International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 03-07-2025, Accepted: 03-08-2025, Published: 18-08-2025
Volume 10, Issue 08, 2025, Page No. 77-81

Study of insect diversity in different habitats of Danya, Almora, Uttarakhand

Anupama Pandey[1], Prachi Tamta[2]
[1] Assistant Professor, Department of Zoology, Government Degree College Danya, Almora, Uttarakhand, India
[2] Assistant Professor, Department of Zoology, H.S.B.G.P.G. College Someshwar Almora, Uttarakhand, India

Abstract
In the animal kingdom, insects are the most successful, diversified, and dominant taxon. They can be found in practically anywhere in the world. Their varied body sizes, habits, fecundities, various breathing techniques and varied diets are the cause of this. They become a significant part of our ecology as a result of these varied traits. They have a big impact on natural resources, agriculture and human health. This served as the primary justification for examining the diversity of insects. In order to estimate the richness and abundance of insect species in various habitat types found in Danya, a variety of bug species were gathered and identified during present study.

Keywords: Insect, habitat, species diversity

Introduction

The largest, most varied, prosperous, and most prevalent taxonomic group on earth is insect. Due to their diversity, they have a significant impact on agriculture, human health and natural resources in addition to playing a significant part in ecology. The biodiversity in an ecosys tem offers a variety of ecological services that work in concert to produce a stable, long–lasting ecosystem (Bindu *et al.*, (2022). Insects are hexapod invertebrates belonging to the class insect, phylum Arthropoda and Kingdom Animalia. They are incredibly diverse in size, and because they have protective shells, or exoskeletons, their ability to fly allows them to flee from attackers and disperse to new areas. Nee (2004) [4] reported in his study that an important ecological function like pollination, pest control decomposition and wild life species preservation depend on insects. Bees, beetles, butterflies, and flies are the most important pollinators Kim (1993) [3]. In addition to pollinating economically important crops, insects of all kinds including bees, wasp and occasionally ants (Hymenoptera), beetles (Coleoptera), Moths, butterflies (Lepidoptera), flies (Diptera) and bugs (Hemiptera) are essential to the food chains of birds, reptiles, spiders and predatory insects Jayapraba (2017) [2]. The diversity of living things from all sources, including terrestrial, marine, and aquatic habitats, is known as insect biodiversity. Species diversity, Genetic diversity and ecological diversity are the three main components of biodiversity. In addition to influencing the species composition and distribution pattern of the insect community, the insect community in the habitat source may have an impact on the survival of the species. It is extremely impossible to preserve the entire globe in the current state because of the low oxygen levels or possibly the absence of flying vertebrates. Therefore, protecting species, communities, and their habitats is the greatest way to practice conservation. The study's primary goal is to collect, identify the insect species in order to determine their variety, richness and abundance in the surrounding Danya area.

Materials and Methods

The present study was conducted from September 2024 to February 2025. Four sampling sites, namely Dhaula Devi, Artola, Jageshwar and Danya college campus in Danya region of District Almora, Uttarakhand. The selected site Danya situated at an altitude 900- 2500mt amsl. During the entire study period, highest temperature was 24^0C and lowest was 7^0C. The study area was surrounded by Deodar, Pine, Rhododendron and Banj.

Collection and identification of insects

Insect species were collected, twice a week using the direct observation approach. During the study period insect species were observed during day time from 10:00 am to 4:00 pm. The available literature, orderly field guides and the characteristics of each insect were used to identify them. The traits of insects were also examined in several volumes of the "Fauna of British India" books in order to identify them. With the assistance of other taxonomist or researchers, unknown specimens were occasionally analysed by contrasting them with the previously described specimens. To identify certain insect online resources such as "Butterfly of India" Moths of India, Beetles of India, Odonata of India, iNaturalist.org etc. were also utilized.
Insect diversity analysis was calculated by using different indices like Shannon-Weiner index (H) and Concentration Dominance index. Insect diversity index was calculated by using Shannon-Wiener information function which is:

$$\overline{H} = \sum_{i=1}^{S} Pi \log_2 Pi,$$

Where, H = Shannon – Weiner index
Concentration of dominance was calculated by using Simpson's index, which is given below:

$$C = \sum_{i=1}^{s} (Pi)^2$$

Table 1: List of insects collected during the entire study period (Sept., 2024 to Feb., 2025)

