These fungi are associated with gradual oak decline. It is predicted that if the European oak bark beetle were to establish in the United States, it could potentially vector the oak wilt fungus *Ceratocystis fagacearum*.

Information sources: 1

Identification

- Adults
 - 2-3mm in length
 - Black body
 - Reddish brown elytra
 - Light brown antennae and legs
 - Pill shaped



Image credits: European oak bark beetle (*Scolytus intricatus*) (Ratzeburg, 1837) - Milan Zubrik, Forest Research Institute - Slovakia - Bugwood.org, #5378102 and 5378105



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Adults are smaller pill-shaped wood boring beetles on average and are between 2-3mm in length. The body is black with light brown antennae and legs. Also, the elytra or wing covers are reddish brown. European oak bark beetles look extremely similar to other *Scolytus* beetles present in the United States. Suspect samples should be sent forward for identification.

Information sources: 1, 4

Lookalikes - Adults



Scolytus multistriatus



Scolytus schevyrewi

Image credits: smaller European elm bark beetle (*Scolytus multistriatus*) (Marshall, 1802) - Pest and Diseases Image Library - Bugwood.org; #5463289; banded elm bark beetle (*Scolytus schevyrewi*) Semenov, 1902 - Pest and Diseases Image Library - Bugwood.org; #5463275



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Scolytus multistriatus and *S. schevyrewi* are both in the genus *Scolytus* and are both known to occur in the United States. These two lookalikes can vector Dutch elm disease. Moreover, the genus *Scolytus* consists of over 100 species with nearly a quarter present in North America. Many of these beetles look very similar and are difficult to distinguish without proper training. Since the beetles are very similar morphologically, a microscope is required for identification.

Information sources: 4

Identification

- Pupae
 - White
 - Wings folded above abdomen



Photograph of a closely related beetle pupa in the genus *Scolytus*.

Image credit: banded elm bark beetle (*Scolytus schweynewi*) Semenov, 1902 - Whitney Cranshaw, Colorado State University - Bugwood.org, #6382178



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Pupae are white and their wings can be seen visibly folded over their abdomen. Like many other related beetles, the European oak bark beetle pupae appear similar to the adults except without coloration. Pupation will occur in the outer bark or the outer sapwood of most hosts. The pupae of many species in the genus *Scolytus* look extremely similar so this life stage is not easily identified.

Information sources: 3

Identification

- Larvae
 - White
 - C-shaped
 - 4mm
 - Amber head
- Eggs
 - Pearly white
 - Oval
 - 1mm in length



Photograph of a closely related beetle larva in the genus *Scolytus*.

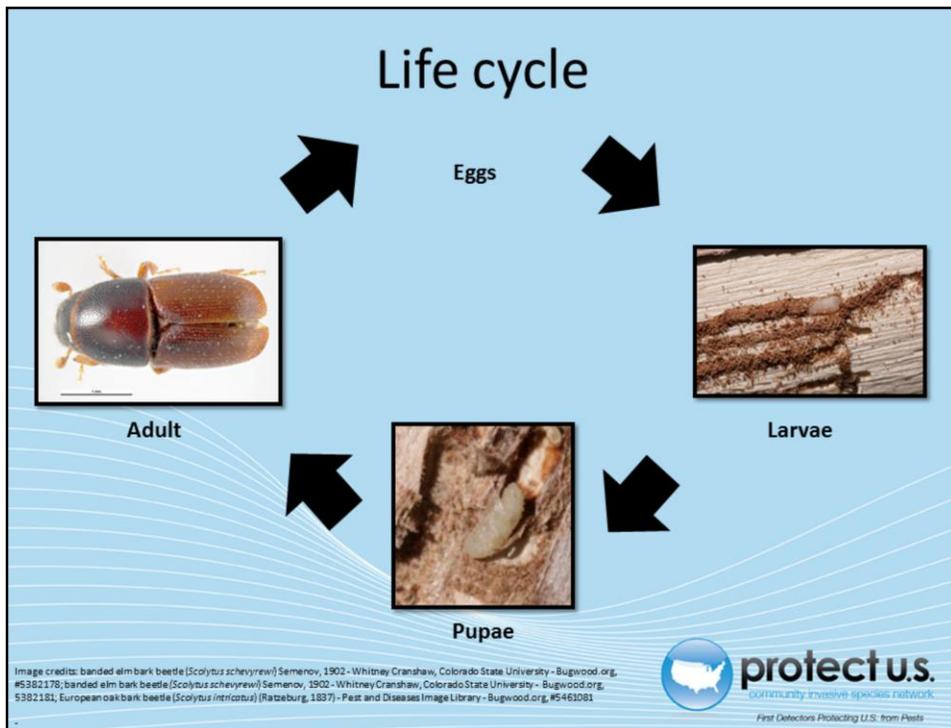
Image credits: banded elm bark beetle [*Scolytus schevyrewi*] Semenov, 1902 - Whitney Cranshaw, Colorado State University - Bugwood.org, 5382181



