

BUTTERFLY FAUNA (INSECTA: LEPIDOPTERA: PAPILIONOIDEA) AND LARVAL HOST PLANT IN BONGAON TOWN, WEST BENGAL, INDIA

Sourabh Biswas¹, Shiladitya Mukhopadhyay², Rajib Dey^{3,*}

¹ Indian Institute of Science Education and Research Kolkata, India

² School Road, Amlapara, Bongaon, West Bengal, India

³ Holding No. 05, Amarabati Road, Madhyamgram, West Bengal, India

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ABSTRACT

An appraisal of butterfly species diversity was carried out in the suburban town of Bongaon, southern West Bengal, India whose butterfly faunal diversity remained undocumented. A total of 76 species of butterflies were recorded from October 2018 to October 2019. The highest number of butterflies were recorded belonging to the family Nymphalidae (27 species), followed by Lycaenidae (21 species), Hesperidae (13 species), Pieridae (8 species) and Papilionidae (7 species). Among the 76 butterfly species that have been recorded, nine species come under the protection category as per the Indian Wildlife (Protection) Act, 1972. Over the study period, 54 species of larval host plants were also documented. This communication will be the first comprehensive work on butterflies of Bongaon town and serve as baseline data for future research on the butterfly.

Keywords: Butterfly fauna, checklist, diversity, larval host plant, Lepidoptera, Sub-urban ecosystem.

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*Corresponding author email: rajibdey88@gmail.com

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INTRODUCTION

Butterflies are good pollinators (Dafni, 1992; Kearns & Inouye 1997), but at the same time, some of them are pest of crops (Nair et al., 2018) and fruits (Abbas et al., 2008). Although awareness of the increasing loss of butterfly biodiversity in the state is already present, several concerted efforts are being made to rescue the butterfly diversity of the state threatened by unplanned urban-tune and wetland as well as green patch reduction (Ganguli et al., 2016).

In West Bengal, as far back as 1866, F. Moore first contributed his butterfly knowledge through his publication (Moore, 1866). Later, de Nicéville (1885) worked on butterfly habits and their larval host plant. Such a fact-finding

study on butterflies was followed by several scientists and amateur personnel, along with their life history stages, choice of food plants and related ecological documentation (Chowdhury, 2015). Judhajit Dasgupta (2010) compiled 452 species of butterflies through his Bengali literature book 'Paschimbanger Prajapati'. Only in 2015, Mitra et al. (2015) listed 79 species of butterflies from Bibhutibhusan Wildlife Sanctuary, a protected area of West Bengal that falls under the Bongaon sub-division. However, no observation has been reported from the Bongaon town in particular. Hence, the data presented here is the first inventory of butterfly species diversity in the town that will act as the baseline data for similar studies in future.

