ABSTRACTS
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VARIATION IN FEMALE SEX PHEROMONE AND MALECHOICE AND NO-CHOICE ASSAYS IN *Cadra cautella*

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The female sex pheromone of *Cadra cautella* is a two-component blend of (*Z*,*E*)-9,12-tetradecadienyl acetate (*Z*9,*E*12-14:Ac) and (*Z*)-9-tetradecenyl acetate (*Z*9-14:Ac). An earlier study documented considerable heritable variation in pheromone component titers and ratio. This study used choice and no-choice assays to quantify the consequences of variation in blend ratio in terms of male orientation behavior. Results from the no-choice assays demonstrated no effect of blend ratio on male wing-fanning and flight initiation behaviors. The number of males contacting the point source was not independent of blend ratio. Significantly more males contacted point sources of blends of both pheromone components than point sources of the major component (*Z*9,*E*12-14:Ac) alone. Results from the choice assays were consistent with weak stabilizing acting on blend ratio. The no-choice assays suggest that in male *Cadra cautella*: 1) the initiation of orientation flight is independent of blend ratio; and 2) location of the point source is independent of blend ratio provided both pheromone components are present. The choice assays suggest that unlike the no-choice assays there are consequences associated with variation in blend ratios that can be measured in terms of male orientation behavior. The significance of these results, are contingent on whether choice or no-choice assays are behaviorally relevant and will be discussed.

MULTI-RESPONSE PERMUTATION PROCEDURES, THE ASSUMPTION OF HOMOGENEITY OF VARIANCES AND TRAP CATCH DATA

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Few data sets generated as a part of trapping studies are able to satisfy the assumptions of normality and homogeneity of variance, in particular those with negative controls. In general, published studies rely on transformations to satisfy the assumption of normality. Unfortunately, data transformed to meet the assumption of normality will not necessarily satisfy the assumption of homogeneity of variance. Using eight key words commonly

can be problematic because the insects are often concealed in cracks and crevices, where they are hard to spot, and where adequate pesticide coverage is difficult to achieve.

For the past several years, we have been working on the identification and development of applications of pheromones of several mealybug species, including the vine, obscure, longtailed, and grape mealybugs, and very recently, a new mealybug pest in California, *Ferrisia gilli*. Pheromones for the first three species have now been identified, and work on the pheromones of the other two species is in progress. The unique chemistry of these pheromones, and the pheromones of related mealybug species, will be discussed, along with important implications. Ongoing work on applications for these pheromones in various cropping systems also will be described.

APHIDS OF MICRONESIA

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The current state of knowledge on the identity, origin, distribution, host range, abundance, and impact of aphids in the various island groups of Micronesia will be discussed. The islands of Micronesia are not the original home for any of the aphid species observed on Micronesian islands. In total, 18 aphid species have been detected on Guam on 103 plant species, of which eight are indigenous, across 34 plant families. Fewer aphid species have been found on islands in the Republic of Palau, the Federated States of Micronesia, and in the Republic of the Marshall Islands. However, *Aphis gossypii* Glover, *Pentalonia nigronervosa* Coquerel, and *Aphis craccivora* Koch are present and locally abundant throughout the main islands of Micronesia, with the exception of Yap where only *A. gossypii* is commonly found but in relatively low numbers. Within Micronesia *Toxoptera citricida* (Kirkaldy) is currently only found on Guam on various citrus species and occasionally become locally abundant. Bunchy top virus of banana vectored by *P. nigronervosa*, and papaya ringspot virus vectored by *A. gossypii*, are currently only present within Micronesia on Guam.

Too Little - Too Late???? *Rhyzobius lophanthae* introduced against Asian cycad scale, *Aulacaspis yasumatsui*, on Guam

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Asian cycad scale, *Aulacaspis yasumatsui*, was first detected in Tumon, Guam in December 2003 in front of a hotel where *Cycas revoluta*, an introduced ornamental cycad and *Cycas micronesica*, an indigenous cycad were planted. The scale is believed to have been imported from Hawaii in 1998 on ornamental cycads. The scale currently infests introduced and indigenous cycads on about two thirds of Guam's 354 square kilometers. Severe infestations have been observed to kill both species within a few months. We fear that *C. micronesica* may be threatened with extinction should the scale spread to the few other Micronesian islands that harbor it. *Rhyzobius lophanthae*, a coccinellid introduced to Hawaii in 1894 for other scale insects, was imported from Maui to Guam in November 2004 and released on *C. micronesica* at the Guam National Wildlife Refuge at Ritidian point in February 2005. *R. lophanthae* populations have subsequently spread to other *C. micronesica*, and additional releases have been made throughout the island. However, *R. lophanthae* alone will not likely contain the infestation. Efforts are underway to import *Coccobius fulvus*, a hymenopteran parasitoid originating in Thailand and China, from Florida. Funds are being sought for exploration for additional biocontrol agents in Asia. IPM strategies using systemic insecticides applied to pruned cycad boles are also being developed.

APHIDS OF HAWAII: TRAITS PROMOTING INVASIVE SUCCESS

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Species introductions into novel habitats, especially island ecosystems, can have devastating effects on ecosystem function and stability. Though none are native, at least 96 aphid species can now be found on one or more of the Hawaiian Islands. As aphids cause direct feeding damage and transmit plant viruses, it is important to identify the traits that have enabled these particular species to successfully colonize the archipelago. To address this question, nine morphological and ecological traits that may contribute to colonization success were assessed for both introduced species and non-introduced congeners. Here we report that traits common to colonizing species are, in decreasing order of importance: anholocycly (i.e., permanent parthenogenesis), presence in continental USA, broad host range, and small apterae size. Asexually reproducing species may be well suited to the subtropical climate, thereby eliminating the need for sexual phases and egg-laying for overwintering. Furthermore, it is likely that small aphids arriving from the mainland US and capable of feeding on numerous plant species are intercepted less often by plant protection workers. By understanding the traits that enable aphids to successfully colonize remote islands, plant protection efforts may be enhanced, thereby reducing ecological damage to native ecosystem.