

A Psyllid, *Boreioglycaspis melaleucae* Moore (Insecta: Hemiptera: Psyllidae)¹

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Introduction

The introduced tree *Melaleuca quinquenervia* (Cav.) S.T. Blake (Myrtaceae), known as paperbark, punktree, or melaleuca, is an aggressive invader of many South Florida ecosystems, including the Everglades. Melaleuca is considered a pest because it displaces native vegetation and degrades wildlife habitat; it also creates fire hazards and can cause human health problems (Rayamajhi et al. 2002). The USDA/ARS with federal and state permission introduced the psyllid *Boreioglycaspis melaleucae* (Figure 1) into Broward County, Florida, in February 2002 as a potential biocontrol agent of melaleuca.



Figure 1. Adults of *Boreioglycaspis melaleucae* Moore, a psyllid. Credits: Susan Wineriter, USDA

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 eventually spread naturally to all 22 central and south Florida counties where melaleuca infestations occur.

Description

Adults

Boreioglycaspis adults (Figure 2) 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, but various shades of red have been observed in the laboratory; its three ocelli are bright orange, the dorsal two being the most obvious. Two prominent finger-shaped appendages or genae (Figure 3) extend outward and slightly downward from beneath the eyes. 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.

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Figure 2. Adults of *Boreioglycaspis melaleucae* Moore, a psyllid.
Credits: Susan Wineriter, USDA



Figure 3. Lateral view of the gena of *Boreioglycaspis melaleucae* Moore, a psyllid.
Credits: Jeffrey Lotz, DPI

Males and females can be distinguished easily from one another by the shape of their abdomens and by the male genitalia. The abdomen of a male is shaped like an elongated isosceles triangle when viewed from above and terminates in distinctive claspers, easily apparent when viewed laterally. The abdomen of a female 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. Adults frequently drag their hind legs when walking, and jump or fly when disturbed.

Nymphs

Nymphs, except for neonates (or newly hatched insects), are sedentary unless disturbed. First instars are pale yellow with no markings, but by the 5th instar they have gray to black markings on the body (Figure 4). Nymphs secrete conspicuous white waxy filaments from a dorsal caudal plate while feeding. The filamentous wax loosely covers their bodies

(Figure 5). Branches and leaves become covered with the waxy filaments creating a flocculence (wool-like tufts) that indicates a heavy infestation (Figure 6). Rain will wash away the flocculence, but nymphs will soon secrete more. In addition, they produce copious amounts of honeydew held externally in balloon-like waxy membranes; nymphs discard honeydew filled spheres nearby. Adults also excrete waxy spheres of honeydew, but they flip them away from their immediate area.



Figure 4. Older nymphs of *Boreioglycaspis melaleucae* Moore, a psyllid, secreting honeydew. Waxy flocculence has been brushed away.
Credits: Jeffrey Lotz, DPI



Figure 5. Nymph of *Boreioglycaspis melaleucae* Moore, a psyllid, exuding filamentous wax strands.
Credits: Susan Wineriter, USDA



Figure 6. Melaleuca stems and leaves covered with a white waxy flocculence produced by a heavy infestation of nymphs of *Boreioglycaspis melaleucae* Moore, a psyllid.

Credits: Susan Wineriter, USDA

Eggs

Eggs are pale to bright yellow and are laid singly or in groups on both leaves and stems of melaleuca (Figure 7). They are held on by a narrow projection or pedicel inserted into the leaf.

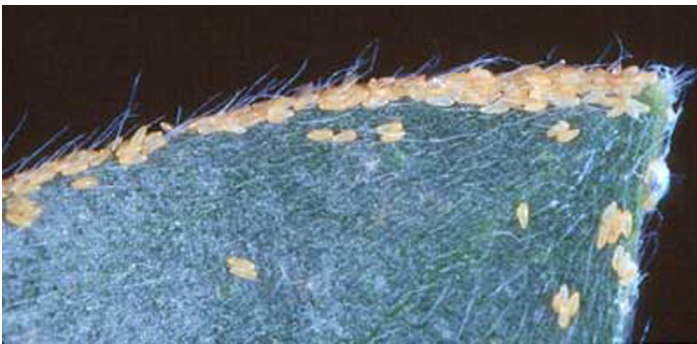


Figure 7. Eggs of *Boreioglycaspis melaleucae* Moore, a psyllid, on tip of a melaleuca leaf.