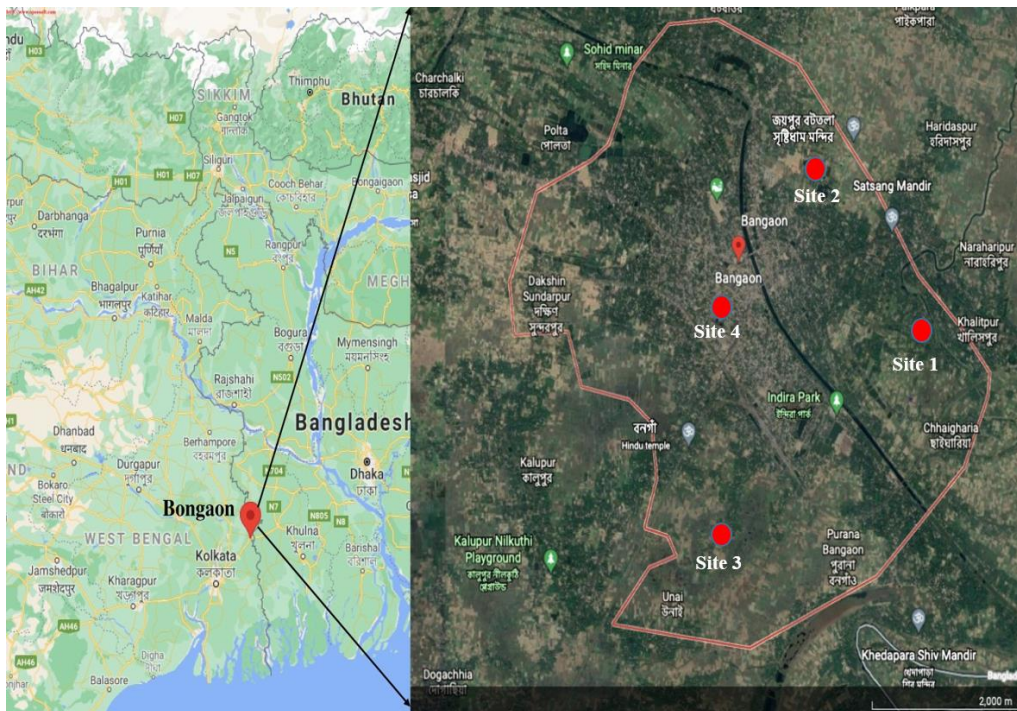


Figure 1. Map of the study area, Bongaon

The study was conducted in and around Bongaon (about 23.07°N; 88.82°E), a municipal town in the state of West Bengal, India (Fig. 1). The town is also a sub-divisional headquarter and situated in the vicinity of the India-Bangladesh border.

River Ichhamati flows through it. The natural vegetation of the suburban town comprises scattered horticultural gardens, orchards, bamboo bushes, shrubs and herbs, and vast stretches of irrigated paddy fields intermingled with expanding human

settlements (Mukhopadhyay & Mazumdar, 2017). The area experiences a tropical monsoon climate. It has four distinct seasons viz., summer (March–May), monsoon (June–August), post-monsoon (September–November) and winter (December–February). The annual temperature ranges from 43 °C to 9 °C, and precipitation is 1,400 mm (Mitra et al., 2015). Relative humidity varies between 50% and 90% (Mukhopadhyay & Mazumdar, 2017).

Four sites were selected within a radius of 3 km of the Bongaon town area for the butterfly survey (Fig. 2). Site 1, 2 and 3 were rural habitats whereas Site 4 was urban habitat. Site 1 is a forested area with scattered horticulture gardens, orchards, bamboo bushes. Site 2 is a wetland area with scattered trees and bushes. Site 3 is dominated by agricultural fields with scattered trees and bushes. Site 4 is the highly populated municipal area with personal gardens and parks.



Figure 2. Habitat of four survey sites in Bongaon town

MATERIALS AND METHODS

Field surveys were conducted weekly from October 2018 to October 2019. Field observations were carried out only on days with suitable weather conditions (i.e., in the absence of rain or strong wind) between 9:30 am to 11:30 am and 3:30 pm to 5:30 pm. A modified Pollard walk (Royer et al., 1998) method is used for data collection and butterfly species random sightings. Butterfly species were recorded and photographed

using digital cameras (Nikon P600 & D7000). Occasionally an entomological net was used for Hesperiid photographs and the butterflies were released unharmed to their natural habitats. No butterfly species were collected, euthanized, or killed during the entire study. Photographs of all species were identified using Evans (1949), Kehimkar (2016) and Ek-Amnuay (2012). The systematic position (order and family), common name and scientific name of each species were assigned

following the synoptic catalogue by Varshney & Smetacek (2015). The observed butterfly species were categorized into five categories based on their presence in the study area VC - very common (> 100 sightings), C - common (> 50–100 sightings), NR - not rare (> 15–50 sightings), R - rare (> 2–15 sightings), VR - very rare (1–2 sightings). Authors have followed the updated scientific name of the larval host plants which were photographed from the study site as per The Plant List (2013) and Prain (1903).

