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A Preliminary survey of interactive ant species (Hymenoptera: Formicidae) with economically important plants - A study from Kerala agricultural University Campus, Kasargod, Kerala, India

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Abstract

The present study aims on the preliminary survey of interactive ant species at different plantation areas in the campus of Kerala Agricultural University, Padannakkad, Kasargod, Kerala. A total of 20 ant species were observed from the entire study site. 5 species were found as common and the remaining species were specific to respective area.

Keywords: Interactive, formicidae, agricultural, Kerala, plantation

1. Introduction

Agent to increase the soil fertility, they have direct or indirect role on plants to disperse seeds, in pollination and to protect them from predators. On their negative aspects, many species of ants are considered as plant pests in agricultural field as they consume the seed and allow the aphids and mealy bugs to grow. In comparison with the studies on the ant plant interaction in worldwide, in India only limited studies were carried out. Some ant species were considered as pests of crops in India (Pradhan S., 1969 & 1983) [6, 7]. *Holcomyrme* (*Monomorium*) *scabriceps*, an important harvesting ant group of Punjab, gather seeds of grass and millets into their nests and stores them in granaries (Maxwell & Lefroy, 1984) [4] and also found to destroyed considerable quantities of seeds from Kangni (*Setaria italica*) by bringing the seeds into their nest (Maxwell & Lefroy, 1990) [5]. *Dorylus orientalis* which behaves much like termites, nests below the soil and attack plants below or at the level of the soil (Maxwell & Lefroy, 1984) [4] and also was found to attack healthy vegetable crops (Maxwell & Lefroy, 1990) [5] such as Cauliflowers, cabbages, artichokes and other vegetables in India and Ceylon. The leaf cutter ants (*Atta sp.*) considered as one of the major pests of plants in new world (Gadagkar, R. 2000) [3] as they cut the leaves and bring them to nest to cultivate fungus in their nest for nutrition. Owing to their role as an important pest of plants, many Latin American countries passed national law to declared leaf cutter ants as 'plague animals'. Indirect damage of plants by growing aphids, mealy bugs by *Camponotus*, *Crematogaster*, *Cataulacus* and *Oecophylla* also reported (Maxwell & Lefroy, 1984) [4] as common in Southern India. The present study aims the preliminary investigation of interactive ant species at different plantation area of Kerala Agricultural University Campus, Kasargod, Kerala.

2. Materials and Methods

The study carried out at the Campus of Kerala Agricultural University, (12°25'N and 75°11'E), situated at Kasargod district of Kerala state, India. Specimens randomly collected by Brush Method & All out Search Method. The studied campus area is grown with different varieties of plants in each part and the plant species were noted from the field itself. The ant specimens were collected both from the plant and from the soil surface of each plantation. The collected specimens were kept in 70% ethanol for preservation. The mounted specimens were identified with the help of Leica MZ6 Stereozoom binocular microscope and with the identification keys of Bingham C.T. (1903) [1] and Bolton B. (1994) [2]. Mounted specimens were kept in the laboratory, Department of Zoology, St. Xavier's college, Aluva, Kerala.

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3. Observations and Results

A total of 20 species were observed from the study sites. Most of the ant species were *Camponotus sericeus*, *Camponotus parius*, *Paratrechina longicornis*, *Diacamma rugosum* and *Pheidologeton affinis*. *Camponotus parius* was found on yard long bean plant (*Vigna sp.*) and was caring aphids. *Anoplolepis gracilipes* and *Paratrechina longicornis* were commonly found in coconut plantations in the study sites. *Paratrechina longicornis* was found as common in Banana and Cashew

plantations. *Diacamma rugosum* and *Pheidologeton affinis* were common in soil of study site and *Polyrhachis rastellata*, *Pachycondyla sulcata*, *Tetramorium mixtum*, *Odontomachus haematodus* were observed on the soils of different plantations. *Solenopsis geminata* found as one of the invasive group on Brinjal of Egg plant (*Solanum sp.*). *Crematogaster subnuda* found on Mahogany tree (*Eucalyptus sp.*) and Tapioca plant (*Manihot esculenta*). The detailed list of ant fauna and the plantation area are given below,

