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New Records on the Species Diversity of Butterflies (Lepidoptera: Insecta) in and around Asan Conservation Reserve and RAMSAR site, Uttarakhand, India and Efforts on their Conservation

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ABSTRACT: The studies on species diversity of Butterflies was conducted in and around Asan Conservation Reserve and RAMSAR site, District Dehradun, Uttarakhand, India during 2021-24. The identification and synthesis of studies resulted into New records of about 43 species of butterflies from the study area, in that Nymphalidae is the dominant family having 22 species followed by Pieridae 13 species, Lycaenidae 06 species and least by Papilionidae 02 species. The study area was divided into four sectors and recorded maximum number of 43 species in the Sector-II (in wetland vegetation opposite end Asan Barrage), followed by 26 species in Sector-I (vegetation around Asan Barrage), 23 species in Sector-III (vegetation around Asan River) and least 17 species in Sector-IV (vegetation around Yamuna river), which indicates that maximum species of Butterflies prefers Sector-II study area having Wetland vegetation as suitable habitat to complete their life cycle. One of the new recorded species, *Hypolimnas misippus* (Linnaeus, 1764) is listed in Schedule II of Indian Wildlife (Protection) Amendment Act, 2022. By the efforts of Government of India, firstly the Asan Barrage Bird Sanctuary established in 1967, further declared as Asan Conservation Reserve in 2005 and as First RAMSAR site of Uttarakhand in 2020, which designates it as Wetland of International importance and playing significant role in the conservation of wetland habitats for the survival of biodiversity.

Keywords: New Records, Butterflies, Diversity, Asan Conservation Reserve, Uttarakhand, India.

INTRODUCTION

A large number of animal and plant species are restricted only to wetlands, their survival depending totally on the existence of these habitats. The Insects represent over half of the global biodiversity in terms of species numbers. Among the different orders of insects, the fascinating butterflies belongs to the order Lepidoptera, in that about 17,500 species of butterfly recorded so far throughout the world, of which about 1,379 species of butterfly are known from India (Evans, 1932; Talbot, 1939; Wynter-Blyth, 1957; Haribal, 1992; Kunte, 2000; Kehimkar, 2008; Cotton *et al.*, 2015; Sondhi & Kunte 2018; Singh, 2022; Singh *et al.*, 2024). Butterflies have fascinated human imagination, creativity, valuable pollinators, one of the important food chain components of the birds, reptiles, spiders and predatory insects, also good indicators of environmental quality as they are sensitive to changes in the environment.