Larvae are white with an amber colored head. The larvae are C-shaped, legless, and can grow up to 4mm in length. The photograph included shows the galleries and a larva of a closely related beetle in the genus *Scolytus*. The larvae of all *Scolytus* are extremely similar and nearly impossible to identify. This stage is not a common method for identification. Larvae will complete 5 to 6 instars within the bark of host trees.

Eggs are pearly white and oval in shape. On average the eggs are 1mm in length. Eggs are individually deposited by adults on different sides of larval galleries in niches of 18-83 eggs. The egg galleries are straight and single armed approximately 1-3cm in length.

Information sources: 2, 3



Scolytus intricatus can have between 1 and 2 generations annually. All life stages can be found within the bark of the host but adults can leave to transfer hosts. Between May and September, adults are active laying eggs or in some cases, transferring hosts. New adults can fly to the tops of hosts and feed on new shoots although adults do not have to feed to survive. In England, adult emergence occurs between mid-May and mid-July but this can vary with temperature. Male and female adults can construct egg galleries in the bark. The literature suggests that adults prefer weakened or dying trees for mating and egg laying. Oviposition can take up to 2 weeks. Eggs will hatch in up to 10-14 days. Larvae will then go through 5-6 instars while creating galleries in host tissues. Larvae can overwinter in the host as 3rd or 5th instars and sometimes, as pupae. Pupation will occur in the late fall or early spring (generation 1 or 2) within chambers in the sapwood depending.

Information sources: 1, 2, 3

Monitoring



- Visual surveying for:
 - Branch dieback
 - Thinning or wilting of foliage
 - Tree mortality
 - Larval galleries
 - Exit holes and boring dust

Image credits: visual tree inspection - Andrew Koeser, International Society of Arboriculture - Bugwood.org_#5375279



Monitoring for the European oak bark beetle is mostly done by aerial and ground surveying. In England, it is recommended to survey between mid-May and mid-July. It is best to look for signs of tree damage such as branch dieback, thinning or wilting of foliage, tree mortality, larval galleries, and exit holes or boring dust. This type of surveying is general and can help protect trees against other pests as well. At this time, a method of monitoring that uses pheromones has not yet been developed and visual surveying is the best way to protect hosts and identify this pest.

Information Sources: 1, 2, 3

Biological Control



Dendrosoter spp.



Spathius spp.

- Parasitoid wasps
 - *Cheiopachus quadrum*
 - *Dendrosoter protuberans*
 - *Ecphylus silesiacus*
 - *Entedon ergias*
 - *Spathius erythrocephalus*

Image credits: Braconid wasp (*Dendrosoter* spp.) Muesebeck - Gerald J. Lanhard, Louisiana State University - Bugwood.org, #0013089, Braconid wasp (*Spathius* spp.) Nees, 1818 - David Cappaert - Bugwood.org, #5389011



The European oak bark beetle has a large number of natural enemies that in the order Hymenoptera. Studies in Serbia concluded that the larvae have around 20 natural enemies that are parasitic wasps. *Cheiopachus quadrum*, *Dendrosoter protuberans*, *Ecphylus silesiacus*, *Entedon ergias*, and *Spathius erythrocephalus* are among the most influential for decreasing this pest's population levels. The remaining parasitoids are all in the families Braconidae, Eurytomidae, Pteromalidae, Eupelmidae and Eulophidae.

Information Sources: 2, 5

Cultural Control

- Removal of dead or damaged trees and debris
- Prevent damage to healthy oaks



Image credits: oak decline - Joseph OBrien, USDA Forest Service - Bugwood.org, #5035019



Cultural control can be useful in prevention of this pest as well as other pests. It is important to remove any dead or damaged trees and all debris that can be a potential breeding ground of the European oak bark beetle. Specifically, trees should be removed if they show any signs of oak decline. Furthermore, healthy oaks should be protected since weakened hosts are more susceptible to invasion.

Presently, there are no chemical controls listed in literature for the European oak bark beetle. Some research has produced inconclusive results. Therefore, chemical control is not an effective way to control for this pest.

