California Forest Pest Council
Fostering education on the pests of California's forests since 1951

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Upcoming Events - Save the Date!

September 20-21: UC Merced Symposium, **Climate Change & Sierra Forests**, Merced, CA

September 26-28: California Urban Forest Council, **2019 Urban Forests Conference**, San Luis Obispo, CA

October 30 - November 3: Society of American Foresters, **SAF National Convention**, Louisville, Kentucky

November 13-14: California Forest Pest Council, CFPC Annual Meeting, Davis, CA

The Goldspotted Oak Borer (GSOB) is Spreading in Southern California

Fig 1a: Gold Spotted Oak Borer adults, Female (top) and Male (bottom).
Fig 1b: Closeup of elytron showing golden scales that form the spots.

Goldspotted oak borer (GSOB; Agrilus auroguattatus) was recently detected in the Big Bear area of San Bernardino in Sugarloaf and other nearby communities. This is the SECOND detection in the County. The new detection is significant since GSOB is a highly destructive invasive species that is devastating red oak forests further south in San Diego, Riverside, Orange, Los Angeles and parts of San Bernardino Counties. New infestations are initiated by GSOB infested oak firewood being brought into an uninfested area unknowingly.
The life history of GSOB allows it to be efficiently spread through the movement of firewood and any other wood products when the bark is left intact **(Coleman & Seybold, 2016)**. GSOB larvae kill trees by tunneling in the cambium and phloem, cutting off the of photosynthate and starving the tree. GSOB is easily spread in firewood because the late instar larvae and prepupae are located in the inner bark. The adults emerge from May - September, with the majority active from late June - early July. After emergence females feed on foliage for a short time prior to laying eggs.

GSOB attacks primarily large red oaks species ≥18" in diameter. In California GSOB impacts coast live oak (Quercus agrifolia) and California black oak (Q. kelloggii). GSOB is native to southeastern Arizona, southern New Mexico, southwestern Texas and northern Mexico which coincides with its primary host, Emory oak (Q. emoryi).

Adults have a background coloration of dark metallic purple with six gold spots on the elytra, (Fig. 1a). When viewed with magnification the spots are revealed as clusters of narrow scale like setae (Fig. 1b). Agrilus spp. larvae are white, legless, and are widest just behind the head capsule. First instar larvae are ˂0.05" in length and final instar larvae are 0.8" in length (fig. 2). If large numbers of larvae fitting this description are found under the bark of trunks or branches ≥8" in diameter of host species, they are most likely GSOB.

Symptoms of GSOB attack develop slowly and take approximately one year to become evident following attack. **Hishinuma et. al (2011) have published a field identification guide to evaluate the severity of**

GSOB infestation. The most definitive evidence are ~2.5mm wide D-shaped exit holes on the bole of the tree produced by emerging adults after one year of infestation (Fig. 3). Other species of Agrilus attack branches ≤ 7" in diameter and produce similar exit holes that can be confused with GSOB. Less definitive symptoms include twig dieback and crown thinning, which usually develops from top to bottom, but there are many other potential causes for these symptoms. Woodpeckers feeding on larvae leave distinctive red patches on the bark.

The **GSOB Zone Of Infestation (ZOI)** in California is periodically updated and **published online.** The potential for spread northward in California has also been assessed (**Coleman et al. 2017**). The Coastal Range north to southern Oregon and the foothills of the Sierra Nevada, and interior live oak (Q. wislizenii) and Shreve oak (Q. parvula) are most at risk.

Management options are reviewed in **Coleman et al. 2017**. Moving oak wood with the bark on is the primary dispersal route for GSOB, and firewood is the most common commercial wood of this type. Mechanical management options include chipping to ≤3", containment/solarization of wood and destroying the bark. It must be stressed that just removing infested bark will have little impact on GSOB emergence rates; the bark must be chipped to ≤3".

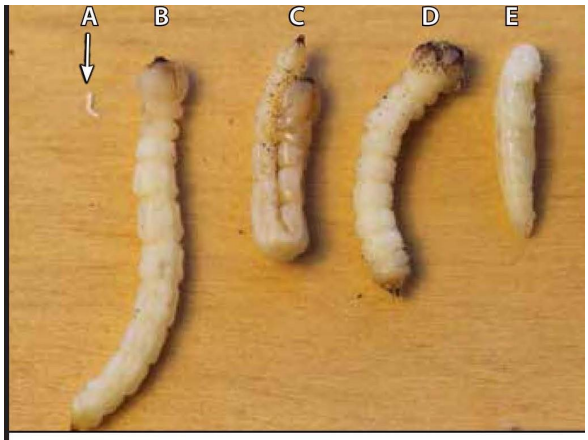

Fig. 2: A) First instar larva, B) Fourth (final) instar larva C) Prepupa, D) Constricted prepupa, E) Pupa.


Fig. 3: GSOB D-shaped exit hole.

Solarizing with black or clear plastic DOES NOT kill developing GSOB. Insecticidal management includes contact and systemic application.

For more information please visit **GSOB.org**

Further Reading

- Coleman, Tom et al. 2017. "Goldspotted Oak Borer", **Forest Insect & Disease Leaflet 183** .
- Coleman, Tom & Seybold, Steve. 2016. " **Goldspotted Oak Borer in California: Invasion History, Biology, Impact, Management, and Implications for Mediterranean Forests Worldwide**" Insects and Diseases of Mediterranean Forest System, Timothy Paine & Francois Lieutier: Switzerland, Springer, pgs. 663-697.

Hishinuma, Stacy et al. 2011. Goldspotted Oak Borer: Field Identification Guide. USDA- Forest Service, **http://ipm.ucanr.edu/PDF/MISC/GSOB_field-identification-guide.pdf**

Tree Mortality and Future Wildfires

A consortium of scientists led by UC Berkeley professor Scott Stephens has published a new overview of

the relationship between California's massive tree mortality and future wildfire-read it here: **Drought, Tree Mortality, and Wildfire in Forests Adapted to Frequent Fire.**

The group's findings suggest that in at least some California forest types, high levels of bark beetle-caused mortality can contribute to increased severity of subsequent wildfires. The paper provides some suggestions on post-mortality management of beetle-killed stands, but it also directs attention to the need for proactive management of overly dense green stands to help prevent large-scale mortality like that seen in the southern Sierra over the last decade.

Newsletter feedback and ideas are welcome. Please submit comments to **caforestpestcouncil@gmail.com**.

When buying firewood for camping or home heating this fall, remember to buy wood sourced local to where you will be using it, helping to minimize the spread of pests and diseases - **Buy It Where You Burn It**. For a list of local firewood dealers, go to **firewoodscout.org**.

Sincerely,

The California Forest Pest Council