Credits: Susan Wineriter, USDA

Life History

Females deposit approximately 80 eggs (Rayamajhi et al. 2002), and nymphs hatch in two to three weeks. The nymphal stage (five instars) requires three to four weeks. Following its release in Florida, *B. melaleucae* established quickly (Center et al. 2006) and dispersed throughout melaleuca's range at a rate of approximately 7 km/year (Balentine et al. 2009). The insect is now widely established, with enormous populations developing during the spring dry season in all habitat types. However, populations decline during the summer, probably due to high temperatures rather than precipitation (Chiarelli et al. 2011).

Importance

Both adults and nymphs feed on melaleuca, causing high mortality of seedlings and premature leaf drop from mature trees (Franks et al. 2006; Morath et al. 2006). High psyllid infestations also increase mortality of coppicing (resprouting) stumps (Center et al. 2007). The *melaleuca snout weevil*, *Oxyops vitiosa*, the first insect released for biological control of melaleuca, cannot establish at permanently flooded melaleuca sites because of the soil requirement for pupation. Under these conditions, the psyllid *B. melaleucae* is still capable of severely damaging melaleuca because this insect completes its life cycle entirely in the tree canopy.

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.

Similar Species in Florida

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



Figure 8. Lateral view of the gena of *Boreioglycaspis brimblecombei* Moore, a psyllid.
Credits: Jeffrey Lotz, DPI



Figure 9. Female green color morph of *Glycaspis brimblecombei* Moore, a psyllid.
Credits: Susan Wineriter, USDA



Figure 10. Female brown color morph of *Glycaspis brimblecombei* Moore, a psyllid.
Credits: Susan Wineriter, USDA

Dead adults can be separated by the following couplet:

1. 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 *B. melaleuca*

- 1'. 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 *G. brimblecombei*

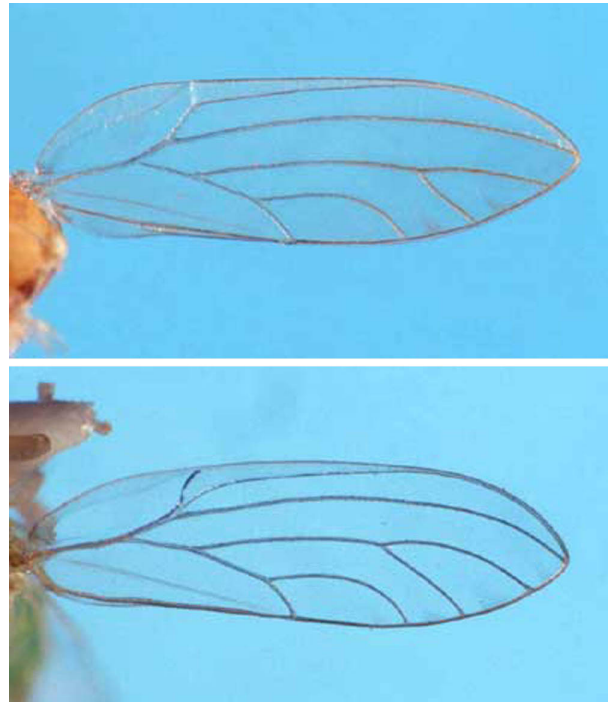


Figure 11. Hind wing of *Boreioglycaspis melaleuca* Moore, a psyllid (top). Hind wing of *Glycaspis brimblecombei* Moore, a psyllid (bottom).
Credits: Susan Wineriter, USDA

Nymphs should not be confused on plants: *Glycaspis brimblecombei* nymphs form lerps (a shelter produced from a carbohydrate secretion from the anus), whereas *B. melaleuca* nymphs are just covered with fuzzy wax. Another introduced but not invasive psyllid, *Blastopsylla occidentalis* Taylor, found on introduced eucalyptus, is morphologically quite distinctive from *B. melaleuca*, but the overall appearance of the adult and similar nymphal flocculence could cause confusion. This psyllid is about half the size of *B. melaleuca* and has no prominent genae.

Management

Biological Control

The psyllid should be a major pest of *Melaleuca quinque-neria* 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.

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