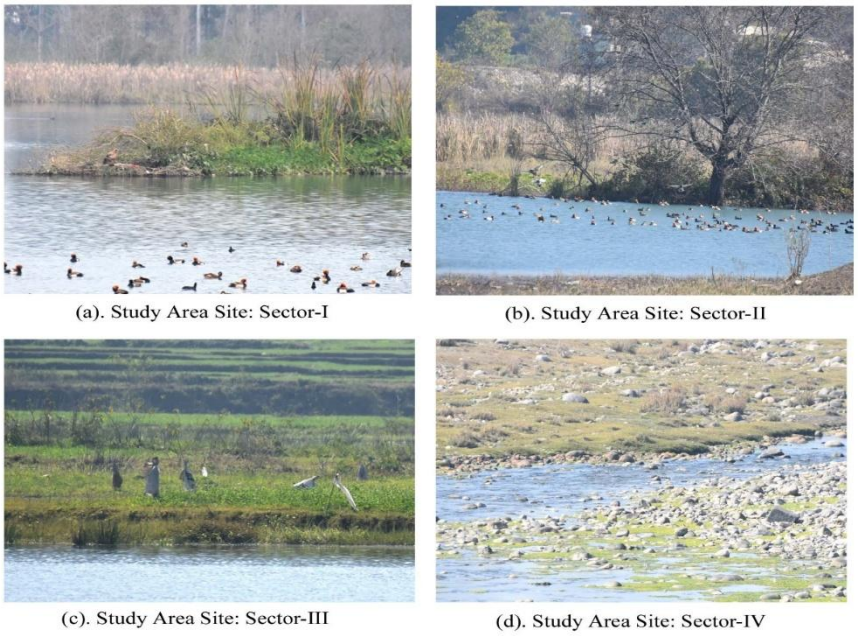
Perusal of literature reveals that the various workers contributed and documented their work on the study of butterflies in the different parts of India *i.e.* de Niceville (1886, 1890); Moore (1890-1903); Marshall & de Niceville (1882); Swinhoe (1893, 1905-1912); Bingham (1905, 1907); Evans (1932); Talbot (1939, 1947); Wynter-Blyth (1957); Cantlie (1962), Varshney (1993, 1994, 1997); Arora (1994, 1995 & 1997); Gaonkar (1996); Haribal (1998), Heppner (1998), Gunathilagaraj *et al.* (1998, 2000); Kunte (2000); Joshi and Joshi (2003); Gupta and Mondal (2005); Sharma *et al.* (2006); Kumar *et al.* (2007 a&b); Maulik, (2010); Tyagi *et al.*, (2011); Smetacek (2012); Arya and Dayakrishna (2014); Singh and Sondhi (2016); Singh (2022); Bisht *et al.*, (2023); Chandra *et al.*, (2023); Singh, *et al.* (2024) *etc.*, but none of the work on study of butterflies was documented from the study area. Therefore, the present studies made a modest attempt to explore the existing diversity of Butterflies of Asan Conservation Reserve and RAMSAR site, District Dehradun, Uttarakhand, India.

MATARIALS AND METHODS

The extensive studies on butterflies has been done by visiting in all the seasons of the year in and around the study area Asan Conservation Reserve and RAMSAR site, District Dehradun, Uttarakhand, India during September, 2021 to October, 2024. The study area having coordinates 30°26′09″N, 77°39′56″E, is a small

wetland spread over an area of 444.4 hectare stretch of Asan river running down to its confluence with the Yamuna river. The Asan Wetland, also known as Dhalipur Lake or Asan Barrage Bird Sanctuary was established in 1967, further declared as Asan Conservation Reserve in 2005 and as First RAMSAR site of Uttarakhand in 2020, it is also famous as tourist attraction for observation of migratory waterbirds from October to March every year. A large number of animal and plant species are restricted only to wetlands, their survival depending totally on the existence of this habitats.

To explore the species diversity the study area Asan Conservation Reserve and RAMSAR site was divided into four Sectors *i.e.* Sector-I (around vegetation near Asan Barrage); Sector-II (around wetland vegetation Opposite end Asan Barrage); Sector-III (around vegetation near Asan river) and Sector-IV (around vegetation near Yamuna river) (Figs. a-d). The unidentified butterfly species were caught in the field by using Insect net and after taking photographs, observation and identification of the species with the help of field guides, the live individuals were released in the habitat. In the field observations were also made on the bahaviour, life history of different species of Butterflies, taken photogrphs of species using Nikon DSLR7000 camera with closeup attachments, collected very few selected repersentatives of unidentified individuals of butterflies species, transferred them into insect collection paper packs and were brought to the laboratory. Also studied the earlier survey collection of butterflies preserved in National Zoological Collections of Zoological Survey of India, Northern Regional Centre, Dehradun. The identification in the field and of the collected preserved specimens was carried out using identification keys provided by Bingham (1905, 1907); Evans (1932); Talbot (1939, 1947); Wynter-Blyth (1957), Cantlie (1962); Varshney (1993, 1994, 1997); Arora (1994, 1995 & 1997); Haribal (1998) *etc*.



(a). Study Area Site: Sector-I (b). Study Area Site: Sector-II

(c). Study Area Site: Sector-III (d). Study Area Site: Sector-IV

Fig. a-d. A glimpse of study area Asan Conservation Reserve, Uttarakhand.

