



A Study On Insect Diversity In Thengapattanam Harbour

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Abstract: The present study was intend to collect, identify and determine the insect collection of Thengapattanam harbour. This is one of the fishing harbours in Kanniyakumari District. This is located on the South western coast of India bordering the Arabian Sea. It serves as a vital ecosystem, supporting various life forms, including insects. The insect diversity in Thengapattanam harbour is extensive, showcasing many species belonging to various orders and families. The diverse habitats within and around the harbour, including mangroves, salt marshes, and coastal areas, contribute to this richness. Insects in Thengapattanam harbour has evolved various adaptations to survive in dynamic coastal environments. During the study period of 3 months 15 species belonging to 15 families were recorded. It is observed that Chrysomelidae is the most dominant family and each family is dominated by separate species. These species play crucial roles in pollination, nutrient cycling, decomposition, and as food sources for other organisms.

Index Terms - Thengapattanam, harbour, ecosystem, species.

I. INTRODUCTION

India is one of the world's twelve mega diversity country. Insects contribute over half of all the recorded species and over three fourth of the estimated species, in the global. The total geographical area of the Kanyakumari district is about 167.184 hectares. It is purely agricultural and solely depends on its economy upon agricultural income The district is divided into five parts as Agastheeswaram, Thovalai, Kalkulam, Vilavancode, and Thiruvattar Taluks for the administrative convenience (Ramesh, 2018).

Thengapattanam derives its name from the abundance of coconut groves sprout along the vast estuary. The harbour has been an annual recipient of high rainfall from both the North-East and South-west monsoons. The South-western monsoon spans the months of June till September, and the North-Eastern monsoon period commences by the October and winds up in the mid or late December. On an average, the harbour receives 2100mm of rainfall with 104 rainy days. The summer is from the month of May to late June, is tropical dry and may reach a peak of 34 °C. The average Humidity in summer is around 74% percentage, while in June the humidity surfaces the 90% mark. The temperature during winter reaches a low of 20 °C. The winter season is marked by high precipitation and moderate rainfall. The harbour has evolved various adaptations to survive in dynamic coastal environments. They play crucial roles in pollination, nutrient cycling, decomposition, and as food sources for other organisms (Nagaraj *et al.*, 2023).

Arthropoda is the largest phylum of the Animal kingdom. In the intrinsic part of the earth's ecosystem, great insect biodiversity is present. Members of Insects are cosmopolitan as they live in highly diverse habitats such as aquatic, terrestrial, and areal. etc. So insect biodiversity accounts for a large ratio of our planet (Parihar and Rajani, 2022).

Insects that feed on dead trees or wood (saproxyllic insects) or decaying organic material (saprophagous insects) play an important role in nutrient cycling in forests. Freshwater habitats have received less attention than terrestrial and marine ecosystems. Stranded debris may provide food and shelter for both aquatic and terrestrial animals. Because of the insects and other organisms that are attached to it,

this beach wrack is an important foraging area for shorebirds (Balakrishnan *et al.*, 2014). Seasonal variation in the abundance of tropical insects is a common phenomenon (Kishimoto and Itioka, 2015).

The richness of tropical insect fauna worldwide is beyond expectations, as insects are the significant components of animal diversity in terms of the number of species in most habitats and ecosystems (Srivastava *et al.*, 2022). Nonetheless, only a few diversity studies consider insects although they are essential components in monitoring ecosystems (Klink *et al.*, 2022). To comprehend the need and conserve biological diversity, there has been interest in evaluating the richness and diversity of the Indian entomological fauna (Chandrakar, 2012).

The species diversity of insects in grassland is closely related to climate change, grazing conditions, vegetation communities, human activities, etc. The changing trend of species diversity of insects is different during grazing of large herbivores. Estimates of the total number of insect species or those within specific orders are often highly variable. Globally, averages of these predictions estimate there are around 1.5 million beetle species and 5.5 million insect species, with around 1 million insect species currently found and described (Jankielsohn, 2018).

II. REVIEW OF LITERATURE

Prakash Chandra Joshi *et al.*, (2008) studied the insect diversity along an altitudinal gradient in pindari forests of western Himalaya, India. Popoola and otalekor (2011) analyzed the aquatic Insects, communities of Awba reservoir and its physico-chemical properties. Belamar and Jadesh (2012) conducted a Belamkar preliminary study on Abundance and diversity of Insects Fauna in Gulbarga District Karnataka. Khan (2013) conducted abundance and diversity of insect pests and Natural enemies in coastal Rice habitat. Anitha and G. Kumar (2013) analysed the seasonal variations in physico-chemical parameters of Thengapattanam estuary, South west coastal zone of Tamil Nadu, India.

