International Research Journal of Biological Sciences ISSN 2278-3202
Vol. **14(4),** 11-17, November **(2025)** *Int. Res. J. Biological Sci.*

Investigation of Butterfly Species in Gairsain block of Chamoli District, Uttarakhand, India

Shilpa[1*], Deepa Pandey[1] and Shankar Kumar[2]
[1]Department of Zoology, SSJDWSSS GPG College Ranikhet–263645, Uttarakhand, India
[2]Department of Mathematics, SSJDWSSS GPG College Ranikhet–263645, Uttarakhand, India
negis8766@gmail.com

Available online at : www.isca.in, www.isca.me
Received 10th August 2025, revised 20th September 2025, accepted 30th November 2025

Abstract

Butterflies are vital indicators of ecological health and also enhance the aesthetic value of habitats. This study examines the butterfly species, abundance and diversity from the Gairsain block in Chamoli district, Uttarakhand, India. Field surveys were carried out from March 2023 to March 2025 in the study area. In the study area, we noted 2,223 individuals, 61 species across 6 families & 18 subfamilies within the super family Papilionoidea, during the research. The Nymphalidae family is dominant at 36%, followed by Pieridae at 21%, Lycaenidae at 18%, Papilionidae at 10%, Hesperiidae at 10%, and Riodinidae at 5%, making it the least common. Notably, species listed under the Wildlife (Protection) Act, 2022, such as Delias sanaca (Schedule I) and Graphium cloanthus (Schedule II), were also documented. The results highlight the region's rich butterfly diversity and emphasise the importance of conserving local habitats to sustain a healthy environment. This research provides a valuable baseline for future studies, conservation efforts, and the promotion of butterfly-based ecotourism in Uttarakhand.

Keywords: Butterfly, diversity, Gairsain block, Chamoli, Uttarakhand, India.

Introduction

Butterflies are one of the few insects that humans love because of their beautiful colours, short lifespan, ability to fly, daylight activity, and overall peaceful and harmonious image. Thus, attention is drawn to aesthetics as a vital component of wildlife observation. Butterflies are typically considered one of the most well examined groups of insects in terms of taxonomy[1]. Butterflies belong to the Lepidoptera, which translates to "scale wing". Numerous butterfly species serve as definitive seasonal markers of anthropogenic disturbance and habitat condition[2]. Ecologists and conservationists have long been interested in the assembly of lepidopteran communities and the elements that affect them. A significant and steadily growing portion of the Earth's surface is made up of human-dominated landscapes. These altered ecosystems often change butterfly species and their dynamics[3,4].

Lepidoptera, which encompasses butterflies and moths, is second most significant order of insect with over 1,40,000 species worldwide, including 12,000 butterflies. Butterfly species are very desirable due to their stunning appearance. Butterflies' juvenile and adult phases rely totally on plants, making them economically and environmentally vital. Many wild and cultivated plant species depend on butterflies as pollinators, and the regeneration of the plants they pollinate may suffer if their numbers decline. Several higher groups of animals, such as birds, bats, and mammals, feed on all stages of butterflies, forming several links in the food chain. The richness of larval food plants is shown by the appearance of butterflies.

In India, there are 1318 butterfly species recorded[5,] and Uttarakhand is home to 500 butterfly species[5] and around 349 species of butterflies found in the Garhwal Himalayas[6].

Materials and Methods

According to geography, the Gairsain block is located between latitudes 29° 56° N and 30° 11° N and longitudes 79° 30° E. Its altitude ranges between 1200 to 3067 as ml, it occupiesa 376.72 km^2area. It is the summer capital of the state of Uttarakhand (Figure-1). The notable variations in temperature and precipitation are indicative of its varied climate. At heights above 1600 meters, severe frost and snowfall occur during the winter. The study area's average annual temperature is 20°C, with the highest reported temperatures in May and June (25–35°C) and the lowest in December and January (-1–10°C). Gairsain block is composed of oak-abies, oak forest, mixed oak forest, pine forest[7].

Data collection and identification–An extensive field survey was conducted from March 2023 to March 2025, using random walks and direct observation from 9 am to 2 pm, when butterflies are generally active. Field surveys were conducted across the investigation area at several sites. Using point and line transect methods[8], the altitude ranges from 1377 to 3000 meters above sea level.