CONCLUSIONS AND DISCUSSION

The identification and synthesis of studies resulted into New record of about 43 species of butterflies from the study area, in that Nymphalidae is the dominant family having 22 species followed by Pieridae 13 species, Lycaenidae 06 species and least by Papilionidae 02 species (Table 1). This aligns with global trends, as Nymphalidae is known to be the largest and most ecologically diverse butterfly family, occupying a wide range of habitats and exhibiting varied life history strategies. As the study area was divided into four sectors and recorded maximum number of 43 species in the Sector-II (in wetland vegetation opposite end Asan Barrage), followed by 26 species in Sector-I (vegetation around Asan Barrage), 23 species in Sector-III (vegetation around Asan River) and least 17 species in Sector-IV (vegetation around Yamuna river), which indicates that maximum species of Butterflies prefers Sector-II study area having Wetland vegetation as suitable habitat to complete their life cycle (Table 1).

The various workers had done extensive studies and documented findings on butterflies in different parts of India *i.e.* deNicéville (1886) focuses on specific butterfly families and subfamilies, providing detailed descriptions and classifications of species found in the Indian subcontinent; Bingham (1905-1907) done foundational work in the study of butterflies species in South Asia; Evans (1932) published the book entitled The Identification of Indian Butterflies; Arora (1994, 1995, 1997) provides a comprehensive overview of the butterfly fauna of Rajaji National Park, worked on the butterfly species of the Western Himalayas and focused on the butterflies of the Nanda Devi Biosphere Reserve, Uttarakhand; Joshi and Joshi (2003) studied Butterfly Diversity in Bhimtal and Ramnagar Region of District Nainital; Tyagi *et al.* (2011) examined the diversity and distribution of butterflies in Nainital

district, Uttarakhand, India; Smetacek (2012) explored the butterfly diversity along with other protected fauna in the Jones Estate; Arya and Dayakrishna (2014) investigated the species richness and diversity of butterflies in and around Kumaun University; Singh and Sondhi (2016) provided an overview of the butterfly species recorded in the Garhwal, Western Himalaya, Uttarakhand; Singh (2022) examined the diversity of butterfly species in different forest types across Uttarakhand in the Western Himalayas; Bisht *et al.* (2023) examined the butterfly diversity along different altitudinal gradients in the Munsiyari region of the Western Himalayas and Chandra *et al.* (2023) focused on the butterfly biodiversity in the protected landscape of Nandhour Landscape, Uttarakhand, India etc.