Mohan and Padmanaban (2013) conducted a study on the species diversity, Richness and evenness of selected insect orders in Erode district, Tamil Nadu, India. Balakrishnan and Srinivasan (2014) analysed the Diversity of some insect fauna in different coastal habitat of Tamil Nadu, South east coast of India. Shah and Mitra (2014) analysed the preliminary study of insect fauna of the proposed city forest in Andaman, Nicobar Islands, India. Sankarganesh (2017) reviewed the Insect Biodiversity of teaming millions. Ramesh (2018) described down fall of agriculture in Kanyakumari district. Revathi *et al.*, (2018) studied diversity of cockroaches in Velliangiri hills of Coimbatore district in southern Western Ghats of Tamil Nadu, India.

Adelusi *et al.*, (2018) studied the diversity and abundance of species in Makurdi, Benue state, Nigeria. Ramar *et al.*, (2018) observed the Biodiversity of insects and distribution pattern from Sinumallai Hills, Eastern Ghats, Tamil Nadu, South India. Anbagalagan (2020) studied the Insects diversity and species distribution in rice field of Thanargambadi Taluk, Nagapattinam district, Tamil Nadu, India. Singh *et al.*, (2021). Studied of insect diversity in different habitats found in nearby locality of Raipur, Chhattisgarh. Fathima *et al.*, (2021) Assessment of Insect diversity in paddy fields of Uthamapalayam, Theni district, Tamil Nadu, India. Jeyaprabha *et al.*, (2023) studied the insect diversity in sarah Tucker college campus, Tirunelveli, Tamil Nadu. Anitha *et al.*, (2023) studied the biodiversity of spiders in Kanyakumari District, Tamil Nadu, India.

III. MATERIALS AND METHODS

3.1 Study Area:

This study was conducted in Thengapattanam harbour (Lat.8.34N; Long 77⁰18¹ E) representing the coastal environments of the southern western coast of India, bordering the Arabian sea to the west, Western Ghats to the north, and vast fertile plains with intermittent rocky hills to the east.

3.2 Species identification:

The collected insects were identified based on Merritt and Cummins (1988), Domingues *et al.* (1992), Trivino-Strixino and Strixino (1995) and Cheng and Hashimoto (1978).

3.3 Sampling Procedure:

Direct observation method is used for this study.

3.4 Survey Method:

The survey method is the practice of gathering data for a study by asking people questions related to your research. Typically, researchers survey people who have particular knowledge, insights or experiences related to the study.

IV. RESULT

A total of 15 species and 15 families were recorded (Table 1, Table 2 and Table 3) in the study area during the study period of December 2023 to February 2024. Indian Green Tortoise in the Chrysomeloidae family is recorded as high during the month of December, Black Clock Beetle in the Carabidae family is high during the month of January and Red cotton bug in the Pyrrhocoridae family is high during the month of February. Carpenter bee in Apidae family is very low throughout the study period.

Table 1: Insects in the Thengapattanam harbour during December 2023

No.	Common Name	Family	Scientific Name	No.of Collection
1	Golden lady Bug	Coccinellidae	Coccinella septempunctata	7
2	Robberfly	Asilidae	Dysmachus trigonus)	3
3	Sparkling northern Jumping spider	<u>Salticidae</u>	Cosmophasis micarioides	2
4	Pallid – winged grasshopper	Acridiae	Trimerotropis pallidipennis	4
5	Black Clock Beetle	Carabidae	Pterostichus madidus	5
6	Flesh fly	Sarcophagidae	<u>Sarcophaga bercaea</u>	5
7	Red paper wasp	Vespidae	Polistes carolina	2
8	Red cotton bug	Pyrrhocoridae	Dysdercus cingulatus	3
9	Carpenter bee	Apidae	Xylocopa violacea	1
10	Yellowtail moth	Erebidae	Euproctis similis	3
11	Cowpea aphid	Aphididae	Aphis craccivora	4
12	House Cricket	Gryllidae	Acheta domesticus	6
13	Indian Green Tortoise	Chrysomeloidae	Chiridopsis bipunctata	11
14	Stilt bugs	Bergtidae	Jalysus whikhami Van Duzee	2
15	Human faced stink bug	Pentatomidae	Cataanthus	2

