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A preliminary checklist of butterflies at Tajpur, West Bengal, India

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Abstract
The present study was conducted to enlist a checklist of butterflies in the coastal belt of Purba Medinipur District, Tajpur of southern West Bengal during the period of January 2021 to December 2022. A total of 41 species of butterflies belonging to 35 genera under five families were recorded during entire study period. Family Nymphalidae (14 members) was the most dominant family followed by Lycaenidae (8 members), Pieridae (7 members), Papilionidae (6 members) and Hesperiidae (6 members). Among 41 butterfly species 2 species were legally protected under the Wildlife (Protection) Act, 1972. During the study a total number of 32 plants from 19 families were documented. The present investigation results also provide a detailed idea about the butterfly diversity of coastal belt in southern West Bengal.

Keywords: Butterfly, checklist, coastal forest, diversity, Purba Medinipur

Introduction
The investigations on the diversity of insect are of great significant due to the prevalence of insects in both terrestrial and aquatic ecosystems and their important roles in ecosystem functions such as pollination, decomposition, controlling of pests and ecological maintenance [1, 2]. Among the Arthropods, butterflies (Lepidopterans) are the most attractive ones and are one of the most taxonomically identifiable group of insects [3, 4]. Butterflies are known to be biodiversity monitors, because their diversity and distribution can be altered with different geographical patterns [5, 6]. Being a valuable ecological indicator species, butterflies are extremely sensitive to any kind of changes to their surrounding abiotic and biotic parameters factors [7, 8]. Habitat specified butterflies those depend on particular plant species for oviposition, are more influenced by the anthropogenic activities [9]. Majority of the butterflies are plant pollinators of different wild plants and help to pollinate more than 50 economically important crop plants on which human-kind depends for their livelihoods [10, 11]. Biodiversity is now rapidly recognized as a vital parameter to detect global and local changes of environment and sustainability of developmental activities. Though the systematic study of non-chordates especially butterflies has not been accomplished from urban regions of West Bengal. It helps as a noticeable tool for conservational strategies of butterflies. Thus, it is worthy to prepare a zone-wise checklist of the butterfly diversity of West Bengal. The diversity of plants and butterflies are fully correlated each other [12], a change in vegetation structure may change in the butterfly diversity. An opportunistic foragers butterflies; visit variety of flowering plants and thereby perform one of the major important ecological processes called 'pollination' in ecosystems [13]. Host plant specificity was observed in female butterflies which are also related with time and space [14].
Thus, butterfly species and their dependence on locally available flora are well established at various habitats [15]. Further, certain butterfly species exhibit distinct floral preference that depends on floral parameters such as color, corollary depth, clustered flowers or florets [16] and chemical clues [17, 18] of flowers.

Materials and Methods
Purba Medinipur is one of the well sounded districts of southern part of West Bengal. This district is guarded by the Bay of Bengal in the south and the state Odisha is at the southwest. River Hoogly and South 24 Parganas district locate to the east, Howrah to the north-east, and Paschim Medinipur to the northwest.

The Tajpur beach is situated at 22°57'38.1" N latitude and 88°31'05.9" E longitude on the shore of Bay of Bengal. The beach of Tajpur has a wide intertidal zone and the entire area is exposed during the low-tides. The temperature during hot summer days rises up to 42 ºC and only in the evening the weather becomes favourable. Tajpur beach receives quite rainfall. The minimum temperature recorded during winters is 8 ºC.

The present study was based on random surveys over a period of December 2021 to December 2022 using line transacts of 50m long. The photographs of butterflies from different angles were clicked to obtain sufficient information with a digital camera for maximum identification. Each species was identified directly in the field on primary basis with the help of field guides followed by photography, and rarely by capture. Collection restricted specimens could not be identified directly. Those specimens were collected with handheld aerial sweep nets, followed by placing in an envelope and carried to the laboratory for further detailing with the help of a field guide.

Results and Discussion

In the family Hesperiidae, show maximum number of species are documented as *Borbo cinnara* (12) followed by *Pelopidason junta* (7), *Parnara guttatus* (4) *Ancistroides folus* (3), *Matapa aria* (2) *and Spialia Galba* (1). In the family Papilionidae, maximum number of species are found in *Papilio demoleus* (12), followed by *Papilio polytes* (9) *Chilasa clytia* (2), *Graphium Sarpedon* (1), *Graphium Agamemnon* (1), *Atrophaneura aristolochiae* (1). In the family Pieridae *Leptosia Nina* (17) show maximum number than other species followed by *Catopsilia pyranthe* (13), *Eurema brigitta* (7), *Catopsilia Pomona* (7), *Delias eucharis* (2), *Eurema hecabe* (2), *Pareronia hippie* (2). In the Lycaenidae family *Neopithecops zalmora (*13), show maximum abundance, followed by *Castalius rosimon* (6), *Chilades lajus* (1), *Acytolepis puspa* (1), *Euchrysops cnejus* (1), *Leptotes plinius* (1), *Rapala manea* (1), *Tarucus Callinara* (2). In the family Nymphalidae *Acraea terpsicore (15)* exhibit maximum number followed by *Melanitis leda (13), Euploea core* (7), *Junonia almana* (6), *Elyymnias hypermnestra* (5), *Phalanta phalantha* (5), *Junonia atlites* (4), *Danaus chrysippus* (3), *Junonia hierta* (2), *Tirumala limniace* (1), *Ypthima baldus* (1), *Moduza procris* (1), *Danaus genutia* (1), *Ariadne merione* (1).