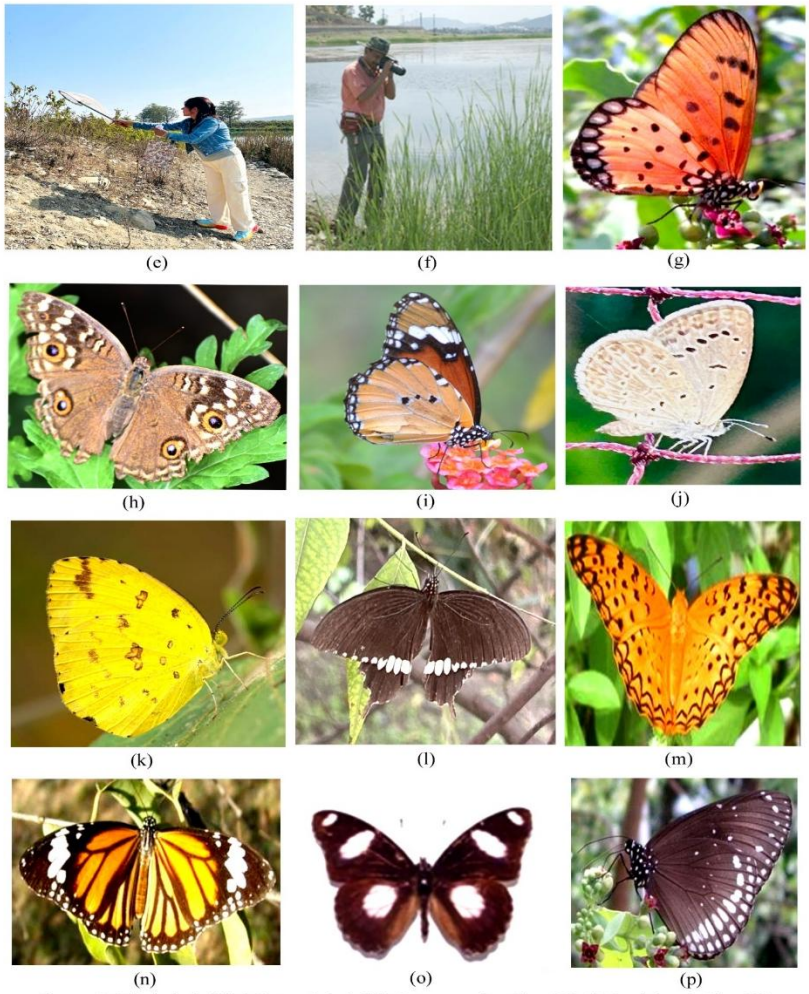
Table 1: Species composition of Butterflies recorded from Asan Conservation Reserve and RAMSAR site, Uttarakhand, India during 2021-24.

Sr. No.	Family	Odonata Species	Sector-I (around Vegetation near Asan Barrage)	Sector-II (around Wetland Vegetation Opposite end Asan Barrage)	Sector-III (around Vegetation near Asan river)	Sector-IV (around Vegetation near Yamuna river)
1.	Nymphalidae	*Acraea trepsicore* (Linnaeus, 1758)	+	+	+	+
2.		*Ariadne ariadne* (Linnaeus,1763)	-	+	+	+
3.		*Ariadne merione* (Cramer, 1777)	-	+	+	-
4.		*Danaus chrysippus* (Linnaeus, 1758)	+	+	+	+
5.		*Danaus genutia* (Cramer, 1779)	-	+	-	-
6.		*Euploea core* (Cramer, 1780)	-	+	+	-
7.		*Euthalia aconthea* (Cramer, 1777)	-	+	-	-
8.		*Hypolimnas misippus* (Linnaeus, 1764)	-	+	-	-
9.		*Hypolimnas bolina* (Linnaeus, 1758)	-	+	-	-
10.		*Junonia almana* (Linnaeus, 1758)	+	+	+	+
11.		*Junonia atlites* (Linnaeus, 1763)	-	+	+	-
12.		*Junonia hierta* (Fabricius, 1798)	+	+	+	+
13.		*Junonia iphita* (Cramer, 1779)	-	+	-	-
14.		*Junonia lemonias* (Linnaeus, 1758)	+	+	+	+
15.		*Junonia orithya* (Linnaeus, 1758)	-	+	-	-
16.		*Melanitis leda* (Linnaeus, 1758)	-	+	-	-
17.		*Mycalesis mineus* (Linnaeus, 1758)	+	+	-	-
18.		*Neptis hylas* (Linnaeus, 1758)	+	+	+	+
19.		*Phalanta phalantha* (Drury, 1773)	+	+	+	+
20.		*Tirumala limniace*	-	+	-	-

