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# New records and an updated checklist of the family Hesperiidae (Lepidoptera) from Uttar Pradesh, India

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**Abstract**: This study presents the documentation of four previously unreported Hesperiidae (Rhopalocera) species within the state of Uttar Pradesh, India. The species recorded include *Tagiades litigiosa* Möschler, 1878, *Coladenia indrani* (Moore, [1866]), *Hyarotis adrastus* (Stoll, [1780]), and *Telicota colon* (Fabricius, 1775), all of which were observed and photographed on 23.x.2023 within the confines of Pilibhit Tiger Reserve, Uttar Pradesh, India. The documentation of these species marks the first recorded specimens of their presence within this particular region, expanding the known biodiversity of Hesperiidae in Uttar Pradesh. With these additions, the total count of hesperiid species within the Rhopalocera list for Uttar Pradesh now stands at 31.

**Keywords**: faunistics, nature conservation, distribution, Pilibhit Tiger Reserve.

## Introduction

The biodiversity of butterflies and moths, among the most conspicuous and diverse insect orders, plays a vital role in ecosystem dynamics, serving as indicators of environmental health and contributing to pollination. Within the expansive array of butterflies, the family Hesperiidae stands as a significant yet often understudied group, encompassing skippers and flats, characterized by their unique morphology and ecological relevance.

Uttar Pradesh, a region renowned for its diverse landscapes and rich flora and fauna, remains a focal point for biodiversity studies. However, despite its ecological significance, comprehensive explorations into the butterfly fauna, particularly the Hesperiidae family, have been relatively limited. Consequently, there exists an essential knowledge gap regarding the diversity, distribution, and ecological roles of these butterflies within the state's ecosystems.

The present study seeks to address this gap by undertaking a systematic investigation into the hesperiid butterflies of Uttar Pradesh, focusing on their faunistic, distribution. Specifically, this research aims to document and analyze the presence of hesperiid spe-

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cies within the confines of the Pilibhit Tiger Reserve, a critical habitat known for its rich biodiversity and significant conservation value. The butterflies studied in this state is available in the form of papers i.e., BEHERA (2016), BURA et al. (2016), DE RYE (1902), Director (2015), SARKAR & MANDAL (2018), SHARMA (2007), CHAMPION & SETH (1968), KUMARI & SHEIKH (2021). As GASSE (2018), the updated version checklist on Indian subcontinenet along with all literature available on hesperiid butterflies in Uttar Paresh State, there are 31 species in total after the addition of these four new records from current study within the state.

Moreover, the Hesperiidae family's unique characteristics, including their distinctive antennal structures and robust thoracic anatomy, warrant detailed examination to comprehend their adaptive features and ecological adaptations. Understanding these traits not only aids in species identification but also provides valuable insights into their ecological roles and behavioral patterns within their respective habitats.

Through field surveys, observation, and documentation of hesperiid species, this study endeavors to contribute significantly to the existing knowledge base. The findings are anticipated to expand the current understanding of Uttar Pradesh's butterfly diversity, underscore the ecological significance of the Pilibhit Tiger Reserve, and provide essential groundwork for future conservation strategies aimed at preserving these intricate yet vital components of the region's natural heritage.

## Material and methods

The Pilibhit Tiger Reserve spans across the Pilibhit, Lakhimpur Kheri, and Bahraich Districts within Uttar Pradesh, India (Fig.1). Positioned alongside the India-Nepal bor-

