GSOB ≠ SOD: Tree mortality from the goldspotted oak borer in oak woodlands of California

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The Smith’s
The goldspotted oak borer (GSOB), *Agrilus coxalis*
Larvae
Larval galleries
Patch killing the cambium
Larval galleries
Bark staining
Adult exit holes
Adult exit holes
Crown thinning and dieback
Woodpecker foraging
Southern California oaks
Why is this a problem?

• GSOB is killing trees across a variety of site conditions

• Oak mortality has been continuous for 6 years

• GSOB is non-native to California

• GSOB is aggressive and attacks several hosts

• California oaks have not evolved with this type of herbivory and there is no natural enemy complex
Oak mortality
GSOB distribution

Known Collection Records for *Agrius coxalis*
- **Quercus agrifolia**
- **Quercus deiva**
- **Quercus hypoleucotes**
- **Quercus kelloggii**
- Other *Quercus*

0 145 290 Kilometers
Created by Meghan Woods
GSOB studies

1) Distribution

2) Trapping
   - Flight period and population densities
   - Trap types
   - Trapping heights
   - Baits
   - Landing rates

3) Firewood emergence and management

4) Insecticide trials

5) Impact of GSOB on forest stands

6) Tree health

7) Comparison of GSOB in introduced and native areas

8) Oak volatiles
Burn it, chip it, or tar it, but just don't move it: Managing oak firewood infested with the goldspotted oak borer, Agrilus coxalis

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INTRODUCTION

- The goldspotted oak borer (GSOB) Agrilus coxalis is a new threat to oaks in southern California. First mortality has been recorded in 2004. No evidence of mortality has been observed in prior years. The first infestation was first confirmed in San Diego Co. in 2004, but has not been seen in the surrounding areas.
- We hypothesize that GSOB was first introduced on firewood from its native distribution in Arizona and Mexico. This is the first report of GSOB from California and is the first report of this species in the state.
- Signs of GSOB injury include browning of the foliage and death of the foliage. Borer exit holes can be observed on the bark of the tree. GSOB population densities are high, and mortality rates are high.
- This new pest is killing healthy trees and shade trees, which can significantly impact the landscape and property values. Loss of a single shade tree in the cost of removing hazards trees. The pest can cause significant economic losses to the state and local governments.
- In addition to the damage caused to trees, GSOB is also a significant economic loss to the state and local governments. The estimated costs of removing hazards trees can range from $50,000 to $500,000.
- We describe a preliminary plan for an IPM program for this new and rapidly spreading pest. IPM principles developed for other well-known Agrilus spp. pests are used.
- Key techniques in the plan include monitoring adult flight periods and sanitation of firewood by various methods including isolation.

ADULT TRAPPING

- For trapping to be effective, the pest must be isolated. This is done by trapping on three different dates for adult trapping.
- During the first week of flight, the traps are placed in the area of the infested trees.
- During the second week of flight, the traps are placed in the area of the infested trees.
- During the third week of flight, the traps are placed in the area of the infested trees.

OAK FIREWOOD

- Movement of firewood is a major pathway for dispersal of many insect pests in the U.S., and represents a major challenge for the management of GSOB in California. There is evidence of movement and spread of GSOB, which is the primary vector of GSOB in California.
- We have identified three primary vectors for the movement of GSOB in California: firewood from Arizona and Mexico, firewood from California, and firewood from other states.
- Firewood is a major source of pest spread, and represents a major challenge for the management of GSOB in California.

TAR FIREWOOD

- In 2006, treatments were initiated using firewood from both coast live oak and Pacific live oak. The treatments were initiated using tar treatment.
- Tar treatment was applied to the firewood, and the treated firewood was placed in the area of the infested trees.
- Tar treatment was effective in reducing the pest population, and represents a viable alternative to other treatments.

ACKNOWLEDGMENTS

Acknowledgments: We would like to thank Forest Health Protection, Forest Health Monitoring, Region 5, the Pacific Southwest Research Station, A.J. Dugger, M.D. Chu, and E.D. Liu. Funding for this work is provided by the Pacific Southwest Research Station, Threatened Species Program, Forest Health Protection, Region 5, and Forest Health Monitoring, California Insect Monitoring Program. This work would not be possible without the support of the California Insect Invasive Species Program.
GSOB in introduced and native areas
Native region: Southeastern Arizona
Silverleaf oak
Emory oak
Emory oak
Emory oak
Emory oak
Emory oak
Threat to California

- Coast Live Oak (*Quercus agrifolia*)
- Interior Live Oak (*Quercus wislizenii*)
- Valley Oak (*Quercus lobata*)
- Black Oak (*Quercus kelloggii*)
- Engelmann Oak (*Quercus engelmannii*)
- Blue Oak (*Quercus douglasii*)
- Oregon Oak (*Quercus garryana*)

*From Griffin and Critchfield, 1977*
Firewood movement
Acknowledgements

- Andreana Cipollone, Andi Koonce, Paul Zambino and Zachary Heath (FHP)
- Mary Louise Flint, Andrew Graves, Deguang Liu (UC-Davis)
- Susan Frankel and Nancy Grulke (PSW)
- Brian Strom (SRS) and Sheri Smith (FHP)
- Cleveland NF
  - Descanso RD
  - Palomar RD
  - Fire stations
- Cal Fire

- Funding
  - PSW, Invasive Species Program
  - FHM, Evaluation/Detection Monitoring
  - Forest Health Protection, R5

- AZ study
  - Joel McMillin and Bobbe Fitsgibbon (FHP R3)
  - Coronado NF

- USDA Forest Service
  - FHP and FHM, R5
  - PSW, Chemical Ecology of Forest Insects