		(Cramer, 1775)				
21.		*Ypthima baldus* (Fabricius, 1775)	-	+	-	-
22.		*Vanessa cardui* Linnaeus, 1758	+	+	+	+
23.	Pieridae	*Belenois aurota* (Fabricius, 1793)	+	+	+	+
24.		*Catopsilia pyranthe* (Linnaeus, 1758)	+	+	+	+
25.		*Catopsilia pomona* (Fabricius, 1775)	+	+	+	+
26.		*Cepora nerissa* Fabricius, 1775	+	+	-	-
27.		*Delias eucharis* (Drury, 1773)	-	+	+	-
28.		*Eurema hecabe* (Linnaeus, 1758)	+	+	+	+
29.		*Eurema laeta* Boisduval,1836	+	+	-	-
30.		*Ixias pyrene* Linnaeus, 1764	+	+	+	-
31.		*Ixias marianne* (Cramer, 1779)	-	+	-	-
32.		*Leptosia nina* (Fabricius, 1793)	-	+	+	-
33.		*Pareronia hippia* (Fabricius, 1787)	-	+	-	-
34.		*Pieris brassicae* Linnaeus, 1858	+	+	+	+
35.		*Pieris canidia* (Sparrman, 1768)	+	+	+	+
36.	Papilionidae	*Papilio demoleus* Linnaeus, 1758	+	+	-	-
37.		*Papilio polytes* Linnaeus, 1758	+	+	-	-
38.	Lycaenidae	*Castalius rosimon* (Fabricius, 1775)	+	+	-	-
39.		*Catochrysops strabo* (Fabricius, 1793)	+	+	-	-
40.		*Euchrysops cnejus* (Fabricius, 1798)	+	+	+	+
41.		*Heliophorus sena* (Kollar, 1844)	+	+	-	-
42.		*Lampides boeticus* (Linnaeus, 1767)	+	+	+	+
43.		*Pseudozizeeria maha* (Kollar, 1844)	+	+	-	-
		Total	**26**	**43**	**23**	**17**

Note: + = species present; - = species absent.

The study reveals that *Ariadne ariadne* (Linnaeus,1763), *Catopsilia pyranthe* (Linnaeus, 1758), *Danaus chrysippus* (Linnaeus, 1758), *Eurema hecabe* (Linnaeus, 1758), *Junonia hierta* (Fabricius, 1798), *Junonia lemonias* (Linnaeus, 1758), *Papilio demoleus* Linnaeus, 1758, *Papilio polytes* Linnaeus, 1758, *Pieris brassicae* Linnaeus, 1858, *Phalanta phalantha* (Drury, 1773) and *Vanessa cardui* Linnaeus, 1758 were the dominant species of Butterflies in the study area. The selected collection of butterflies by insect net, photography of butterflies in the study area and some of dominant butterflies species were shown in Figs. e-p.



Figs. e-p. (e). Collection in the field; (f). Photography in the field; (g). *Acraea trepsicore* (Linn., 1758); (h). *Junonia lemonias* (Linn., 1758); (i). *Danaus chrysippus* (Linn., 1758); (j). *Pseudozizeeria maha* (Kollar, 1844); (k). *Eurema hecabe* (Linn., 1758); (l). *Papilio polytes* Linn., 1758; (m). *Phalanta phalantha* (Drury, 1773); (n). *Danaus genutia* (Cramer, 1779); (o). *Hypolimnas misippus* (Linn., 1764); (p). *Euploea core* (Cramer, 1780).

74 species of Indian butterflies were assessed in the IUCN Red List of Threatened Species, in that Ludlow's Bhutan Glory (*Bhutanitis ludlowi* Gabriel, 1942) is endangered, 03 species are assessed as vulnerable, 04 are near threatened and rest 66 species are assessed as least concern. 391 species/subspecies of Indian butterflies are listed under Indian Wildlife Protection (Amendment) Act 2022, of which 96 species/subspecies are listed as Schedule I and 295 species in Schedule II (Singh *et al.,* 2024). One of the recorded species from the study area *Hypolimnas misippus* (Linnaeus, 1764) is listed in Schedule II of Indian Wildlife (Protection) Amendment Act, 2022 (Annon., 2022).