Table 2: Insects in the Thengapattanam harbour during January 2024

No.	Common Name	Family	Scientific Name	No.of Collection
1	Golden lady Bug	Coccinellidae	Coccinella septempunctata	5
2	Robberfly	Asilidae	Dysmachus trigonus)	0
3	Sparkling northern Jumping spider	<u>Salticidae</u>	Cosmophasis micarioides	2
4	Pallid – winged grasshopper	Acridiae	Trimerotropis pallidipennis	3
5	Black Clock Beetle	Carabidae	Pterostichus madidus	8
6	Flesh fly	Sarcophagidae	<u>Sarcophaga bercaea</u>	3
7	Red paper wasp	Vespidae	Polistes carolina	1
8	Red cotton bug	Pyrrhocoridae	Dysdercus cingulatus	2
9	Carpenter bee	Apidae	Xylocopa violacea	0
10	Yellowtail moth	Erebidae	Euproctis similis	2
11	Cowpea aphid	Aphididae	Aphis craccivora	4
12	House Cricket	Gryllidae	Acheta domesticus	6
13	Indian Green Tortoise	Chrysomeloidae	Chiridopsis bipunctata	7
14	Stilt bugs	Bergtidae	Jalysus whikhami Van	0

			Duzee	
15	Human faced stink bug	Pentatomidae	Cataanthus	2

Table 3: Insects in the Thengapattanam harbour during February2024

No.	Common Name	Family	Scientific Name	No.of Collection
1	Golden lady Bug	Coccinellidae	Coccinella septempunctata	5
2	Robberfly	Asilidae	Dysmachus trigonus)	1
3	Sparkling northern Jumping spider	<u>Salticidae</u>	Cosmophasis micarioides	2
4	Pallid – winged grasshopper	Acrididae	Trimerotropis pallidipennis	2
5	Black Clock Beetle	Carabidae	Pterostichus madidus	4
6	Flesh fly	Sarcophagidae	<u>Sarcophaga bercaea</u>	5
7	Red paper wasp	Vespidae	Polistes carolina	0
8	Red cotton bug	Pyrrhocoridae	Dysdercus cingulatus	9
9	Carpenter bee	Apidae	Xylocopa violacea	1
10	Yellowtail moth	Erebidae	Euproctis similis	2
11	Cowpea aphid	Aphididae	Aphis craccivora	4
12	House Cricket	Gryllidae	Acheta domesticus	3
13	Indian Green Tortoise	Chrysomeloidae	Chiridopsis bipunctata	8
14	Stilt bugs	Bergtidae	Jalysus whikhami Van Duzee	1
15	Human faced stink bug	Pentatomidae	Cataanthus	1

V. DISCUSSION

Insects ecology is the scientific study of how insects, individually or as a community, interact with the surrounding environment or ecosystem since they have a wide distribution (Duane, 2006). Insects constitute a remarkably species group of organisms attributed mainly to their small size, which allows them to occupy niches not available to larger organisms. Insect abundance is crucial because it regulates insect communities' ecosystems (Savopoulous et al., 2012). Insects are critical natural resources in ecosystems, in addition to their role as efficient pollinators and natural/biological pest control agents (Strong et al., 1984; Buchs, 2003). Insect species are critical pointers in ecosystem management and their diversity and abundance play significant roles in the functioning of ecosystems. Insects influence the nutrient and energy flow of ecosystems in many ways, most essentially as decomposers.

Similarly, species diversity is a parameter of community structure involving species richness and their abundance for the given taxa (Wang et al., 2000) and that the reduction in species richness could be caused by the loss of a rare species and the reason for a decline in species diversity could be the increased dominance of one species (Price, 1984). Henceforth, species diversity and complexity of association among species are essential to the community's stability (Van Emden & Williams, 1974). Biological communities have a degree of organization represented by their specific abundance distribution or relative frequency of the environment's species. The biological diversity in one biological community possesses two components: species richness (existing species number) and homogeneity, which depends on the larger or smaller uniformity of the distribution frequency of extant species (Hurlbert, 1971). The importance of diversity indices is their application in monitoring studies of biological communities' dynamics and structural change detection when the community environment is modified, and the species have to adapt to the modifications to contribute to the conservation of biodiversity in agriculture ecosystems (South wood, 1995).

This research paper identifies that insects of almost all major order found in the study area and all these insects show different types of adaptations. Insects are unique creatures and they are adapted to all environments. Researchers have found about a hundred types of insects in this area.

VI. CONCLUSION

In this study, 15 species belonging to 15 families were recorded during the study period of December 2023 to February 2024. The family Chrysomelidae is the most dominant family in the study area during the study period. During the study period of three months December 2023 to February 2024 are rib in species richness. Indian Green Tortoise occupies a major position in the Chrysomelidae family as it is the most dominating species of the total species observed. Apidae is the reserved family which comprises very small values in the entire study period.

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