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continued on the back inside cover

Cover: Long-tailed Shrike *Lanius schach* resting on a dry branch after courtship. Digital illustration on Procreate. © Aakanksha Komanduri.

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ARTICLE

Butterflies (Lepidoptera: Rhopalocera) of Mahananda Wildlife Sanctuary, West Bengal, India: a preliminary checklist

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Abstract: The present study from Mahananda Wildlife Sanctuary records a total of 98 butterfly species among which 66 species are found as 'first-time records' from the sanctuary. Therein, eight butterfly species are scheduled under the Wild Life (Protection) Amendment Act, 2022 and two are enlisted in the IUCN species list (2016). Nymphalids were recorded at the highest frequency (45.92%) whereas Riodinids are rarest (2.04%).

Keywords: Darjeeling, lepidopteran-diversity, new species records, Nymphalidae, protected area, Riodinidae, Terai.

Bangla: পশ্চিমবঙ্গের হিমালয়-পাদদেশ অঞ্চলে অবস্থিত মহানন্দা অভয়ারণ্যে ২০২৪ সালের মার্চ থেকে সেপ্টেম্বর মাস পর্যন্ত একটি সমীক্ষা চালিয়ে ছয়টি পরিবারের অন্তর্গত ৯৮টি প্রজাতির প্রজাপতিকে নথিভুক্ত করা হয়েছে যার মধ্যে ৬৬টি প্রজাতির এই অভয়ারণ্যে প্রথম দেখা মিলেছে। এদের আটটি প্রজাপতি প্রজাতি 'বন্যপ্রাণ সংরক্ষণ সংশোধিত আইন' (২০২২) এবং দুটি 'আইইউসিএন-এর প্রজাতি তালিকাভুক্ত' (২০১৬)। প্রজাপতিগুলির মধ্যে নিম্ফ্যালিডি পরিবারের প্রজাতি সংখ্যাই সর্বাধিক (৪৫.৯২%) এবং রিওডিনিডি-র প্রজাতি সংখ্যা সর্বনিম্ন (২.০৪%)।

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Author details: Sarkar, R. worked as a researcher at the University of North Bengal, ATREE and WWF, cherishes his close interest in insects. Rai, P. is a researcher at ATREE and currently, pursuing her PhD from Sikkim Central University.

Author contributions: RS & PR—Conceptualization, field works, species identification, writing original draft, review writing and editing.

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INTRODUCTION

Butterflies (Lepidoptera: Rhopalocera) are 'day-flying lepidopterans', belonging to the world's second largest insect order under the Class Insecta (Wendimu et al. 2024). These widespread creatures are found almost in every ecological stratum and perform diverse ecological functions in nature. Butterflies act as bio-indicators for a healthy environment and pollinate many flowering plants, thus serving a wide range of ecological benefits (Sinha et al. 2019).

The northern sub-Himalayan part of West Bengal is extremely biodiverse; a handful of studies were reported on butterfly diversity, records, and its ecology from this region. Chakraborty et al. (2023) recorded a few butterfly species from Buxa Tiger Reserve (BTR). Only two studies have been conducted from the Neora Valley National Park (Roy et al. 2012; Sengupta et al. 2014). Pradhan & Khaling (2020) recorded butterfly diversity from an organic tea plantation garden of the Darjeeling hills, and a single work from the University of North Bengal campus have been reported (Saha et al. 2023) till date. Approximately, 256 species of butterflies have been recorded from Darjeeling district, of which the family Nymphalidae is the most diverse (114 species), followed by Lycaenidae (52 species), Pieridae (28 species), Hesperiidae (28 species), Papilionidae (27 species), and Riodinidae (7 species) (Roy et al. 2012; Sengupta et al. 2014; Pradhan & Khaling 2020; Saha et al. 2023).

Singhal & Chowdhury (1996) provided the first comprehensive record of biodiversity from Mahananda Wildlife Sanctuary (MWS), documenting 170 species of plants (39 trees, 55 herbs, 54 shrubs, and 22 climbers) and 329 species of animals (32 mammals, 253 birds, 9 reptiles, 6 amphibians, and 27 lepidopterans). No systematic study on butterfly diversity has been conducted in MWS to date. Only a baseline study on the flora and fauna of MWS is available (Singhal & Chowdhury 1996), conducted collaboratively by the Wildlife Wing, Forest Department, Government of West Bengal; the West Bengal Forest Development Corporation Ltd.; and the Nature, Environment & Wildlife Society (NEWS). In the survey report by Singhal & Chowdhury (1996), 27 species of butterflies were listed along with other wildlife taxa approximately 30 years ago, providing only rudimentary information on the butterfly fauna of MWS. There are several protected forests in India where butterfly diversity data was recorded because of its pivotal role as pollinators in all the habitats (Sengupta et al. 2014; Gogoi et al. 2023; Choudhury et al. 2024). Therefore, the present study was undertaken in MWS to generate an updated checklist of butterfly species, providing baseline information to facilitate future studies on their diversity, abundance, distribution, and conservation within this protected area.

MATERIALS AND METHODS

MWS along its four ranges, namely, Sukna or East, West, North, and South Range, is expanded over the foothills of central Himalaya and parts of Terai plains (26.798°–26.925° N, 88.393°–88.558° E) of West Bengal (Figure 1). It falls under one of the most species-rich regions in the Indian subcontinent. Hydrologically, the sanctuary is influenced by the Mahananda River system, with the Teesta River defining its eastern margin. The sanctuary encompasses an area of about 161 km², with elevations ranging approximately 150–1,300 m (MWS Management Plan 2012–2022). Most of the habitats of the sanctuary are hilly mountains with precipitous to moderate slopes. The sanctuary contains temperate to tropical climate which give rise evergreen tropical, sub-tropical and deciduous forest and even grasslands in its different parts. Along the two rivers, MWS has characteristic thin watercourses or streams generated from the Himalayan mountains and monsoon rains, innervating the whole sanctuary, are lifelines to its numerous bioresources and wildlife. The sanctuary is situated in the trans-boundary between highly biodiverse 'Doars' in the eastern side and Darjeeling Himalaya in its extreme northern side.

