

Macrohymenopteran Fauna of the Silent Valley National Park, Kerala, India

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Abstract

One hundred and eight species of macrohymenopterans belonging to fifteen families and fifty six genera were recorded from the Silent Valley National Park. The families Sphecidae, Formicidae, Pompilidae and Apidae contained maximum number of species. The insects were collected from five habitats, *viz.*, tropical evergreen forest, subtropical broad leaved hill forest, montane wet temperate forest, low altitude grasslands and high altitude grasslands. Of the various species recorded in this study, seven genera and eleven species are new reports for Kerala and seven species are new reports for India.

সারসংক্ষেপ

সাইলেন্ট ভ্যালি ন্যাশনাল পার্ক থেকে পনরটি পরিবারভুক্ত ছাপানুটি গণের একশ আট প্রজাতির ম্যাক্রোহাইমেনোপ্টেরান পোকা রেকর্ড করা হয়েছে। স্ফেসিডি, ফর্মিসিডি, পমপিলিডি এবং এপিডি পরিবারভুক্ত প্রজাতিগুলোর সংখ্যা বেশি ছিল। পাঁচটি আবাসস্থল যথা গ্রীষ্মমন্ডলীয় চিরসবুজ বন, আধা-গ্রীষ্মমন্ডলীয় চওড়া পাতার পাহাড়ী বন, পার্বত্য অর্ধ নাতিশীতোষ্ণ বন, নিম্ন উচ্চতার তৃণভূমি এবং উঁচু উচ্চতার তৃণভূমি থেকে পোকাগুলো সংগৃহীত হয়। এ প্রবন্ধে যে সব পোকার বর্ণনা আছে তাদের মধ্যে সাতটি গণ এবং এগারটি প্রজাতি কেরালার জন্য এবং সাতটি প্রজাতি ভারতের জন্য নতুন রেকর্ড করা হয়েছে।

Key words : Hymenoptera, India, Kerala, Silent Valley

Introduction

Hymenoptera which are the most evolved of all the insects are very diverse in their habits (Lasalle and Gauld 1993). In forest ecosystems they play important roles like promoting diversity among plants by helping in pollination and seed dispersion and regulating the population size of other organisms by their predatory and

parasitic habits. Because of their role in the functioning of the ecosystem, there is considerable interest on species found in specific habitats.

Pioneer works on the Hymenopteran fauna of India have been made by Bingham (1897, 1903). Subsequently several workers have made studies on the hymenopteran fauna at various localities in the country (Nurse 1914, Dutt 1921, Lal 1939).

However, very little has been done on these lines in Kerala, except for a few studies by workers like Narendran (1989, 1994) and Sudheendrakumar (1984, 1985). This paper forms part of a study carried out during 1994-1997 on the insect fauna of the Silent Valley National Park, Kerala.

Materials and methods

Study area

The Silent Valley National Park which forms the core area of the Nilgiri Biosphere Reserve is located in the Palghat District of Kerala between latitude 110°3' and 110°15' N and longitude 76°23' and 76°30' E. It is situated on a plateau of about 1000 m and is 90 km² in extent. Surrounded by steep slopes on all sides, the area is practically isolated from the outside world. This has contributed to the area remaining more or less undisturbed. Four types of habitats are encountered in Silent Valley, viz., west coast tropical evergreen forest (up to 1200 m), sub-tropical broad leaved hill forest (up to 1800 m), montane wet temperate forest (1800 m and above) and grasslands. Grasslands are of two types - low altitude (<1500 m) and high altitude (>1500 m) grasslands.

Methods

The insects were collected from different habitats using sweep net and by direct catch. Insects recorded from different habitats were preserved separately. Identification was carried out by referring to relevant literature and comparing the specimens with materials available in the national collections of Zoological Survey of India (ZSI) and Indian Agricultural Research Institute (IARI). All identifications were further confirmed by the fourth author who is an authority on many families of Hymenoptera. The major references aided the identification include Bingham (1897, 1903), Bohart and Menke (1976) and Gauld and Mitchell (1981).

Results and discussion

A total of 130 species of Hymenoptera were collected during the study period of which 108 species belonging to 15 families and 56 genera were identified. Maximum number of species collected belonged to the families Sphecidae (20 species), Formicidae (17 species), Apidae (13 species) and Pompilidae (13 species). Braconidae (1) and Colletidae (1) contained least number of species. With regard to distribution, the maximum number of species was collected from the tropical wet evergreen forests (106 species) followed by the sub-tropical broad leaved hill forests (72 species) and the low altitude grasslands (53 species). Least number of species collected was from the high altitude grasslands (8 species) and the montane wet temperate forests (9 species).