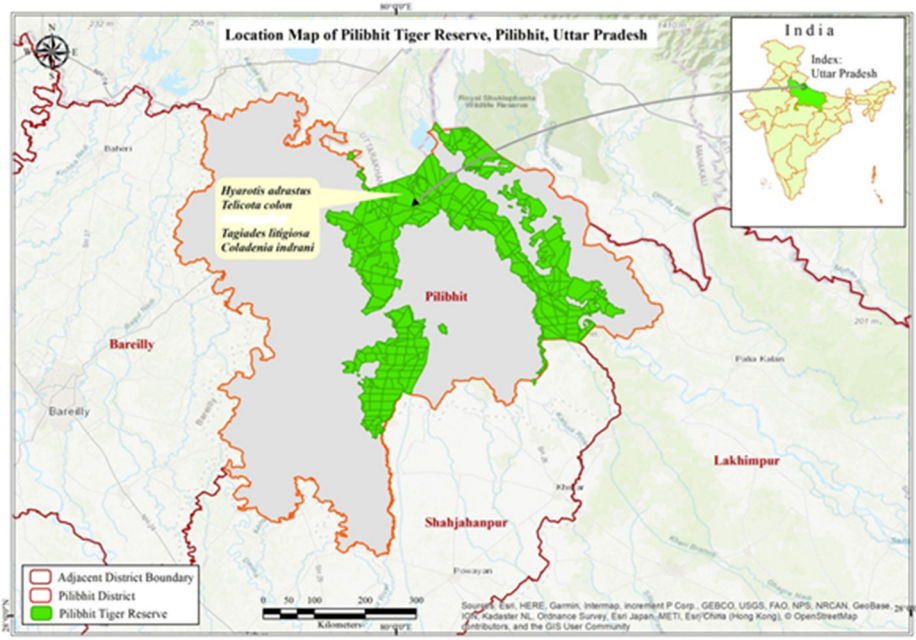


**Fig. 1: Map showing the location of recorded species**

der, it sprawls across the foothills of the Himalayas and the plains of Uttar Pradesh known as the 'terai'. Recognized as one of India's 50 Project Tiger reserves, it stands as a testament to biodiversity and conservation efforts.

Renowned for its dense forest cover, Pilibhit district boasts over 800 $km^2$ (310 sq mi) of forests, encompassing nearly 23% of the district's total area, as estimated in 2004. Within these forests reside approximately 36 tigers, thriving due to a robust prey population that supports their existence.

The Chuka forest, situated along the banks of the Sharda river within Pilibhit district, offers a picturesque setting, complemented by the Sharda Sagar dam and reservoir. These areas blend natural beauty with serene landscapes.

Rich in biodiversity, the Sal forests within this region serve as habitats for diverse bird and animal species, providing an ideal setting for reconnecting with nature.

The Pilibhit Tiger Reserve stands as an exemplary representation of the diverse and thriving Terai-Duar savanna and grasslands ecosystem.

Noteworthy for its population of rare and endangered species e.g. such as the Bengal tiger (Anonymus 2023), the reserve's significance extends to the realm of butterfly conservation, highlighting the importance of ongoing research and preservation endeavors.

The identification was done with the help of available literature like Kehimkar (2016), Evans (1932).

Observations and photography conducted in the month of October, 2023 within specific zones of Pilibhit Tiger Reserve facilitated the identification of four new records. The butterflies were photographed with the help of DSLR Nikon D750. Distribution map has been prepared with ArcGIS 10.5 software by using original base map of India (Fig. 1).

## Results

Herein we report four species belonging to two subfamilies in the family Hesperiidae as new state records as well as digital field photographs, host plants, and ecological notes are provided.

### ***Tagiades litigiosa*** Möschler, 1878

*Diagnosis* (Fig. 2): The upper side of the forewing is typically black, often denser than in *Tagiades menaka*, with similar markings, featuring two additional spots one below the cell spot at the beginning of vein 5 and another positioned in the center of the first median interspace. These additions create a slightly curved hue involving the four spots (including the sub-costal spot). The hindwing usually has a smaller white space compared to *T. menaka*, with similar marginal spots and lacks the two black spots within the white space.

*Distribution*: This species is prevalent in the Western Ghats, ranging up to 1500 meters, spanning from Kerala and Western Tamil Nadu northwards through Western Karnataka, Goa, and Western Maharashtra to Southeast Gujarat. It also occurs in the Eastern Ghats, from Andhra Pradesh (extending south to Nagalapuram Hills) northward through Orissa to Jharkhand and the adjacent areas of West Bengal (Bankura). Additionally, it is reasonably common in the Himalayas, found at altitudes up to 1800 meters. Its presence extends from Himachal Pradesh (west to Kangra) moving eastwards

through Uttarakhand, Nepal, Sikkim, North West Bengal, Bhutan, and into Arunachal Pradesh and the remaining northeastern states of India (GASSE 2018), Uttar Pradesh (Recent Record).

*Material examined*: India. Uttar Pradesh: Pilibhit Tiger Reserve, 28.692°N 79.853°E, 170 m, 23.x.2023, observed more than five individuals by Ratindra Pandey.

*Host plants*: *Dioscorea alata, Dioscorea oppositifolia*, and *Smilax* spp.

***Coladenia indrani*** (Moore, [1866])

*Diagnosis* (Fig. 3): The upper side displays a vibrant golden-yellow coloration: on the forewing, there are four semi-transparent white spots outlined in black. The first spot is small and positioned above the cell's tip, followed by a larger square spot within the cell, then an elongated spot below it, and finally, a spot outside their meeting point. Below these, there's a pale golden-yellow spot outlined in black. Towards the apex, there's a sequence of four similar white spots outlined in black, with the top three connected. A distinct black spot sits below the cell near the base. The outer margin and cilia appear dark, with the cilia turning white at the rear angle. On the hindwing, there's a semi-circular line of black spots near the edge and two similar inner discal spots, the outer edge is black, and the cilia alternate between black and white.

