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# A report on butterfly (Lepidoptera) population at Indian Institute of Sugarcane Research, Lucknow, Uttar Pradesh

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**Abstract**
The study site Indian Institute of Sugarcane Research was chosen on the basis of their contrasting vegetation type and anthropogenic activities low. The survey has been carried out from 8 AM to 11 AM. During survey total 273 butterflies of 28 species belong to five families (*Nymphalidae (13), Pieridae (5), Lycaenidae (5), Papilionidae (4) and Hesperiidae (1*) recorded from the study site

**Keywords:** Butterfly families, population, insecta, lepidoptera, species

## Introduction

More than half of the world's known animal species are insects and the Lepidoptera are regarded as one of the important component of biodiversity (New and Collins, 1991) [20] and are the second largest order among insects made up of approximately 1, 50,000 species so far known to the literature. Lepidoptera is one of the most widespread and widely recognized orders of class insect in the world. Order Lepidoptera is grouped in 08 families- Nymphalidae, Papilionidae, Lycaenidae, Pieridae, Hesperiidae, Megathymidae, Libytheidae and Nemeobiidae. India having only 2.3 percent (3,287,263 Km2) of the total land mass of the world so far recorded around 89,500 animal species, comprises 7.28 percent of the total world animal species (Alfred *et al*., 1998) [2]. Approximately, 17,200 species of butterfly found through-out the world, of which 1,501 species of butterfly are known from India (Kunte, 2000) [18]. Although India has a rich butterfly fauna, but due to various reasons such as habitat destruction, fire, use of pesticides and weedicides and illegal collection for trade, many species have become very rare and some are on the verge of extinction (Sharma and Joshi, 2009) [27]. Butterflies are the most beautiful and attractive than most other insects and have fascinated human imagination and creativity (Sharma and Joshi 2009) [27]. They are valuable pollinators when they move from plant to plant, gathering nectar and are the one of the important food chain components of the birds, reptiles, spiders and predatory insects (Sharma and Joshi, 2009) [27]. Many of butterfly species are strictly seasonal and prefer only a particular set of habitats (Kunte, 1997) [16] and they are good indicators in terms of anthropogenic disturbance and habitat quality (Kocher and Williams, 2000) [12]. Among insects, butterflies are certainly most popular and eminent group. Butterflies occupy a vital position in ecosystems and their occurrence and diversity are considered as good indicators of the health of any given terrestrial biotope (Aluri and Rao, 2002; Kunte, 2000) [3, 18]. Butterflies and moths (order Lepidoptera) offer good opportunities for studies on population and community ecology (Pollard 1991) [23]. Among insects, the order Lepidoptera is ecologically very important. The adults generally feed on nectar and serve as important pollinators of flowering plants. The larvae, which feed on foliage, are frequently the primary herbivores in ecosystems and are important in the transfer of radiant energy fixed by plants, making it available to the other organisms in the ecosystem. Butterflies are called day-flying insects which are in the order of Lepidoptera. Lepidos in greek for "scales" and ptera means "wings". Like any holometabolous insects, the butterflies also have life cycle or metamorphosis which consists of egg, larva, pupa and adult. Butterflies have large, often brightly coloured, and conspicuous wings. The body is divided in to three parts, like all other insects, the head, thorax (chest), abdomen (bottom). The butterflies have four wings and six legs which are attached to the thorax. Insects are ideal for monitoring various landscapes for biological conservation. Among them butterflies are especially useful for ecological evaluation (Thomas and Malorie, 1985; Kim,1993; Samways,1994; Pollard and Yates,1993; New *et al*., 1995) [11, 21, 24, 26, 31]. Abiotic factors like variations in temperature, humidity and solar radiations have profound influence on the activity of any insect at any given time. This is especially true for small ectotherms such as butterflies because of their reduced thermal inertia (Rutowski, 1984; Piexoto and Benson, 2009) [22, 25]. A Preliminary Study on Butterflies of the Kathlaur- Kaushlian Wildlife Sanctuary, Pathankot, Punjab, India Studied by Sharma etal, 2015 [28]. Atluri etal. in 2011 [5] total of 555 butterflies belonging to 22 genera with 29 species were encountered in Anacardium plantation. Among the 29 species the most dominant species include Junonia lemonias, Catopsilia pyranthe and Euthalia garuda. First records of some butterfly in Uttar Pradesh recorded by Sushmita etal 2021 [29],2022