Information Sources: 3

Suspect Sample Submissions

- Contact your State Department of Agriculture or University Cooperative Extension laboratory
 - <http://www.npdn.org/home>
- PPQ form 391, Specimens for Determination
 - https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf

The image shows a detailed form titled 'PPQ Form 391, Specimens for Determination'. It is a multi-section document with various fields for data entry, including checkboxes and dropdown menus. Key sections include:

- SECTION 1: GENERAL INFORMATION** - Fields for collector name, date, and location.
- SECTION 2: SPECIMEN INFORMATION** - Fields for specimen name, quantity, and collection method.
- SECTION 3: IDENTIFICATION** - Fields for pest name, host plant, and other identifying details.
- SECTION 4: ADDITIONAL INFORMATION** - Fields for collector contact information and other notes.

 The form is designed to be filled out by a collector and submitted to a laboratory for pest identification.

An example of a PPQ form for sample submissions

Image credits: https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf



If a suspect pest has been located in the United States, a sample should be submitted for proper identification. Contact your local diagnostic lab to ship in a sample for identification. Information regarding your local diagnostic lab is available at National Plant Diagnostic Network (NPDN) website. The diagnostic lab information and available contacts are divided by state.

<http://www.npdn.org/home>

The sample specimen should be submitted along with accompanying documentation using the PPQ form 391.

https://www.aphis.usda.gov/library/forms/pdf/PPQ_Form_391.pdf

Your local diagnostic lab is part of your local cooperative extension service or your state department of agriculture. Your local lab will also have a specific form. All local labs may not be a member of NPDN. However, all labs should report new pest and pathogen detections to local regulatory officials.

Communications



- Contact your State Plant Health Director
 - https://www.aphis.usda.gov/aphis/ourfocus/planthealth/ppq-program-overview/ct_sphd



- Contact your State Plant Regulatory Official
 - <http://nationalplantboard.org/membership/>

image credits: <http://www.usda.gov/wps/portal/usda/usdahome>; <http://nationalplantboard.org/>



Remember that new pest and pathogen records must be reported to your State Plant Health Director (SPHD) and your State Plant Regulatory Official (SPRO). The SPRO is a State Department of Agriculture Employee and the SPHD is a USDA-APHIS-PPQ employee.

The link to your SPRO is on the National Plant Board (NPB) website. It has an interactive map and when you click on your state it will take you to another page with contact information. The NPB is a cooperative organization that includes membership from all State Departments of Agriculture.

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Publication date: October 2016



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Educational Disclaimer and Citation

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- Citation: Pinkerton, Morgan and Amanda Hodges. 2016. European oak bark beetle – *Scolytus intricatus*. Accessed (add the date) – www.protectingusnow.org



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- United States Department of Agriculture, National Institute of Food and Agriculture (USDA NIFA)
- United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ)
- Cooperative Agriculture Pest Survey (CAPS) Program
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- Extension Disaster Education Network (EDEN)
- Center for Invasive Species and Ecosystem Health (Bugwood)
- National Plant Diagnostic Network (NPDN)
- U.S. Department of Homeland Security (DHS)
- U.S. Forest Service (USFS)



References

1. Anonymous. 2013. Exotic Wood Borer/Bark Beetle: *Scolytus intricatus* datasheet. Accessed 7/1/2016.
 - download.ceris.purdue.edu/file/1982
2. Anonymous. 2014. *Scolytus intricatus* (European oak bark beetle). Invasive Species Compendium. Accessed 7/1/2016.
 - <http://www.cabi.org/isc/datasheet/49203>
3. Anonymous. Plantwise Technical Factsheet: European oak bark beetle (*Scolytus intricatus*). Plantwise. Accessed 7/2/2016.
 - <http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=49203>
4. Benzel, J. S. 2015. Six-toothed Bark Beetle, *Scolytus intricatus* (Ratzeburg). Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 6 pp. Accessed 7/6/2016.
 - http://idtools.org/screeningaids/beetles/low/Scolytus_intrincatus_LoRes.pdf



References

5. Galko, J. and S. Pavlík. 2009. Parasitic wasps (Hymenoptera) of the European oak bark beetle larvae (*Scolytus intricatus* Ratz., Coleoptera: Scolytidae). *Lesnický Casopis*. 55 (1), 1.
 - <http://www.degruyter.com/view/j/forj.2009.55.issue-1/v10114-009-0001-8/v10114-009-0001-8.xml>