In the field, we are careful to take photos of the butterflies using a Nikon DX3100 camera and a mobile camera. Butterfly identification is done by using many books and literature like A Synoptic Catalogue of the Butterflies of India[9], Butterflies of Uttarakhand[5] and Kumar. P.[10] book.

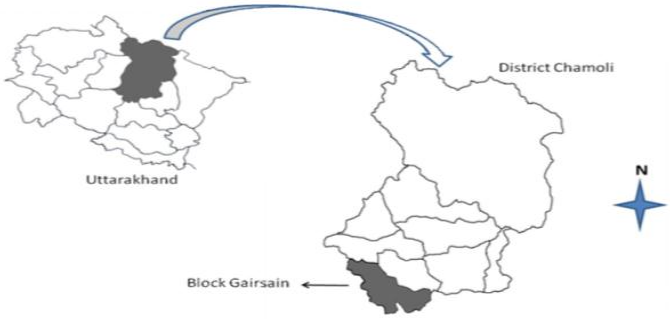

Figure-1: Map of the study area[7].

Results and Discussion

The checklist of butterflies recorded at the Gairsain block of Chamoli district, Uttarakhand, India, from March 2023 to March 2025, noted 2,223 individual butterflies, which belong 61 species across 6 families and 18 subfamilies (Table-1). The Nymphalidae family was dominant, 22 species (36% total), then Pieridae with 13 species (21% total), Lycaenidae with 11 species (18% total), Papilionidae 06 species (10% total), Hesperidae 06 species (10% total), and Riodinidae03 species of butterflies (05% total of the) were recorded during the field work (Figure-2).

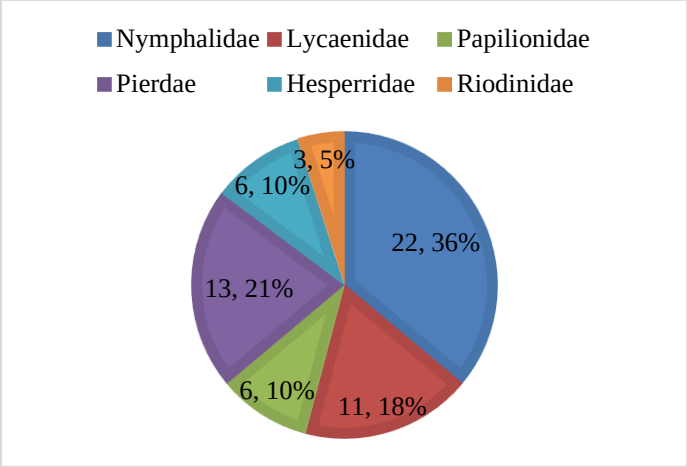

Figure-2: Butterfly family present in the study area.

The existence of species in all abundance categories indicates a dynamic and balanced community structure. The large number of "Very Common" and "Common" species (Figure-3) suggests sustained populations of generalist species. However, "Uncommon" and "Locally Common" species may be documented due to habitat specialisation, seasonal change, or inadequate sampling in certain microhabitats (Table-1).

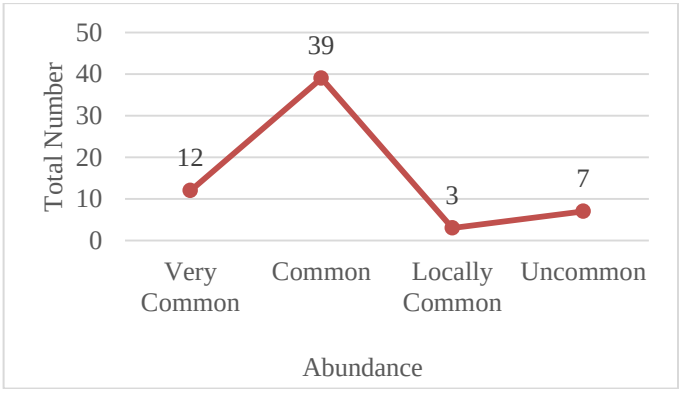

Figure-3: Relative Abundance of Butterfly species recorded in the study area.

The region's importance for conservation is shown by the finding of four species that are protected by law under the 2022 Wildlife (Protection) Amendment Act. The assessed area's ecological sensitivity and its conservation significance are highlighted by the inclusion of *Delias sanaca* (Pale Jezebel) in Schedule I. Furthermore, the identification of *Papilio* and *Graphium* species under Schedule II indicates the necessity of further habitat protection and monitoring (Table-2).