The perennial and non-perennial watercourses of MWS serve as lifelines to the wildlife that often visit the places for water and leave their droppings on the shores. The natural bleach and mineral salts are accumulated on the rocks and sandy shores from the algae. The forest soil also shows a variation of sandy loam, coarse sand or 'slit' type texture and color from light brown to dark brown, contains different grades of mineral salts and organic matters (MWS Management Plan 2012–2022). These attributes of several spots of Mahananda habitat attract the butterflies to puddle inside the sanctuary for the accumulation of salts, minerals, and amino acids, essential for their physiological and reproductive functions.

For this study, opportunistic surveys were carried out on sunny days from 0800 h to 1200 h, occasionally in the dawn for capturing specific butterflies, between March–September 2024, in the sanctuary. Due to permanent occupancy of mega-mammals, like elephants, butterflies were solely documented by direct sighting and random

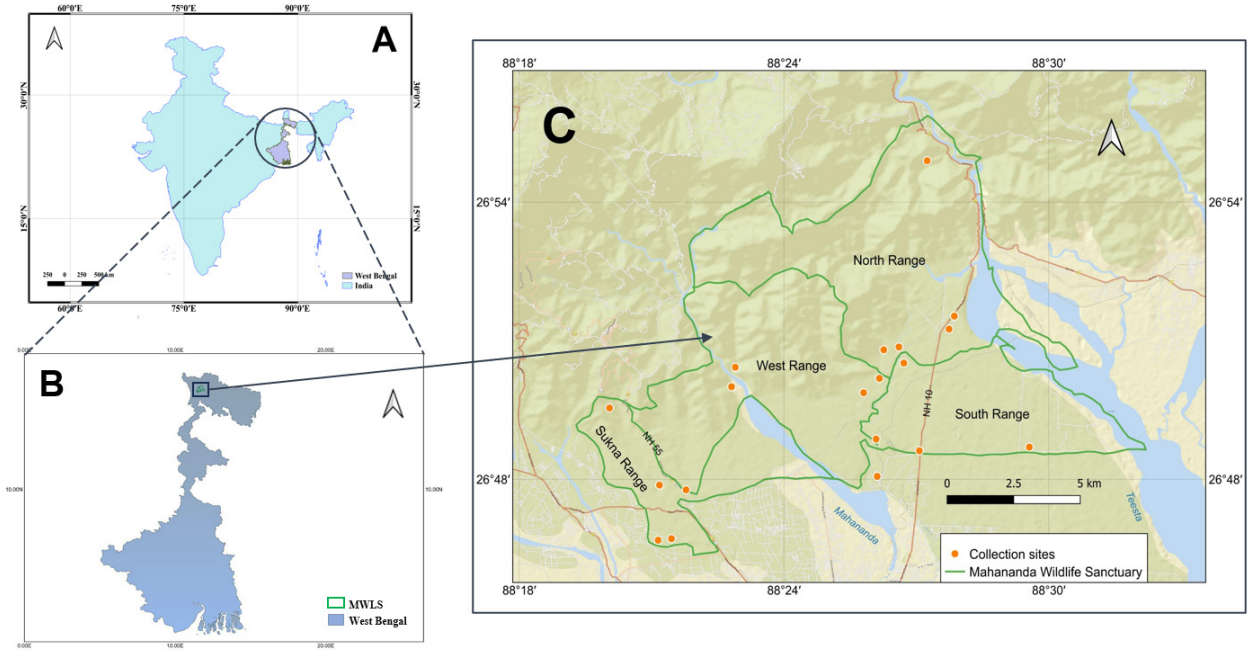


Figure 1. Study area map: A—West Bengal within India | B—Location of the study area within West Bengal | C—Mahananda Wildlife Sanctuary.

walks (Murugesan et al. 2013; Upadhyay et al. 2023) near the water courses, roadsides, range office compounds, plantation forests and sometimes in forest core areas (Image 6). Butterflies were photographed in their natural habitat using a digital camera (NIKON P-900), and common species were identified based on their body and wing color patterns, and designs on the spot. All species were later verified using published literature (Mukherjee & Mondal 2020), standard books (Evans 1932), field guide books (Smetacek 2017; Sinha et al. 2019), and from some relevant websites (https://www.ifoundbutterflies.org; https://www.inaturalist.org) (Kunte et al. 2026; iNaturalist 2026). All photo plates and data charts were prepared in the MS-PowerPoint 2019 and MS-Excel 2019, respectively.

RESULTS

In this study, a total of 98 butterfly species, representing 66 genera across all six extant families, were recorded from MWS. Among these, 86 species were photographed during the survey (Images 1–5). Detailed information on all 98 species is presented in Table 1.

The family-wise distribution of species in the sanctuary was as follows: Riodinidae–2 species (2.04%), Hesperiidae–8 species (8.16%), Papilionidae–9 species (9.18%), Pieridae–12 species (12.24%), Lycaenidae–22 species (22.45%), and Nymphalidae–45 species (45.92%) (Table 1, Figure 2). Four families, namely, Papilionidae, Pieridae, Lycaenidae, and Nymphalidae, were recorded in all four ranges of the sanctuary, whereas Hesperiidae was absent from the northern range. Riodinidae was recorded exclusively in the eastern (Sukna) range (Table 1; Figure 3). Among all families, Nymphalidae was the most species-rich and abundant, while Riodinidae was the least abundant, represented by only two species.

Butterfly species were observed within an altitudinal range of 161–576 m in MWS, with 91 out of the 98 species found occurring below 200 m, ranging from sub-tropical and tropical to moist forests (Table 1).

Of the 98 recorded species, eight are listed under the Wildlife (Protection) Amendment Act, 2022. Two species, Orchid Tit *Hypolycaena othona* and Grey Count *Tanaecia lepidea*, are included in Schedule I; five species, Danaid Eggfly *Hypolimnas misippus*, Long-banded Silverline *Spindasis lohita*, Great Evening Brown *Melanitis zitenius*, White-bar Bushbrown *Mycalesis anaxias*, and Blue Oakleaf Butterfly *Kallima horsfieldi*, are included in Schedule II; and a single species, Common Crow *Euploea core*, is included in Schedule IV (Table 1). Under the IUCN Red List (2016), two species—Common Imperial *Cheritra freja* and Plain Tiger *Danaus chrysippus*—are classified as 'Least Concern' (Table 1), whereas the remaining species have not been assessed.