The long-term monitoring studies on Butterflies and its habitats will help us to analyse/predict climate change, other meteorological factors and will be considered as an important model group in understanding ecology of a particular landscape. The threats like habitat loss, habitat degradation, habitat fragmentation, industrial settlement, deforestation, fire, use of pesticides/weedicides/chemicals in agriculture, by illegal collection for trade many species have become very rare, some are on the verge of extinction and the population of these living creatures Butterflies has been declining in the last few decades. The illegal export/collection by visitors of rare species those restricted/threatened/endemic to particular habitats and the collection by immature workers (school/college students) will also adversely affected butterflies fauna. By the Government of India efforts in conservation of biodiversity/habitats and protection of threatened species under **Indian Wildlife (Protection) Act**, 1972, still there is need of public awareness/participation, interaction/collaborative work between researchers, to develop standard common methodology for research study to conserve and protect these valuable creatures. The present study reveals that the study area Asan Conservation Reserve and RAMSAR site is rich in diversity of Butterfly fauna and provide a suitable natural habitat for their survival. So far 89 RAMSAR sites declared in India, including the study area Asan Conservation Reserve that was recognized as RAMSAR site in 2020 and Wetland of International Importance under RAMSAR Convention, aim to conserve biodiversity and sustainably use of Wetlands. Therefore, the present study made a modest attempt to highlight the current status of the diversity of butterflies, helps in planning conservation management plans for wetland and understanding the ecological patterns in the study area Asan Conservation Reserve and RAMSAR site, District Dehradun, Uttarakhand, India.

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REFERENCES

Annonymous (2022). *The Wildlife (Protection) Amendment Act, 2022*. No. 18 of 2022. The Gazette of India. CG-DL-E-20122022-241252. Published by The Controller of Publications, Delhi–110054, 1-165.

Arora, G. S. (1994). Lepidoptera: Butterflies. In Fauna of Rajaji National Park, *Fauna of Cons. Area Ser., zool. Surv. India, 5*, 245-300.

Arora, G. S. (1995). Lepidoptera: Rhopalocera. In Fauna of Western Himalaya, *Himalayan Ecosystem Series, Zool. Surv. India, 1*, 61-73.

Arora, G.S. (1997). Lepidoptera: Rhopalocera. In Fauna of Nanda Devi Biosphere Reserve (Uttaranchal). *Fauna of Conservation Areas Series, Zool. Surv. India, 9*, 67-88.

Arya, M. K. & Dayakrishna, C. R. (2014). Species richness and diversity of butterflies in and around Kumaun University, Nainital, Uttarakhand, India. *Journal of Entomology and Zoology studies*, *2*(3), 153-159.

Bingham, C. L. (1905). *The fauna of British India including Ceylon and Burma, Butterfly-Vol-I.* Taylor and Francis Ltd., London, 511pp.

Bingham, C. L. (1907). *The fauna of British India including Ceylon and Burma, Butterfly-Vol-II.* Taylor and Francis Ltd., London, 453pp.

Bisht, M., Goswami, D., Uniyal, V. P. & Singh, V. (2023). Diversity of butterfly along different altitudinal gradient of Munsiyari, Western Himalayan, Uttarakhand, India. *Asian Journal of Conservation Biology*, *12*(2), 258-265.

Cantlie, K. (1962). *The Lycaenidae portion (except the Arhopala group) of Brigadier Evan's the identification of Indian Butterflies 1932 (India, Pakistan, Ceylon, Burma).* The Bombay Natural History Society, Bombay, India, 156pp.

Chandra, H., Arya, M. K. & Verma, A. (2023). Biodiversity of butterflies (Lepidoptera: Rhopalocera) in the protected landscape of Nandhour, Uttarakhand, India. *Journal of Threatened Taxa*, *15*(1), 22448-22470.