## Materials and Methods

Lucknow is one of the largest cities in India and the capital of Uttar Pradesh, located in the northern part of the country experiences a warm sub-tropical climate, typical of the North India. Summer starts in late March with temperatures rising to 48°C at its peak in May. In addition, hot winds may blow in the afternoons, adding to the discomfort. The monsoon arrives in the middle of June and continues till early October. Winter starts in the middle of November and is pleasant and cool with daytime temperatures typically 20°C, though temperatures can drop significantly in the night. January takes chilli winds with it, and sometimes daytime temperature rise only up to 13-18°C, and minimum temperature fall to $3^0$C, 0°C is the lowest temperature recorded in the city. The study site Indian Institute of

Sugarcane Research was chosen on the basis of their contrasting vegetation type and anthropogenic activities low. The survey has been carried out from 8 A.M. to 10 A.M. Butterflies were photographed from different angles as often as possible to obtain sufficient photographs to enable positive identification of species. Photographs were taken with a camera, butterflies will be identified based on standard monographs of Yates (1935) [33], Wynter-Blyth (1957), Kunte (2000) and Kehimkar (2008) [10, 18].

**Results and Discussion**

The present study was conducted to determine the population of Butterflies at the Indian Institute of Sugarcane Research. During survey total 273 butterflies of 28 species belong to five families (*Nymphalidae, Pieridae, Lycaenidae, Papilionidae and Hesperiidae*) recorded from study site. Family Nymphalidae was the most common followed by Pieridae, Lycaenidae, Papilionidae and followed by family Hesperiidae. 13 species of family Nymphalidae recorded in study site These species are *Junonia lemonias* (Lemon pansy*), Junonia orithya* (Blue pansy), *Junonia hierta* (Yellow pansy*), Junonia almana* (Peacock pansy), *Danaus chrysippus* (Plain tiger), *Danaus genutia* (stripede tiger), *Hypolomnas misippus* (Danaid eggfly), *Hypolimnas bolina* (Great eggfly) *Euploea core* (Common crow), *Tirumala limniace* (Blue tiger), *Melanitis leda* (Common evening brown), *Ariadne merione* (common castor), *Phalantha phalantha* (common leopard). Five species of family Pieridae recorded in the site these are *Belenois aurota* (Indian pioneer), *Eurema hecabe* (Common grass yellow), *Catopsilia pyranthe* (Mottled emigrant), *Ixias marrianne* (white orange tip), *Cepora nerissa* (Common gull). Four species of family Papilionidae recorded in the site, these species are *Papilio demoleus* (Lime butterfly), *Papilio polytes* (Common mormon), *Graphium doson* (Common jay), *Graphium Agamemnon* (Tailed jay). Five species of family Lycaenidae recorded in site, these are *Chilades parrhassius* (Small cupid), *Tarucus nara* (Striped pierrot), *Zizina otis*(Lesser grass blue), *Freyeria putli* (Oriental grass jewel), *Arthopala bazalus* (Powdered oakblue). Only one species of family Hesperiidae recorded in the site which is *Hasora chromus* (Common banded awl) Table-1. Total 273 butterflies of 28 species belong to 21 genera recorded from study site referable to 5 families *viz*., Nymphalidae (13 species (46.42%) under 8 genera (38.09%), Pieridae 5species(17.85%) under 5genera(23.80%), Papilionidae 4 species (14.28%) under 2 genera (9.52%), Lycaenidae (5 species (17.85%) under 5 genera(23.80%), and Hesperiidae (1 species (3.57%) under 1 genera (4.76%) has been recorded the site. Table-2. This positive relationship between the local abundance and regional distribution of species is almost universal pattern in ecology (Hanski *et al*. 1993, Gaston *et al*. 1997b, Gaston & Blackburn 2000) [6, 7, 8]. The pattern has been observed in a variety of taxa and over a spectrum of spatial scales. However, some studies reveal a negative relationship between regional distribution and local abundance (Adams & Anderson 1982, Arita *et al*. 1990, Johnson 1998). Gaston *et al*. (1997b) [1, 4, 7, 9] argue that negative relationship between distribution and abundance deserves more attention. Negative relationships can largely be generated by the same mechanisms that give rise to positive correlations, for substantially different circumstances and parameter values (Gaston *et al*. 1997b) [7]. Nine mechanisms have been proposed to explain positive distribution abundance pattern, and five of them can also generate negative relationships (Gaston *et al*. 1997b, Gaston & Blackburn 2000) [6, 7]. Kumar and Rana (2018),studied on species diversity and community structure of butterfly in urban forest fragments at Lucknow, India. Species diversity and distribution of butterfly fauna with different habitats in Jhansi, India (Kumar,2011;2017) [13, 15]