Table 1. Checklist of butterflies recorded from Mahananda Wildlife Sanctuary (March–September, 2024).

Scientific name	Common name	Habitat type	Collection locality	Elevation (m)	Red List status	WPAA, 2022 status
Family 1. Riodinidae (2 species)						
Zemeros flegyas Cramer, 1780*	Punchinello	TPF; FROC	ER; ER	184; 197	NL	NM
Abisara bifasciata Moore, 1877*	Double-banded Judy	TPF	ER	181	NL	NM
Family 2. Hesperiidae (8 species)						
Seseria sambara Moore, 1866*	Notched Seseria	LHWMF	WR	177	NL	NM
Gerosis bhagava Moore, 1866*	Yellow-breasted Flat	FROC	ER	197	NL	NM
Pseudocoladenia dan Fabricius, 1787*	(Himalayan) Fulvous Pied Flat	FROC	ER	197	NL	NM
Sarangesa dasahara Moore, 1866*	Indian Common Small Flat	FROC	ER	197	-	-
Burara gomata Moore, 1866*	Pale Green Awlet	FROC	ER	197	NL	NM
Pelopidas agna Moore, 1865*	Bengal Obscure Branded Swift	FROC	SR	186	-	-
Oriens gola Moore, 1877*	Common Dartlet	FROC	ER	197	NL	NM
Iambrix salsala Moore, 1866*	Chestnut Bob	FROC	ER	197	NL	NM
Family 3. Papilionidae (9 species)						
Graphium agamemnon Linnaeus, 1758§	Tailed Jay	SPF -	SR; Golaghat, 1995	162	NL	NM
Graphium antiphates Cramer, 1775*	Five-bar Swordtail	LHWMF; FROC	WR; ER	177; 197	NL	NM
Graphium doson Felder, 1864*	Common Jay	LHWMF	WR	177	NL	NM
Graphium sarpedon Linnaeus, 1758§	Common Bluebottle	LHWMF; FROC -	WR; ER; Golaghat, 1995	177; 197; -	NL	NM
Papilio nephelus Boisduval, 1836*	Yellow Helen	LHWMF; FROC; LHDMF; LHDMF	WR; ER; NR; NR	177; 197; 235; 190	NL	NM
Papilio memnon Linnaeus, 1758*	Great Mormon	FROC LHDMF	ER; NR	197; 190	NL	NM
Papilio polytes Linnaeus, 1758§	Common Mormon	FROC; LHDMF; LHDMF; LHDMF; FROC; FROC; LHWMF	NR; NR; NR; NR; ER; SR; WR; Hatisar, 1995	195; 317; 228; 190; 197; 186; 177	NL	NM
Papilio demoleus Linnaeus, 1758¥	Lime butterfly	-	Andheri, 1995	-	NA	NM
Pachliopta aristolochiae Fabricius, 1775¥	Common Rose	-	Sukna, 1995	-	NL	NM
Family 4. Pieridae (12 species)						
Pieris canidia Linnaeus, 1768*	Asian Cabbage White	FROC; LHWMF	ER; WR	197;184	NL	NM
Leptosia nina Fabricius, 1793§	Psyche	FROC & roadside	ER; Jogijhora, 1995	197	NL	NM
Eurema blanda Boisduval, 1836*	Three-spot Grass Yellow	LHWMF; FROC & roadside	WR; ER	177; 197	NL	NM
Eurema hecabe Linnaeus, 1758§	Common Grass Yellow	LHWMF - -	WR; Golaghat, 1995; Hatisar, 1995	177; -	NL	NM
Catopsilia pomona Fabricius, 1775*	Lemon Emigrant	FROC	ER	197	NL	NM
Ixias pyrene Linnaeus, 1764§	Yellow Orange-tip	LHWMF -	WR; Banderjhola, 1995	177; -	NL	NM
Hebomoia glaucippe Linnaeus, 1758*	Great Orange-tip	LHWMF; WMF	WR; SR	184; 174	NL	NM
Cepora nerissa Fabricius, 1775*	Common Gull	LHWMF; Roadside	WR; ER	177; 197	NL	NM