Cotton, A., Zdenek, F., Gupta, I., Paul, V. G., Yutaka, I., Khew, S.K., Kirton, G., Torben, L., Markhasiov, M., Majumdar, M., Olivier, P., Jiri, R., Saito, M., Smith, P., Varshney, R. K. & Smetacek, P. (2015). A Synoptic Catalogue of the Butterflies of India. 10.13140/RG.2.1.3966.2164.

de Niceville, L. (1886). *The butterflies of India, Burma and Ceylon. Vol-II. Nymphalidae, Lemoniidae, Libythaeinae, Nemeobinae.* The Calcutta Central press Co. Ltd., 332pp.

de Niceville, L. (1890). *The butterflies of India, Burma and Ceylon. Vol-III (Lycaenidae).* The Calcutta Central press Co. Ltd., 503pp.

Evans, W. H. (1932). *The identification of Indian Butterflies. (2nd Edition).* The Bombay Natural History Society, Mumbai, India, 454pp.

Gaonkar, H. (1996). Butterflies of the Western Ghats, India, including Sri Lanka: A biodiversity assessment of a threatened mountain system, 51pp.

Gunathilagaraj, K., Perumal, T.N.A., Jayaram, K. & Kumar, M.G. (1998). *Some South Indian Butterflies.* Nilgiri Wildlife and Environment Association, Tamil Nadu, India, 274pp.

Gunathilagaraj, K., Daniel, B.A., Molur, S. & Walker, S. (2000). *Handbook on Protected Invertebrates of India- Part-I-Butterflies.* Zoo Outreach Organisation, Coimbatore, India, 186pp.

Gupta, I. J. & Mondal, D. K. (2005). Red Data Book-Butterflies of India-Part-II. Director, Zoological Survey of India, Kolkata., 535pp.

Haribal, M. (1998). *The Butterflies of Sikkim Himalaya and their natural history.* Sikkim Nature Conservation Foundation, Gangtok, India, 217pp.

Heppner, J.B. (1998). *Classification of Lepidoptera Part 1. Introduction.* Holarctic Lepid. (Gainsville), *5*, 1-148.

Kehimkar, I. (2008). The Book of Indian Butterflies, Bombay Natural History Society, Mumbai, India Oxford University, 1-487.

Kumar, R., Sharma, G., Ramamurthy, V. V. & Kumar, N. (2007a). Major lepidopterous insect pests of vegetables in North India. *Indian Journal of Entomology*, *69*(2), 189-195.

Kumar, R., Sharma, G., Ramamurthy, V. V. & Kumar, N. (2007b). Biosystematic studies of *Junonia orithya* Linnaeus (Lepidoptera: Nymphalidae) from North India. *Indian Journal of Entomology*, *69*(3), 224-229.

Kunte, K. (2000). *Butterflies of Peninsular India.* Indian Academy of Sciences, Universities Press (India) Limited, 254pp.

Joshi, P. & Joshi, R. (2003) The Study of Butterfly Diversity in Bhimtal and Ramnagar Region of District Nainital Uttarakhand. *J. Mountain Res.*, *18*(1), 153-156.

Marshall, G. F. L. & De Niceville, L. (1882). *Butterflies of India, Burma and Ceylon. Vol-I. Nymphalidae (Danainae, Satyrinae, Elymniinae, Morphinae, Acraeinae).* The Calcutta Central press Co. Ltd., 327pp.

Maulik, D.R. 2010. Insecta: Lepidoptera :Papilionidae, Danaidae, Lasiocampidae and Lymantriidae. State Fauna Series, Fauna of Uttarakhand, Zool. Surv. India, *18*(2), 592-610.

Moore, F. (1890-1892). *Lepidoptera Indica. Vol.I. Rhopalocera. Family Nymphalidae.* Lovell Reeve & Co. Ltd., London, 317pp.

Moore, F. (1893-1896). *Lepidoptera Indica. Vol.II. Rhopalocera. Family Nymphalidae.* Lovell Reeve & Co. Ltd., London, 274pp.

Moore, F. (1896-1899). *Lepidoptera Indica. Vol.III. Rhopalocera. Family Nymphalidae.* Lovell Reeve & Co. Ltd., London, 253pp.