*Distribution*: This species is frequently found in the Himalayas at altitudes reaching up to 1800 meters and is likely present in Kashmir. Its distribution spans from Himachal Pradesh and Uttarakhand through Nepal, Sikkim, North West Bengal, and Bhutan, extending to Arunachal Pradesh and the western hills of Northeast India situated south of Brahmaputra (including Assam and Meghalaya) (GASSE 2018), Uttar Pradesh (Recent Record).

*Material examined*: India.Uttar Pradesh: Pilibhit Tiger Reserve, 28.692°N 79.853°E, 170 m, 23.x.2023, observed more than seven individuals by Ratindra Pandey.

*Host plant*: Not Recorded yet.

***Hyarotis adrastus*** (Stoll, [1780])

*Diagnosis* (Figs 4-5): The coloration is a deep chocolate-brown. On the upper side, the forewing exhibits three small clustered semi-transparent white spots near the tip, followed by three larger similar spots in the middle, and an additional spot above them within the cell. The underside appears darker brown towards the base and lighter towards the edges. The forewing mirrors the upper pattern, with spots outlined externally by a diffuse dark brown streak. The hindwing showcases a dual row of white lunules outlined in dark brown, crossing the wing's middle. Beyond this, there's a submarginal series of smudged dark brown spots.

*Distribution*: This species is not frequently encountered in the Western Ghats, usually found up to 1200 meters, occurring from Kerala and Western Tamil Nadu northwards through Western Karnataka and Goa, extending to Southwest Maharashtra (Sindhudurg and Kolhapur). It's sporadically observed in the Eastern Ghats, with recorded sightings from Southeast Andhra Pradesh (Nellore) and sporadically from Orissa into South and

Central West Bengal. In the Himalayas, it is infrequent and typically found up to 1650 meters, spanning from Himachal Pradesh (west to Kangra) and extending eastwards through Uttarakhand, Nepal, Northern Bihar (Champaran), Sikkim, North West Bengal, and Bhutan to Arunachal Pradesh and the remaining northeastern regions of India (GASSE 2018), Uttar Pradesh (Recent Record).

*Material examined*: India. Uttar Pradesh: Pilibhit Tiger Reserve, 28.692°N 79.853°E, 170 m, 23.x.2023, observed more than six individuals by Ratindra Pandey.

*Host plant*: *Calamus* sp., *Phoenix acaulis*.


**Figs 2-6: 2. *Tagiades litigiosa* 3. Coladenia indrani 4&5. *Hyarotis adrastus* 6. *Telicota colon***

***Telicota colon*** (Fabricius, 1775) (Fig. 6)

*Diagnosis* (Fig. 6): The upper side displays a vibrant golden-yellow coloration: on the forewing, there are four semi-transparent white spots outlined in black. The first spot is small and positioned above the cell's tip, followed by a larger square spot within the cell, then an elongated spot below it, and finally, a spot outside their meeting point. Below these, there's a pale golden-yellow spot outlined in black. Towards the apex, there's a sequence of four similar white spots outlined in black, with the top three connected. A distinct black spot sits below the cell near the base. The outer margin and cilia appear dark, with the cilia turning white at the rear angle. On the hindwing, there's a semi-circular line of black spots near the edge and two similar inner discal spots, the outer edge is black, and the cilia alternate between black and white. Each species' distribution and habitat preferences were recorded alongside photographic evidence.

*Distribution*: 1500 meters. Its range extends from Kerala and Tamil Nadu, traversing all states (except for Kutch in Gujarat, Rajasthan, West Haryana, and South Punjab, it hasn't been recorded in Jharkhand but is likely present). In the Himalayas, it's generally common, stretching from Himachal Pradesh (Hamirpur) and moving eastward through Uttarakhand, Nepal, Sikkim, North West Bengal, and Bhutan to Arunachal Pradesh (GASSE 2018), Uttar Pradesh (Recent Record).

*Material examined*: India.Uttar Pradesh: Pilibhit Tiger Reserve, 28.692°N 79.853°E, 170 m, 23.x.2023, observed more than five individuals by Ratindra Pandey.

*Host plants*: *Bambusa vulgaris, Phragmites karka*, and *Saccharum* sp.

