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FIRST REPORT OF THE BIOLOGICAL CONTROL AGENT *BOREIOGLYCASPIS MELALEUCAE* (HEMIPTERA: PSYLLIDAE) IN CALIFORNIA, USA

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The Australian tree *Melaleuca quinquenervia* (Cav.) S. T. Blake (Myrtaceae) has been internationally disseminated over the last century for ornamental, revegetation, and agroforestry purposes (Dray et al. 2006). This exotic tree was introduced into various locations in the United States (USA) and Caribbean, but was especially widely planted and propagated in Florida (Dray et al. 2006). After its introduction, *M. quinquenervia* has proven to be a superior competitor to most native vegetation occurring in forested and sawgrass dominated wetlands of the Florida Everglades (Turner et al. 1998).

A classical weed biological control program targeting *M. quinquenervia* in Florida was initiated in the mid 1980s, with the expectation that introduced herbivores would limit invasion and complement conventional control tactics (Silvers et al. 2007). The biological control program's area of implementation was identified as the geographic range of *M. quinquenervia* in Florida, which encompassed much of the Florida peninsula.

One of three herbivores established for biological control of *M. quinquenervia* in Florida is the psyllid, *Boreioglycaspis melaleucae* Moore. Host range studies demonstrated that the insect completes development only on a small group of species in the genus *Melaleuca* (Wineriter et al. 2003) of which there are no native representatives in the New World. Based on this narrow host range, the psyllid was permitted for release in southern Florida during the spring of 2002. Post release monitoring of the herbivore in Florida indicates that feeding by psyllids induces leaf senescence, eventually resulting in partial defoliation of mature trees and mortality of seedlings (Center et al. 2006, 2007). Following establishment, common garden experiments confirmed that feeding and development by the psyllid was restricted to *Melaleuca* species, as had been predicted in quarantine-based host range testing, and that it posed no threat to native or economically important species (Center et al. 2007).

In addition to Florida, *M. quinquenervia* also occurs in Louisiana, southern Texas and California (Dray et al. 2006). In California, for instance, the tree occurs widely in public parks, residential properties, and along streets of Los Angeles County. Despite the extensive use of *M. quinquenervia* as an ornamental in southern California, the tree has not exhibited the same invasive ten-

dencies as experienced in other regions (Pratt, personal observation).

In Nov 2009 *B. melaleucae* was discovered feeding on *M. quinquenervia* trees within a neighborhood community approximately 5 km north of the Los Angeles International Airport. Identification of *B. melaleucae* was confirmed by the authors and voucher specimens were deposited with the California State Collection of Arthropods in Sacramento. While populations of the psyllid fluctuate over time, the continued presence of *B. melaleucae* from 2009 to 2011 indicates that permanent establishment and eventual spread of the insect throughout southern California is likely.

The discovery of *B. melaleucae* in Los Angeles County raises the question: where did the herbivore come from? Florida, as compared to Australia, is the most logical origin of the Los Angeles County psyllid population based on proximity and transportation connectivity. Los Angeles County lies approximately 3000 km west of Miami, Florida whereas Brisbane, Australia is about 5000 km east. Assuming individuals arrived from Florida, this dispersal event spanned the North American Continent with no observed satellite colonies distributed between donor and recipient locations (e.g. southern Texas). A more probable explanation is that *B. melaleucae* was introduced, either accidentally or intentionally, to Los Angeles. Human activities play an important role in accidental insect invasions, with the most common introduction pathways including international transportation of airplane luggage and cargo (Kiritani & Yamamura 2003). Considering the frequent transport of tourists and cargo between southern Florida and southern California, the premise that *B. melaleucae* was inadvertently carried or "hitchhiked" remains a plausible explanation. While the invasion pathway of *B. melaleucae* remains uncertain, the occurrence of the psyllid in Los Angeles County draws attention to the potential for movement of biological control agents far beyond their intended range. For this reason, biological control programs must consider risks to the flora of neighboring regions, especially if these regions harbor populations of the target weed.

Both host range testing and post release field studies indicate that development of *B. melaleucae* is restricted to *M. quinquenervia* and closely related congeners, and is therefore unlikely to pose a threat to the native flora of California.

However, partial defoliation of ornamental *M. quinquenervia* trees is expected, and the same fate would likely befall other broad-leaf *Melaleuca* species if they were planted in the region.

SUMMARY

The Australian psyllid *Boreioglycaspis melaleucae* is a specialized herbivore of *Melaleuca quinquenervia* and other closely related congeners. *Boreioglycaspis melaleucae* was discovered in Los Angeles County (California, USA) in late 2009, feeding on ornamentally planted *M. quinquenervia* trees. The psyllid poses no threat to native plant species but is expected to attack ornamental landscape plantings of *M. quinquenervia*.

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