Moore, F. (1899-1900). *Lepidoptera Indica. Vol.IV. Rhopalocera. Family Papilionidae, Family Pieridae*. Lovell Reeve & Co. Ltd., London.

Moore, F. (1901-1903). *Lepidoptera Indica. Vol.V. Rhopalocera. Family Nymphalidae, Family Riodinidae, Family Papilionidae.* Lovell Reeve & Co. Ltd., London.

Singh, A. P. & S. Sondhi. (2016). Butterflies of Garhwal, Uttarakhand, Western Himalaya, India. *Journal of Threatened Taxa*, *8*(4), 8666-8697.

Singh, A. P. (2022). Associations of butterflies across different forest types in Uttarakhand, western Himalaya, India: implications for conservation planning. *Journal of Threatened Taxa, 14*(1), 20346–20370.

Singh, N., Kaur, A., Pathania, P. C., Sharma, N., Kalawate, A., Palot, J., Banerjee, D., Talukdar, A., Lenka, R., Kumari, A., Raha, A. & Joshi, R. (2024). *Fauna of India Checklist: Arthropoda: Insecta: Lepidoptera. Version 1.0. Zoological Survey India*, 1-288.

Smetacek, P. (2012). Butterflies (Lepidoptera: Papilionoidea and Hesperoidea) and other protected fauna of Jones Estate, a dying watershed in the Kumaon Himalaya, Uttarakhand, India. *Journal of Threatened Taxa*, *4*(9): 2857-2874.

Sondhi, S. & Kunte, K. (2018). *Butterflies of Uttarakhand-A Field Guide.* Bishen Singh Mahendra Pal Singh (Dehradun), Titli Trust (Dehradun) & National Centre for Biological Sciences (Bengaluru), 1-310.

Swinhoe, C. (1893). A list of the Lepidoptera of the Khasia hills. *Trans. Ent. Soc. London, 3*, 267-330.

Swinhoe, C. (1905-1910). *Lepidoptera indica. Vol. VII. Rhopalocera family Papilionidae, family Lycaenidae.* Lovell Reeve & Co. Ltd., London, 286pp.

Swinhoe, C. (1910-1911). *Lepidoptera indica. Vol. VIII. Rhopalocera family Lycaenidae.* Lovell Reeve & Co. Ltd., London, 293pp.

Swinhoe, C. (1911-1912). *Lepidoptera indica. Vol. IX. Rhopalocera family Lycaenidae family Hesperiidae.* Lovell Reeve & Co. Ltd., London, 278pp.

Talbot, G. (1939). *The fauna of British India including Ceylon and Burma, Butterfly-Vol-I.* Taylor and Francis Ltd., London, 600pp.

Talbot, G. (1947). *The fauna of British India including Ceylon and Burma, Butterfly-Vol-II.* Taylor and Francis Ltd., London, 506pp.

Tyagi, R., Joshi, P. C. & Joshi, N. C. (2011). Butterfly diversity of district Nainital, Uttarakhand, India. *Journal of Environment and Bio-Sciences*, *25*(2), 273-278.

Varshney, R.K. (1993). Index Rhopalocera Indica. Part III. Genera of butterflies from India and neighbouring countries [Lepidoptera: (A) Papilionidae, Pieridae and Danaidae]. *Oriental Insects, 27*, 347-372.

Varshney, R. K. (1994). Index Rhopalocera Indica. Part III. Genera of butterflies from India and neighbouring countries [Lepidoptera: (B) Papilionidae, Pieridae and Danaidae]. *Oriental Insects, 28*, 151-198.

Varshney, R. K. (1997). Index Rhopalocera Indica. Part III. Genera of butterflies from India and neighbouring countries [Lepidoptera: (C) Lycaenidae]. *Oriental Insects, 31*, 83-138.

Wynter-Blyth, M. A. (1957). *Butterflies of the Indian region.* Bombay Natural History Society, Bombay, 523pp.

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