## Discussion

The addition of these species expands the known diversity of Hesperiidae in Uttar Pradesh, emphasizing the reserve's significance in housing varied butterfly species. The implications for conservation and potential threats to these newly discovered species were considered. Four new records of Hesperiidae species i.e., *Tagiades litigiosa* Möschler, 1878, *Coladenia indrani* (Moore, [1866]), *Hyarotis adrastus* (Stoll, [1780]), and *Telicota colon* (Fabricius, 1775) are being reported along with photographs for the first time from the state of Uttar Pradesh. There is no previous record or sighting of these species from Uttar Pradesh State. Now on the addition of these four hesperiidae species, there are now 31 species in this family of Rhopalocera (Table: 1). The host plants available of all the species in the region are also listed in the tabular form and the conservation status is also given in tabular form, none species are in Schedule I and II of Wildlife Protection Act, 1972 (Amendement 2022) (Table: 1). The available literature, articles, papers, books were consulted to cross check the distribution of these species from this region of India and after checking the literature and current checklist on Butterflies of India by van GASSE (2018), an updated version, these five species are claimed as the first record in Uttar Pradesh. The current study coincides with the previous articles written on the same State, the previous articles BEHERA (2016), BURA et al. (2016), de RYE (1902), Director (2015), SARKAR & MANDAL (2018), SHARMA (2007), CHAMPION & SETH (1968), KUMARI & SHEIKH (2021), SHEIKH ET AL. (2023), DE ET AL. (2023). The current study is also correlated with the other studies which were done in other states and based on the

format of those articles, the current article is prepared. The articles with similar work based on new records from other states like Sheikh & Parey (2019a, 2019b), Sheikh & Malik (2020), Parey & Sheikh (2021), Riyaz et al. (2021), Sheikh (2022), Sheikh & Parey (2022), Gupta & Sheikh (2021), Khan & Sheikh (2022), Sheikh & Mishra (2022), Dar et al. (2022a, 2022b), Sheikh & Hassan (2023), De et al. (2024), Pandey et. al (2024). Out of them, none is listed in the Wildlife (Protection) Act, 1972 (Anonymous 2006) and the Wildlife (Protection) Amendment Act, 2022, (Anonymous 2022).

**Table: 1: Showing hesperiid butterflies checklist with current records, their host plants and Wilflife Conservation Status as per Wildlife Protection Act 1972 (Amendment, 2022) is NA**

| No. | Scientific name | Host plants | References |
|---|---|---|---|
| Subfamily: **Coeliadinae** | | | |
| 1. | *Hasora chromus* (Cramer, [1780]) | *Derris scandens, Heynea trijuga, Pongamia pinnata, Ricinus communis, Toddalia asiatica.* | (De et.al. 2023) Recent Record from Duhwa National Park |
| 2. | *Badamia exclamationis* (Fabricius, 1775) | *Anogeissus acuminata, Combretum albidum, Combretum latifolium, Hiptage benghalensis, Ficus* spp. | (Philipe 1902) |
| Tribe: ***Tagiadini*** | | | |
| 3. | *Sarangesa dasahara* (Moore, [1866]) | *Asystasia* spp., *Blepharis* spp. | (Gasse 2018) Recent Record from Duhwa National Park |
| 4. | *Coladenia indrani* (Moore, [1866]) | Not recorded. | New Record |
| 5. | *Tagiades litigiosa* Möschler, 1878 | *Dioscorea alata, Dioscorea oppositifolia, Smilax* spp. | New Record |
| 6. | *Caprona agama* (Moore, [1858]) | Not recorded. | (Gasse 2018) Recent Record from Duhwa National Park |
| Tribe: ***Pyrgini*** | | | |
| 7. | *Spialia galba* (Fabricius, 1793) | *Glycine max, Hibiscus, Sida rhombifolia, Melochia corchorifolia, Urena lobata, Waltheria indica* | (De et.al. 2023) Recent Record from Duhwa National Park |
| Subfamily: **Hesperiinae** | | | |
| Tribe: ***Astictopterini*** | | | |
| 8. | *Ampittia dioscorides* (Fabricius, 1793) | *Leersia hexandra, Oryza rufipogon, Oryza sativa* | (Gasse 2018) Recent Record from Duhwa National Park |
| Tribe: ***Ancistordini*** | | | |
| 9.. | *Notocrypta curvifascia* (C. & R. Felder, 1862) | *Cheilocostus speciosus, Curcuma longa, Musa sp., Zingiber officinale.* | (Gasse 2018) Recent Record from Duhwa National Park |
| 10. | *Udaspes folus* (Cramer, [1775]) | *Curcuma aromatica, Curcuma longa, Zingiber officinale* | (Gasse 2018) Recent Record from Duhwa National Park |

