

# Insect Community of Hirpora Wildlife Sanctuary (Shopian), Jammu and Kashmir, India

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## Abstract

Insects are known to be the most successful and diverse form of organisms on earth. Insects play an important role in running an ecosystem and help to perform various activities which are necessary for an ecological balance. The study which was carried in 2013 reports the insect diversity of Hirpora wildlife sanctuary (Shopian) and a total of 338 insect individuals of twenty six (26) species were recorded belonging to twenty (20) families and seven (07) orders during the time period of June-Nov. 2013. Lepidoptera order comprise of greater number of insects followed by Hymenoptera, Diptera and coleoptera while lesser number of insects were found in Odonata, Hemiptera and Orthoptera. The maximum number of insects were recorded in the month of July and August due to the favorable environmental conditions and least number of insects were recorded during the month of October and November at this stage their life cycle changes and their number starts to decline because of non availability of food and drastic change in the environment of which they are a part.

**Keywords:** Distribution; Diversity; Insects; Hirpora; Wildlife sanctuary

## Introduction

Insects are known to be the most successful and diverse form of animals on earth. They have adapted for almost every conceivable type of environment on land, in air and water, deserts, even in highly harsh environment such as pools of crude petroleum [1] and almost every possible habitat. The insects roughly account for more than 75 percent of the identified species of the animals. There are 1.4 million species of insects described in the scientific literature [2] and 59353 species of insects pertaining to 27 orders are well-known in India [3]. Insects make up more than half of all living species, a further quarter are green plants, and only 4% of all described species are vertebrates [4].

Insects play an important role in running of an ecosystem [5]. They act as herbivores, scavengers and detritivores, predators and parasites [6]. Insects play an essential role in energy flow [7]. The success of insects is attributed largely to the evolution of flight, which has improved dispersal, escape from predators, and access to food and optimal environmental conditions. Insects amaze not only by their gigantic species richness but also by their diversity of life forms: the four largest insect orders, Coleoptera, Diptera, Lepidoptera and Hymenoptera, correspond to major functional groups [4]. Insect as decomposers plays critical role in decomposition of plant material (both leaf litter and woody material), dead animals and waste materials. They are the major herbivores and consume large proportion of plant biomass in terrestrial ecosystems [8]. The substantial benefits to humanity from insects generally receive less hype than the financial losses that result from their roles as vectors of diseases and as pests of agriculture, fibers and stored goods. The main benefits are ecological, economic, scientific and aesthetic. Conspicuous insects such as butterflies and dragonflies are particularly useful in monitoring changes. Dragonflies play an important role as indicators of the ecological quality of land-water ecotones, habitat heterogeneity, water pH, salinity and pollination [9]. Insects are also an important pollinators as well as one of the important components of food chain of the birds, reptiles, spiders and predatory insect [10]. Despite their vital role little is known about the insect communities of Hirpora. Therefore, keeping in mind the above fact, present work was conducted to study the diversity and distribution of insects in Hirpora wildlife Sanctuary, Shopian.

## Materials and Methods

### Study area and study sites

The present study on insects was carried out in forest ecosystem of Hirpora Wildlife Sanctuary (Shopian). It is located in Shopian district of Kashmir, 70 km South of Srinagar at an around 33°39' 55" N latitude and 74°39' 40" E longitude at an altitude of 2546 m above mean sea level (Figure 1). It is bounded to the north by Lake Gumsar, northeast by Hirpora village, to the east by Rupri, to the south by Saransar and to the west by the Pir Panjal pass. The slopes are gentle to moderately steep on the eastern aspect and very steep with many cliffs on the upper northern and western portion. The southern and southeastern portions are moderately steep. This sanctuary was established in 1987 and its total area is 341.25 km<sup>2</sup>, beautified by forests, pastures, scrub land, waste land and water bodies [11]. Although Flora and Fauna of Hirpora Wildlife Sanctuary has been studied but no survey or study has been undertaken so far on the insect fauna of Hirpora wildlife sanctuary. The climatic conditions of the Hirpora are somehow different from Kashmir valley. The highest day temperature is in between 627°C in summers and the winters are chilly with heavy snowfall. Its forests comprise of Western mixed coniferous forests and deciduous sub-alpines scrub forests. The presence of pastures and meadows beautify the area and provide a grazing site during summers.