Table 1: Shows the family and common name, scientific name

Family	Common name	Scientific name	Number	RA
Hesperidia	Rice Swift	*Borbo cinnara*	12	6%
	Common redeye	*Matapa aria*	2	1%
	Straight Swift	*Parnara guttatus*	4	2%
	Conjoined Swift	*Pelopidas conjuncta*	7	3%
	Grass Demon	*Ancistroides folus*	3	1.5%
	Indian Skipper	*Spialia galba*	1	0.5%
Papilionidae	Common rose	*Atrophaneura aristolochiae*	1	0.5%
	Common mime	*Chilasa clytia*	2	1%
	Tailed jay	*Graphium agamemnon*	1	0.%
	Common blue bottle	*Graphium sarpedon*	1	0.005
	Lime butterfly	*Papilio demoleus*	12	0.06
	Common Mormon	*Papilio polytes*	9	0.045
Pieridae	Common emigrant	*Catopsilia pomona*	7	0.035
	Mottled emigrant	*Catopsilia pyranthe*	13	0.65
	Common jezebel	*Delias eucharis*	2	0.01
	Small grass yellow	*Eurema brigitta*	7	0.035
	Common grass yellow	*Eurema hecabe*	2	0.01
	Psyche	*Leptosia nina*	17	0.086
	Common wanderer	*Pareronia hippie*	2	0.01
Lycaenidae	Common hedge blue	*Acytolepis puspa*	1	0.005
	Common pierrot	*Castalius rosimon*	6	0.03
	Lime blue	*Chilades lajus*	1	0.005
	Gram blue	*Euchrysops cnejus*	1	0.005
	Zebra blue	*Leptotes Plinius*	1	0.005
	Quaker	*Neopithecops zalmora*	13	0.065
	Slate flash	*Rapala manea*	1	0.005
	Rounded pier rot	*Tarucus callinara*	2	0.01
Nymphalidae	Tawny Coster	*Acraea terpsicore*	15	0.076
	Common castor	*Ariadne merione*	1	0.005
	Plain tiger	*Danaus chrysippuss*	3	0.015
	Striped Tiger	*Danaus genutia*	1	0.005
	Common palmfly	*Elyymnias hypermnestra*	5	0.025
	Common crow	*Euploea core*	7	0.035
	Yellow pansy	*Junonia hierta*	2	0.01
	Grey pansy	*Junonia atlites*	4	0.02
	Peacock pansy	*Junonia almanac*	6	0.03
	Lemon pansy	*Junonia lemonias*	2	0.01
	Common evening brown	*Melanitis leda*	13	0.065
	Commander	*Moduza Procris*	1	0.005
	Common leopard	*Phalanta phalantha*	5	0.025
	Blue tiger	*Tirumala limniace*	1	0.005
	Common fevering	*Ypthima baldus*	1	0.005

Several authors have reported butterfly diversity in southern West Bengal. Ghosh & Siddique (2005) enlist 68 species in and around urban area of Kolkata [19]. Chowdhury & Chowdhury (2007) reported 33 species from the Medially Ecological Park in urban Kolkata [20]. Chowdhury & Das (2007) showed 64 species of butterflies from the Indian Botanical Garden of Howrah [21].

Prior to prevail the skies, butterflies spend early days of its life as caterpillars, extremely dependent on a limited set of plants of their preference. Butterflies play a crucial ecological role in the ecosystem they inhabit. As adults, they visit a countless number of flowers and agriculture crops as they seek out nectar and during this time butterflies also gather pollen from plants of different species, assisting in those species' reproduction and growth.

The delicate deep relationship between butterflies and their host plants is irretrievable, and the abundance of caterpillars is strongly influenced by the distribution of their host plants-if the plant hosts disappear, the butterflies will disappear too.

A total 32 plant species under 19 families were documented during field visit in the coastal belt. 5 species were found under Fabaceae family followed by Rutaceae (4), Apocynaceae and Lamiaceae each having 3 species, Arecaceae (2) and other family having 1 species. Table 2 shows the family and respective host plants for above listed butterflies. Chowdhury & Soren (2011) showed 96 species in the Chintamoni Kar Bird Sanctuary in suburban Kolkata and 74 species were recorded from the East Calcutta Wetlands, Kolkata [22]. Jana *et al.* (2013) reported 27 species from the adjacent coastal region of Purba Medinipur district [23]. Nair *et al.* (2014) found 49 species in the Sarojini Naidu College campus of Kolkata [24]. Chowdhury (2014) reported 76 species from the Indian Sundarban Biosphere Reserve [25]. Hajra *et al.* (2015) documented 46 species from Contai region in Purba Medinipur district [26]. Mukherjee *et al.* reported 96 species in and around Kolkata [27]. Ghosh & Saha (2016) reported 51 species from Taki, North 24 Parganas [28]. Mukherjee *et al.* found 54 species in Kolkata metropolis [29]. Payra *et al.* reported 112 butterfly species from the costal belt of Purba Medinipur [30]. Mandal *et al.* enlightened up about 70 species from the Rice Research Station and adjoining locality in Chinsurah, Hooghly [31].