| No. | Scientific name | Host plants | References |
|---|---|---|---|
| Tribe: ***Plastingiini*** | | | |
| 11. | *Suastus germius* (Fabricius, 1798) | *Borassus flabellifer, Calamus, Caryota urens, Cocos nucifera, Phoenix sylvestris, Tamarindus indica* | (De et.al. 2023) Recent Record from Duhwa National Park |
| 12. | *Hyarotis adrastus* (Stoll, [1780]) | *Calamus* sp., *Phoenix acaulis* | New Record |
| 13. | *Gangara thyrsis* (Fabricius, 1775) | *Borassus flabellifer, Caryota urens, Cocos nucifera, Cyperus alternifolius, Phoenix acaulis* | (Gasse 2018) Recent Record from Pilibhit Tiger Reserve |
| 14. | *Matapa aria* (Moore, [1866]) | *Bambusa bambos, Bambusa vulgaris, Dendrocalamus strictus* | (Sushmita et .al. 2021) Recent Record from Pilibhit Tiger Reserve |
| Tribe: ***Taractrocerini*** | | | |
| 15. | *Taractrocera maevius* (Fabricius, 1793) | Poaceae | (Gasse 2018) Recent Record from Duhwa National Park |
| 16. | *Oriens gola* (Moore, 1877) | | (Gasse 2018) |
| 17. | *Potanthus pseudomaesa* (Moore, 1881) | Poaceae | (Gasse 2018) |
| 18. | *Potanthus dara* Kollar, 1842 | Not recorded | (Philipe 1902) |
| 19. | *Telicota colon* (Fabricius, 1775) | *Bambusa vulgaris, Phragmites karka, Saccharum* sp. | New Record |
| 20. | *Telicota bambusae* (Moore, 1878) | *Bambusa vulgaris, Oryza* spp., *Saccharum* sp. | (Philipe 1902) Recent Record from Duhwa National Park |
| Tribe: ***Gegenini*** | | | |
| 21. | *Parnara guttata* (Bremer & Grey, [1852]) | *Oryza sativa, Zea mays* | (Gasse, 2018) |
| 22. | *Panara bada* (Moore, 1878) | *Oryza sativa*, Poaceae | (Gasse 2018) Recent Record from Duhwa National Park |
| 23. | *Gegenes nostrodamus* (Fabricius, 1793) | *Panicum* sp. | (Gasse 2018) |
| 24. | *Borbo cinnara* (Wallace, 1866) | *Andropogon, Arundo donax, Brachiaria mutica, Eragrostis gangetica, Ischaemum, Oryza rufipogon, Oryza sativa, Pennisetum, Phragmites karka, Setaria barbata, Setaria pumila* | (De et.al. 2023) Recent Record from Duhwa National Park |
| 25. | *Pelopidas agna* (Moore, [1866]) | *Axonopus compressus, Pennisetum* sp., Poaceae | (Gasse 2018) Recent Record from Katerniaghat WLS |
| 26. | *Pelopidas thrax* (Hübner, 1821) | *Imperata* spp., *Oryza* spp., *Panicum miliaceum* | (Gasse 2018) |
| 27. | *Pelopidas subochracea* (Moore, 1878) | *Axonopus compressus*, Poaceae | (Gasse,2018) |

| No. | Scientific name | Host plants | References |
|---|---|---|---|
| 28. | *Pelopidas mathias* (Fabricius, 1798) | *Arundo donax, Axonopus compressus, Brachiaria mutica, Brachiaria subquadripara, Eragrostis gangetica, Oryza rufipogon, Oryza sativa, Saccharum officinarum, Sorghum bicolor* | (De et.al. 2023) Recent Record from Duhwa National Park |
| 29. | *Pelopidas conjuncta* (Herrich-Schäffer, 1869) | *Bambusa* sp, *Coix lacryma-jobi, Rottboellia cochinchinensis, Saccharum officinarum, Sorghum halepense, Zea mays* | Recent Record from Duhwa National Park |
| 30. | *Polytremis lubricans* (Herrich-Schäffer, 1869) | *Brachiaria mutica, Imperata cylindrica* | (Gasse 2018) Recent Record from Duhwa National Park |
| 31. | *Caltoris kumara* (Moore, 1878) | *Bambusa vulgaris, Imperata cylindrica, Oryza sativa* | (De et.al. 2023) |

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