### Collection of insects

Sampling for insects was carried from June to November during 2013. Various methods i.e., hand picking, use of sweeping nets, aerial nets and beating sheets were used for the collection of insects from

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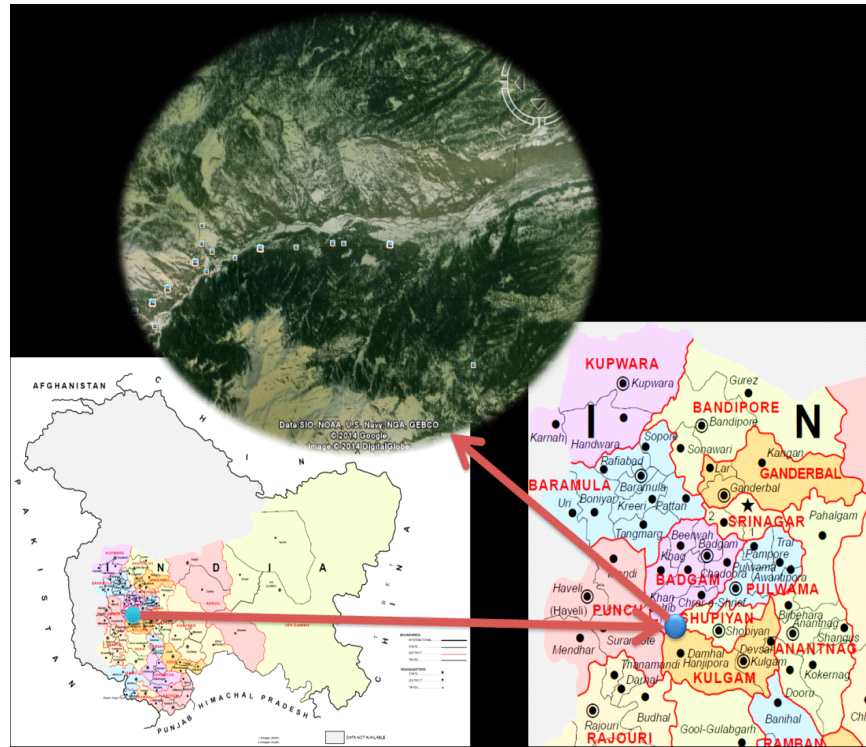


Figure 1: Outline map of study area.

vegetation including grasses, herbs, shrubs, bushes and trees up to a height of 2 m at each site. Insects were then transferred into well labeled collection bottles containing cotton soaked with ethyl acetate and carried to laboratory. All specimens were mounted on entomological boxes with the help of entomological pins and dried to prevent decomposition. The specimens were then sending for identification to the Entomology Department of Sher-I-Kashmir Agricultural University of Science and Technology (SKAUST), Kashmir (Supplementary Figures).

## Results and Discussion

During the course of present study, 338 insect individuals were recorded belonging to 26 species from 20 families and 07 orders which includes order Lepidoptera consisting of 08 species, followed by Hymenoptera and Coleoptera which comprises of 05 species each, while Diptera comprise of 04 species. Lesser number of species was found in orders Odonata (02), Hemiptera (01) and Ophotera (01). These findings were also supported to our results (Table 1).

The study revealed that maximum numbers of insects were found during the months of July, August and September (Table 2) since favorable weather and climatic conditions are present increasing the chances of their survival. It has been found that all species are active during the summer months [12]. The temperature showed an increasing trend from July-Sep. 2013 which might be in favour of certain insect species to flourish. The increase in temperature directly affects the insect community and leads to an increase in their population [13] which seems to be the reason for the peak value in population density found during summer months. It has also been found that with the increase in productivity species richness also increases [14-18].

The seasonal fluctuations of insect population (Figure 2) also probably reflect seasonal variability in availability and quality of food resources [19], diverse topography, vegetative features, climatic setting and breeding sites in a forest area [20]. The various environmental factors such as temperature, humidity, rainfall, vegetation and food sources directly influence insect diversity [21,22]. The present study has also revealed that the high variability among insect populations may have occurred due to slight differences in environmental factors or plant composition and numbers may fluctuate greatly within the study area [23]. In addition to normal vegetation the presence of wooden logs at study site supported the growth and survival of many insect species [24].

## Conclusion

Insects are the most abundant and diverse forms of organisms present on the earth. The present study revealed some of the interesting facts about the insect diversity of Hirpora wildlife Sanctuary, Shopian. A total of 338 insect individuals were recorded during the study period. Among the 26 insect species recorded in the study, the Lepidoptera order comprises of 8 species consisting of 94 individuals, while as Hemiptera order and Ophotera order comprised of only 01 species each order consisting of 75 individuals. Maximum numbers of insects were found during the month of July and August while less number of insects was recorded during the month of October and November. During summer maximum number of insects occurs due to the favorable weather and climatic conditions for their survival but the human interference in the form of upcoming construction of Mughal road results into destruction of habitats and food availability which is affecting adversely the overall insect diversity of Sanctuary. Thus, there is an immediate need to take steps to improve its quality so that it can support a variety of life forms.

