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A preliminary study of insect fauna of the proposed city forest in Andaman & Nicobar Islands, India

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Abstract

City forests are maintained for greening the city and also for recreational and research purposes. A complete floral and faunal information is required to preserve the biodiversity of a city forest. In this respect, a preliminary study of insect diversity of the proposed city forest area in Andaman and Nicobar Islands was carried out during September 2011. A total of 53 species of insects belonging to six orders and twenty families were recorded. Four endemic species were recorded during the study period namely *Euploea andamanensis* Cramer, *Elymnias cottonis cottonis* Hewitson, *Parthenos sylvia roepstorffii* (Moore) and *Hypsa andamana* Moore.

Key words: City forest, insect diversity, Andaman and Nicobar Islands.

1. Introduction

Insects play major roles in functioning of terrestrial and freshwater ecosystems. Their diversity can be attributed to the extensive interactions with plants through herbivory^[1] and pollination^[2]. The insects decompose decaying organic material thus they influencing energy flow of ecosystem. They are of economic value and also important as prey, predators and parasitoids. The proposed city forest of Andaman and Nicobar Islands is located between 11°39'24" N & 92°44'30" E behind Joggers Park of Port Blair city (Fig.1), the entrance of city forest (Fig. 2). It measures 23.29 ha land area. The area has been transferred by the Revenue Department in favor of Forest Department (vide Order No.184 dt.15/2/2006) in lieu of forest land diverted for construction of road from Campbell Bay to Shastri Nagar in Great Nicobar Island for compensatory afforestation with the provision for establishment of Botanical Garden as per the provision under Indian Forest (Conservation) Act, 1980. The establishment of this city forest aims to provide scope for botanical research and to fulfil recreation purposes. The topography of city forest is very undulating having two prominent hillocks and seven ridges. The altitude of the highest point is 90 metres. The ridges have maximum gradient between 50° to 60° and slope steeply towards Dilthaman Tank (Fig. 2) which is the drainage basin of all the ridges. The vegetation is supplemented with Dipterocarpus trees, ferns, wild mushrooms and grasses grown in the open fields. Climate is humid- tropical. There are many published works on the insect diversity of Andaman & Nicobar Islands^[3-14] but in particular nothing has been reported from the proposed city forest area.

In the present work insect diversity of the proposed City forest in Andaman and Nicobar Islands has been studied. Their ecological significance is also incorporated in this study.

2. Materials and methods

The survey was conducted in the month of September, 2011. A ten members team sampled the area i.e., park boundary, trails, ridges and streams. The insects were randomly collected at day time between 6.00 a.m. to 11.00 a.m. for two consecutive days by sweeping butterfly net, beating vegetation and handpicking method. The nocturnal insects were collected between 5.30 p.m. to 9.00 p.m. by using light trap (a white screen and an 80 Watt CFL lamp operated by Honda mini generator). Most of the insects especially Lepidopteron insects were photographed and identified in the field itself. Only doubtful specimens were collected, killed by putting them in killing bottle containing ethyl acetate and brought to the laboratory in insect envelopes. Soft bodied insects like Hymenopterans and some dipterans etc. were collected and preserved in glass vials containing 90 percent ethyl alcohol. The collected specimens were identified by Scientists of Z.S.I., Kolkata.

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The specimens were deposited in National Zoological Collection, Zoological Survey of India, Port Blair.



Fig 1: Port Blair City map and location of the Jogger’s Park

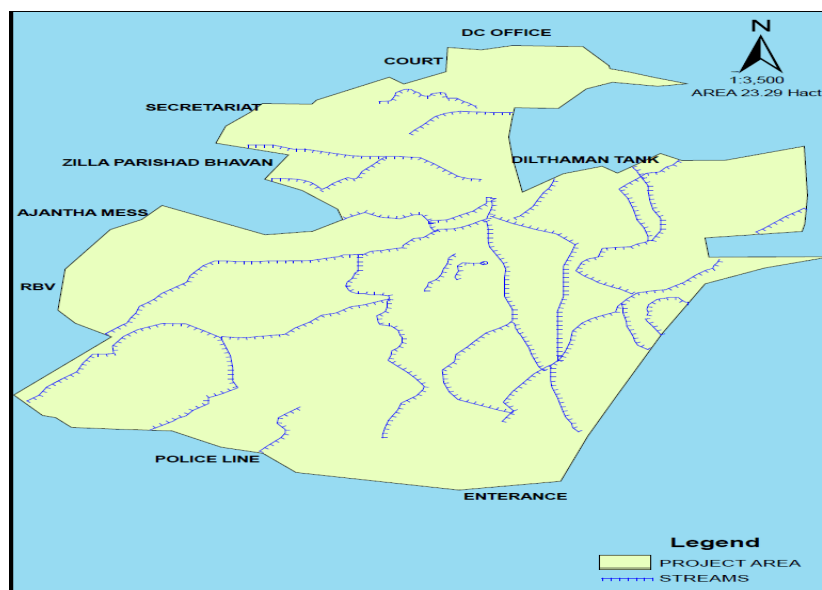


Fig 2: The location and area of the City forest area

Table 1: List of species reported from Proposed City Forest, Port Blair and their ecological role.

