Diversity and Foraging of Ants (Formicidae) Inhabiting on Mango Trees from Sindh, Pakistan

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***Abstract*:** The ants are most diversified insects in the animal fauna; hence it is vital to know their diversity and habitats. It is due to their co existence within crops, vegetation and as their predatory role. The foraging is the main characteristic of ants in formicidae. But literature reveals that a few studied were carried out in the past. Because of this reason the study on diversity and foraging of ants (Formicidae) conceded, and started in April 2019 to December, 2020. All through, 10256 specimens were collected and sorted out into fifteen species, five genera five subfamilies, Formicinae, Ponerinae, Myrmicinae, Pseudomyrmicinae and Dolichoderinae. Their feeding strategies were known while using different baits like chicken visceral, sweets and insects placing on white paper sheets. Identification was done by literature and keys different entomologists.

Index Terms: Diversity; Foraging; Formicidae; Inhabiting; Mango trees; Sindh; Pakistan

I. INTRODUCTION

The relationships of only some animals are very imperative for agro ecosystem. For instance bees are famous for pollination of floweres, earth worms are well-known for the soil fertility and as natural plough, preying mantids and spiders fauna as biocontrol agents of nature with pest control, while house fly cleanses of debris etc alike the ants fauna achieve versatile and vital functions in the agro ecosystem for instance, they play their role as ecological sustainers, predators, scavengers, pollinators, soil turners mean soil fertility and sometimes pests. They are communal insects having a great diversity and foraging habitats. This study is support on the diversity and foraging behaviors of ants related with mango trees developed in Tando Allahyar, MirpurKhas, Matiari, Sanghar and Nuashahro Feroze Districts. No literature was found in respect of this project title but more relevant work was studied as shown in upcoming paragraph. Ants are called communal insects that fit in to family Formicidae and order Hymenoptera; (Asif et al., (2020; Asfiya et al., 2015; Drummond and Choate, 2011 and Jacquot et al., 2017). They are recognized to appear about 120 million years ago; (Johari et al., 2021; Kwon et al., 2014; Mark, and Guenard, 2017). Depending upon specific variant and habitat they are green, black, red or metallic body; (Perfecto and Sediles, 1992). They are hemi metallic insects having resourceful significance; (Pećarević et al., 2010). They are soil turners, sign for the situation of ecosystem, predators, pollinators and scavengers to important component of food chain; (Plowes et al., 2013). Each species of ant has soaring force on Biodiversity that generate sway directly or indirectly for development and destruction of ecosystem. Ants fauna were inadequately and little studied in Pakistan. This research work will open gate for new researcher for future studies on different pieces and parameters, especially in the biological control and the pest managements; (Reddy et al., 2016).

II. MATERIALS AND METHODS

Sindh is the center of Mango gardens, it is located a t 26° 21′ 0″ N, 68° 51′ 0″ in Pakistan. This study was taken from five districts and five selected sites of each district. The different districts were Matiari, Mirpurkhas, Tando Allahyar, Sanghar and Naushahro Feroze. The survey period was 2019 and 2020. The collection was done from the mango gardens on behalf of their activeness (morning, evening and night time). Hand picking method was adopted while using baits of sweets and chicken visceral and insects. Overall 10256 specimens were sorted out into fifteen species, six genera and five subfamilies.

Preferred specimen were arranged for laboratory work, these species were preserved into 80% ethanol along with few drops of glycerin

Fig .1,2: Collection of specimens by using different baits and Observation of foraging

Fig 3,4: Observation of foraging strategies of Ants from mango garden, day and night.

