

Boreioglycaspis melaleucae (Hemiptera: Psyllidae), an Introduced Biocontrol Agent of *Melaleuca quinquenervia* (Myrtaceae) in Florida¹

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INTRODUCTION: The USDA/ARS with federal and state permission introduced the psyllid *Boreioglycaspis melaleucae* Moore (Fig. 1, 2) in Broward Co., Florida, in February 2002 as a potential biocontrol agent of the introduced invasive pest tree *Melaleuca quinquenervia* (Cav.) S.T. Blake, known as paperbark, punk tree, or melaleuca. Both the psyllid and melaleuca originate in Australia.



Fig. 1. *B. melaleucae* female, lateral view. (Photograph by Susan Wineriter, USDA)

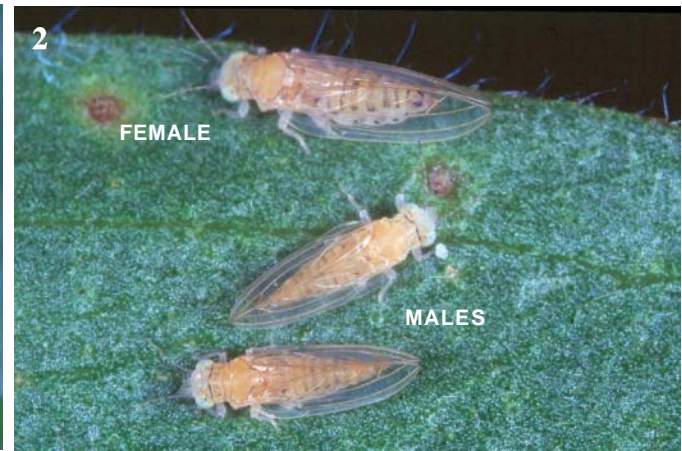


Fig. 2. *B. melaleucae* adults. (Photograph by Susan Wineriter, USDA)

DESCRIPTION: *Boreioglycaspis* adults are small, about 3 mm long, and inconspicuous, pale yellow-orange to white in color with gray to black markings. The tips of the antennae are gray to black and the wings are transparent with yellow veins. The compound eyes are usually pale green with a distinctive dark spot within (Fig. 1), but various shades of red have been observed in the laboratory; its three ocelli are bright orange, the dorsal two being the most obvious (Fig. 2). Two prominent finger-shaped appendages or genae extend outward and slightly downward from beneath the eyes (Fig. 7). When resting or feeding, the body is parallel to leaf or stem surfaces unlike, for example, the invasive Asian citrus psyllid, *Diaphorina citri*, that holds its body at a 45° angle. Males and females can be distinguished easily from one another by the shape of their abdomens and by the male genitalia. The abdomen of males is shaped like an elongated isosceles triangle when viewed from above (Fig. 2) and terminates in distinctive claspers, easily apparent when viewed laterally. The abdomen of females is more rectangular, gradually tapering to the tip; the pleural membranes usually are expanded, partially visible from above, bulging with eggs. Females generally are larger than males (Fig. 2). Adults frequently drag their hind legs when walking, and jump or fly when disturbed. Nymphs, except for hatchlings, are sedentary, except when disturbed. First instar nymphs are pale yellow with no markings, but by the 5th instar they have gray to black markings on the body (Fig. 5). Nymphs secrete conspicuous white waxy filaments from a dorsal caudal plate while feeding. The filamentous wax loosely covers their bodies (Fig. 3). Branches and leaves covered with flocculence indicate a heavy infestation (Fig. 4).



Fig. 3. *B. melaleucae* nymph exuding filamentous wax strands. (Photograph by Susan Wineriter, USDA)

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Fig. 4. Melaleuca stems and leaves covered with a white waxy flocculence produced by a heavy infestation of *B. melaleucae* nymphs. (Photograph by Susan Wineriter, USDA)



Fig. 5. Older *B. melaleucae* nymphs secreting honeydew. Waxy flocculence has been brushed away. (Photograph by Susan Wineriter, USDA)

Rain will wash away the flocculence, but nymphs will soon secrete more. In addition, they produce copious amount of honeydew (Fig. 5) held externally in balloon-like waxy membranes; nymphs discard filled spheres nearby. Adults also excrete waxy spheres of honeydew, but they flip them away from their immediate area. Eggs are pale to bright yellow and are laid singly or in groups on both leaves and stems of melaleuca. They are held on by a narrow projection or pedicel inserted into the leaf (Fig. 6).

LIFE HISTORY: Seasonal occurrence of *B. melaleucae* in Australia or Florida has not been documented yet. In Australia, “congregations of nymphs frequently were observed among the tightly bound leaves of young shoots” (Purcell *et al.* 1997). Laboratory observations indicate that under South Florida conditions, it should reproduce year-round. Populations will be more abundant when melaleuca plants are in a growth phase (late fall through spring). At 25-27°C in the laboratory, the melaleuca psyllid completed its life cycle in about 6-7 weeks. Females had a short pre-oviposition period, a day or less, and mated throughout the day. Eggs hatched in 2-3 weeks. The nymphal stage (5 instars) lasted 3-4 weeks. Both adults and nymphs fed on melaleuca, but nymphal feeding severely damaged melaleuca. Leaves became chlorotic, turned brown and eventually died. Heavy infestations killed young plants and saplings.