Scientific name	Common name	Habitat type	Collection locality	Elevation (m)	Red List status	WPAA, 2022 status
Delias descombesi Boisduval, 1836§	Red-spot Jezebel	FV -	NR; Kokhlong, 1995	195; -	NL	NM
Appias lyncida Cramer, 1777§	Chocolate Albatross	LHWMF; Roadside; LHDMF -	WR; ER; NR; Chewa, 1995	177; 184; 228; -	NL	NM
Appias olferna Swinhoe, 1890*	Eastern Striped Albatross	Roadside; FROC; LHWMF	ER; ER; WR	184; 197; 177	NL	NM
Delias hyparete Linnaeus, 1758¥	Painted Jezebel	-	Kuhi, 1995	-	NL	NM
Family 5. Lycaenidae (22 species)						
Arhopala centauruns Fabricius, 1775*	Centaur Oakblue	FROC	ER	197	NL	NM
Arhopala sp.	Oakblue Butterfly	TPF	ER	184	NL	NM
Castalius rosimon Fabricius, 1775*	Common Pierrot	FROC	ER	197	NL	NM
Cheritra freja Fabricius, 1793*	Common Imperial	LHWMF; FROC	WR; ER	177; 197	**LC**	NM
Curetis sp.	Sunbeam	FROC	NR	195	NL	NM
Spalgis epius Westwood, 1851*	Apefly	FV	ER	576	NL	NM
Talicada nyseus Guerin, 1843*	Indian Red Pierrot	LHWMF; FROC	WR; ER	184; 197	NL	NM
Heliophorus epicles Godart, 1824*	Purple Sapphire	LHWMF	WR	184	NL	NM
Pseudozizeeria maha Kollar, 1844*	Pale Grass Blue	LHWMF; FROC	WR; ER	177; 197	NL	NM
Jamides alecto C. Felder, 1860*	Metallic Cerulean	LHWMF; FROC	WR; ER	177; 197	NL	NM
Jamides bochus Stoll, 1782*	Dark Cerulean	FROC	ER	197	NL	NM
Jamides celeno Cramer, 1775*	Common Cerulean	LHWMF; FROC -	WR; ER; WR	184; 197; 177	NL	NM
Catapaecilma major Druce, 1895*	(Himalayan) Common Tinsel	SPF	SR	161	NL	NM
Catochrysops strabo Fabricius, 1793*	Forget-me-not	FROC	ER	197	NL	NM
Hypolycaena erylus Godart, 1824*	Common Tit	Sal forest	SR	161	NL	NM
Hypolycaena othona Hewitson, 1865*	Orchid Tit	FROC	ER	197	NL	**Sch-I**
Spindasis sp.	Silverline	FROC	ER	197	-	-
Spindasis lohita Horsfield, 1829*	Long-banded Silverline	SPF	SR	161	NL	**Sch-II**
Prosotas nora C. Felder, 1860*	Common Lineblue	FROC	ER	197	NL	NM
Leptotes plinius Fabricius, 1793*	Zebra blue	FROC	ER	197	NL	NM
Chilades pandava Horsfield, 1829*	Plains Cupid	FROC	ER	197	NL	NM
Loxura atymnus Stoll, 1780*	Yamfly	FROC	ER	197	NL	NM
Family 6. Nymphalidae (45 species)						
Cirrochroa aoris Doubleday, 1847*	Large Yeoman	TPF; FROC; FROC	NR; SR; ER	186; 164; 197	NL	NM
Junonia iphita Cramer, 1779§	Chocolate Pansy	LHWMF; LHWMF; FROC -	WR; WR; ER; Latpanchor, 1995	184; 177; 197; -	NL	NM
Junonia hierta Fabricius, 1798*	Yellow Pansy	LHWMF	WR	184	NA	NM
Junonia lemonias Linnaeus, 1758*	Lemon Pansy	LHWMF	WR	177	NL	NM
Danaus genutia Cramer, 1779§	Striped Tiger	LHWMF; FROC; FROC	WR; ER; Rhyeum, 1995	184; 197; -	NL	NM
Danaus chrysippus Linnaeus, 1758§	Plain Tiger	LHWMF; FROC -	WR; ER; Golaghat, 1995	184; 197; -	**LC**	NM

Scientific name	Common name	Habitat type	Collection locality	Elevation (m)	Red List status	WPAA, 2022 status
Parantica aglea Stoll, 1782*	Glassy Tiger	LHWMF; WMF	WR; SR	177; 184	NL	NM
Tirumala septentrionis Butler, 1874*	Dark Blue Tiger	LHWMF	WR	184	NL	NM
Euploea sp.	Crow Butterfly	LHWMF; LHWMF; FROC	WR; WR; ER	184; 177;197	NL	NM
Euploea core Cramer, 1780[§]	Common Crow	FROC; WMF; Forest road -	ER; WR; SR; Sukna, 1995	197; 184; 164; -	NL	**Sch-IV**
Melanitis zitenius Herbst, 1796*	Great Evening Brown	LHWMF	WR	291	NL	**Sch- II**
Chersonesia risa Doubleday, 1848*	Common Maplet	LHWMF	WR	179	NL	NM
Kallima inachus Doyere, 1840*	Himalayan Orange Oakleaf	WMF	WR; SR	184; 174	NL	NM
Lethe confusa Aurivillius, 1898[§]	Banded Treebrown	FV; FV	ER; ER; Panchanai, 1995	184; 576; -	NL	NM
Mycalesis anaxias Hewitson, 1862*	White-bar Bushbrown	FROC	ER	197	NL	**Sch-II**
Mycalesis visala Moore, 1858*	Long-branded Bushbrown	WMF	ER	181	NL	NM
Orsotriaena medus Fabricius, 1775*	Oriental Medus Brown	FROC	ER	197	NL	NM
Mycalesis perseus Fabricius, 1775*	Common Bushbrown	FROC	ER; SR	197;162	NL	NM
Charaxes bharata C. & R. Felder, 186[7]§	Indian Nawab	FROC	ER; Golaghat, 1995	197; -	NL	NM
Tanaecia jahnu Moore, 1858*	Plain Earl	FROC	ER	197	NL	NM
*Tanaecia lepidea Butler, 1868**	Grey Count	FROC	ER	197	NL	**Sch-I**
Tanaecia julii Lesson, 1837*	Common Earl	FROC	ER	197	NL	NM
Euthalia aconthea Cramer, 1777*	Common Baron	FROC	ER	197	NL	NM
Neptis clinia susruta Moore, 1872*	Himalayan Sullied Sailer	FROC	ER	197	NL	NM
Athyma inara Westwood, 1850*	Color Sergeant	FROC	ER	197	NL	NM
Pantoporia hordonia Stoll, 1790*	Common Lascar	FROC	ER	197	NL	NM
Neptis miah miah Moore, 1858*	East Himalayan Small Yellow Sailer	FROC	ER	197	NL	NM
Athyma perius perius Linnaeus, 1758*	Oriental Common Sergeant	FROC	ER	197	NL	NM
Lasippa viraja Moore, 1872*	Yellowjack Sailer	FROC	ER	197	NL	NM
Neptis sp.	Sailer	LHWMF	WR	177	-	NM
Lebadea martha Fabricius, 1787*	Knight	FROC	ER	197	NL	NM
Phalanta phalantha Drury, 1773[§]	Common Leopard	LHDMF; LHWMF; -	NR; WR; Sukna, 1995	228; 184; -	NL	NM
Charaxes psaphon imna Westwood, 1847*	Indian Plain Tawny Rajah	FROC	ER	197	NL	NM
Hypolimnas bolina Linnaeus, 1758*	Great Eggfly	FROC	ER	197	NL	NM
Elymnias hypermnestra undularis Drury, 1773*	Himalayan Palmfly	FROC	ER	197	NL	NM
Ypthima baldus Fabricius, 1775[§]	Common Five-ring	FROC; SPF	ER; Panchanai, 1995	197; -	NL	NM
Ypthima huebneri Kirby, 187[1]§	Common Four-ring	FROC; LHDMF	ER; Upper Ghoramara, 1995	197; -	NL	NM
Aglais caschmirensis Kollar, 18[4]4§	Indian Tortoiseshell	FROC	ER Sukna 1995a,b	197; -	NL	NM
Symbrenthia lilaea Hewitson, 1864*	Northern Common Jester	FROC	ER	197	NL	NM
Charaxes bernardus Fabricius, 17[9]3¥	Tawny Rajah	-	Hatisar, 1995	-	NL	NM
Cyrestis thyodamas Doyere, 1840[¥]	Map Butterfly	-	Jogijhora, 1995	-	NL	NM
Hypolimnas misippus Linnaeus, 1764[¥]	Danaid Eggfly	-	Golma, 1995	-	NA	**Sch-II**