No.	Order	Family	Species	Remarks				
				I	II	III	IV	V
1	Lepidoptera	Nymphalidae	<i>Cethosia cyane</i> Drury		+			
2			<i>Junonia lemonias</i> Evans		+			
3			<i>Junonia atlites</i> Linnaeus		+			
4			<i>Orsotriaena medus medus</i> Fabricius				+	
5			<i>Mycalasis mineus</i> Linnaeus				+	
6			<i>Neptis hylas andamana</i> Moore				+	
7			<i>Euploea andamanensis</i> Cramer		+			+
8			<i>Elymnias cottonis cottonis</i> Hewitson				+	+
9			<i>Appias albina</i> (Boisduval)		+			
10			<i>Parthenos sylvia roepstorffii</i> (Moore)		+			+
11		Pieridae	<i>Ixias pyrene</i> Linnaeus		+			
12			<i>Eurema hecabe</i> Linnaeus		+			
13			<i>Catopsilia pomona</i> Fabricius		+			
14		Lycaenidae	<i>Everes</i> sp.	-	-	-	+	-
15			<i>Jamides celeno</i> (Cramer)		+			
16		Papilionidae	<i>Papilio polytes</i> Linnaeus		+			
17		Hesperidae	<i>Potanthus</i> sp.		+			
18			<i>Pelopidas mathias</i> Fabricius		+			
19		Noctuidae	<i>Mocis undata</i> Fabricius			+		
20			<i>Sypna</i> sp.			+		
21			<i>Thyas coronata</i> (Fabricius)			+		
22		Amatidae	<i>Amata</i> sp.			+		
23		Hypsidae	<i>Asota caricae</i> Fabricius			+		
24			<i>Hypsa andamana</i> Moore			+		+
25	Odonata	Libellulidae	<i>Brachydiplax chalybea chalybea</i> Brauer	+				
26			<i>Crocothemis servilia servilia</i> (Drury)	+				
27			<i>Diplacodes trivialis</i> (Rambur)	+				
28			<i>Lathrecista asiatica asiatica</i> (Fabricius)	+				
29			<i>Orthetrum Sabina Sabina</i> (Drury)	+				
30			<i>Orthetrum pruinosum</i> (Rambur)	+				
31			<i>Rhyothemis variegata variegata</i> (Linnaeus)	+				
32			<i>Tramea limbata similata</i> (Rambur)	+				
33			<i>Trithemis</i> sp.	+				
34			<i>Brachythemis contaminata</i> (Fabricius)	+				
35			<i>Potamarcha congener</i> Rambur	+				
36		Coenagrionidae	<i>Agriocnemis pygmaea</i> (Rambur)	+				
37	Hymenoptera	Apidae	<i>Apis dorsata</i> Fabricius		+			
38			<i>Apis cerana indica</i> Fabricius		+			
39		Formicidae	<i>Odontoponera transversa</i> (Smith)	+				
40			<i>Cataulacus granulatus</i> (Latreille)	+				
41			<i>Polyrhachis simplex</i> Mayr	+				
42			<i>Pheidole longipes</i> (Latreille)	+				
43		Eumenidae	<i>Eumenes petiolata</i> Fabricius	+				
44	Coleoptera	Scarabaeidae	<i>Scarabaeus laticollis</i> Linnaeus				+	
45			<i>Anomala dorsalis</i> Fabricius			+		
46		coccinellidae	<i>Verania discolor</i> (Fabricius)	+				
47		Dytiscidae	<i>Eretes sticticus</i> (Linnaeus)	+				
48	Diptera	Stratiomyidae	<i>Sargus metallinus</i> (Fabricius)		+			
49		Muscidae	<i>Musca (Musca) domestica</i> Linnaeus		+			
50			<i>Musca (Byomya) sorbens</i> Wiedemann		+			
51		Culicidae	<i>Culex</i> sp.		+		+	
52	Orthoptera	Acrididae	<i>Spathosternum prasiniferum prasiniferum</i> Walker			+		
53			<i>Oxya hyla hyla</i> Serville			+		

I= Predator of insect larvae and soft body insects, II= Pollinator of flowering plants, III= Pest of forest plants, IV= other ecological services of beneficial nature, V= Endemic to Andaman and Nicobar Islands.