S.No.	Order	Family	Species	Common Name	Total
1	Lepidoptera	Nymphalidae	<i>Vanessa cashmirensis</i>	Small tortoiseshell	16
2	Lepidoptera	Pieridae	<i>Pieris brassicae</i>	Cabbage butterfly	18
3	Lepidoptera	Nymphalidae	<i>Issoria lathonia</i>	Queen of Spain fritillary	09
4	Lepidoptera	Pieridae	<i>Colias romanovi</i>	clouded yellows	13
5	Lepidoptera	Pieridae	<i>Eurema sp.</i>	Grass yellow	08
6	Lepidoptera	Lycaenidae	<i>Aricia agestis</i>	Brown agestis	16
7	Lepidoptera	Arctiidae	<i>Lemyra stigmata</i>	Moth	08
8	Lepidoptera	Lymantriidae	<i>Leucoma salicis</i>	White satin moth	06
9	Hymenoptera	Vespidae	<i>Vespula vulgaris</i>	Yellow jacket/wasp	16
10	Hymenoptera	Ichneumonidae	<i>Eriborus terebrans</i>		14
11	Hymenoptera	Apidae	<i>Apis florea</i>	Dwarf honey bee	08
12	Hymenoptera	Formicidae	<i>Formica sp.</i>	Red wood ant	21
13	Hymenoptera	Formicidae	<i>Myrmica sp.</i>	Black ant	16
14	Coleoptera	Lycidae	<i>Dictyopterus simplicipes</i>	Netwing beetle	08
15	Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i>	Ladybird beetle	11
16	Coleoptera	Scarabacidae	<i>Adoretus versutus</i>	Rose beetle	12
17	Coleoptera	Scarabacidae	<i>Canthon pilularius</i>	Dung beetle	11
18	Coleoptera	Chrysomelidae	<i>Chrysomela coeruleans</i>	Mint beetle	14
19	Diptera	Empidae	<i>Empis livida</i>	Dance Fly	15
20	Diptera	Syrphidae	<i>Eupeodes sp.</i>	Hover fly	12
21	Diptera	Sarcophagidae	<i>Sarcophaga sp.</i>	Flesh fly	15
22	Diptera	Calliphoridae	<i>Callophora vomitoria</i>	Blue bottle fly	17
23	Odonata	Libellulidae	<i>Orthetrum caledonicum</i>	Blue skimmer	14
24	Odonata	Libellulidae	<i>Trithemis annulata</i>	Violet dropwing	18
25	Hemiptera	Lygacidae	<i>Lygaeus equestris</i>	Seed bug	14
26	Orthoptera	Acrididae	<i>Chorthippus biguttulus</i>	Grasshopper	08
<b>Total</b>					<b>338</b>

Table 1: Showing the observed insects in Hirpora wildlife Sanctuary (Shopian).

Order	June	July	Aug	Sept	Oct	Nov	Total
Lepidoptera	14	28	29	13	6	4	94
Hymenoptera	10	20	24	13	5	3	75
Coleoptera	9	15	19	7	4	2	56
Diptera	9	17	16	9	5	3	59
Odonata	3	12	8	4	3	2	32
Hemiptera	1	3	4	3	2	1	14
Orthoptera	1	3	2	1	1	0	8
<b>Total</b>	<b>47</b>	<b>98</b>	<b>102</b>	<b>49</b>	<b>27</b>	<b>15</b>	<b>338</b>

Table 2: Showing the monthly fluctuation of insect orders collected during study period June-Nov.2013.

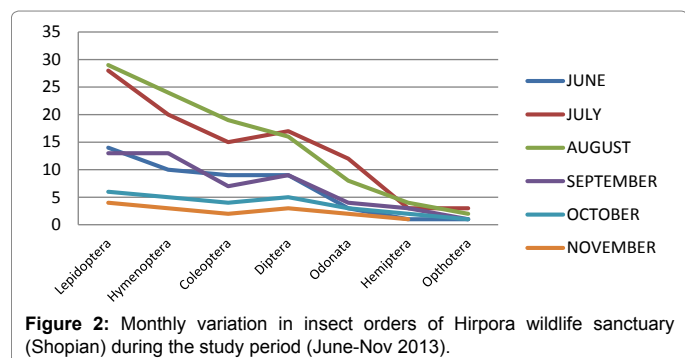


Figure 2: Monthly variation in insect orders of Hirpora wildlife sanctuary (Shopian) during the study period (June-Nov 2013).

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