Area of Plantations	Ant species observed	Remarks
Coconut tree (<i>Cocos nucifera</i>)	1. <i>Anoplolepis gracilipes</i> Smith 2. <i>Odontomachus haematodus</i> Linnaeus 3. <i>Polyrhachis rastellata</i> Latreille 4. <i>Pachycondyla sulcata</i> Mayr 5. <i>Paratrechina longicornis</i> Latreille	Nest of <i>Anoplolepis gracilipes</i> was found under the coconut tree and <i>Paratrechina longicornis</i> was observed on the tree; <i>Odontomachus haematodus</i> , <i>Polyrhachis rastellata</i> , and <i>Pachycondyla sulcata</i> were observed on the soil.
Banana plant (<i>Musa sp.</i>)	1. <i>Tapinoma sp.</i> 2. <i>Diacamma rugosum</i> Le Guillou 3. <i>Anoplolepis gracilipes</i> Smith 4. <i>Crematogaster rogenhoferi</i> Mayr 5. <i>Paratrechina longicornis</i> Latreille 6. <i>Camponotus sericeus</i> Fabricius	<i>Paratrechina longicornis</i> , <i>Tapinoma sp.</i> , <i>Crematogaster rogenhoferi</i> and <i>Anoplolepis gracilipes</i> observed on the plant. The remaining species, <i>Diacamma rugosum</i> and <i>Camponotus sericeus</i> observed from the soil.
Mango tree (<i>Mangifera sp.</i>)	1. <i>Oecophylla smaragdina</i> Fabricius 2. <i>Tetramorium mixtum</i> Forel 3. <i>Solenopsis geminata</i> Fabricius 4. <i>Camponotus sericeus</i> Fabricius 5. <i>Camponotus parius</i> Emery 6. <i>Pheidologeton affinis</i> Jerdon 7. <i>Diacamma rugosum</i> LeGuillou 8. <i>Paratrechina longicornis</i> Latreille	<i>Camponotus parius</i> , <i>Paratrechina longicornis</i> , <i>Oecophylla smaragdina</i> found on the tree. <i>Pheidologeton affinis</i> , <i>Diacamma rugosum</i> , <i>Solenopsis geminata</i> , <i>Tetramorium mixtum</i> were in soil.
Mahogany tree (<i>Eucalyptus sp.</i>)	1. <i>Crematogaster subnuda</i> Mayr	Nest found on tree
Yard long bean plant (<i>Vigna sp.</i>)	1. <i>Camponotus parius</i> Emery 2. <i>Diacamma rugosum</i> LeGuillou 3. <i>Camponotus sericeus</i> Fabricius 4. <i>Pheidologeton affinis</i> Jerdon	<i>Camponotus parius</i> cares aphids on the plant. The remaining species observed on the soil, beside the plant
Brinjal Egg plant (<i>Solanum sp.</i>)	1. <i>Solenopsis geminata</i> Fabricius	One of the remarkable finding, was this species attacked the fruit, by making nest under the base of the plant.
Pumpkin plant (<i>Cucurbita sp.</i>)	1. <i>Pachycondyla melanaria</i> Emery 2. <i>Crematogaster subnuda</i> Mayr	Nest of <i>Pachycondyla melanaria</i> was found in soil close to the plant, but the nest of <i>Crematogaster subnuda</i> did not found from the site.
Powder puff plant (<i>Calliandra sp.</i>)	1. <i>Tapinoma sp.</i> 2. <i>Camponotus mendax</i> Emery 3. <i>Camponotus sericeus</i> Fabricius	<i>Tapinoma sp.</i> and <i>Camponotus mendax</i> were observed on the flowers and tree branches. <i>Camponotus sericeus</i> was found under the tree in soil.
Tapioca (<i>Manihot esculenta</i>)	1. <i>Crematogaster subnuda</i> Mayr	Found on the tree
Cashew Plantation <i>Anacardium occidentale</i>	1. <i>Diacamma rugosum</i> Le Guillou 2. <i>Camponotus parius</i> Emery 3. <i>Paratrechina longicornis</i> Latreille 4. <i>Lophomyrmex quadrispinosus</i> Jerdon	Only <i>Paratrechina longicornis</i> was found on cashew trees and the remaining species were found on soil.
Spinach (<i>Basella sp.</i>)	1. <i>Monomorium mayri</i> Forel 2. <i>Pheidologeton affinis</i> Jerdon	Both the species were in the soil and there was no direct interaction with the plant.
<i>Gliricidia sp.</i>	1. <i>Camponotus parius</i> Emery	Observed in the plant
Unknown tree	1. <i>Crematogaster subnuda</i> Mayr	Nested under the skin of the tree

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