Ten species were recognised as most abundant within the study area. *Aglais caschmirensis* showed the highest abundance with 83 individuals recorded, followed closely by *Vanessa indica* (78) and *Pieris canidia* (75). *Acytolepis puspa* accounted for 70 individuals, while *Gonepteryx nepalensis* was represented by 60. The next most common species included *Symbrenthia lilaea* (53), *Heliophorus sena* (52), *Junonia iphita* (51), *Talicada nyseus* (50), and *Papilio polytes* (49) (Figure-4). These species collectively formed the dominant component of the butterfly population in the region and highlight the composition of the most frequently encountered species during the survey.

A total of 2223 individual butterflies were recorded during the study, representing six butterfly families. Among these, the Nymphalidae family exhibited the highest diversity, comprising 18 genera and 9 subfamilies, with a total of 798 individuals, which is 35.9% of the total count followed by Pieridae with 7 genera, 2 subfamilies, 488 individuals and 22.0% of the total count and Lycaenidae with 10 genera, 3 subfamilies, 447 individuals and 20.1% of total count followed by Papilionidae family was represented by 2 genera and 1 subfamily, contributing 187 individuals and 8.4% of the total count to the overall dataset followed by Hesperiidae with 5 genera, 2 subfamilies contributed 171 individuals 7.7% of the total count. While Riodinidae, the least represented family, included 2 genera and 1 subfamily, with only 132 individuals, which is 5.9% of the total count (Figure-5) (Table-3).

Table-1: Relative Abundance of Butterfly Species.

Very Common	Common	Locally Common	Uncommon
12	39	03	07

Table-2: Checklist of Butterflies recorded in Gairsain blocks of Chamoli district, Uttarakhand.

S. No.	Species Scientific Name	Common English Name	Relative Abundance	WL(P)A, 2022
1. Superfamily: Papilionoidea				
1.1. Family: Hesperidae (06)				
1.1.1. Subfamily: Hesperiinae (04)				
1	*Borbo cinnara* (Wallace, [1866])	Rice Swift	Uncommon	_
2	*Udaspes folus* (Cramer, [1775])	Grass Demon	Common	_
3	*Pelopidas mathias* (Fabricius,[1798])	Small Branded Swift	Common	_
4	*Pelopidas sinensis* (Mabilles, 1877)	Chinese Branded Swift	Common	_
1.1.2. Subfamily: Pyrginae (02)				
5	*Pseudocoladenia fatih* (Kollar,1844)	West Himalayan Pied Flat	Common	_
6	*Celaenorrhinus dhanada* (Moore,[1866])	Yellow-banded Flat (Himalayan Yellow-banded Flat)	Locally Common	_
1.2. Family: Lycaenidae (11)				
1.2.1. Subfamily: Polyommatinae (06)				
7	*Acytolepis puspa* (Horsfield, [1828])	Common Hedge Blue	Very Common	_
8	*Pseudozizeeria maha* (Kollar, [1844])	Pale Grass Blue	Very Common	_
9	*Talicada nyseus* (Guérin-Méneville, 1843)	Red Pierrot	Common	_
10	*Euchrysops cnejus* (Fabricius, 1798)	Gram Blue	Common	_
11	*Catochrysops strabo* (Fabricius, 1793)	Forget-Me-not	Common	_
12	*Lampides boeticus* (Linnaeus, 1767)	Pea Blue	Common	_
1.2.2 Subfamily: Lycaeninae (03)				
13	*Heliophorus sena* (Kollar,[1844])	Sorrel Sapphire	very Common	_
14	*Heliophorus moorei* (Hewitson,1885)	Azure Sapphire	Common	_
15	*Lycaena panava* (Westwood,1852)	White- bordered Copper	Common	_
1.2.3 Subfamily: Theclinae (02)				
16	*Hypolycaena kina* (Hewitson,1869)	Blue Tit	Uncommon	Schedule II

