

Duangthip Kantha 2014: Obstructing the Mutualistic Relationship between *Meranoplus bicolor* (Hymenoptera: Formicidae) and Honeydew Producing Hemipterans in Guava Plantation. Doctor of Philosophy (Entomology), Major Field: Entomology, Department of Entomology. Thesis Advisor: Associate Professor Intawat Burikam, Ph.D. 65 pages.

Mutualistic relationships between the shield ant, *Meranoplus bicolor* (Guérin-Méneville), and two species of hemipteran, *Aphis gossypii* Glover and *Ferrisia virgata* (Cockerell), were investigated in an unsprayed guava plot at Kamphaeng Saen, Nakhon Pathom, Thailand. The reciprocal benefits were observed in both field and laboratory studies. *M. bicolor* activity coincided with peak seasonal activity of both hemipterans during June–August 2012. There were two sets of support evidence in *M. bicolor* honeydew preference: (i) statistically higher value of adjusted honeydew weight collected by ant workers from *A. gossypii* compared with that from *F. virgata* ( $p$ -value = .005), and (ii) the higher value of the strength of effect ( $\eta^2 = .62$ ) in the total variance of multi-species association. A two–group, ant–tended and ant–excluded, between–subjects multivariate analysis of variance (MANOVA) was used in order to show hemipteran benefits. Both hemipteran populations increased in the ant–tended treatment, together with lesser amounts of their natural enemies: *Menochilus sexmaculatus* (Fabricius) and *Coccinella transversalis* Fabricius, and, *Pseudodorus clavatus* (Fabricius), compared with the ant exclusion treatment ( $p$ -value <.001). The mutualistic relationships were interfered by using liquid ant bait. Three insecticidal materials, i.e. boric acid, imidacloprid, and fipronil, dissolved in 25% sugar water including an untreated control were distributed in a bait dispenser attached to the base of guava tree. Liquid ant baits were evaluated for efficiency on visitation rates of *M. bicolor*, and visual counts of The both hemipterans and their natural enemies, there was statistically significant treatment impact on composite dependent variate consisting of ant visitation rates, hemipteran densities, and abundance of natural enemies ( $p$ -value <.001). Bait dispenser with 3% boric acid was the most effective ant bait followed by untreated control bait and either .0001% imidacloprid or .0001% fipronil. The efficiency of liquid bait was strongly influenced by the persistence of attractive odor over time. Sugary liquid bait with either imidacloprid or fipronil, together with control comprising 25% sugar water were unable to maintain their freshness due to fermentation of the materials at high temperature. Conversely, the durability of sugary smell in boric acid bait came from its antibacterial and antifungal properties.

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Thesis Advisor's signature