Screening Aid

Mediterranean Pine Engraver

*Orthotomicus erosus (*Wollaston*)*

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Version 5
18 June 2015

This CAPS (Cooperative Agricultural Pest Survey) screening aid produced for and distributed by:
USDA-APHIS-PPQ National Identification Services (NIS)
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The Mediterranean Pine Engraver, *Orthotomicus erosus* (Fig. 1) (Wollaston), is an important pest species in southern Europe. Members of this species infest and breed in pine (*Pinus*), but will also feed in spruce (*Picea*), Douglas fir (*Pseudotsuga*), and Larch (*Larix*). Adults and larvae feed in the cambium of tree branches damaging the tree by girdling the branches and spreading blue stain fungus (Figs. 2-5).

Fig. 1: *Orthotomicus erosus* on tree (photo by Louis-Michel Nageleisen, Département de la Santé des Forêts, Bugwood.org).

Orthotomicus erosus is a member of the Curculionidae (subfamily Scolytinae) which is comprised of weevils and bark beetles. The family is highly variable but almost all species share a distinct club on the end of their antennae made up of three sections. The subfamily Scolytinae, to which *O. erosus* belongs, consists of the bark beetles. In general, members of Scolytinae are small (<10mm long) pill shaped beetles of a reddish brown, black, or tan color. Some authors consider Scolytinae to be a distinct family (Scolytidae).

The tribe Ipini is a large and closely allied group of genera within the Scolytinae. Members of the tribe have an excavated elytral declivity flanked by a number of spines on each side. The genus *Orthotomicus* contains about a dozen species, three of which are native to North America. The remaining species occur in Eurasia. Members of the genus are distinguished by an obliquely truncate antennal club and a spined elytral declivity, with the last pair of spines being distinctly mesad of the lateral margin.

Fig. 2: *Orthotomicus erosus* galleries (photo by William M. Ciesla, Forest Health Management International, Bugwood.org).

Orthotomicus erosus was detected in Fresno, California in 2004 and has since infested ten counties in the southern Central Valley of California. No other state has reported a positive find. Non-targets often captured and misidentified as *O. erosus* include Nearctic members of the genus and tribe such as *O. caelatus*, *O. latidens*, and *Ips pini*. A quality high powered microscope is required to identify these beetles.

This aid is designed to assist in the sorting and screening *O. erosus* suspect adults collected in CAPS multi funnel traps in the continental United States. It covers basic Sorting of traps, Level 1 and Level 2 screening, all based on morphological characters. Basic knowledge of Coleoptera morphology is necessary to screen *O. erosus* suspects.

Orthotomicus erosus funnel traps should be sorted initially for the presence of beetles of the appropriate size color and shape. Traps containing beetles meeting all of the following requirements should be moved to Level 1 Screening (Page 3):

1. Beetles are less than 4mm (0.36 inches) long.

2. Beetles are pill-like in shape.

3. Beetles are black, reddish-brown, or tan colored.

Beetles meeting these requirements should be forwarded to Level 1 Screening.

Fig. 3: Tree attacked by *Orthotomicus erosus*. During a bark beetle attack trees will show little sign of damage other than a series of small bore holes. Often it is not apparent that bark beetles have infested a tree until after they have emerged from it (photo by William M. Ciesla, Forest Health Management International, Bugwood.org).

Fig. 4-5: *Orthotomicus erosus* in galleries infected with bluestain fungus. Many types of bark beetle spread this symbiotic fungus which aids in the destruction of the tree's cambium (photos by William M. Ciesla, Forest Health Management International, Bugwood.org)

Suspect adults should be pointed and properly labeled. Level 1 Screening is based on characteristics of the antennae, general dorsal surface, and elytral declivity. Specimens with these traits should be forwarded to Level 2 Screening.

Fig. 6: Antennae of *Ips* spp. Note the long scape and large three part club.

Antennae

Scolytids have relatively stout, geniculate, clubbed antennae. The clubs are made up of three antennomers and can be solid, annulated, or occasionally lamellate. The scape will always be well developed (Fig. 6).

General Dorsal Surface

Beetles in the tribe Ipini have the basal margins of their elytra unarmed and forming a straight line across the body (Fig. 7). The scutellum of tribe members is usually large and flat and the head is usually concealed at least partially by an enlarged pronotum.

Fig. 7: Base of elytra and scutellum of *Ips* spp. members of the Scolytinae should have a broad scutellum and the base of the elytra should be unarmed.

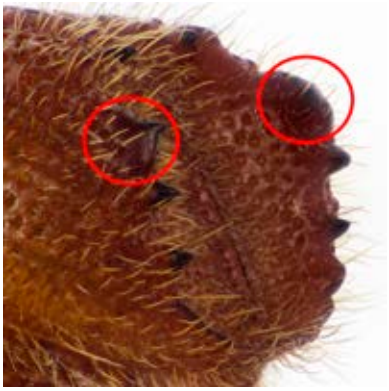
Elytral Declivity

The tribe Ipini (Figs. 9-10) is known for the multiple pairs of spines found around the beetle's elytral declivity (Fig. 8). The number of spines ranges from 1-7 on each elytron, depending on species. Some spines may be capitate.