17	*Rapala nissa* (Kollar,[1844])	Common Flash	Common	_
1.3. Family: Nymphalidae (22)				
1.3.1 SUBFAMILY :Cyrestinae(01)				
18	*Cyrestis thyodamas ganescha* (Kollar,1848)	Map Butterfly	Common	_
1.3.2. Subfamily: Danainae (01)				
19	*Parantica sita* (Kollar, [1844])	Chestnut Tiger	Common	_
1.3.3. Subfamily: Helioconiinae (04)				
20	*Acraea issoria* (Hubner, [1819])	Yellow Coster	Locally Common	_
21	*Phalanta phalantha* (Drury, [1773])	Common Leopard	Common	_
22	*Issoria isaeea* (Gray, 1846)	Himalayan Queen Fritillary	Common	_
23	*Argynnis hyperbius* (Linnaeus, 1763)	Indian Fritillary/Tropical Fritillary	Uncommon	_
1.3.4. Subfamily: Libytheinae (01)				
24	*Libythea myrrha* (Godart, 1819)	Club Beak	Common	_
1.3.5. Subfamily: Apaturinae (01)				
25	*Sephisa dichroa* (Kollar, [1844])	Western Courtier	Locally Common	_
1.3.6. Subfamily: Limenitidinae (03)				
26	*Athyma cama* (Moore, [1858])	Orange Staff Sergeant	Uncommon	_
27	*Athyma perius* (Linnaeus, 1758)	Common Sergeant	Common	_
28	*Neptis hylas* ((Linnaeus, 1758)	Common Sailer	Common	_
1.3.7. Subfamily: Nymphalinae (06)				
29	*Aglais caschmirensis* (Kollar, 1844)	Indian Tortoiseshell	Very Common	_
30	*Junonia iphita* (Cramer, 1779)	Chocolate Pansy	Common	_
31	*Kaniska canace* (Linnaeus, 1763)	Blue Admiral	Common	_
32	*Symbrenthia lilaea* (Hewitson, [1864])	Common Jester	Very Common	_
33	*Vanessa cardui* (Linnaeus, 1758)	Painted Lady	Common	_
34	*Vanessa indica* (Herbst, 1794)	Indian Red Admiral	Common	_
1.3.8. Subfamily : Pseudergolinae (01)				
35	*Pseudergolis wedah* (Kollar, [1844])	Tabby	Common	-
1.3.9. Subfamily: Satyrinae(04)				

36	*Callerebia hybrida* (Butler,1880)	Hybrid Argus	Common	_
37	*Ypthima nikaea* (Moore,[1875]	Kumaon Five –ring	Common	_
38	*Callerebia scanda* (Kollar,[1844])	Pallid Argus	Common	ScheduleII
39	*Ypthima baldus* (Fabricius, 1775)	Common Fivering	Very Common	_
1.4. Family: Papilionidae (06)				
1.4.1. Subfamily: Papilioninae (06)				
40	*Graphium cloanthus* (Westwood, 1841)	Glassy Bluebottle	Common	Schedule II
41	*Graphium sarpedon* (Linnaeus, 1758)	Common Bluebottle	Very common	Schedule II
42	*Papilio machaon* (Linnaeus, 1758)	Common yellow Swallowtail	Common	Schedule II
43	*Papilio bianor* (Cramer, [1777])	Common Peacock	Common	_
44	*Papilio polytes* (Linnaeus, 1758)	Common Mormon	Very Common	_
45	*Papilio protenor* (Cramer, 1775)	Spangle	Common	_
1.5. Family: Pieridae (13)				
1.5.1. Subfamily: Coliadinae(07)				
46	*Catopsilia Pomona* (Fabricius, 1775)	Lemon Emigrant/Common Emigrant	Very Common	_
47	*Catopsilia pyranthe* (Linnaeus, 1758)	Mottled Emigrant	Common	_
48	*Colias fieldii* (Menetries, 1855)	Dark Clouded Yellow	Common	_
49	*Gonepteryx nepalensis* (Doubledy, 1847)	Common Brimstone/ Pale Brimstone	Common	_
50	*Eurema blanda* (Boisduval, 1836)	Three-spot Grass Yellow	Common	_
51	*Eurema brigitta* (Stoll, 1780)	Small Grass Yellow	Common	_
52	*Eurema laeta* (Boisduval, 1836)	Spotless Grass Yellow	Common	_
1.5.2. Subfamily: Pierinae(06)				
53	*Aporia agathon* (Gray, 1831)	Great Blackvein	Common	_
54	*Delias sanaca* (Moore, [1858])	Pale Jezebel	Uncommon	Schedule I
55	*Delias belladonna* (Fabricius, 1793)	Hill Jezebel	Very Common	_
56	*Delias eucharis* (Drury, 1773)	Indian Jezebel	Uncommon	_
57	*Pieris brassicae* (Linnaeus, 1758)	Large Cabbage White	Very Common	_

58	*Pieris canidia* (Linnaeus, 1768)	Indian Cabbage White	Very Common	_
1.6. Family: Riodinidae (03)				
1.6.1. Subfamily: Nemeobiinae(03)				
59	*Dodona durga* (Kollar, [1844])	Common Punch	Common	_
60	*Dodona eugenes* (Bates,[1868])	Tailed Punch	Common	_
61	*Zemeros flegyas* (Cramer, [1780])	Punchinello	Uncommon	_

Table-3: Table showing the total number of families, genera, subfamilies and Individuals of butterflies found in the study area.