3. Results and Discussion

Altogether 53 species of insects belonging to 50 genera of 20 families under 6 orders have been recorded (Table.1). Of them predominant order was Lepidoptera (45%, 24 species), followed by Odonata (23%, 12 species), Hymenoptera (13%, 7 species), Coleoptera and Diptera (each 8%, each 4 species) and Orthoptera

(4%, 2 species) (Table2; Fig.3).

Among the Lepidoptera the family Nymphalidae was found dominant with 10 species, Pieridae and Noctuidae each shared 3 species, Lycaenidae, Hesperidae and Hypsidae each with 2 species and Papilionidae and Amatidae each contained only one species. These included five endemic species, namely, *Neptis hylas*

andamana Moore, *Euploea andamanensis* Cramer, *Elymnias cottonis cottonis* Hewitson, *Appias albina* (Boisduval), *Parthenos sylvia roepstorffii* (Moore) and *Hypsa andamana* Moore. Of the Odonates the family Libellulidae was dominant with 11 species and Coenagrionidae contained only one species. The family Formicidae included highest 4 species among Hymenopterans, the families Apidae and Eumenidae contained 2 species and one species

respectively. Among Coleoptera the family Scarabaeidae dominated with four species followed by the families Coccinellidae and Dytiscidae each with one species. Dipteran diversity was enriched with the families Muscidae with 2 species and Stratiomyidae and Culicidae each with 1 species. Orthoptera was represented by only family Acrididae with 2 species.

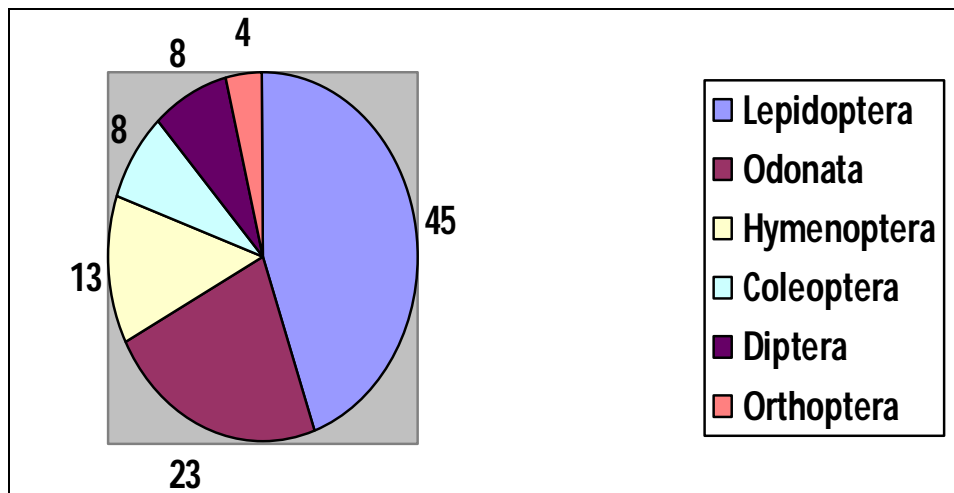


Fig 3: Distribution (%) of insect species in City forest (Order-wise)

Being a very short term trial study only 53 species could be reported which constitutes almost 2% of total known insects' species from Andaman and Nicobar Islands^[15]. The presence of 24 species of Lepidoptera reflects the availability of suitable habitats and ecologically favorable conditions. Thirteen species of butterflies were recognized as pollinators of different angiosperms and six species of moths as forest pests (Table 1). Further the results indicate the presence of suitable food plants and hosts for butterflies and moths in the study area. Comparatively richer Odonate diversity (12 species) reveals the better quality of wetland habitat needed for the survival of both prey and predators. This reflects that both habitat and species should be taken in to consideration for long term conservation. Hymenopterans (7 species) were third in diversity after Odonata. Five species of them were recognized as predators and rest two were effective pollinators (Table. 1). These insects were found to inhabit variety of micro habitats which again indicates the need to conserve the ecosystem. Beetles other than their aesthetic value and remarkable diversity are beneficial for ecosystem as well as to human beings. In addition to providing food for other animals, beetles play other important roles in the environment. During the present study 4 species of Coleoptera were recorded from the study area, of which one acted as pest and two as predators (Table 1). All the 4 species of Diptera found in this area were flower visitors and pollinators (Table. 1). Among the recorded Orthoptera one species was found as pest (Table. 1). The species falling in other categories (Table1) are also equally important in view of their ecological role in nature.

4. Conclusion

It can be concluded that the study area is positively a miniature form of tropical rain forest, particularly in respect to insect diversity which needs conservation at local, regional and national levels.

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