Of the various species collected from the tropical evergreen forest habitat in Silent Valley, 12 species were found to be highly specific to this habitat (Table 1). This included *Eumenes petiolata* Fb., *Anmatomes* sp., *Anpulex compressa* Fb., *Crematogaster* sp., *Cardiochile* sp., *Leptophion* sp., *Pseudagenia blanda* Guer, and *Salius* sp. Most of the insects collected from this habitat belonged to the families Sphecidae and Formicidae.

No specificity was observed in the species found in the sub-tropical broad leaved hill forests and low altitude grasslands. In the sub-tropical broad leaved hill forest, maximum number of species belonged to the families Sphecidae (14), Apidae (10) and Formicidae (9). The species like *Thyreus* sp., *Compsomeris prismatica* Smith, *Megascolia* sp., *Animophila atripes* Smith, *Sphex fulvo-hirtus* Bingham, *Polistes hebraeus* Fb. and *Gotra* sp. were very common in this habitat. In the low altitude grasslands, 53 species belonging to 11 families were encountered. The families Apidae (13), Formicidae (9) and Pompilidae (8) contained more number of species. *Coelioxys cuneatus* Smith, *Nomia thoracica* Smith, *Sphex praedator leutipennis* Mocsary, *Pompilus cameroni* Bingham and *Salius caerulipennis* Sauss. Were very commonly found in this habitat.

Table 1. Hymenoptera species and their distribution in different habitats in Silent Valley.

Insect species	Habitat				
	TEF	SBLHF	MWTF	LAG	HAG
APIDAE					
<i>Apis dorsta</i> Fb.	*	*	*	*	*
<i>A. indica</i> Fb.	*	*	*	*	*
<i>A. florea</i> Fb.	*	*	*	*	*
<i>Apis</i> sp.	*	*	-	*	-
<i>Coelioxys cuneatus</i> Smith +	*	-	-	*	-
<i>Thyreus ramosa</i> Lep.+	*	*	-	*	-
<i>Thyreus</i> sp.	*	*	-	*	-
<i>Thyreus</i> sp.	*	*	-	*	-
<i>Thyreus</i> sp.	*	-	-	*	-
<i>Thyreus</i> sp.	*	*	*	*	*
<i>Nomia elliotii</i> Smith++	*	*	*	*	*
<i>N. thoracica</i> Smith+	*	-	-	*	-
<i>Psithyrus</i> sp.	*	*	-	*	-
XYLOCOPIDAE					
<i>Xylocopa dissimilis</i> Lep.	*	*	-	*	-
<i>X. verticalis</i> Lep.	*	*	-	*	-
<i>X. amethystina</i> Fb.	-	-	*	-	*
ANTHOPHORIDAE					
<i>Anthophora niveocincta</i> Smith	*	*	-	*	-
<i>A. zonata</i> (Lin.)	*	*	*	*	*
<i>A. confusa</i> Smith	*	-	-	*	-
<i>Ceratina unimaculata</i> Smith++	*	*	-	*	-
MEGACHILIDAE					
<i>Megachile lanata</i> Fb.	*	*	*	*	*

Table 1. Contd.

Insect species	Habitat				
	TEF	SBLHF	MWTF	LAG	HAG
<i>M. carbonaria</i> Smith ⁺⁺	*	*	-	*	-
<i>M. quartinae</i> Gribodo ⁺	*	*	-	*	-
COLLETIDAE					
<i>Hylaeus feai</i> (Vachal) ⁺⁺	*	-	-	*	-
EUMENIDAE					
<i>Eumenes conica</i> Fb.	*	-	-	-	-
<i>E. flavopicta</i> Blanch	*	*	-	-	-
<i>E. petiolata</i> Fb.	*	-	-	-	-
<i>Eumenes</i> sp.	*	*	-	-	-
<i>Odynerus fragilis</i> Smith ⁺	*	-	-	*	-
<i>Rhynchium brunneum</i> (Fb.)	*	*	-	-	-
SCOLIIDAE					
<i>Compsomeris prismatica</i> Smith ⁺⁺	*	*	-	-	-
<i>Compsomeris</i> sp.	*	*	-	-	-
<i>Megascolia</i> sp. nr. <i>azuria</i> ⁺⁺	*	*	-	-	-
<i>Megascolia</i> sp.	*	*	-	-	-
<i>Scolia carbonaria</i> Sauss. ⁺⁺	*	*	-	-	-
<i>S. aureipennis</i> Lep.	*	*	-	-	-
SPHECIDAE					
<i>Anmatomes</i> sp.	*	-	-	-	-
<i>Ampulex compressa</i> Fb.	*	-	-	-	-
<i>Ammophila laevigata</i> Smith	*	*	-	*	-
<i>A. atripes</i> Smith	*	*	-	*	-
<i>Chalybion bengalense</i> Dahl.	*	*	-	-	-

