

California Pest Rating Proposal

Orthotomicus erosus (Wollaston): Mediterranean pine engraver

Coleoptera: Curculionidae

Current Rating: B

Proposed Rating: C

Comment Period: 7/30/2020 – 9/13/2020

Initiating Event:

Orthotomicus erosus was first found in California (and the United States) in 2004 in the city of Fresno. Since then, it has spread to a total of 15 counties in the state. Because of this significant range expansion, the risk this pest poses to California should be re-assessed. Therefore, a pest rating proposal is needed.

History & Status:

Background: Adult *O. erosus* are approximately 2.7-3.5 mm long (Seybold, Penrose, and Graves, 2006).

The males initiate tunneling in aboveground portions of trees and are joined by females. The larvae feed on the phloem. An assortment of fungi are carried by the beetles and grow in the galleries. This beetle has from two to five generations per year across its range (Lee et al., 2005). Most reported hosts are pines, but other conifers are attacked as well. This beetle is usually reported to be associated with dead or injured trees (Tribe, 1992). However, it is reported to have killed pine trees in Israel and to have caused wilting and dieback of Aleppo pine (*Pinus halepensis*) in Croatia (Mendel and Halperin, 1982; Pernek et al., 2018). In the latter case, the authors suspected that drought led to the outbreak. In California, it has been found in cut logs, stumps, dead standing trees, and declining branches of native and exotic pine species, but there does not appear to be evidence that it has caused tree mortality in this state (Lee et al., 2005).

Worldwide Distribution: *Orthotomicus erosus* is native to the Mediterranean (Europe and northern Africa), the Middle East, and Central Asia. It may be native to China as well. It has been introduced to Chile, Uruguay, South Africa, and the United States (California, Nevada, Arizona, and Utah) (A. Graves, pers. comm.; Gómez and Martínez, 2013; Lee et al., 2005; Phillips et al., 2017; Tribe, 1992).

Official Control: *Orthotomicus erosus* is considered reportable by the USDA and a quarantine pest by Japan (Ministry of Agriculture, Forestry and Fisheries; U.S. regulated plant pest table)

California Distribution: *Orthotomicus erosus* has been found in 15 counties in California, from Sacramento County in the north to Orange County in the south (California Department of Food and Agriculture; S. Smith, pers. comm.).

California Interceptions: *Orthotomicus erosus* has not been intercepted in California.

The risk *Orthotomicus erosus* poses to California is evaluated below.

Consequences of Introduction:

- 1) **Climate/Host Interaction:** *Orthotomicus erosus* has already become widely established in California. It has been found in 15 counties. This is likely due to its polyphagous feeding habits and it being well suited for the climates present in California. Therefore, it receives a **High (3)** in this category.
 - Low (1) Not likely to establish in California; or likely to establish in very limited areas.
 - Medium (2) may be able to establish in a larger but limited part of California.
 - **High (3) likely to establish a widespread distribution in California.**
- 2) **Known Pest Host Range:** *Orthotomicus erosus* has been found infesting nine species of pines, including *Pinus halepensis*, *P. pinea*, *P. canariensis*, *P. radiata*, *P. sabiniana*, and *P. coulteri*, and also deodar cedar,

Cedrus deodora (California Forest Pest Council 2005 report; Seybold et al., 2006). It has been shown in laboratory experiments to be capable of completing development on additional species of pine (including *P. contorta murrayana*, *P. jeffreyi*, *P. lambertiana*, and *P. monophylla*) as well as species from several other genera of Pinaceae including *Picea*, *Larix*, and *Pseudotsuga* species (CA Forest Pest Council 2007 report; Walter et al., 2010). Taking into account the laboratory hosts, it receives a **Medium (2)** in this category.

– Low (1) has a very limited host range.

– **Medium (2) has a moderate host range.**

– High (3) has a wide host range.