S. No.	Taxonomic Composition	Common Name	Site 1	Site 2	Site 3	Site 4
ORDER- LEPIDOPTERA (5 FAMILY 8 SPECIES)						
1. Family: Nymphalidae						
1-	Neptishylas	Common Sailer	+	+	+	+
2.	Aglaiscaschmirensis	Indian Tortoiseshell	+	+	-	-
Family: Crambidae						
3.	Nomophilanoctuella	Rush Veneer	+	-	-	-
2. Family: Erebidae						
4.	Cyanaperegrine	Peregrine Cyana	+	+	-	-
3. Family: Lycaenidae						
5.	Strymonmelinus	Grey Hairstreaks	+	+	+	+
4. Family: Papilionidae						
6.	PapilioMemnon	The Great Mormon	+	+	-	-
5. Family: Geometridae						
7.	Pingasadispensata	White Looper Moth	+	+	_	+
8.	Anonychiagrisea		+	-	-	-
ORDER- COLEOPTERA (3 FAMILY 4 SPECIES)						
1. Family: Tenebrionidae						
9.	Gonocephalumgranulatum	Dusty Surface Beetle	+	+	+	-
2. Family: Scarabaeidae						
10.	Cotinisnitida	Green June Beetle	+	+	+	-
11.	Scarabaeus sacer	Dung Beetle	+	+	+	+
3. Family- Cerambycidae-						
12.	Knullianacincta	Longhorn beetles	+	+	+	+
ORDER- DIPTERA (1 FAMILY 1 SPECIES)						
1- Family- Bibionidae						
13.	Plecianearctica	Love Bug	+	+	+	+
ORDER- HEMIPTERA (5 FAMILY 7 SPECIES)						
1- Family- Pyrrhocoridae						
14.	Pyrrhocorisapterus	Fire Bug	+	+	+	+
15.	Antilochuscoquebertii	Red Cotton bug	+	+	-	+
2- Family- Pentatomidae						
16.	Halyomorphahalys	Brown Marmorated Stink Bug	+	+	-	-
17.	ErthesinaFullo	Yellow Marmorated Stink Bug	+	-	-	-
3- Family- Cicadidae						
18.	Platypleurakaempferi	Kempfer Cicada	+	+	+	-
4- Family-Coreoidea						
19.	Anoplocnemiscurvipes	Leaf Footed bug	+	-	-	-
5- Family- Largidae						
20.	Physopeltagutta	Gutta Bug	+	+	+	+
ORDER- ORTHOPTERA (2 FAMILY 2 SPECIES)						
1- Family- Tettigoniidae						
21.	Scudderiafurcata	Fork Tailed Bush Katydid	+	+	+	+
2- Family-Acrididae						
22.	Trimerotropispallidipennis	Pallid-Winged Grasshopper	+	+	-	+
ORDER- HYMENOPTERA (2 FAMILY 2 SPECIES)						
1- Family- Apidae						
23-	Bombuslapidaries	Bumble Bee	+	+	+	+
2- Family- Vespidae						
24-	Vespa simillima	Yellow hornet	+	+	+	+

