



## The Study of Butterfly Diversity in Bhimtal and Ramnagar Region of District Nainital Uttarakhand

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**Abstract:** Taking into account rising anthropogenic pressure and its significant effects on vegetation distribution as well as frightening environmental changes, the following study was carried out to examine the effect of environmental changes on butterfly diversity in the Ramnagar and Bhimtal region of Nainital district, Uttarakhand. On both observation sites, a total of 636 individuals from three butterfly families are present. The butterfly population was discovered to be linked to both the human population and plant distribution. Due to low pollution and high elevation, the highest number of butterflies were observed along the Bhimtal lake, near the butterfly museum, and in the village region, whereas the lowest number of butterflies were observed at the study site's town area due to high pollution and temperature.

**Key words:** Abundance • Butterflies • Composition • Diversity • Bhimtal

### Introduction

Insects account for more than 53% of the roughly 1.4 million known species of living creatures, with Coleoptera, Lepidoptera, and Diptera having the most species. Current data suggest that the order Lepidoptera may contain more species than previously assumed (Powell 2009). In terms of importance, it is one of the most important insect orders in agriculture, as well as a ubiquitous and well-known insect order worldwide. Linnaeus recognised three divisions of the Lepidoptera, Papilio, Sphinx, and Phalaena, each with seven subgroups (Linnaeus 1758). The order Lepidoptera now consists of 46 super families separated into these three divisions. According to records, 174,250 species have been identified under these 46 super families, which are grouped into 126 families (Mallet 2007). The estimated percentage of skippers among the 174,250 identified species is 17,950 (Capinera 2008). A frequent nickname for butterflies is "insects of the sun" due to their vibrant colours and delicate charm (Natural

Resource Conservation Service Butterflies, 2000).

For millennia, people have admired their physical beauty. Moths and butterflies offer good opportunities for population and community ecology study (Pollard 1991). The presence and diversity of butterflies, which play a vital role in the ecosystem, are indicators of the health of any given terrestrial biotope (Tiple 2012). Butterflies are effective environmental indicators due to their sensitivity to habitat degradation and temperature change (Tyagi 2011). Many species are completely seasonal and prefer just a specific set of environments. They can be used to develop conservation plans because they are good indicators of climatic conditions as well as seasonal and ecological changes (Tiple 2009). It is so positive that butterflies are currently being prioritised in biodiversity conservation and biodiversity study programming (Gadgil 1996) and a checklist was published includes 32 species belonging to 27 genera containing 5 families from 2 sites viz. Kandoliya Road and Gadoli from, Pauri



Garhwal, Himalaya Uttarakhand India (Saini and Koshal 2021). The purpose of the current investigation was to assess the effect of environmental changes on species richness and diversity of butterflies, mainly 3 families viz, Pieridae, Nymphalidae and Lycaenidae in two observation area of Nainital district of Uttarakhand, India.

### Material and Methods

Sampling of butterflies was conducted from January to June 2021. The butterflies were collected by “Sweep Net sampling Method” as per Gadagkar *et al* (2017). The collection of butterflies was carried out in the early hours of the day because butterflies are usually active at early sunrise, therefore, it was easy to observe and collect them. Specimens were identified with help of literature available (Sabir 2000, Wyntel 1957) and identification key (Abbas 2002, Munir 2008).

**Study sites:** The town and nagar panchayat of Bhimtal are located in the Nainital district of the India's Uttarakhand state is located at a 1370-meter altitude. It is roughly 22 kilometers away from Nainital and located above sea level. The Bhimtal Lake, which features an island in the middle, is the main draw of the town. Butterfly samples are taken from the Butterfly research center in Bhimtal, Tallital, near lake side and dhungsil village area of Bhimtal.

Ramnagar is located 345 metres above sea level on the banks of the Kosi River in the Nainital district of Uttarakhand's Kumaon region. Ramnagar serves as the starting point for Kumaon Hills, but it's also one of the entrances

to the illustrious Jim Corbett National Park. Butterfly samples were taken from Uttarakhand board of education, P.N.G.P.G College and forest compound area in Ramnagar.

### Results and Discussion

In order to research the impacts of anthropogenic influences on butterfly biodiversity in specific study location with varying human population, surveys were conducted during January to June 2021 and the study following the gathering of 636 members from three different families, the Pieridae, Nymphalidae and Lycaenidae. The current investigation's findings are presented and debated as follows.

A total of 636 butterflies from 14 species belonging to the Pieridae, Nymphalidae and Lycaenidae families. During the surveys, were recorded in four different sites of Bhimtal and three different site of Ramnagar with different human population, which has been shown in table.

A total of 341 butterflies of seven species belonging to Pieridae family are recorded from a given study area, in and 2 respectively.

In family Lycaenidae 145 individuals are recorded from 4 different family. In which *Prosotas noreia* observed in large number (30) and *Helioporus sena* observed in low number (5) in site 1 and 2 respectively.



**Table 1: Individuals and species of butterflies recorded from observation site.**

S.N	Species Composition	Common Name	Family	Site 1	Site 2	Total
1	<i>Anahaeis aurota aurota</i> (Fabricus)	The Pioneer	Pieridae	20	30	50
2	<i>Colias erate erate</i> (Esper)	The Pale coloured yellow	Pieridae	10	20	30
3	<i>Delias belladonna horsfieldi</i> (Gray)	The hill jezebel	Pieridae	15	10	25
4	<i>Eurema hecabe fimbriata</i> (Wallace)	The commongrass yellow	Pieridae	30	40	70
5	<i>Gonepteryx rhamni nepalensis</i> (Double day)	The common brimstone	Pieridae	20	16	36
6	<i>Pieries brassicae nepalensis</i> (Double day)	The large cabbage white	Pieridae	50	20	70
7	<i>Pieries canidia canidia</i> evans	The large cabbage white	Pieridae	40	20	60
8	<i>Junonia iphita</i> (Cramer)	The chocolate pansy	Nymphalidae	10	25	35
9	<i>Ypthima huebneri</i>	Common fourring	Nymphalidae	15	30	45
10	<i>Neptis narayana</i>	Sailer butterfly	Nymphalidae	30	40	70
11	<i>Castalius rosimon</i>	Common pierrot	Lycaenidae	25	20	45
12	<i>Helioporus sena</i>	The sorrel sapphire	Lycaenidae	20	5	25
13	<i>Talicauda nyseus</i>	Red pierrot	Lycaenidae	25	10	35
14	<i>Prositas noreria</i>	Common line blue	Lycaenidae	30	10	40
			<b>Total</b>	<b>340</b>	<b>296</b>	<b>636</b>

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