Scientific name	Common name	Habitat type	Collection locality	Elevation (m)	Red List status	WPAA, 2022 status
Tirumala limniace Cramer, 177[5]¥	Blue Tiger Butterfly	-	Sukna, 1995	-	NL	NM
Neptis hylas Linnaeus, 175[6]¥	Common Sailer	-	Golaghat, 1995	-	NL	NM
Kallima horsfieldi Kollar, 184[4]¥	Blue Oakleaf Butterfly	-	Latpanchor, 1995	-	NA	**Sch-II**

ER—East range | FROC—Forest range office compound | LC—Least Concern | LHDMF—Lower hill dry mixed forest | LHWMF—Lower hill wet mixed forests | NA—Not applicable | NL—Not listed | NM—Not mentioned | NR—North range | Sch—Schedule | SPF—Sal Plantation forest | SR—South range | TPF—Teak Plantation Forest | WMF—Wet mixed forest | WPAA—Wildlife (Protection) Amendment Act, 2022 | WR—West range.
*Species identified in this study represent new records.
§Species found in both the previous records and this study;
¥Species found in the previous records but not in this study

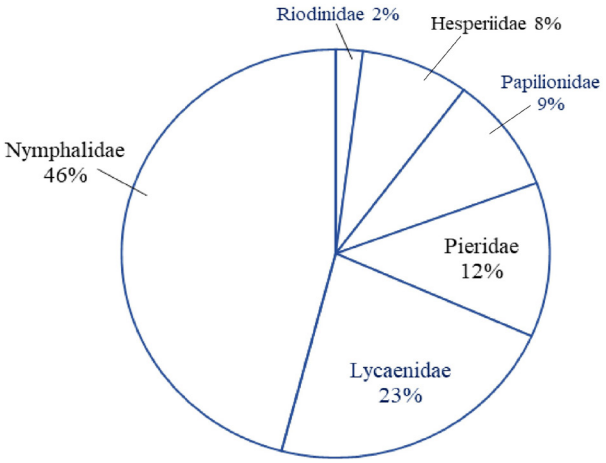


Figure 2. Percentage composition of six butterfly families from Mahananda Wildlife Sanctuary.

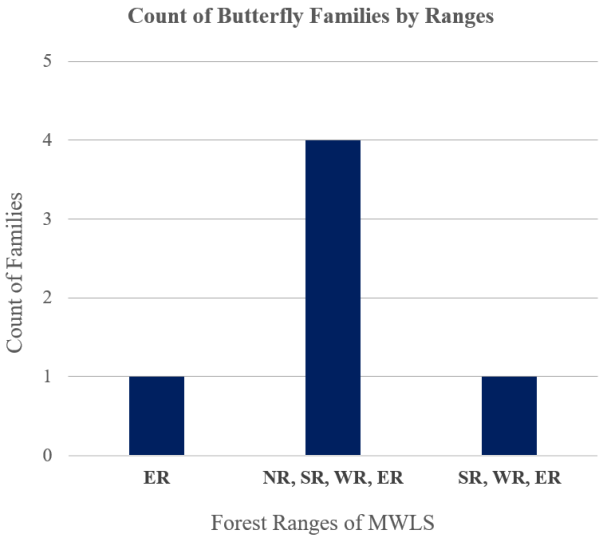
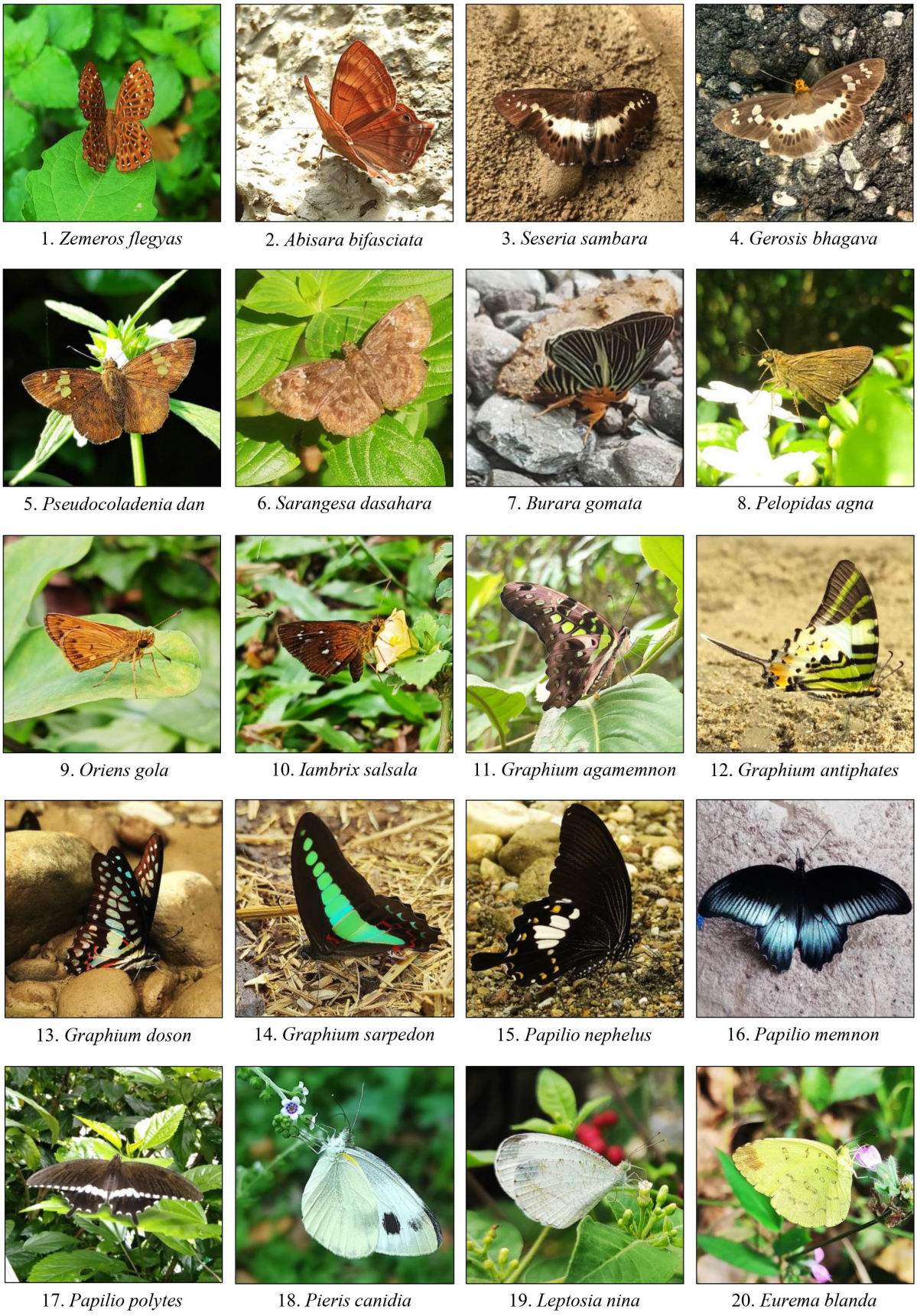