Table 1. Contd.

Insect species	Habitat				
	TEF	SBLHF	MWTF	LAG	HAG
<i>Chlorion lobatum</i> Fb.	*	*	-	-	-
<i>Cerceris</i> sp. nr. <i>unifasciata</i> **	*	*	-	-	-
<i>Cerceris</i> sp.**	*	*	-	-	-
<i>Larra maura</i> Fb.	*	*	-	-	-
<i>L. erratica</i> Bingh.	*	*	-	-	-
<i>Sceliphron javanum nalandicum</i> Lep.	*	*	-	*	-
<i>S. coromandelicum</i> (Lep.)	*	-	-	*	-
<i>S. madraspatanam madraspatanam</i> Fb.	*	-	-	*	-
<i>Sphex argentatus</i> Fb.	*	*	-	-	-
<i>S. praedator leutipennis</i> Mocsary	*	-	-	*	-
<i>S. nigripes</i> Smith	*	*	-	-	-
<i>S. sericius</i> Fb.	*	*	-	-	-
<i>S. fulvo-hirtus</i> Bingh.*	*	*	-	-	-
<i>Trypoxylon errans</i> Sauss.	*	-	-	*	-
<i>T. absonator</i> Smith	*	*	-	-	-
CHRYSIDIDAE					
<i>Stilbum cyanurum</i> Forster	*	*	-	*	-
<i>Trichrysis lusca</i> Fb.	*	*	-	-	-
VESPIDAE					
<i>Vespa cincta</i> Fb.	*	*	-	-	-
<i>Rhopalidia ferruginea</i> Fb.**	*	*	-	-	-
<i>Rhopalidia</i> sp.**	*	*	-	-	-
<i>Polistes hebraeus</i> Fb.**	*	*	-	-	-
<i>Polistes</i> sp.**	*	*	-	-	-
<i>Polybia</i> sp.	*	*	-	-	-

Table 1. Contd.

Insect species	Habitat				
	TEF	SBLHF	MWTF	LAG	HAG
POMPILIDAE					
<i>Ceropales</i> sp.	*	-	-	*	-
<i>Pompilus cameroni</i> Bingh.+	*	-	-	*	-
<i>P. pedestris</i> Smith**	*	*	-	*	-
<i>Pompilus</i> sp.	*	*	-	-	-
<i>Pompilus</i> sp.	*	-	-	*	-
<i>Pseudagenia blanda</i> Guer.**	*	-	-	-	-
<i>Pseudagenia</i> sp.**	*	-	-	-	-
<i>Salius fulvipennis</i> Fb.**	*	-	-	*	-
<i>S. flavus</i> Fb.	*	*	-	-	-
<i>S. aureosericeus</i> (Guer.)	*	*	-	*	-
<i>S. praestabilis</i> Bingh.+	*	-	-	*	-
<i>S. caerulipennis</i> Sauss.**	*	-	-	*	-
<i>Salius</i> sp.	*	-	-	-	-
BRACONIDAE					
<i>Cardiochile</i> sp.	*	-	-	-	-
ICHNEUMONIDAE					
<i>Enicospilus vastator</i> (Smith)	*	*	-	-	-
<i>Enicospilus</i> sp.	-	-	*	-	-
<i>Gotra marginata</i> (Br.)	*	*	-	-	-
<i>Gotra</i> sp.	*	*	-	-	-
<i>Leptophion</i> sp.	*	-	-	-	-
<i>Netelia</i> sp.	*	*	-	-	-
<i>Symplecis</i> sp.	*	*	-	-	-
<i>Xanthopimpla</i> sp.	*	*	-	-	-

Table 1. Contd.

