Ultrastructural and chemical studies on integument wax and wax-producing structures in the melaleuca psyllid *Boreioglycaspis melaleucae* (Hemiptera: Psyllidae). El-Desouky Ammar, Rocco Alessandro, Matthew Hentz, David G. Hall and Robert G. Shatters Jr. USDA-ARS, USHRL, 2001 S. Rock Rd., Fort Pierce, FL 34945. eldammar@hotmail.com

The melaleuca psyllid, *Boreioglycaspis melaleucae* (Hemiptera: Psyllidae), has been introduced to Florida as a biological control agent against *Melaleuca quinquenervia*, an invasive evergreen tree that has invaded large areas of Florida wetland since its introduction earlier from Australia as an ornamental plant. Colonies of *B. melaleucae* on young shoots and leaves of melaleuca are normally covered by white waxy material, and nymphs of various instars produce long bundles of white waxy filaments extending laterally and posteriorly from their abdomens. A scanning electron microscopy study of ‘naturally waxed’ and ‘dewaxed’ nymphs (cleaned from wax) revealed two types of wax pore plates located dorsally and laterally on the integument of the abdominal segments starting with the 5th segment. Type-1 wax pore plates, with raised rim, slits and pits, produce long ribbons and filaments of waxy secretions that wound together forming very long wax bundles, whereas type-2 wax pore plates, with slits only, produce shorter curls of wax. Additionally, in both nymphs and adult females, the circumanal ring (around the anus) contained ornate rows of smaller wax pores that produce wax filaments covering their honeydew excretions. Infra-red spectroscopy of waxy secretions by the melaleuca psyllid nymphs indicated that they have spectra similar to those of ester wax. The role(s) of waxy secretions by *B. melaleucae*, in avoiding contamination with their honeydew among other possibilities, are discussed.


Asian citrus psyllid antennae reacted strongly when stimulated with citral and ocimene that had been aged for 3-5 d in glass stimulus tubes. When neat ocimene or citral were aged on filter paper strips in sealed Pasteur pipettes for 6 d, voltage changes were observed in both male and female antennae when a 1 ml air puff was applied through the pipette into the humidified airstream flowing past the antenna. This voltage change was not seen in newly prepared (0 day) stimulus tubes. Gas chromatography-mass spectrometry analyses of headspace volatiles of stimulus tubes loaded with 20 μl of citral or ocimene indicated that the compounds were present at 0 days but could no longer be found at 6 days. Coupled gas chromatograph-electroantennogram analyses documented two peaks from extracts of aged filter papers from ocimene and citral tubes that were stimulatory to psyllid antennae. Gas chromatography-mass spectrometry analysis determined the peaks to be acetic and formic acid. Acetic acid elicited greater responses from female antennae than from male antennae. There were no statistical differences noted between male and female antennae in response to formic acid. This is the first observation of antennally detectable volatiles resulting from degradation products of constitutive
Management of the Asian citrus psyllid (ACP) *Diaphorina citri* is critical to reduce the incidence of its vectored huanglongbing or citrus greening disease in regions where both are established. Florida citrus industry faces serious challenge from this pest disease complex. Both biological and chemical control tactics are required for sustainable management of *D. citri* and other pests such as aphids and mealybugs which colonize citrus. Naturally occurring populations of lady beetle species known to be effective against *D. citri* and several other pests of Florida citrus are being decimated through wide spread use of broad spectrum insecticides targeted against *D. citri*. None of these species are commercially available for mass release to augment biological control. Very few species are commercially available that could be potential predators of psyllids and additional pests. *Cryptolaemus montrouzieri* commonly known as an efficient predator of mealybugs was never tested against *D. citri*. Here we report results of our experiments designed to study survival, development and reproduction of *C. montrouzieri* on diets of *D. citri* and some other pests such as citrus mealybug *Planococcus citri*, green citrus aphid or spirea aphid *Aphis spiraecola*, corn leaf aphid *Rhopalosipham maidis* and flour moth *Ephestia kuehniella* which could be useful to help support its survival in citrus and other agro-ecosystems and to maintain its colonies in the laboratory.

The Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Psyllidae), is the primary vector of *Candidatus Liberibacter asiaticus* (CLas) implicated as causative agent of citrus huanglongbing (citrus greening), currently the most serious citrus disease worldwide. CLas is transmitted by *D. citri* in a persistent circulative manner, but the question of replication of this bacterium in its vector has not been resolved so far. Thus, we conducted two large experiments to study the effects of various acquisition access periods (AAP) on infected citrus plants by nymphs and adults of *D. citri* on CLas acquisition and transmission as well as on CLas replication in this vector. RT-PCR analysis indicated that following 1-7-day acquisition access period (AAP) by nymphs 34-52% of *D. citri* became infected, whereas only 11-23% were infected after 1-7 day AAP by adults. Also, the CLas titer in *D. citri* (relative to that of psyllid S20 ribosomal protein gene) was: 1) generally higher in nymphs than in adults, 2) higher with longer AAP, and 3)