Figure 3. Presence-absence data of the six butterfly families across the ranges of Mahananda Wildlife Sanctuary: ER—East range | NR—North range | SR—South range | WR—West range.

DISCUSSION AND CONCLUSION

Out of 98 species, 18 were found both this study and in the record of Singhal & Chowdhury (1996). Whereas, nine other species of previous record were absent during this study. Amongst 66 species were first-time recorded from the sanctuary in this study: Nymphalidae–27 species—*Cirrochroa aoris*, *Junonia hierta*, *Junonia lemonias*, *Parantica aglea*, *Tirumala septentrionis*, *Melanitis zitenius*, *Chersonesia risa*, *Kallima inachus*, *Mycalesis anaxias*, *Mycalesis visala*, *Orsotriaena medus*, *Mycalesis perseus*, *Tanaecia jahnu*, *Tanaecia lepidea*, *Tanaecia julii*, *Euthalia aconthea*, *Neptis clinia susruta*, *Athyma inara*, *Pantoporia hordonia*, *Neptis miah miah*, *Athyma perius perius*, *Lasippa viraja*, *Lebadea martha*, *Charaxes psaphon imna*, *Hypolimnas bolina*, *Elymnias hypermnestra undularis*, *Symbrenthia lilaea*; Lycaenidae–19 species—*Arhopala centaurus*, *Castalius rosimon*, *Cheritra freja*, *Spalgis epius*, *Talicada nyseus*, *Heliophorus epicles*, *Pseudozizeeria maha*, *Jamides alecto*, *Jamides bochus*, *Jamides celeno*, *Catapaecilma major*, *Catochrysops strabo*, *Hypolycaena erylus*, *Hypolycaena othona*, *Spindasis lohita*, *Prosotas nora*, *Leptotes plinius*, *Chilades pandava*, and *Loxura atymnus*; Hesperiidae–eight species—*Seseria sambara, Gerosis bhagava, Pseudocoladenia dan, Sarangesa dasahara, Burara gomata, Pelopidas agna, Oriens gola, Iambrix salsala*; Pieridae–six species—*Pieris canidia*, *Eurema blanda*, *Catopsilia pomona*, *Hebomoia glaucippe*, *Cepora nerissa*, and *Appias olferna*; Papilionidae–four species—*Graphium antiphates, Graphium doson, Papilio nephelus*, and *Papilio memnon*; and Riodinidae–two species—*Zemeros flegyas* and *Abisara bifasciata*. Records of the majority butterfly species (91 species) within a 162–200 m range of MWS is corroborated with Priya (2024).

In India, about 500 Nymphalid species are found, among which 45 species are now found from MWS.



1. *Zemeros flegyas* 2. *Abisara bifasciata* 3. *Seseria sambara* 4. *Gerosis bhagava*

5. *Pseudocoladenia dan* 6. *Sarangesa dasahara* 7. *Burara gomata* 8. *Pelopidas agna*

9. *Oriens gola* 10. *Iambrix salsala* 11. *Graphium agamemnon* 12. *Graphium antiphates*

13. *Graphium doson* 14. *Graphium sarpedon* 15. *Papilio nephelus* 16. *Papilio memnon*

17. *Papilio polytes* 18. *Pieris canidia* 19. *Leptosia nina* 20. *Eurema blanda*

Image 1. Family Riodinidae (1–2); Hesperiidae (3–10); Papilionidae (11–17); Pieridae (18–20). © Ratnadeep Sarkar & Priyanka Rai.