Insect species	Habitat				
	TEF	SBLHF	MWTF	LAG	HAG
FORMICIDAE					
<i>Camponotus</i> sp.	*	-	-	*	-
<i>Camponotus</i> sp.	*	-	-	-	-
<i>Cataulacus taprobanae</i> Smith ⁺⁺	*	*	-	-	-
<i>Crematogaster</i> sp.	*	-	-	-	-
<i>Harpegnathos saltator</i> Jer.	*	*	-	*	-
<i>Leptogenys</i> sp.	*	-	-	-	-
<i>Myrmicaria</i> sp.	*	-	-	*	-
<i>Oecophylla smaragdina</i> Fb.	*	*	-	*	-
<i>Pheidologiton diversus</i> Jer.	*	*	-	*	-
<i>P. affinis</i> Jer.	*	*	-	*	-
<i>Plagiolepis longipes</i> Jer.	*	-	-	*	-
<i>P. rothmeyji</i> Forel ⁺⁺	*	*	-	-	-
<i>Platythyrea</i> sp.	*	*	-	-	-
<i>Polyrhachis mayri</i> Roger	*	*	-	-	-
<i>P. illaudata</i> Wlk.	*	-	-	*	-
<i>Tetraoponera rufonigra</i> Jer.	*	*	-	-	-
<i>Tetraoponera</i> sp.	*	-	-	*	-
MUTILLIDAE					
<i>Mutilla semiaurata</i> Smith ⁺⁺	*	-	-	*	-
<i>M. cicatrificera</i> Andre ⁺⁺	*	*	-	*	-
<i>Mutilla</i> sp. ⁺⁺	*	*	-	*	-
<i>Mutilla</i> sp. ⁺⁺	*	-	-	*	-
<i>Mutilla</i> sp. ⁺⁺	*	*	-	-	-

Note: * Present, - Absent; + New to India; ++ New to Kerala; TEF - Tropical Evergreen Forest; SBLHF - Sub-tropical Broad Leaved Hill Forest; MWTF - Montane Wet Temperate Forest; LAG - Low Altitude Grasslands; HAG - High Altitude Grasslands.

The montane wet temperate forest and the high altitude grasslands harboured only very few species which mostly belonged to Apidae, Anthophoridae and Xylocopidae. The species *Xylocopa amethystina* Fb. and *Enicospilus* sp. recorded in this study were confined only to these habitats.

Based on the occurrence and distribution pattern of various species in the study area, seven species were considered as the most common species in Silent Valley. These include three species of bees such as *Apis dorsata* Fb., *Apis indica* Fb., and *Apis florea* Fb. and one species each of *Thyreus*, *Nomia*, *Anthophora* and *Megachile*. Eighty eight species of Hymenoptera recorded from more than one habitat in Silent Valley are considered to be fairly common and 13 species confined to distinct forest habitats are considered as rare.

An examination of data gathered here indicate a progressive reduction in the number of species with increasing altitude. Vegetation and microclimatic conditions characteristic at higher elevations are known to influence the distribution of insects. The tropical evergreen forests having a mean elevation of 1000 m is the most species rich habitat from where a total of 106 species were collected. This is followed by sub-tropical broad leaved hill forests (72 species) and low altitude grasslands (53 species). The montane wet temperate forests and high altitude grasslands at an altitude of around 2000 m contained only less number of species.

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Earlier Narendran (1989, 1994) has reported 18 species of microhymenopterans from the Silent Valley forests. Except for this study, no work has been carried out on the hymenopteran fauna of Silent Valley.

Species like *Coelioxys cuneatus* Smith, *Nomia thoracica* Smith, *Odynerus fragilis* Smith, *Sphex fulvohirtus* Bingham, *Megachile quartinae* Gribodo, *Pompilus cameroni* Bingham, and *Salius praestabilis* Bingham collected from Silent Valley are recorded for the first time from India. It is also interesting to note here that seven genera including *Cerceris* Latr., *Rhopalidia* Sauss., *Mutilla* Linn., *Pseudagenia* Kohl., etc. and 11 species including *Thyreus ramosa* Lep., *Megascolia* sp. nr. *azuria*, *Hylaeus feai* (Vachal), *Compsomeris prismatica* Smith, *Pompilus pedestris* Smith, and *Salius caeruleipennis* Sauss., etc. recorded in this study are new reports for Kerala (Bingham 1897, 1903; Table 1).

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