DISTRIBUTION: *B. melaleucae* has been collected from all states in its native Australia except South Australia (Burkhardt 1991). Specimens released in Florida originated from southeastern Queensland. As of October 2002, the melaleuca psyllid had been released in five Florida counties: Broward, Collier, Lee, Miami-Dade and Palm Beach, and is known to have established in all counties except Palm Beach. It will be introduced or spread naturally to all 10 South Florida counties where melaleuca infestations occur.

HOSTS: In Australia, *B. melaleucae* is known to occur on four species of closely related melaleucas in the *Melaleuca leucadendra*-complex. These are *Melaleuca argentea*, *Melaleuca leucadendra*, *Melaleuca nervosa*, and *Melaleuca quinquenervia*. None of these species is native to the New World. In addition, in host-range studies conducted at the USDA/ARS Australian Biological Control Laboratory, it completed development on *Melaleuca viridiflora* and *Melaleuca nodosa*, also native to Australia. In host-range tests conducted at the FDACS Florida Biological Control Laboratory, it completed development one time on bottlebrush, *Callistemon* (= *Melaleuca*) *citrinus*, the broad-leaved form, an introduced ornamental.

SURVEY AND DETECTION: In order to survey for *B. melaleucae*, look for flocculence on the newest growth of the host trees. Adults can be collected using a beat sheet and an insect aspirator or with yellow sticky insect trapping cards.



Fig. 6. *B. melaleucae* eggs on a tip of a melaleuca leaf. (Photograph by Susan Wineriter, USDA)

BIOLOGICAL CONTROL: The psyllid should be a major pest of *Melaleuca quinquenervia* only; and therefore, there should be no need for biological control. One Australian nymphal parasitoid, *Psyllaephagus* sp., (Hymenoptera: Encyrtidae) is known from *B. melaleuca* (Purcell *et al.* 1997) and was screened out of shipments sent to Florida. No *Psyllaephagus* spp. occur in Florida, and native Florida psyllid parasites are unlikely to cross-over.

CHEMICAL CONTROL: *Melaleuca quinquenervia* is a federally and state-listed noxious weed and legally cannot be purchased or possessed. However, landowners of older large melaleuca trees in urban areas may be distressed by the damage psyllids cause to their trees or by the abundance of flocculence and honeydew produced by nymphs. While homeowners should be encouraged to remove trees, they may not be willing to do so. Chemicals labeled for psyllids may be warranted in this instance. Strong sprays of water will wash the nymphs from the leaves.

SIMILAR SPECIES IN FLORIDA: *Boreioglycaspis melaleuca* is distinctive because of its long genae, which are nearly as long as the vertex (Fig. 7). The only other species in Florida with such conspicuous long genae is the invasive pest species, *Glycaspis brimblecombei* (Fig. 8), found on introduced *Eucalyptus* (Halbert *et al.* 2001). When alive, the green color morph (Fig. 9) would not be confused with *B. melaleuca*, but the brown color morph (Fig. 10) could be. When dead, *G. brimblecombei* color morphs are more similar and both could be confused with *B. melaleuca*.

Dead adults can be separated by the following couplet:

- 1a. Antennae less than half as long as body, excluding wings; branch of the median wing vein distal to the point at which Cu1a intersects the edge of the wing (Fig. 11) *B. melaleuca*
- 1b. Antennae about 3/4 as long as body, excluding wings; branch of median wing vein proximal to the point at which Cu1a intersects the edge of the wing (Fig. 12) *G. brimblecombei*



Fig. 7. Lateral view of *B. melaleuca* genae. (Photograph by Jeffrey Lotz, DPI)



Fig. 8. Lateral view of *G. brimblecombei* genae. (Photograph by Jeffrey Lotz, DPI)



Fig. 9. *Glycaspis brimblecombei*, female green color morph. (Photograph by Susan Wineriter, USDA)



Fig. 10. *Glycaspis brimblecombei*, female brown color morph. (Photograph by Susan Wineriter, DPI)



Fig. 11. *B. melaleucae* hind wing. (Photograph by Jeffrey Lotz, DPI)



Fig. 12. *G. brimblecombei* hind wing. (Photograph by Jeffrey Lotz, DPI)

Nymphs should not be confused on plants: *Glycaspis brimblecombei* nymphs form lerps, whereas *B. melaleucae* nymphs are just covered with fuzzy wax (Fig. 3).

Another introduced but not invasive psyllid, *Blastopsylla occidentalis* Taylor, found on introduced eucalyptus, is morphologically quite distinctive from *B. melaleucae*, but the overall appearance of the adult and similar nymphal flocculence could cause confusion. This psyllid is about half the size of *B. melaleucae* and has no prominent genae.

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