Potential attractants for the redbay ambrosia beetle (*Xyleborus glabratus* Eichhoff)

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Abstract

The redbay ambrosia beetle (RAB) was first detected in Florida in 2005. The fungus they carry causes laurel wilt, which kills members of the family Lauraceae. The purpose of this study was to screen various essential oils singly and in combination to determine if they are attractive to RAB. Calamus oil was not statistically different from manuka oil on 2 out of 5 sampling dates. Combining treatments with camphor oil did not increase trap catch nor did any of the other combinations.

Introduction

The redbay ambrosia beetle (RAB) (*Xyleborus glabratus* Eichoff) (Fig. 1) was first detected in Florida from Duval Co. in 2005. Like other ambrosia beetles, females bore into the sapwood of a host tree and inoculate the tunnels, called galleries (Fig. 2), with a fungus that both the adults and developing larvae consume. Males are haploid, dwarfed, flightless and don't leave the galleries.

RAB are unusual in that they attack seemingly healthy host plants. The fungus they carry, *Raffaelea lauricola*, causes laurel wilt, which can kill a host tree in as little as a few weeks (Fig. 3). Hosts trees of the RAB are members of the family Lauraceae, which includes avacado, an important agricultural crop in south Florida.

Both manuka and phoebe oils are attractive to RAB because they contain significant quantities of α-copaene and calamenene. Unfortunately, phoebe oil is now difficult to obtain and manuka oil has increased in price (10 ml costs $15 USD).

Fig. 1: Adult female (a) and male (b) redbay ambrosia beetles. Photos courtesy of Lyle Buss, University of Florida.

Fig. 2: Cross-section of a redbay tree showing RAB galleries.

Fig. 3: A redbay tree in the later stages of laurel wilt disease.

Objective

The purpose of this study was to determine if other essential oils containing α-copaene are attractive to RAB.

Materials and Methods

Study 1: Single essential oils

- 9 treatments: avacado, sweet basil, calamus, sassafras, thyme, and ylang ylang # 1 oils, 3-carene, manuka oil lure, and unbaited
- 4 replicates in a RCBD
- ½ dr vials of each compound were hung in bottle traps (fig. 4) spaced ~5 m apart
- Traps were checked twice weekly for 2.5 weeks and Ambrosia beetles caught in traps were collected, counted, and identified to species

Study 2: Combinations 1

- 7 treatments: sweet basil + camphor oil, calamus + camphor, sassafras + camphor, ylang ylang # 1 + camphor, 3-carene + camphor, manuka lure, and unbaited
- Bottle traps were baited with two ½ dr vials each containing one essential oil and were arranged and checked as above

Study 3: Combinations 2

- 7 treatments: sweet basil + calamus, calamus + 3-carene, 3-carene + sassafras, sassafras + ylang ylang # 1, and ylang ylang # 1 + sweet basil, manuka lure, and unbaited
- Bottle traps were baited, arranged, and checked as above

Results

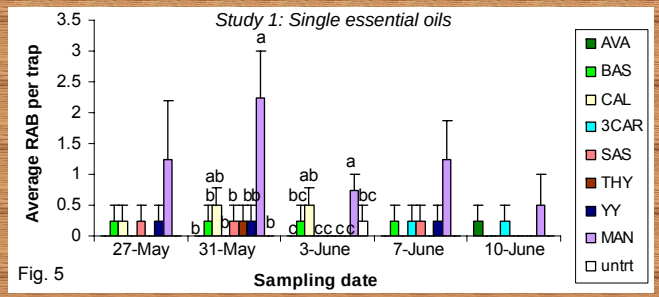

Fig. 5

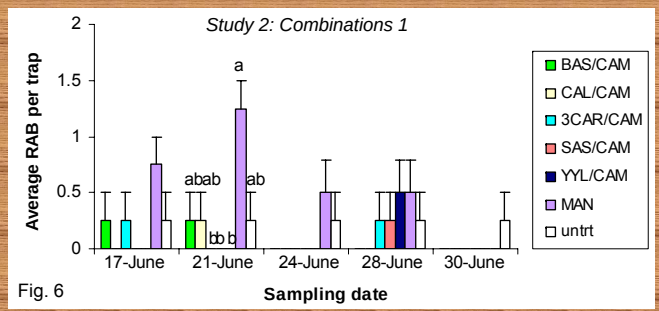

Fig. 6

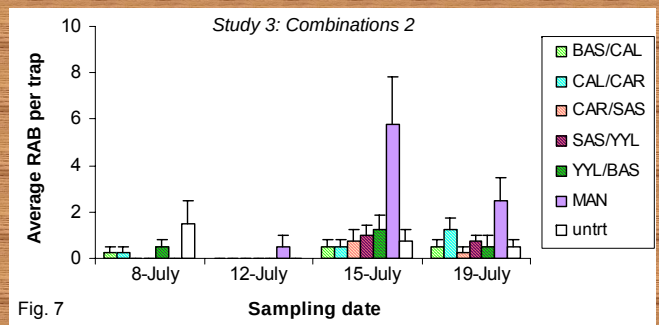

Fig. 7

Figs. 5-7: Average RAB per trap from each treatment on each sampling day. Treatments with the same letter are not significantly different at $P < 0.05$.

Fig. 4: A bottle trap baited with a manuka oil lure.

Conclusions

- The number of RAB collected from traps baited with calamus oil did not differ significantly from the number of RAB collected from manuka oil baited traps
- The addition of camphor oil did not increase trap catch
- Combining various compounds did not increase trap catch

Future Research

- The essential oils and 3-carene will be further evaluated by attaching vials of each compound to redbay bolts and as infusions into redbay bolts
- Any promising oils will be used in an effort to develop factitious hosts

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