III. RESULTS

We have collected total number of samples 10256 specimens, the most abundant species Monomorium schurri and least abundant species Monomorium longi were recorded as shown in (Table. I). during the research 05 five unlike colonies of formicidae were studies from the reported mango garden sites. The most significant abiotic factors like humidity and temperature also measured (Table. III) in which six months data was measured which shows September was the warmer month having 38.9-39.4 average temperature in the mongo fields and have average humidity 76-85% in the air while minimum temperature was recorded in the month of April; have 33.9-35.00 maximum and 22.8-28.5 as minimum temperature with average 60-65% humidity. In Sindh this association of ants in the mango trees is presented first time. It is pragmatic research work from Sindh because previously research work was inadequate and need to wide range investigation Ants Fauna. Due to their huge diversity and diverse foraging habits of ants. As shown in the (Table. II) Foraging habits of ants is giving which shows that

mostly all ants are polyphagous, predators and scavengers, in both conditions all are beneficial for the mango garden and their association with mango trees is vital due to biological control agents and ecosystem sustainer.

Table. 1: Diversity of collected species of ants at different mango garden sites of different district

Name of Species	TA	MT	MK	SAN	NF	SP#
Camponotus compressus	+	+	+	+	+	683
C. confuccii	+	+	+	+	+	710
C. sericeus	-	+	+	+	+	742
C. maculates	_	+	_	+	+	513
C. oblongus	_	+	_	+	+	643
C. japonicas	-	+	+	+	+	654
Meranoplus bicolor	+	-	+	+	-	428
Poly rhachis hogsoni	+	+	+	_	+	815
Lioponera longitarsus	+	+	+	+	_	752
Pheidole neineri	+	+	_	+	+	623
Solenopsis germinates	+	+	+	+	_	833
Lasius alienus	+	+	+	+	_	540
Monomorium longi	+	+	+	+	_	203
M. schurri	+	+	+	+	+	981
Tetramorium Smithi	+	+	+	+	+	514
Total Specimens	**10256**					

*(+) presence & (-) absence of species of ants. While abbreviations used for major sites: TA= Tando Allahyar, MT= Matiari, MK= Mirpurkhas, SAN= Sanghar, NF= Nausharo Feroze.

Table. 2: Foraging status of ant species in the mango garden.

S#	Name of species	Foraging habits
01	*Camponotus confucii*	Often Ground feeder and stem dwelling insect's feeder like insects if come in their territory.
02	*C. confuccii*	Forage near by the stems of the mango trees and like arthropods
03	*C. compressus*	Often feed upon honeydew produced by treehoppers and insects.
04	*Polyrhachis hodgsoni*	Forage upon dead vegetative and non vegetative parts and rarely dead animals.
05	*Meranoplus bicolor*	Tree dwelling, mostly forage upon honeydew, mealworms, fly, mosquito, cricket and other arthropods
06	*C.blongus*	Polyphagous ant
07	*C. japonicus*	Often forage upon termites colonies and arthropods when they reached in their territory
08	*Monomorium longi*	Polyphagous ant
09	*Lasius alienus*	It forage upon exudates of root aphids and great scavenger
10	*Monomorium schurri*	Polyphagous
11	*Lioponera longitarsus*	Polyphagous predator
12	*Pheidole neinri*	Polyphagous scavenger

Table. 3: Six months recorded Humidity and Temperature data.

Month	Relative Humidity (%) Average	Temperature ℃ Average	
		Maximum	Minimum
April	60-65	33.9-35.00	22.8-28.5
May	61-66	35.8-37.7	23.7-26.8
June	64-67	37.6-39.8	26.8-36.7

July	70-85	37.00-40.8	34.6-37.9
August	79-91	37.9-40.8	31.9-36-35.7
September	76-85	38.9-39.4	32.7-34.8

IV. CONCLUSION

Diversity of ant's fauna inhabiting on the mango trees is fortunately richest in visited sites of Sindh. While their foraging associations have great impact on the mango garden due to their roles as (predator, carnivore, pollinator, scavenger, decomposer, soil aerator and gardener) of the mango trees. Ants exhibit major existence with vigorous nests (ant colonies) on the branches of mango trees and also in the roots of mango trees. Fifteen species, five genera five subfamilies (Formicinae, Ponerinae, Myrmicinae, Pseudomyrmicinae and Dolichoderinae) were reported and identified. Supremacy of weaver and carpenter ants indicated their significant role in food chain allied with the host trees.

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