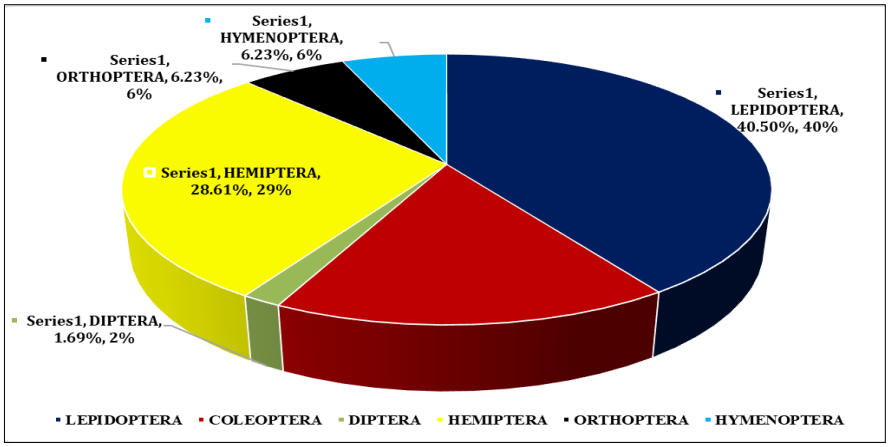

Fig 1: Percent composition of different order of insects

Table 2: Number of individual and relative abundance of different orders of insects recorded from study sites.

S. No	Order	No. of individuals	Relative abundance
1.	Lepidoptera	143	40.50
2.	Coleoptera	59	16.71
3.	Diptera	6	1.69
4.	Hemiptera	101	28.61
5.	Orthoptera	22	6.23
6.	Hymenoptera	22	6.23
	Total=	353	

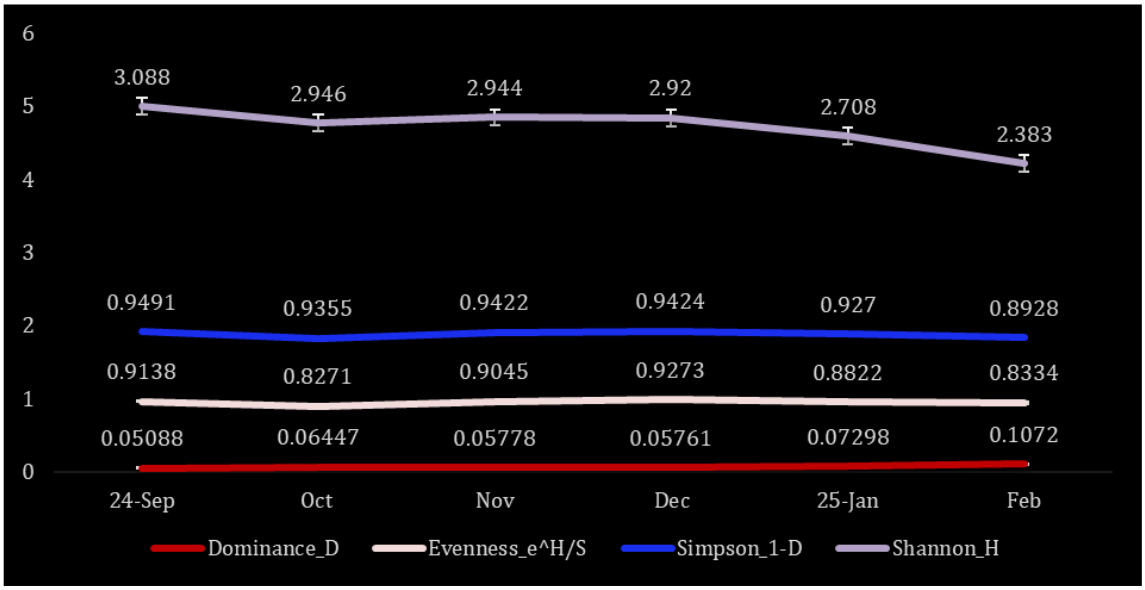

Fig 2: Diversity indices of insects during the entire study period from Sept., 2024 to Feb., 2025

Table 2: Seasonal Changes in total species content in different groups of insects in Danya during entire study period

Month	Abundance	Relative Abundance	Shannon wiener index	Evenness
Sept. 2024	88	24.92	3.088	0.9138
Oct.	81	22.94	2.946	0.8271
Nov.	60	16.99	2.944	0.9045
Dec.	54	15.29	2.92	0.9273
Jan. 2025	39	11.04	2.708	0.8822
Feb.	31	8.78	2.383	0.8334

