

DIVERSITY AND DISTRIBUTION OF FRUIT FLIES (DIPTERA: TEPHRITIDAE) IN *MATALE* AND *GAMPAHA* DISTRICTS OF SRI LANKA: DEVELOPMENT OF VAPOR HEAT TREATMENT STANDARDS

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Fruit flies are destructive pests in global horticulture, causing substantial economic losses by infesting various fruits including mango. Limited information is available on species composition and host plant range of fruit flies in Sri Lanka. This research aimed to examine the diversity, and distribution of fruit flies across mango-growing areas representing small-scale fields, home gardens, and large-scale commercial farms in *Matale* and *Gampaha* districts in alignment with ISPM standards using Cue-lure and Methyl-eugenol traps. Infested fruits were also collected and reared to examine the host range. The Shannon-weaver index (H') and species richness (S) were used to compare the species diversity. A hot water immersion test (46°C) was conducted using different life stages (eggs, 1st instar, 2nd instar and 3rd instar) to examine the most heat-resistant stage to use in Vapor Heat Treatment (VHT). The field surveys identified six (06) fruit fly species, *Bactrocera dorsalis*, *Bactrocera Kandiensis*, *Bactrocera correcta*, *Bactrocera nigrofemoralis*, *Zeugodacus cucurbitae* and *Zeugodacus tau*. The species diversity (H') was varied in different locations tested. The highest diversity was recorded from *Mahawela* ($H'=1.167$, $S=5$) in *Matale* and *Kandana* ($H'=1.078$, $S=4$) in *Gampaha* districts. The abundance of fruit fly species in different locations were significantly ($p<0.05$) different. *Bactrocera dorsalis* was the most dominant species (62.6%) in *Matale* district, while it was *B. kandiensis* (38.3%) in *Gampaha* district. *Bactrocera dorsalis* and *B. kandiensis* have a higher host range than other recorded species. The hot water immersion test revealed that *B. dorsalis* is the most heat-tolerant species, with its egg stage being the most heat-resistant. Therefore, the mature egg stage of *B. dorsalis* need to be considered when VHT protocols are developed to ensure effective control. The study provides insights for optimizing VHT standards to manage fruit flies in Sri Lankan mango exports, enhancing export potential and promoting broader pest management strategies.

Keywords: Corrected mortality, Hot water immersion, ISPM, Phytosanitary treatment