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A Field Guide to Insects and Diseases of California Oaks

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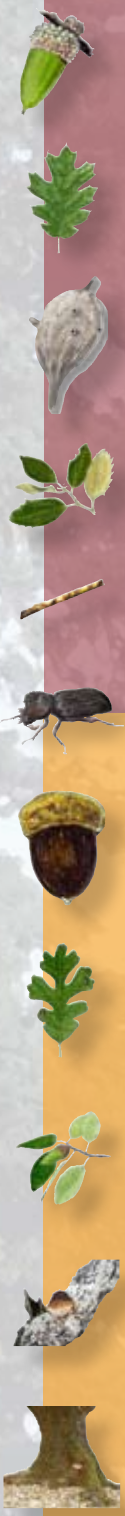

Addendum 1: Sept 2011

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Goldspotted oak borer

Agrilus auroguttatus (Buprestidae)

Distribution/Hosts

Agrilus auroguttatus, the goldspotted oak borer (GSOB), appears to be native to southern Arizona and California Baja Sur, Mexico. This species is similar to *A. coxalis*, which ranges from central Mexico to Guatemala. The two species were previously combined under the name *A. coxalis*, but are now considered distinct species. GSOB was apparently introduced into California in the vicinity of Descanso (San Diego County) before 2002. It is likely that GSOB was transported to the area in infested firewood. As of 2011, GSOB had only been detected in eastern San Diego County south of Lake Henshaw, with one outlying coastal detection near La Jolla. Based on its distribution in Arizona, it appears that GSOB could become much more widely distributed in California. In California, GSOB primarily attacks coast live, California black, and canyon live oak, but has also been found on Engelmann oak. Hosts in Arizona include emory (*Q. emoryi*) and silverleaf oak (*Q. hypoleucoides*).

Symptoms

The first visible symptoms of attack are D-shaped exit holes (about 3 mm wide) in areas where adult GSOB beetles have emerged (*fig. 148*). When the infestation level increases and internal injury becomes more extensive, fluid begins to ooze from infested areas. The ooze is initially light

Figure 148. D-shaped exit hole of *Agrilus auroguttatus* on coast live oak.

Figure 149. Coast live oak with bleeding and woodpecker chipping associated with GSOB infestation.

colored and watery, but can become dark amber to brownish black and viscous, and stains the bark surface (*fig. 149*). In coast live oak, and sometimes in black oak, woodpeckers searching for GSOB larvae and pupae remove chips of outer bark and may expose tunnels beneath the bark surface (*fig. 149*). Large-diameter trees are commonly attacked, and may develop high densities of exit holes and oozing spots. GSOB generally does not infest stems less than 12.5 cm in diameter.

Figure 150. Bark of this coast live oak has been cut away to reveal dark stained GSOB galleries causing this watery canker. A single larva bent in hairpin shape is visible to left. Photo Kim Camilli, CDF.

Cutting away the outer bark in infested areas reveals the larval galleries (*fig. 150*). The galleries appear as dark winding tunnels up to 4 mm wide that are packed with dark, granular frass. Galleries are most extensive in the cambium area, the interface between the live bark (phloem) and underlying sapwood (*fig. 150*). Galleries are initially

surrounded by healthy tissue, but dark, water-soaked cankers later develop around heavily-infested areas. Dark-colored flattened cavities eventually develop beneath the bark surface in association with large GSOB larval galleries. These cavities, which may have host callus tissue around the edges, are commonly filled with watery fluid that flows out when the outer bark is chipped. When affected bark dies and falls off, old galleries are visible as scoring of the exposed outer sapwood.

Heavily infested trees commonly develop canopy thinning and dieback. This is first visible as defoliation and dieback of small twigs and branches in the upper canopy. Progressive canopy defoliation, thinning, and dieback may occur over several years, although spring growth flushes may still occur. In final stages of tree decline, the remaining leaves of coast live and canyon live oak turn brown and remain attached (*fig. 151*). In California black oak, leaves turn brown and drop early before tree death. Adult beetles also feed on oak foliage, making small notches along the leaf edges, but this feeding is inconsequential.

Figure 151. Coast live oak (right, between pines) killed by GSOB infestation shows evidence of previous canopy thinning near top and retains dead leaves. Oak at far left does not show canopy symptoms.

Agent Description

Agrilus auroguttatus adults (*fig. 152*) are slender, about 9.5 mm long and 2 mm wide. They are dull metallic green with six golden yellow spots on the wing covers (elytra), and are agile flyers. Eggs are tiny (0.3 mm), dull colored, and rarely observed. Mature larvae are legless, yellowish-white and about 18 mm long and 3 mm wide. The segment at the head end is widened into an oval shape and two pincher-like spines are located at the tip of the abdomen. Mature larvae in the outer bark are bent in a hairpin shape (*fig. 150, 153*). These transform into pupae, which resemble adults, but are white and soft-bodied.

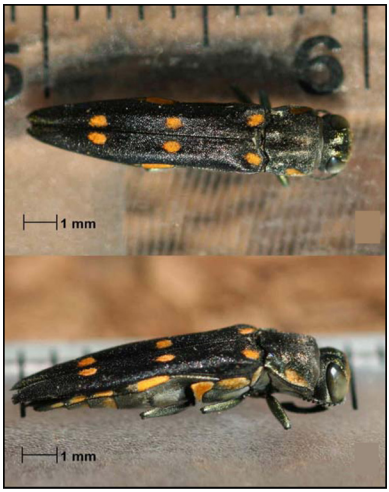

Figure 152. *Agrilus auroguttatus* adult beetles shown in top and side views. Photo: Tom Coleman, USDA-FS.

Figure 153. Mature *Agrilus auroguttatus* larva showing hairpin bend in a tunnel just below the bark surface in a coast live oak.

Biology

Observations to date indicate that GSOB typically completes one generation per year in San Diego County. Initial GSOB attacks commonly occur on apparently healthy trees. Eggs are laid in bark cracks on the trunk and large branches in summer. Larvae tunnel though the bark and feed primarily near the cambium. Mature larvae migrate back toward the bark surface, where they assume a bent hairpin shape in the outer bark. Pupae are found in the outer bark from late spring through

early summer. Emerging adult beetles chew a D-shaped exit hole in the bark. In San Diego County, adults are present from mid May into November. The peak flight period is late June to early July.

Importance

GSOB has been associated with extensive mortality of coast live and California black oak in the infested area since its introduction. Factors associated with attack are still under investigation. GSOB may pose a significant threat to coast live and California black oak throughout their range in California and may impact other California oak species as well.

References

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