3) **Pest Reproductive and Dispersal Potential:** *Orthotomicus erosus* was found to be capable of flying at least six miles in recapture experiments. It can be moved with wood. It was the second most commonly intercepted scolytine at United States ports of entry from 1985 to 2000 (probably mostly in wood packing) (Haack, 2006) and Seybold, Penrose, and Graves (2006) found it in logs at green waste facilities. Therefore, it receives a **Medium (2)** in this category.

– Low (1) does not have high reproductive or dispersal potential.

– **Medium (2) has either high reproductive or dispersal potential.**

– High (3) has both high reproduction and dispersal potential.

4) **Economic Impact.** *Orthotomicus erosus* vectors the bluestain fungus *Ophiostoma ips* in California and elsewhere (Kim (2010). This type of fungus can impact the value of wood. *Orthotomicus erosus* is considered a threat to the pine plantations of the southeastern United States and it is reportable. However, it seems unlikely that this would impact trade in any California products. Therefore, it receives a **Low (1)** in this category.

Economic Impact: E

A. The pest could lower crop yield.

- B. The pest could lower crop value (includes increasing crop production costs).
- C. The pest could trigger the loss of markets (includes quarantines).
- D. The pest could negatively change normal cultural practices.
- E. The pest can vector, or is vectored, by another pestiferous organism.**
- F. The organism is injurious or poisonous to agriculturally important animals.
- G. The organism can interfere with the delivery or supply of water for agricultural uses.

Economic Impact Score: Low

- **Low (1) causes 0 or 1 of these impacts.**
- Medium (2) causes 2 of these impacts.
- High (3) causes 3 or more of these impacts.

- 5) **Environmental Impact.** *Orthotomicus erosus* is reported to colonize the endangered Monterey pine (*Pinus radiata*). It has attacked multiple species of exotic pines planted as landscape trees in the Central Valley of California. Therefore, *O. erosus* receives a **High (3)** in this category.

Evaluate the environmental impact of the pest on California using the criteria below.

Environmental Impact: B, E

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.
- B. The pest could directly affect threatened or endangered species.**
- C. The pest could impact threatened or endangered species by disrupting critical habitats.
- D. The pest could trigger additional official or private treatment programs.
- E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.**

Environmental Impact Score: High (3)

- Low (1) causes none of the above to occur.
- Medium (2) causes one of the above to occur.
- **High (3) causes two or more of the above to occur.**

Consequences of Introduction to California for *Orthotomicus erosus*: Medium (11)

Add up the total score and include it here.

- Low = 5-8 points
- Medium = 9-12 points**
- High = 13-15 points

6) **Post Entry Distribution and Survey Information:** *Orthotomicus erosus* is reported from 15 counties in California. It receives a **High (-3)** in this category.

- Not established (0) Pest never detected in California, or known only from incursions.
- Low (-1) Pest has a localized distribution in California, or is established in one suitable climate/host area (region).
- Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.
- High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.**

Final Score:

7) The final score is the consequences of introduction score minus the post entry distribution and survey information score: Low (8)

Uncertainty:

Orthotomicus erosus may continue to spread in California (and the rest of the United States) and it could have greater impacts in new habitats, for example, in the Sierra Nevada mountains or foothills. Climate

change could result in a higher frequency of drought stress in pine trees, and this could lead to outbreaks of *O. erosus* and greater impact to forests and tree plantings.

Conclusion and Rating Justification:

Orthotomicus erosus has been known to be in California for at least 16 years and it has so far spread to 15 counties. Its initial discovery caused concern for pine trees in the state. However, it does not appear to be having a significant impact on trees in this state and it is already widespread here. For these reasons, a “C” rating is justified.

