



Research Article

DIVERSITY OF CHALCID PARASITIDS (CHALCIDOIDEA: HYMENOPTERA) IN HORTICULTURAL ECOSYSTEM AT THADIYANKUDISAI, TAMIL NADU, INDIA

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Received: May 30, 2019; Revised: June 10, 2019; Accepted: June 12, 2019; Published: June 15, 2019

Abstract: The present investigation was carried out to study the chalcid species diversity in Horticultural ecosystem at Horticultural Research Station, Thadiyankudisai, Dindigul, Tamil Nadu from January, 2018 to January, 2019. A total of 257 numbers of individuals were recorded under 4 families, 9 genera and 10 species. The seasonal abundance studies revealed that the highest population of species was recorded in South West Monsoon (SWM) (52.9%) followed by winter season (32.7%) and the least number of species during North East Monsoon (NEM) (5.8%). The species diversity comprised of *Copidosoma floridamum* (24.5%) followed by *Dipara* sp. (13.2%), *Brachymeria jambolana* (10.9%), *Agarwalencyrtus citri* (10.5%), *Gonatocerus* sp. (10.1%) and (*Lymanon delhiensis* and *Epitranus* sp.) (7.8%). The least population was recorded in *Haltichella* sp (3.5%). Insect pests are a major constraint in achieving higher yields in Horticulture, hence, the studies of Chalcidoidea diversity is crucial for success in biological control.

Keywords: Chalcidoidea, Horticulture, Diversity, Indices, Parasitoids, Seasons

Citation: Manikandan K.R., et al., (2019) Diversity of Chalcid parasitoids (Chalcidoidea: Hymenoptera) in Horticultural ecosystem at Thadiyankudisai, Tamil Nadu, India. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 11, Issue 11, pp.- 8555-8557.

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Academic Editor / Reviewer:

Introduction

Hymenopterans are the most successful biological control agents under the super family Chalcidoidea. The Chalcid families are predominantly primary endoparasitoids of Diptera and Lepidoptera and Coleoptera, though a few species attack Neuroptera [4]. Most of the species are parasitoids attacking egg or larval stage of the host. It has a significant major role in ecosystem balance [5]. The Chalcidoidea parasitoids belong to 90 genera and 1530 species globally where only 29 genera and 214 species are reported from India [10]. Despite the surplus production of food production, insects are a major constraint in achieving higher yields. More than 100 insects have been recorded as pests in coffee [7]. Indiscriminate usage of pesticides causes the loss of biodiversity of beneficial organisms. Recently, biodiversity in agricultural land has received growing attention because it plays a significant role in agro-ecosystem function [3]. Chalcidoidea from coffee ecosystem has been of least concern in the past creating a void in biological control of the coffee pests. The area of coffee plantations in Thadiyankudisai is about 13,436 ha [1]. Insect pests are a major constraint in achieving higher yields in coffee. Chalcidoidea diversity is necessary for the achievement of biological control. Hence, this study was undertaken.

Materials and Methods

The present study was carried out to study the Chalcidoidea species diversity in Horticultural ecosystem at Horticultural Research Station, Thadiyankudisai from January, 2018 to January, 2019.

Study area

Survey sites were chosen based on accessibility. Dindigul district is located at latitude 10.29°N and longitude 77.71°E and has an average elevation of 1098 meters above (MSL) with soil types red and peat with average rainfall of 1400 mm. The climatic seasons recognized at Thadiyankudisai region were winter season

(December to February), summer season (March to May), South West Monsoon (SWM) (June to August) and North East Monsoon (NEM) (September to November).

Experimental sites

The area falls under Lower Pulney hills where coffee is inter- cropped with silver oak, pepper, avocado, mandarin orange, macadamia nut, Kalyana Murungai, silk cotton, jack and banana. Coffee variety (*Coffea arabica*) S 382 (Coc x S 759 x cuttura).

Sampling and identification of Hymenopterans

Sampling was carried out weekly using yellow pan traps at different elevation plots. Four such elevation plots were chosen at random with each plot size of 10 × 10 m.

Yellow pan trap

This trap is based on the principle that many insects are attracted to bright yellow colour. 20 such traps were placed in four elevation plots. The traps were placed around the coffee plantations randomly at intervals of about 1.0 - 1.5 m. The traps were filled with water to which a few drops of detergent (soap oil) and pinch of salt were added to break the surface tension and to reduce the rate of evaporation. The samples were filtered with a fine mesh filter after 24h from the yellow pan trap. The relative abundance of the hymenopterans was recorded at weekly intervals.

Preservation and identification of the specimens

The hymenopteran specimens thus collected were preserved in 70 % ethyl alcohol. The dried specimens were mounted on pointed triangular cards and studied under a Stereo zoom (Stemi- zeiss DV4), photographed in stereo zoom microscope (Leica M 205 C) and identified through conventional taxonomic techniques by following the keys of [9].