RESULTS

The study revealed the presence of 76 butterfly species belonging to 5 families in the study area (Table 1, Fig. 1). Nymphalidae was the richest family, comprising 27 species (35.52%), followed by Lycaenidae 21 species (27.63%), Hesperidae 13 species (17.10%), Pieridae 08 species (10.52%) and Papilionidae 07 species (9.21%). Assessment of local abundance revealed that 19 species (25%) were very common, 27 species (35.52%) were

common, 17 species (22.36%) were fairly common, and 5 species (10.52%) were rare. Eight butterfly species, namely *Arhopala atrax* (Hewitson, 1862), *Venessa cardui* (Linnaeus, 1758), *Mahathala ameria* (Hewitson, 1862), *Discophora sondaica* (Boisduval, 1836), *Lethe europa* (Fabricius, 1775), *Junonia orithya* (Linnaeus, 1758), *Junonia iphita* (Cramer, 1779) and *Baoris farri* (Moore, 1878) were reported only once during the study period. 10 species have a protected status under the Indian Wildlife (Protection) Act (WPA), 1972 (Anonymous, 2010), including *Discophora sondaica* (Boisduval, 1836) under Schedule I, *Anthene lycaenina* (Felder, 1868), *Baoris farri* (Moore, 1878), *Euthalia aconthea* (Cramer, 1777), *Lampides boeticus* (Linnaeus, 1767), *Euchrysops cnejus* (Fabricius, 1798), *Mahathala ameria* (Hewitson, 1862), *Rapala varuna* (Horsfield, 1829) under Schedule II, and *Euploea core* (Cramer, 1758), *Euploea klugii kollari* (Felder & Felder, 1865) under Schedule IV.

Table 1. List of Butterflies found in and around the Bongaon Municipality area

Subfamily	Binomial name	Status	WPA	Site 1	Site 2	Site 3	Site 4
Papilionidae (3 genera, 7 species)							
Papilioninae	<i>Graphium doson</i> (Felder & Felder, 1864)	R		+	-	-	-
	<i>Graphium agamemnon</i> (Linnaeus, 1758)	VC		+	+	-	+
	<i>Pachliopta aristolochiae</i> (Fabricius, 1775)	NR		+	+	-	-
	<i>Papilio clytia</i> (Linnaeus, 1758)	NR		+	+	+	+
	<i>Papilio polytes</i> (Linnaeus, 1758)	VC		+	+	+	+
	<i>Papilio polymnestor</i> (Cramer, 1775)	C		+	+	-	+
	<i>Papilio demoleus</i> (Linnaeus, 1758)	C		+	+	+	+
Nymphalidae (18 genera, 27 species)							
Danainae	<i>Tirumala limniace</i> (Cramer, 1775)	NR		+	+	+	-
	<i>Danaus genutia</i> (Cramer, 1779)	C		+	+	+	+
	<i>Danaus chrysippus</i> (Linnaeus, 1758)	VC		+	+	+	+
	<i>Euploea core</i> (Cramer, 1758)	VC	Sch. IV	+	+	+	+
	<i>Euploea klugii kollari</i> (Felder & Felder, 1865)	NR	Sch. IV	+	+	-	+
Morphinae	<i>Discophora sondaica</i> (Boisduval, 1836)	VR	Sch. I	+	+	-	-
Satyrinae	<i>Elymnias hypermnestra</i> (Drury, 1763)	VC		+	+	+	+
	<i>Melanitis leda</i> (Linnaeus, 1758)	VC		+	+	+	+
	<i>Lethe europa</i> (Fabricius, 1775)	VR		+	-	-	-
	<i>Mycalesis</i> sp. (Huebner, 1818)	VC		+	+	+	+
	<i>Ypthima baldus</i> (Fabricius, 1775)	NR		+	+	+	-
	<i>Ypthima huebneri</i> (Kirby, 1871)	VC		+	+	+	-
Acraeinae	<i>Acraea violae</i> (Fabricius, 1775)	C		+	+	+	+
	<i>Phalanta phalantha</i> (Drury, 1773)	C		+	+	-	-