Family	Genus	Subfamily	Total Number of Individuals
Nymphalidae	18	9	798
Lycaenidae	10	3	447
Papilionidae	2	1	187
Pierdae	7	2	488
Hesperridae	5	2	171
Riodinidae	2	1	132
Total	44	18	2223

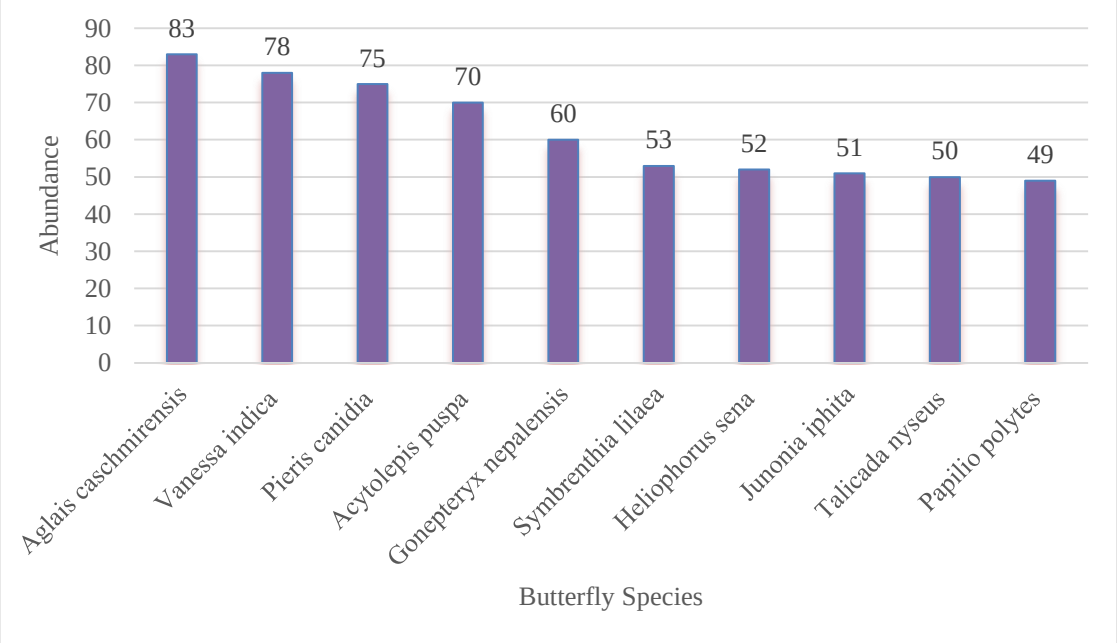

Figure-4: Top ten species found in the study area.

