

Host Preference, Impact of Host Transfer and Insecticide Susceptibility among *Aphis gossypii* Group (Order: Hemiptera) in Jamaica

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Abstract : *Aphis gossypii*, as a pest, directly damages its host plant by extracting phloem sap (sucking) and indirectly damages it by the transmission of viruses, ultimately affecting the yield of the host. Due to its polyphagous nature, this species affects a wide range of host plants, some of which may serve as a reservoir for colonisation of important crops. In Jamaica, there have been outbreaks of viral plant pathogens that were transmitted by *Aphis gossypii*. Three such examples are Citrus tristeza virus, the Watermelon mosaic virus, and Papaya ringspot virus. *Aphis gossypii* also heavily colonized economically significant host plants, including pepper, eggplant, watermelon, cucumber, and hibiscus. To facilitate integrated pest management, it is imperative to understand the biology of the aphid and its host preference. Preliminary work in Jamaica has indicated differences in biology and host preference, as well as host variety within the species. However, specific details of fecundity, colony growth, host preference, distribution, and insecticide resistance of *Aphis gossypii* were unknown to the best of our knowledge. The aim was to investigate the following in relation to *Aphis gossypii*: influence of the host plant on colonization, life span, fecundity, population size, and morphology; the impact of host transfer on fecundity and population size as a measure of host preference and host transfer success and susceptibility to four commonly used insecticides. Fecundity and colony size were documented daily from aphids acclimatized on *Capsicum chinense* Jacquin 1776, *Cucumis sativus* Linnaeus 1630, *Gossypium hirsutum* Linnaeus 1751 and *Abelmoschus esculentus* (L.) Moench 1794 for three generations. The same measures were used after third instar aphids were transferred among the hosts as a measure of suitability and success. Mortality, and fecundity of survivors, were determined after aphids were exposed to varying concentrations of Actara®, Diazinon™, Karate Zeon®, and Pegasus®. Host preference results indicated that, over a 24-day period, *Aphis gossypii* reached its largest colony size on *G. hirsutum* (\bar{x} 381.80), with January - February being the most fecund period. Host transfer experiments were all significantly different, with the most significant occurring between transfers from *C. chinense* to *C. sativus* ($p < 0.05$). Colony sizes were found to increase significantly every 5 days, which has implications for regimes implemented to monitor and evaluate plots. Insecticides ranked on lethality are Karate Zeon® > Actara® > Pegasus® > Diazinon™. The highest LC50 values were obtained for aphids on *G. hirsutum* and *C. chinense* was with Pegasus® and for those on *C. sativus* with Diazinon™. Survivors of insecticide treatments had colony sizes on average that were 98 % less than untreated aphids. Cotton was preferred both in the field and in the glasshouse. It is on cotton the aphids settled first, had the highest fecundity, and the lowest mortality. Cotton can serve as reservoir for (re)populating other cotton or different host species based on migration due to overcrowding, heavy showers, high wind, or ant attendance. Host transfer success between all three hosts is highly probable within an intercropping system. Survivors of insecticide treatments can successfully repopulate host plants.

Keywords : *Aphis gossypii*, host-plant preference, colonization sequence, host transfers, insecticide susceptibility

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