



DIVERSITY OF HYMENOPTERA IN COFFEE IN TAMIL NADU

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ABSTRACT

A total of 2334 hymenopterans of 24 families under 14 superfamilies were collected in the coffee ecosystem at Horticultural Research Station, Thadiyankudisai, Dindigul, Tamil Nadu. The hymenopteran diversity comprised predominantly Ichneumonidae (14.7%) followed by Diapriidae (13.4%), Platygasteridae (13.0%), Braconidae (12.0%) and Scelionidae (11.3%). Ceraphronidae, Eulophidae, Ampulicidae, Figitidae (0.7%) and Eupelmidae (0.6%) were observed to be the least in diversity.

Key words: Coffee, Hymenoptera, diversity, parasitoids, Ichneumonidae, Diapriidae, Platygasteridae, Braconidae, Scelionidae, diversity indices

Hymenoptera is the third largest insect order, comprising over 1,50,000 species (Janke et al., 2013). Collectively, Hymenoptera are the most important group because they act as pollinators of wild and cultivated flowering plants, natural enemies (predator and parasitoids) of destructive insects and as makers of honey (Taye et al., 2017). Many environmental and social problems result from the overuse of insecticides (Wei and Yu, 1998). Indiscriminate usage of pesticides causes the loss of biodiversity of beneficial organisms. Recently, biodiversity in agricultural land has received growing attention (Dudley et al., 2005). Coffee is the most important perennial beverage with national productivity of 765 kg/ha while it is 519 kg/ha in Tamil Nadu (Central Coffee Research Institute CCRI, 2018). More than 100 insects had been recorded as pests in coffee (Le Pelley, 1968). Hymenoptera from the coffee ecosystem has been of least concern comparatively in the past creating a void in biological control of the coffee pests. In the study area of Thadiyankudisai, coffee is cultivated in an area of 13,436 ha, and insect pests are a major constraint in achieving higher yield. Basic study on hymenopteran diversity is a prerequisite for the success of any biological control and IPM, and hence the present study.

MATERIALS AND METHODS

The hymenopteran diversity in coffee ecosystem at the Horticultural Research Station, Thadiyankudisai (10.29°N, 77.71°E 1098 masl) was studied from

January to December, 2018. Thadiyankudisai region has a winter (from December to February), summer (from March to May), south west monsoon (SWM) (from June to August) and north east monsoon (NEM) (from September to November) seasons. Coffee is intercropped with silver oak, pepper, avocado, mandarin orange, macadamia nut, Indian coral tree, silk cotton, jack and banana. Need based application of chlorpyrifos and quinalphos in recommended doses is the common plant protection measure followed here. Sampling was taken at weekly intervals with yellow pan traps (30cm dia) (@ 20 traps/ plot of 10x 10 m) at four points. The traps were filled with water along with a few drops of detergent (soap oil) and pinch of salt. The hymenopterans were filtered with a fine mesh filter after 24 hr. Relative abundance of the hymenopterans during the prevailing four seasons was recorded.

The collected specimens were preserved in 70% ethyl alcohol. Specimens were also mounted on pointed triangular cards and studied under a stereozoom microscope (Stemi- Zeiss DV4) and photographed in stereozoom microscope (Leica M205C). These were identified following the keys by Narendran and Achterberg (2016). Further, identification was confirmed by Dr. A. Rameshkumar (Chalcidoidea), Dr. K. Rajmohana (Platygastridae), Ms. Nabasri Basak (Chalcidoidea) and Mr. Arnab Mandi (Formicidae) of the Zoological Survey of India, Kolkata. The parasitoid collections were deposited at the Insect Biosystematics laboratory, Department of Agricultural Entomology,