21. *Eurema hecabe*

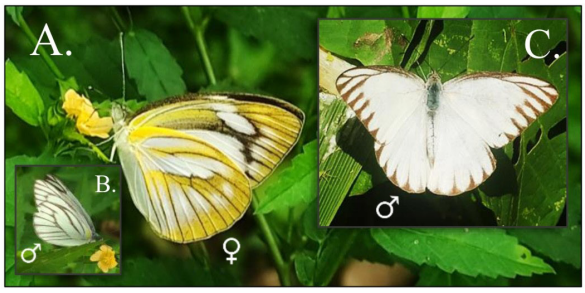

22. *Catopsilia pomona*


23. *Ixias pyrene*


24. *Hebomoia glaucippe*


25. *Cepora nerissa*


26. *Appias lyncida*



27. *Appias olferna*; A- Female; B, C- Male


28. *Arhopala centauruns*


29. *Arhopala* sp.


30. *Castalius rosimon*


31. *Cheritra freja*


32. *Curetis* sp.


33. *Spalgis epius*


34. *Talicada nyseus*

35. *Heliophorus epicles*


36. *Pseudozizeeria maha*


37. *Jamides alecto*


38. *Jamides bochus*


39. *Jamides celeno*

Image 2. Family Pieridae (21–27) & Lycaenidae (28–39). © Ratnadeep Sarkar & Priyanka Rai.


40. *Catapaecilma major*


41. *Catochrysops strabo*


42. *Hypolycaena erylus*


43. *Hypolycaena othona*


44. *Spindasis* sp.


45. *Prosotas nora*


46. *Leptotes plinius*

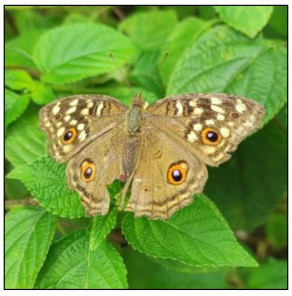

47. *Chilades pandava*


48. *Loxura atymnus*


49. *Cirrochrroa aoris*


50. *Junonia iphita*


51. *Junonia hierta*


52. *Junonia lemonias*


53. *Danaus genutia*


54. *Danaus chrysippus*


55. *Parantica aglea*


56. *Tirumala septentrionis*


57. *Euploea* sp.

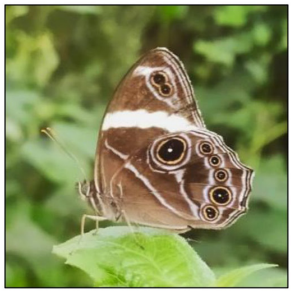

58. *Euploea core*


59. *Melanitis zitenius*

Image 3. Family Lycaenidae (40–48) Nymphalidae (49–59). © Ratnadeep Sarkar & Priyanka Rai.

60. *Chersonesia risa*

61. *Kallima inachus*



62. *Lethe confusa*

63. *Mycalesis anaxias*

64. *Mycalesis visala*

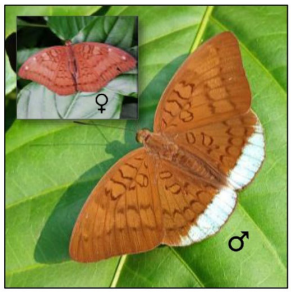
65. *Orsotriaena medus*

66. *Mycalesis perseus*; DSF- Dry seasonal form, WSF- Wet Seasonal form

67. *Charaxes bharata*

68. *Tanaecia jahnu*

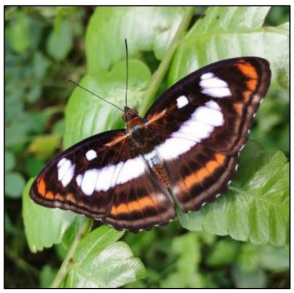
69. *Tanaecia lepidea*



70. *Tanaecia julii*

71. *Euthalia aconthea*

72. *Neptis clinia*



73. *Athyma inara*

74. *Pantoporia hordonia*

75. *Neptis miah miah*

76. *Athyma perius perius*

77. *Lasippa viraja*

78. *Neptis* sp.

Image 4. Family Nymphalidae (60–78). © Ratnadeep Sarkar & Priyanka Rai.