Fig. 8: *Ips* spp. elytral declivity. Note the ring of spines and yellow hairs surrounding the declivity which is typical of the Ipini.

Figs. 9 and 10 (left): Dorsal and lateral views of the common North American species *Ips pini.* Note how the pronotum covers the head, the large wide scutellum and the excavated and armed elytral declivity.

Fig. 11 (above): Dorsal view of *Orthotomicus erosus.*



Figs. 12 (top) and 13 (bottom): lateral and posterolateral view of *Orthotomicus erosus* elytral declivity. In *O. erosus* suspects the declivity should be ringed by 8 spines (four on each side) with the second spine down from the top broad based and not capitate (circled).

Fig. 14: *Orthotomicus caelatus* declivity. Posterolateral view.

Fig. 15: *Orthotomicus latidens* declivity, posterolateral view.

While only three species of *Orthotomicus* are native to the United States, there are many native species that bear a close resemblance to *O. erosus* (Fig 11). This species shares many features with members of the genus *Ips* and some researchers consider the two genera to be synonymous (Fig. 19). *Orthotomicus erosus* members can be distinguished from native species (Figs. 17-20) through traits on the elytral declivity, antennae, and frons. They are relatively small in length (2.5-3.5 mm).

Fig. 16: *Ips pini* declivity, posterolateral view.

Declivity

Orthotomicus erosus has four pairs of spines on its declivity (Figs. 12-13), distinguishing it from *O. caelatus* which has only three pairs (Fig. 14). The second tooth from the top is the largest and is very wide with only a small point at the top. In *O. latidens* and *Ips pini,* the teeth are all capitate or conical and the third tooth from the top is the largest (Figs. 15-16).

Antennae

The sutures on the *Orthotomicus erosus* antennal club (Fig. 21) are procurved as in *Ips* (Fig. 23) rather than recurved like *O. caelatus* (Fig 22).

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*Orthotomicus erosus (*Wollaston*)*

Fig. 17: *Orthotomicus erosus.*

Fig. 18: *Orthotomicus caelatus.*

Fig. 19: *Ips pini.*

Fig. 20: *Orthotomicus latidens.*

Fig. 21: *Orthotomicus erosus* antenna.

Fig. 22: *Orthotomicus caelatus* antenna.

Fig. 23: *Ips pini* antenna.

Suspect *Orthotomicus erosus* specimens (scolytids with a depressed elytral declivity ringed by four spines on each side with the second spine from the top being the largest and broad based, and with procurved antennae) should be sent forward for identification. Specimens must be labeled and carefully packed to avoid damage during shipping.

Key to Sort and Screen *Orthotomicus erosus* Suspects in the United States

1. Beetles approximately 2-4 mm long; pill shaped and with black; brown, or tan coloration..... 2
1'. Beetles larger or smaller than 2-4 mm long; not pill shaped; or color not a shade of black, brown, or tan..... Not *O. erosus*

2. Antennae geniculate with a large club made up of three segments on the end (Fig. 6); basal margins of elytra unarmed and forming a straight transverse line across the body (Fig. 7); scutellum large and flat; head usually covered by pronotum; elytral declivity surrounded by multiple pairs of spines (Fig. 8)..... 3
2'. Antennae not geniculate or without a large club made up of three segments on the end; basal margins of elytra armed with ridge or forming strongly procurved ;scutellum small or absent; head may or may not be covered by pronotum; elytral declivity unarmed..... Not *O. erosus*

3. Each elytron armed with four spines the second of which is the largest and is broad at the base (Figs. 12-13); sutures on antennal club procurved (Fig. 21)..... ***O. erosus suspect***
3'. Each elytron not armed with exactly four spines, or if armed with four spines the second of which is either not the largest or is capitate, or broad at the base (Figs. 14-16); antennal club sutures procurved or recurved (Figs. 22-23). ..... Not *O. erosus*

Citation

Benzel, J. S. 2015. Screening aid: Mediterranean Pine Engraver, *Orthotomicus erosus* (Wollaston). Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 6 pp.

References for more information on *O. erosus* and non-targets

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Acknowledgments

Funding for this project was provided to J. S. Benzel through section 10201 of the FY2014 Farm Bill. I would like thank Terrence Walters (USDA-APHIS-PPQ-S&T ITP) and USDA-APHIS-PPQ National Identification Services for support of this work and access to imaging equipment. Boris Kondratieff, Donald Bright, and Todd Gilligan (Colorado State University) provided advice on species identification, image editing, and screening aid formatting.