References:

Calflora. Accessed June 29, 2020:
<https://www.calflora.org/>

California Department of Food and Agriculture. Pest and damage record database. Accessed June 29, 2020:
<https://pdr.cdfa.ca.gov/PDR/pdrmainmenu.aspx>

California Forest Pest Council 2005 report. Accessed July 7, 2020:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_045223.pdf

California Forest Pest Council 2007 report. Accessed July 7, 2020:
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_045753.pdf

Gómez, D. and Martínez, G. 2013. Bark beetles in pine tree plantations in Uruguay: First record of *Orthotomicus erosus* Wollaston (Coleoptera: Curculionidae: Scolytinae). *The Coleopterists Bulletin* 67:470-472.

Haack, R. 2006. Exotic bark- and wood-boring Coleoptera in the United States: Recent establishments and interceptions. *Canadian Journal of Forest Research* 36:269-288.

Kim, S. 2010. Ophiostomatales isolated from two European bark beetles, *Hylurgus ligniperda* and *Orthotomicus erosus*, in California. M.S. thesis. Iowa State University.

Lee, J. C., Smith, S. L., and Seybold, S. J. 2005. Pest alert: Mediterranean pine engraver. United States Department of Agriculture, Forest Service.



Mendel, Z. and Halperin, J. 1982. The biology and behavior of *Orthotomicus erosus* in Israel. *Phytoparasitica* 10:169-181.

Ministry of Agriculture, Forestry and Fisheries. Accessed July 6, 2020:

https://www.maff.go.jp/pps/j/law/houki/shorei/E_AnnexedTable1_from_20201111.html

Pernek, M., Lacković, N., Lukić, I., Zorić, N., and Matošević, D. 2018. Outbreak of *Orthotomicus erosus* (Coleoptera, Curculionidae) on Aleppo pine in the Mediterranean region in Croatia. SEEFOR 10:19-27.

Phillips, G., Malesky, D., Guyon II, J., and Knight, J. 2017. 2016 forest pest conditions in Nevada.

Accessed July 3, 2020:

<http://forestry.nv.gov/wp-content/uploads/2017/06/2016-NVCondReport-Final.pdf>

Seybold, S. J., Lee, J. C., Luxova, A., Hamud, S. M., Jiroš, P., and Penrose, R. L. 2006. Chemical ecology of bark beetles in California's urban forest. pp. 87-94 in Hoddle, M. S. and M. W. Johnson (eds.), Proceedings of the 5th Annual Meeting of the California Conference on Biological Control, Riverside, California, July 27-28, 2006.

Seybold, S. J., Penrose, R. L., and Graves, A. D. 2006. Chapter 21. Invasive Bark and Ambrosia Beetles in California Mediterranean Forest Ecosystems. pp. 583-662 in Paine, T. D. and F. Lieutier (eds.), Insects and Diseases of Mediterranean Forest Systems. Springer, New York, New York.

Tribe, G. D. 1992. Colonisation sites on *Pinus radiata* logs of the bark beetles, *Orthotomicus erosus*, *Hylastes angustatus* and *Hylurgus ligniperda* (Coleoptera Scolytidae). Journal of the Entomological Society of Southern Africa 55:77-84.

U.S. regulated plant pest table. Accessed July 6, 2020:

<https://www.aphis.usda.gov/aphis/ourfocus/planthealth/import-information/rppl/rppl-table>

Walter, A. J., Venette, R. C., and Kells, S. A. 2010. Acceptance and suitability of novel trees for *Orthotomicus erosus*, an exotic bark beetle in North America. Biological Invasions 12:1133-1144.

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***Comment Period: 7/30/2020 – 9/13/2020**

***NOTE:**

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at permits[@]cdfa.ca.gov.

Comment Format:

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

Example Comment:

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to “Climate/Host Interaction” here.]

- ❖ Posted comments will not be able to be viewed immediately.

- ❖ Comments may not be posted if they:

Contain inappropriate language which is not germane to the pest rating proposal;

Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;

Violates agency regulations prohibiting sexual harassment or other forms of discrimination;

Violates agency regulations prohibiting workplace violence, including threats.

- ❖ Comments may be edited prior to posting to ensure they are entirely germane.

- ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

Proposed Pest Rating: C