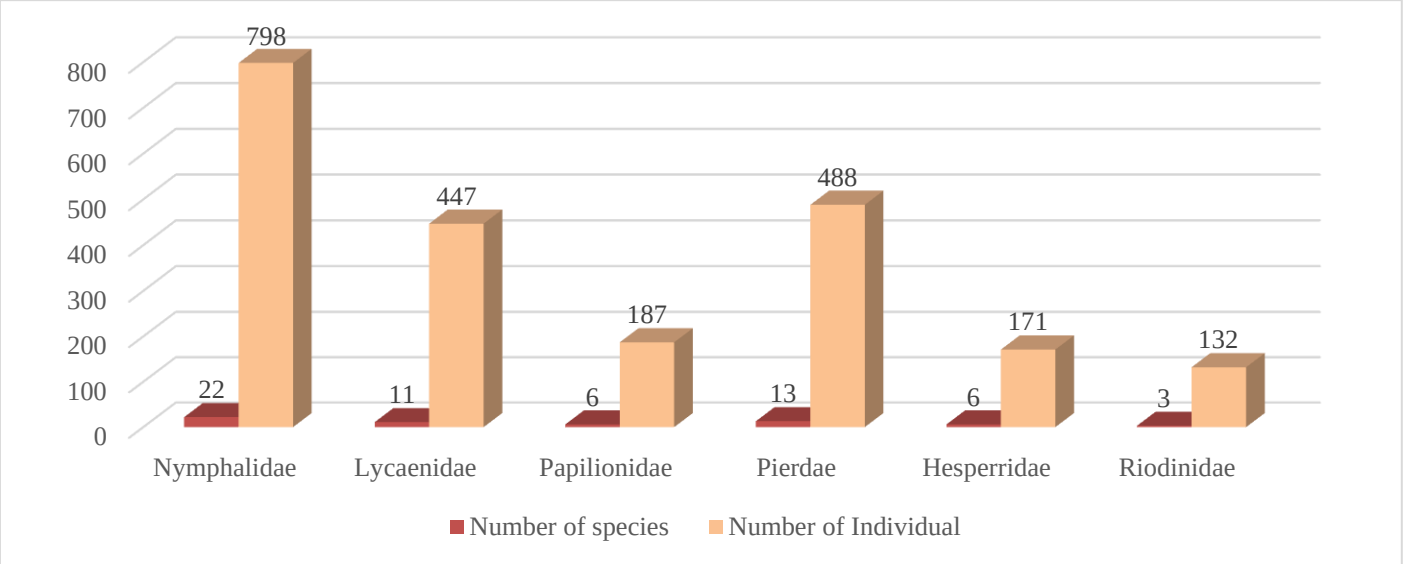

Figure-5: Number of individuals per Butterfly family.

Conclusion

Overall, the study reveals that Gairsain has a relatively diverse butterfly fauna, comprising species that represent both habitat-specific taxa and common generalists. Identifying legally protected butterfly species alongside those that are widely distributed indicates a balanced community. Further research on habitat preferences and ecological Interactions is vital for efficient conservation and management strategies in this Himalayan region. This variety highlights the region's ecological significance and underscores the need to integrate butterfly conservation into broader environmental management and ecotourism initiatives.

Acknowledgements

The authors sincerely thank all the friends and team members who assisted throughout the fieldwork. This study would not have been possible without your efforts in surveying and gathering data.

References

1. Robbins, R. K., & Opler, P. A. (1997). Butterfly diversity and a preliminary comparison with bird and mammal diversity. *Biodiversity II: understanding and protecting our biological resources*, 69-82.
2. Kocher S.D., & Williams, E.H. (2000). The diversity and abundance of North American butterflies vary with habitat disturbance and geography. *Journal of biogeography*, 27(4), 785-794.
3. Gascon, C., Lovejoy, T. E., Bierregaard Jr, R. O., Malcolm, J. R., Stouffer, P. C., Vasconcelos, H. L., Laurance, W.F., Zimmerman, B., Tocher, M. and Borges, S. (1999). Matrix habitat and species richness in tropical forest remnants. *Biological conservation*, 91(2-3), 223-229. https://doi.org/10.1016/S0006-3207(99)00080-4.
4. TH, R. (2001). Countryside biogeography of moths in a fragmented landscape: biodiversity in native and agricultural habitats. *Conserv Biol*, 15, 378-388.
5. Sondhi, S. & K. Kunte (2018). Butterflies of Uttarakhand Afield Guide. M/s Bishen Singh Mahendra Pal Singh (Dehradun), Titli Trust (Dehradun), National Centre for Biological Sciences (Bengaluru) & Indian Foundation of Butterflies (Bengaluru), pp 1-310.
6. Singh, A. P. and Sondhi, S. (2016). Butterflies of Garhwal, Uttarakhand, western Himalaya, India. *Journal of Threatened Taxa*, 8(4), 8666-8697.
7. Tiwari, P., Tiwari, J. K., & Singh, D. (2013). Changing Scenario of Traditional Beekeeping in Garhwal Himalaya: A Case Study from Gairsain Block of district Chamoli, Uttarakhand. *International Journal of Life Sciences*, 2(1), 16-20.
8. Burnham, K. P., Anderson, D. R., & Laake, J. L. (1980). Estimation of density from line transect sampling of biological populations. *Wildlife monographs*, (72), 3-202.
9. R.K.Varshney & P. Smetacek (2015). A Synoptic Catalogue of the Butterflies of India. Butterfly Research Centre, Bhimtal and Indinov Publishing, New Delhi, pp 1-261.
10. Kumar P. (2008). Handbook on common butterflies of Uttarakhand. *Zoological Survey of India*, 1-136.