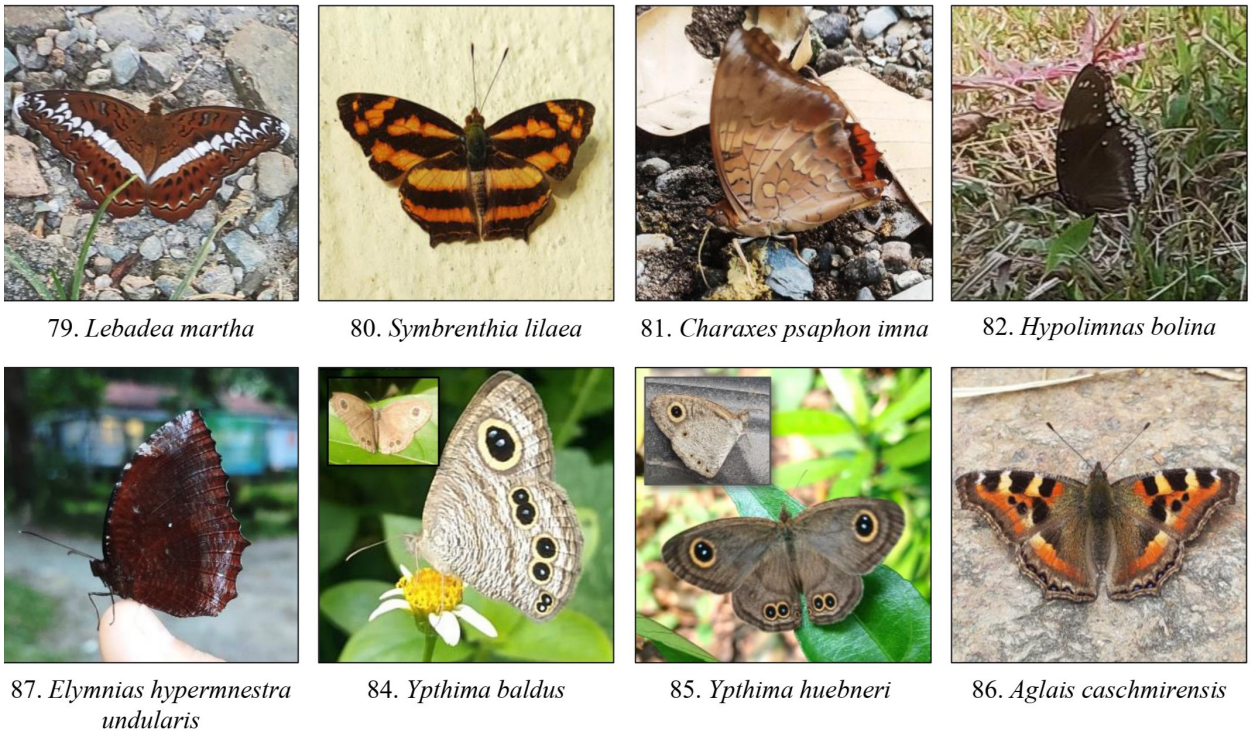


Image 5. Family Nymphalidae (79–86). © Ratnadeep Sarkar & Priyanka Rai.

As other studies from the region (Roy et al. 2012; Sengupta et al. 2014; Pradhan & Khaling 2020; Saha et al. 2023), here only the highest number of species is from Nymphalidae and the lowest number from Riodinidae. Their dominance in MWS may be due to its habitat preferences and larval host as well as nectar plants among the vast floral diversity in the foothills of the Himalaya (Sengupta et al. 2014; Pradhan & Khaling 2020). With 98 butterfly species, several of protected under WPA, 1972 and the IUCN species list (2016), the MWS can be considered an important reserve of butterflies in the transition zone between the peninsular Indian sub-region and Indo-Malayan sub-region of the Oriental region.

With 98 species, although this work is the first of its kind in the record of butterflies, not only from MWS but also from any protected forests of the Darjeeling District, this study demands systematic, long-term investigation for the record of more butterfly species as well as a survey on its nectar and host plants and precise efforts for the introduction of conservation and management practices for the butterfly fauna in MWS.

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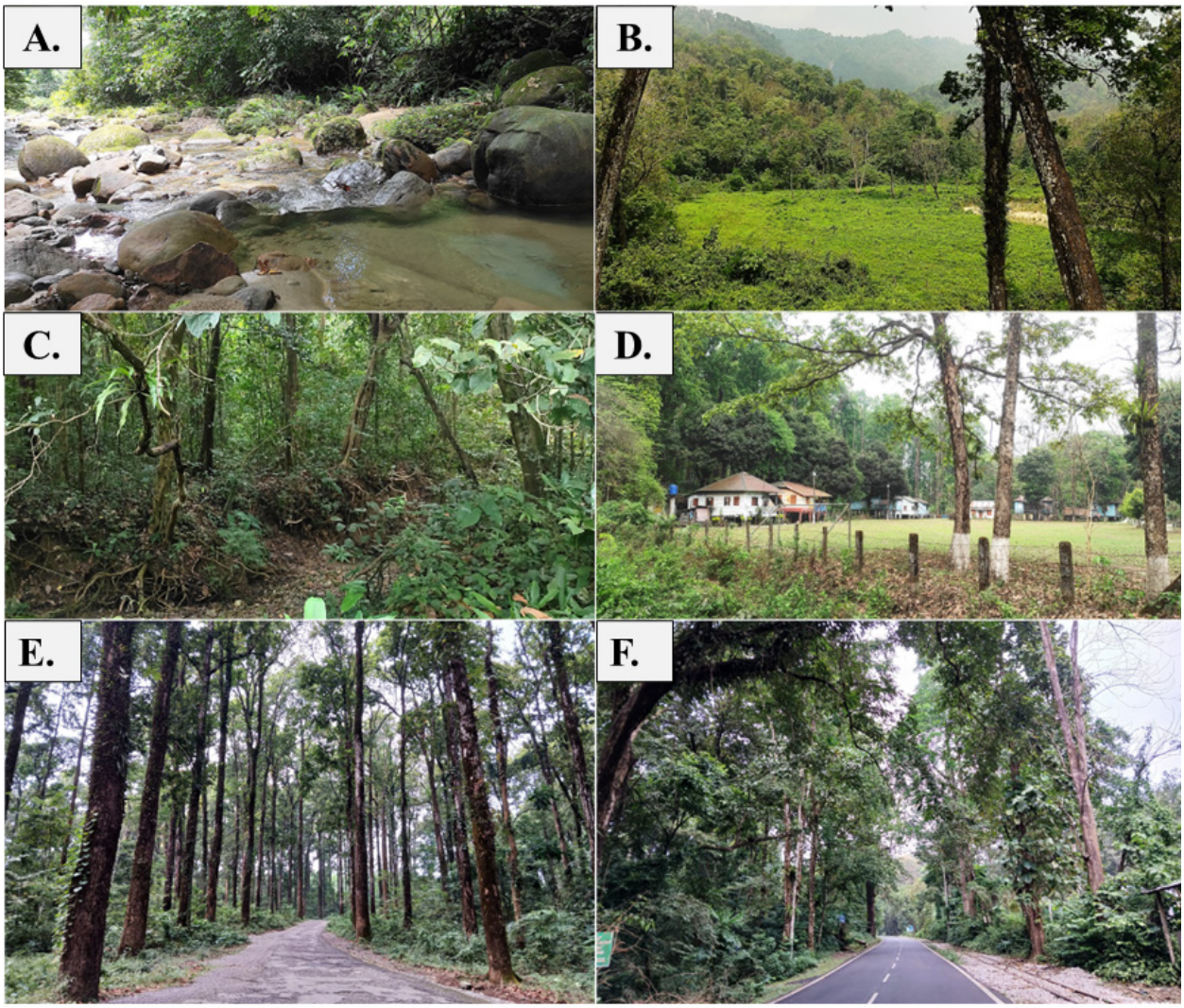

Image 6. Study sites: A—Watercourses inside the sanctuary | B—Lower hill dry mixed forest | C—Lower hill wet mixed forest | D—Forest range office compound | E—Sal Plantation forest | F—Hill cart road innervating the sanctuary. © Ratnadeep Sarkar.

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