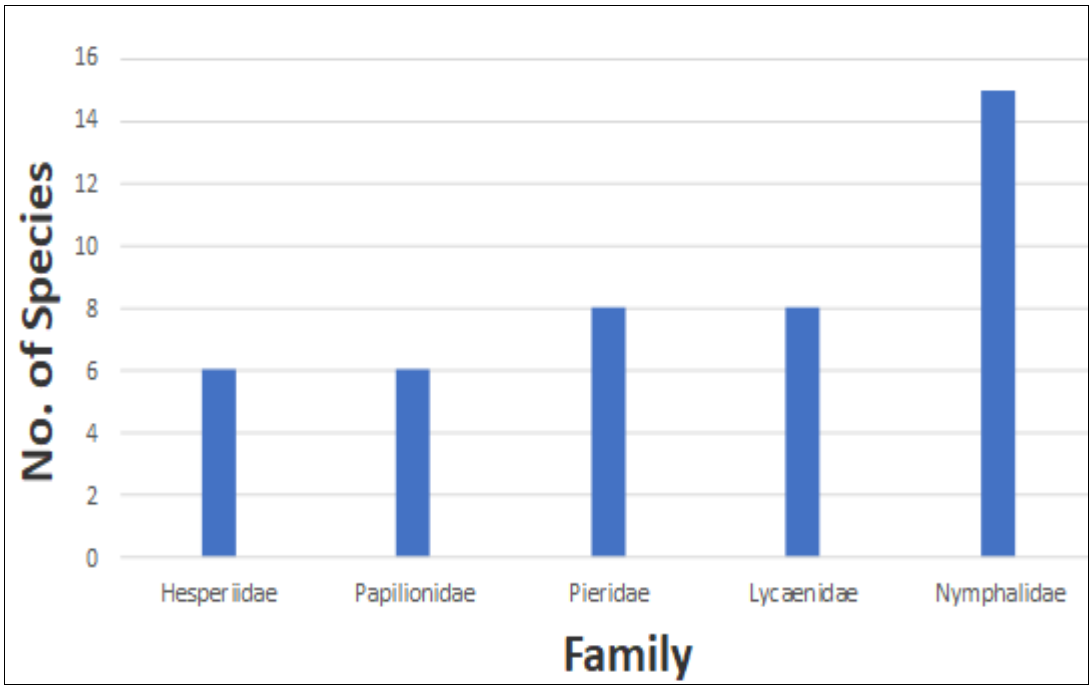

Fig 1: Show Family and No of Species

Table 2: Shows the family and respective host plants for above listed butterflies

Family	Scientific name of the plants
Amaranthaceae	*Gomphrena serrata*
Anacardiaceae	*Mangifera indica*
Annonaceae	*Polyalthia longifolia*
Apocynaceae	*Calotropis gigantea*
	Catharanthus roseus
	Pergularia daemia
Arecaceae	*Phoenix Sylvestris*
	Cocos nucifera
Boraginaceous	*Heliotropium indicum*
Cleomaceae	*Cleome viscosa*
Convolvuluses	*Ipomea sagittifolia*
	Evolvulus nummularius
Euphorbiaceae	*Jatropha gossypiifolia*
Fabaceae	*Mimosa pudica*
	Crotalaria pallida
	Senna occidentalis

	Senna alata
	Aeschynomene indica
Lamiaceae	*Vitex negundo*
	Ocimum americanum
	Leucas aspera
Moraceae	*Ficus benghalensis*
Nyctaginaceae	*Boerhavia diffusa*
Poaceae	*Bambusa sp.*
Rhamnaceae	*Ziziphus mauritiana*
Rutaceae	*Citrus limon*
	Glycosmis pentaphylla
	Murraya koenigii
	Aegle marmelos
Verbenaceae	*Lantana camara*
	Phyla nodiflora
Zingiberaceae	*Curcuma longa*

Conclusion

A total 41 species of butterflies are recorded in this area. This results emphasize the significance of that particular area. The present study is short and compact in nature, with relevant reports on diversity of butterflies and will contribute in effective conservation measures in Tajpur, a coastal habitat of East Medinipur of West Bengal.

Habitat destruction due to deforestation and expansion of urbanization can be potential threat to this area and is suggested to be the reason for the reduction of abundance of butterflies in the study area. A long-term study is continuously portraying butterfly as an indicator taxa for habitat alteration can be carried out to develop effective conservation measure for coastal landscape.

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