Subfamily	Binomial name	Status	WPA	Site 1	Site 2	Site 3	Site 4
Limenitinae	<i>Moduza procris</i> (Cramer, 1777)	R		+	+	+	+
	<i>Neptis hylas</i> (Linnaeus, 1758)	C		+	-	-	+
	<i>Neptis jumbah</i> (Moore, 1858)	NR		+	+	-	-
	<i>Euthalia aconthea</i> (Cramer, 1777)	C	Sch. II	+	+	+	+
Biblidinae	<i>Ariadne Ariadne</i> (Linnaeus, 1763)	VC		+	+	+	+
	<i>Ariadne merione</i> (Cramer, 1777)	C		+	-	-	+
Nymphalinae	<i>Venessa cardui</i> (Linnaeus, 1758)	VR		-	+	-	-
	<i>Junonia orithya</i> (Linnaeus, 1758)	VR		-	-	+	-
	<i>Junonia iphita</i> (Cramer, 1779)	VR		+	-	-	-
	<i>Junonia atlites</i> (Linnaeus, 1763)	VC		+	+	+	+
	<i>Junonia almana</i> (Linnaeus, 1758)	C		+	+	+	+
	<i>Junonia lemonias</i> (Linnaeus, 1758)	VC		+	+	+	+
	<i>Hypolimnas bolina</i> (Linnaeus, 1758)	C		+	+	+	-
Pieridae (7 genera, 8 species)							
Coliadinae	<i>Eurema hecabe</i> (Linnaeus, 1758)	VC		+	+	+	+
Pierinae	<i>Catopsilia pomona</i> (Fabricius, 1775)	VC		+	+	+	+
	<i>Catopsilia pyranthe</i> (Linnaeus, 1758)	VC		+	+	+	+
	<i>Pareronia valeria</i> (Cramer, 1776)	C		+	+	+	-
	<i>Appias olferna</i> (Swinhoe, 1890)	C		-	+	-	+
	<i>Cepora nerissa</i> (Fabricius, 1775)	C		+	+	+	+
	<i>Delias eucharis</i> (Drury, 1773)	C		+	+	+	+
	<i>Leptosia nina</i> (Fabricius, 1793)	VC		+	+	+	+
Lycaenidae (18 genera, 21 species)							
Miletinae	<i>Spalgis epius</i> (Westwood, 1851)	NR		+	-	-	+
Aphnaeinae	<i>Spindasis vulcanus</i> (Fabricius, 1775)	C		+	+	+	+
Polyommatainae	<i>Anthene emolus</i> (Godart, 1824)	NR		+	-	+	-
	<i>Anthene lycaenina</i> (Felder, 1868)	NR	Sch. II	+	-	-	-
	<i>Catochrysops strabo</i> (Fabricius, 1793)	C		+	+	-	-
	<i>Lampides boeticus</i> (Linnaeus, 1767)	R	Sch. II	-	+	-	-
	<i>Castalius rosimon</i> (Fabricius, 1775)	VC		+	+	+	-
	<i>Tarucus balkanicus</i> (Freyer, 1844)	NR		+	+	+	-
	<i>Zizeeria karsandra</i> (Moore, 1865)	NR		+	+	+	-
	<i>Pseudozizeeria maha</i> (Kollar, 1844)	C		+	+	+	-
	<i>Zizula hylax</i> (Fabricius, 1775)	NR		-	+	+	-
	<i>Neopithecops zalmora</i> (Butler, 1870)	C		+	+	+	+
	<i>Euchrysops cnejus</i> (Fabricius, 1798)	C	Sch. II	+	+	+	+
	<i>Chilades pandava</i> (Horsfield, 1829)	VC		+	+	+	+
	<i>Chilades lajus</i> (Stoll, 1780)	VC		+	+	+	+
Theclinae	<i>Arhopala atrax</i> (Hewitson, 1862)	VR		+	-	-	-
	<i>Mahathala ameria</i> (Hewitson, 1862)	VR	Sch. II	+	-	-	-
	<i>Loxura atymnus</i> (Stoll, 1780)	NR		+	-	+	-
	<i>Rathinda amor</i> (Fabricius, 1775)	C		+	+	-	+
	<i>Rapala manea</i> (Hewitson, 1863)	C		+	+	+	+
	<i>Rapala varuna</i> (Horsfield, 1829)	R	Sch. II	-	-	-	+
Hesperiidae (12 genera, 13 species)							
Pyrginae	<i>Tagiades japedus</i> (Stoll, 1781)	NR		+	+	-	+
Hesperiinae	<i>Iambrix salsala</i> (Moore, 1866)	VC		+	+	-	-
	<i>Suastus gremius</i> (Fabricius, 1798)	C		+	+	+	-
	<i>Matapa aria</i> (Moore, 1866)	NR		+	+	-	-
	<i>Parnara bada</i> (Moore, 1878)	C		+	-	-	-

