

# Species Composition and Population Dynamics of Thrips (Thysanoptera) in Mango Orchards of Northern Peninsular Malaysia

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**ABSTRACT** Thrips are key pests of mango, *Mangifera indica* (L.), in Malaysia, including the Northern Peninsular. As Penang has year-round equatorial climate and high of rainfall, the populations of thrips may be subject to variations in composition and size. With a goal of developing an appropriate control strategy, a survey was conducted in Penang to determine species composition and abundance in relation to some environmental factors. Sprayed and unsprayed orchards were sampled on weekly basis through two flowering seasons of 2009 using CO<sub>2</sub> collection technique. Larval population falling into the ground to pupate and adults emerging from the soil were investigated in both orchards. *Thrips hawaiiensis* (Morgan) and *Scirtothrips dorsalis* (Hood) were the most prevalent species in the sprayed and the unsprayed orchards, respectively. The abundance of thrips was high during the flowering period of the dry season and decreased during the flowering period of the rainy season. This latter period coincided with decreased temperature and increased relative humidity. Percentage of adult emergence from the soil was lower in the rainy season than recorded in the dry season in both orchards. Taken together, these observations suggest that *T. hawaiiensis* and *S. dorsalis* are the main thrips species pests of mango panicles in Penang. Direct control with insecticides focusing on these two species may help to reduce cosmetic injuries and other damages on mango fruits.

**KEY WORDS** thrips, *Mangifera indica*, population dynamics, adult emergence

Mango, *Mangifera indica* (L.) cultivation in the world is expanding as a result of the popularity of this fruit and ever increasing demand for fresh and processed mango products. In Malaysia, mango is one of the most consumed fruit that occupies ≈4,565 ha agricultural land area (Kwee and Chong 1994). This popular commodity is being threatened by various thrips species. These insects cause substantial crop losses by feeding on the petals, anthers, pollen, and floral nectaries and ovipositing in the panicles, which leads to discoloration and reduced vigor of the panicles (Higgins 1992, Pena et al. 2002). They also feed and oviposit on the pericarp of the fruits, which causes bronzing of the fruit surface, and severe infestations often result in the cracking of the fruit skin. These cosmetic injuries reduce the economic value of mango fruits and their marketability (Grove et al. 2000, Nault et al. 2003).

Thrips lay their eggs in soft tissue of green fruits, panicles, and tender leaves. When the last instar (larva II) completes its development, it seeks protected places to develop into the prepupal and pupal stage, which do not feed and remain immobile (Lewis 1973). Many species of the subclass Terebrantia undergo pupation in the soil beneath the trees because soil offers better conditions and more protection (Lewis

and Navas 1962, Grove et al. 2000). However, thrips adults also emerge from various places such as bark, flowers, leaves, and plant cavities (Pearsall and Myers 2000), which are safe from unfavorable conditions and insect predators.

Efforts to prevent thrips-caused damage rely heavily on insecticides. However, control operations based on the increased use of insecticides have met with only limited success. One of the reasons for inefficacy of this strategy includes the emergence of insecticide resistance (Allen et al. 2005, Nauen and Denholm 2005); hence, there is a growing emphasis on reducing the use of insecticides. Accurate information regarding the identity of the main thrips pests, the peak of abundance of any thrips target, their spatial distributions, and seasonal population variations has the potential to reduce the amount of product sprayed onto the crops. Surprisingly, the population dynamics of thrips fauna on mango production is poorly understood in Malaysia. In this study, we examined the species composition and seasonal variations of thrips in northern Peninsular Malaysia using the CO<sub>2</sub> collection technique. Specifically, we sought to: 1) determine the seasonal fluctuation in population density, taking into account the within-plant distribution of developmental stages of various thrips species, and 2) obtain information on generation patterns and adult

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