



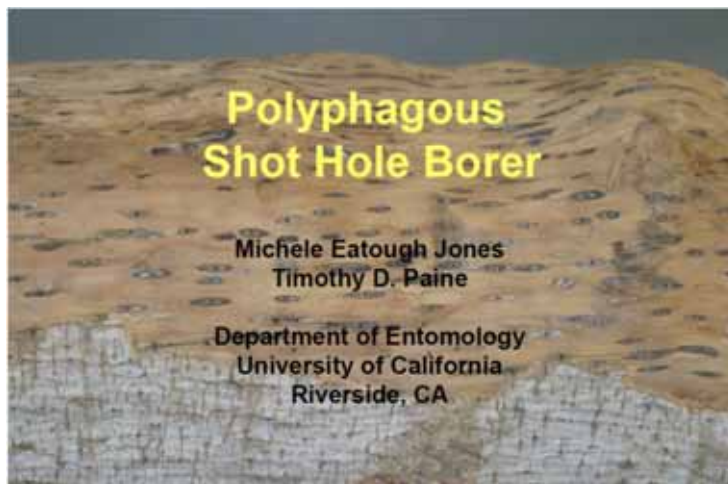
## Polyphagous Shot Hole Borer

Parks, Recreation and Community  
Services Department

Community Services and Youth Committee  
April 17, 2017

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### PRESENTATION COLLABORATION



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## POLYPHAGOUS SHOT HOLE BORER



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## POLYPHAGOUS SHOT HOLE BORER

- Mated female bores into tree, creates galleries
- Galleries are infected with symbiotic fungus
- Fungus grows on gallery walls and spreads through the tree

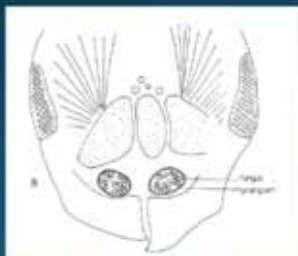


Photo: Richard Stouthamer

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## HOSTS FOR PSHB

- 1. Box Elder\*
- 2. Big leaf maple\*
- 3. Evergreen Maple
- 4. Trident maple
- 5. Japanese maple
- 6. Castorbean
- 7. California Sycamore\*
- 8. Mexican sycamore
- 9. Red Willow\*
- 10. Arroyo willow\*
- 11. Avocado
- 12. Mimosa
- 13. English Oak
- 14. Coast live oak\*
- 15. London plane
- 16. Cottonwood\*
- 17. Black cottonwood\*
- 18. White Alder\*
- 19. Titoki
- 20. Engelmann Oak\*
- 21. Cork Oak
- 22. Valley oak\*
- 23. Coral tree
- 24. Blue palo verde\*
- 25. Palo verde\*
- 26. Moreton Bay Chestnut
- 27. Brea
- 28. Mesquite\*
- 29. Weeping willow
- 30. Chinese holly
- 31. Camelia
- 32. Acacia
- 33. Liquidambar
- 34. Red Flowering Gum
- 35. Japanese wisteria
- 36. Black willow\*
- 37. Tree of heaven
- 38. Kurrajong
- 39. Black mission fig
- 40. Japanese beech
- 41. Dense logwood
- 42. Mule Fat\*
- 43. Black Poplar\*
- 44. Carrotwood
- 45. California buckeye\*
- 46. Canyon Live oak\*
- 47. Kentia Palm
- 48. King Palm
- 49. Tamarix



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## IDENTIFYING PSHB

- Entry hole: round, 0.85 mm



Mimosa



Coast Live Oak



Sycamore

Photos by  
Monica Dimson (UCANR)  
and Akif Eskalen (UCR)



Boring dust



Staining



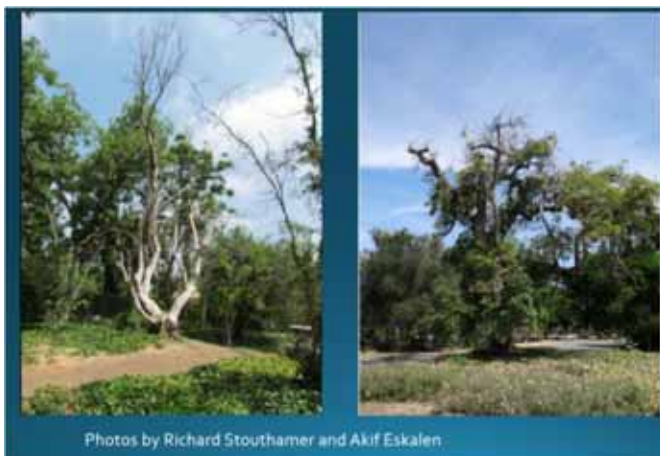
Gumming

Sugary exudate  
(avocado)

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## BRANCH DIEBACK



Photos by Richard Stouthamer and Akif Eskalen



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## AMBROSIA BEETLES

### Ambrosia Beetles are difficult to control

- Generally only short time outside the tree
- Sex pheromones- No
- Aggregation pheromone- No
- Sibling mating before females disperse



Photo: Akif Eskalen



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## DISPOSAL

Firewood movement  
and disposal of infested material



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## CHIPPING

Chipping infested wood greatly reduces beetle survival  
Material less than 1 inch is best



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## SOLARIZATION

Solarization  
effective during hottest summer months



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## IRRIGATION

Irrigation studies at Huntington  
Botanical garden and UC Irvine

- Water regime established before beetle arrived:
- Drought-stressed trees may show more disease symptoms
- Water shut off after trees attacked:
- Higher attacks where irrigation was shut off



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## PESTICIDES

### Pesticides tested to date

#### Contact Insecticides:

Bifenthrin  
Dinotefuran  
Clothianidin  
Fenpropathrin  
Orange Oil

#### Systemic Insecticides:

Imidacloprid  
Enamectin benzoate  
Clothianidin  
Abamectin

#### Fungicides:

Tebuconazole  
Propiconazole  
Metconazole  
benzimidazole carbamate

#### Biorational control:

*Bacillus subtilis*



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## PESTICIDE STUDIES

- Currently there are no sustainable efficient control measures
- Combinations were more effective
- Contact insecticide, systemic insecticide and fungicide
- Biorational control agent *B. subtilis* was effective short term



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## ACKNOWLEDGEMENTS



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## RECOMMENDATION

That the Community Services and Youth Committee receive the report for file.



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