Subfamily	Binomial name	Status	WPA	Site 1	Site 2	Site 3	Site 4
	<i>Borbo cinnara</i> (Wallace, 1866)	C		+	+	+	+
	<i>Pelopidas</i> sp. (Walker, 1870)	C		+	+	+	+
	<i>Baoris farri</i> (Moore, 1878)	VR	Sch. II	+	-	-	-
	<i>Oriens gola</i> (Moore, 1877)	C		+	+	+	-
	<i>Telicota colon</i> (Fabricius, 1775)	C		+	+	+	-
	<i>Telicota bambusae</i> (Moore, 1878)	NR		+	+	-	-
	<i>Cephrenes acalle</i> (Hopffer, 1874)	R		+	-	-	-
	<i>Udaspes folus</i> (Cramer, 1775)	NR		+	+	-	+

Abbreviations: VC - Very Common (> 100 sightings); C - Common (> 50–100 sightings); NR - Not Rare (> 15–50 sightings); R - Rare (> 2–15 sightings); VR - Very Rare (1–2 sightings); +: Present; -: Absent

Authors have recorded 70 species of butterflies from Site 1, 60 species from Site 2, 46 species from Site 3 and 41 species from site 4 (Fig. 3). Chi-square goodness of fit test was performed using R statistical software to compare the species richness across sites. The result showed a significant difference (Chi value = 9.6728, df = 3, p-value = 0.02) across sites. A pairwise comparison using the chi-square test identified a significant difference (p-value = 0.03) of species richness between Site 1 and Site 4. In the course of the study, a total of 54 plant species belonging to 28 families and 51 genera were found to use by the butterfly larvae of this town as host plants (Table 2). Poaceae (8 species) and Fabaceae (6 species)

were the most dominant families of host plants in this area. Six species of caterpillars feed on the plant *Cassia fistula*, whereas *Capparis zeylanica* exclusively supports the growth of four species of caterpillars.

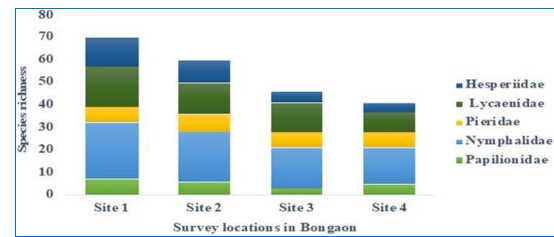


Figure 3. Family wise species richness of butterflies in four different locations of the study area

Table 2. The list of larval host plants observed in Bongaon during the study period