**Table 1:** Recorded butterflies list along with their scientific name, families from Indian institute of sugar cane research

| S.No. | Scientific Name | Common Name | Family | No. of Individuals |
|---|---|---|---|---|
| 1 | *Junonia lemonias* | Lemon Pansy | Nymphalidae | 18 |
| 2 | *Junonia orithya* | Blue pansy | Nymphalidae | 6 |
| 3 | *Junonia hierta* | Yellow pansy | Nymphalidae | 7 |
| 4 | *Junonia almana* | Peacock pansy | Nymphalidae | 3 |
| 5 | *Danaus chrysippus* | Plain tiger | Nymphalidae | 14 |
| 6 | *Danaus genutia* | Striped tiger | Nymphalidae | 3 |
| 7 | *Hypolimnas misippus* | Danaid eggfly | Nymphalidae | 2 |
| 8 | *Hypolimnas bolina* | Great eggfly | Nymphalidae | 4 |
| 9 | *Euploea core* | Common crow | Nymphalidae | 5 |
| 10 | *Tirumala limniace* | Blue tiger | Nymphalidae | 5 |
| 11 | *Melanitis leda* | Common evening brown | Nymphalidae | 3 |
| 12 | *Ariadne merione* | Common castor | Nymphalidae | 4 |
| 13 | *Phalantha phalantha* | Common leopard | Nymphalidae | 3 |
| 14 | *Belenois aurota* | Indian pioneer | Pieridae | 2 |
| 15 | *Eurema hecabe* | Common grass yellow | Pieridae | 127 |
| 16 | *Catopsilia pyranthe* | Mottled emigrant | Pieridae | 38 |
| 17 | *Ixias marrianne* | White orange tip | Pieridae | 3 |
| 18 | *Cepora nerissa* | Common gull | Pieridae | 2 |
| 19 | *Papilio demoleus* | Lime butterfly | Papilionidae | 5 |
| 20 | *Papilio polytes* | Common mormon | Papilionidae | 1 |
| 21 | *Graphium doson* | Common jay | Papilionidae | 2 |
| 22 | *Graphium agamemnon* | Tailed jay | Papilionidae | 2 |
| 23 | *Chilades parrhassius* | Small cupid | Lycaenidae | 6 |
| 24 | *Tarucus nara* | Striped pierrot | Lycaenidae | 3 |
| 25 | *Zizina otis* | Lesser grass blue | Lycaenidae | 2 |
| 26 | *Freyeria putli* | Oriental grass jewel | Lycaenidae | 2 |
| 27 | *Arthopola bazalus* | Powdered oakblue | Lycaenidae | 1 |
| 28 | *Hasora chromus* | Common banded awl | Hesperiidae | 2 |

**Table 2:** List of butterfly families, numbers, percentage of genus and species recorded from Indian institute of sugar cane research

| S.No. | Families/Individuals | Genus (21) | Species (28) | Genus (%) | Species (%) |
|---|---|---|---|---|---|
| 1. | Nymphalidae /77 | 8 | 13 | 38.09 | 46.42 |
| 2. | Pieridae/172 | 5 | 5 | 23.80 | 17.85 |
| 3. | Papilionidae/10 | 2 | 4 | 9.52 | 14,28 |
| 4. | Lycaenidae /14 | 5 | 5 | 23.80 | 17.85 |
| 5. | Hesperiidae/2 | 1 | 1 | 4.76 | 3.57 |

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