Neptis hylas

Aglais caschmirensis

Nomophila noctuella

Cyana peregrine

Strymon melinus

Papilio Memnon

Pingasa dispensata

Anonychia grisea

Fig 3. Images of insects collected during the entire study period (Sept., 2024 to Feb., 2025)

Result and Discussion

Among the most significant component of the biosphere are insects. In terms of species richness and abundance, insect have achieved remarkable success, and they are thought to be the main contributors to species richness, along with terrestrial arthropods (Stork et. al., 2015) [5].During the entire study period, a total of 353 individuals belonging to 24 species of 18 families and 6 orders were recorded from four different study sites.Among the total insects recorded Lepidoptera was found to be the most dominant order with 8 species Constituting about 40.50% of total abundance (fig.3) followed by Hemiptera (7 Species, 28.61%), Coleoptera (4 species 16,71%), Hymenopteraand Orthoptera both contributed 2 species and 6.23% of the total abundance whereas Diptera contributed 1 specices and only 1.69% of the total abundance (Fig1).In terms of the number of individuals, the maximum number of individuals belonged to the order Lepidoptera (143) followed by Hemiptera (101) Coleoptera (59), where Hymenoptera and Orthoptera both represents equal number 22 individuals, and only 6 individuals recorded in order Diptera (Table 2).

References

1. Bennet BB, Riyadharshini PP, Jeyprabha L. Emerging of Insect pests in Agriculture area of Surandai, Tenkasi District, Tamil Nadu. International Journal of Innovative Research in Technology,2022:9(2):485–488.
2. Jayapraba L, AjazHajaMohideen RA. Preliminary study of butterfly in Tirunelveli, Tamilnadu. International Journal of Scientific Research and Modern Education,2017:2(1):171–174.
3. Kim KC. Biodiversity conservation and inventory: Why insect matter. Biodiversity and Conservation,1993:2:191–214.

4. Nee S. More than meets the eyes, Earths real biodiversity is invisible, whether we like it or not. Nature,2004:429:804–805.
5. Stork NE, McBroom J, Gely C, Hamilton AJ. New approaches Narrow Global Species Estimates for Beedtles, Insects, and terrestrial Arthropods. Proceeding of the National Academy of Sciences of the United States of America,2015:112:7519–7523.
6. Dev P, Tewari M, Kaushal BR. Diversity and abundance of insects in a cropland of central Himalayan Bhabar region of Kumaun, Uttarakhand. Entomon,2009:34(1):11–21.
7. Gadagkar R, Chandrashaekara K, Nair P. Insect species diversity in the tropics: sampling method and case study. Journal of Bombay Natural History Society,1990:87(3):328–353.
8. Ambrose DP. Insect Pest Management: A Current Scenario. Entomology Research Unit, St. Xavier's College: Palayamkottai, India,2011:38–57.
9. Arya MK, Verma A, Tamta P. Diversity of Butterflies (Lepidoptera: Papilionoidea) in a Temperate Forest Ecosystem, Binsar Wildlife Sanctuary, Indian Himalayan Region. Nature Environment & Pollution Technology,2020:19(3).
10. Grampurohit B, Karkhanis H. Insect biodiversity at mangrove ecosystem. National Conference on Biodiversity: Status and challenges in conservation-Faveo, 2013.
11. Garia A, Goswami D, Lohani H, Kaushal BR. Insect species diversity and abundance in oak forest of Kumaun Himalaya, Uttarakhand. Entomon,2017:42(1):13–22.
12. Naman K, Auta IK, Abdullah MK. Insect species diversity and abundance in Kaduna State University Main Campus, Kaduna, Nigeria. Science World Journal,2019:14(2):51–54.
13. Senapathi D, Fründ J, Albrecht M, Garratt MP, Kleijn D, Pickles BJ, *et al*. Wild insect diversity increases inter-annual stability in global crop pollinator communities. Proceedings of the Royal Society B, 2021:288:1947:20210212.
14. Arya MK, Joshi PC. Species composition, abundance and density of Hymenopteran insects in Nanda Devi Biosphere Reserve, Western Himalayas, India. J. Env. Bio-Sci,2011:25(2):175–179.