Family	Larval host plant	Butterfly species	References
Fabaceae	<i>Senna tora</i> (L.) Roxb.	<i>Eurema hecabe</i>	Nitin et al., 2018
	<i>Senna occidentalis</i> (L.) Link	<i>Catopsilia pomona</i>	Kunte et al., 2021
		<i>Catopsilia pyranthe</i>	
	<i>Cassia fistula</i> L.	<i>Eurema hecabe</i>	Robinson et al., 2010
		<i>Catopsilia pomona</i>	Robinson et al., 2010
		<i>Catopsilia pyranthe</i>	Robinson et al., 2010
		<i>Spindasis vulcanus</i>	Nitin et al., 2018
		<i>Anthene emolus</i>	Robinson et al., 2010
		<i>Graphium agamemnon</i>	Robinson et al., 2010
	<i>Tamarindus indica</i> L.	<i>Suastus gremius</i>	Robinson et al., 2010
<i>Lablab purpureus</i> (L.) Sweet	<i>Euchrysops cnejus</i>	Robinson et al., 2010	
<i>Cajanus cajan</i> (L.) Millsp.	<i>Lampides boeticus</i>	Robinson et al., 2010	
	<i>Catochrysops strabo</i>		
Rutaceae	<i>Aegle marmelos</i> (L.) Corrêa	<i>Papilio demoleus</i>	Robinson et al., 2010
		<i>Papilio polytes</i>	
	<i>Glycosmis pentaphylla</i> (Retz.) DC.	<i>Neopithecops zalmora</i>	Robinson et al., 2010
		<i>Papilio polytes</i>	
	<i>Citrus</i> sp.	<i>Papilio polytes</i>	Robinson et al., 2010

Family	Larval host plant	Butterfly species	References
		<i>Chilades lajus</i>	
	<i>Murraya koenigii</i> (L.) Spreng.	<i>Papilio polytes</i>	Robinson et al., 2010
Salicaceae	<i>Flacourtia indica</i> (Burm.f.) Merr.	<i>Phalanta phalantha</i>	Robinson et al., 2010
Sapindaceae	<i>Litchi chinensis</i> Sonn.	<i>Anthene emolus</i>	Robinson et al., 2010
		<i>Rathinda amor</i>	
Annonaceae	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	<i>Graphium agamemnon</i>	Robinson et al., 2010
		<i>Graphium doson</i>	
	<i>Polyalthia suberosa</i> (Roxb.) Thwaites	<i>Graphium agamemnon</i>	Kunte et al., 2021
	<i>Annona reticulata</i> L.	<i>Graphium doson</i>	Robinson et al., 2010
Lauraceae	<i>Litsea glutinosa</i> (Lour.) C. B. Rob.	<i>Papilio clytia</i>	Robinson et al., 2010
	<i>Cinnamomum tamala</i> (Buch.-Ham.) T. Nees & Eberm.	<i>Papilio clytia</i>	Kunte et al., 2021
Passifloceae	<i>Passiflora foetida</i> L.	<i>Acraea violae</i>	Kunte et al., 2021
Rubiaceae	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	<i>Moduza procris</i>	Kunte et al., 2021
	<i>Ixora coccinea</i> L.	<i>Rathinda amor</i>	Kunte et al., 2021
Anacardiaceae	<i>Mangifera indica</i> L.	<i>Rathinda amor</i>	Robinson et al., 2010
		<i>Euthalia aconthea</i>	
		<i>Anthene emolus</i>	
Euphorbiaceae	<i>Ricinus communis</i> L.	<i>Ariadne merione</i>	Kunte et al., 2021
		<i>Ariadne ariadne</i>	
	<i>Tragia involucrata</i> L.	<i>Ariadne merione</i>	
		<i>Ariadne ariadne</i>	
Verbenaceae	<i>Lantana camara</i> L.	<i>Zizula hylax</i>	Robinson et al., 2010
		<i>Rapala manea</i>	
		<i>Rapala varuna</i>	
Arecaceae	<i>Phoenix sylvestris</i> (L.) Roxb.	<i>Elymnias hypermnestra</i>	Kunte et al., 2021
		<i>Suastus gremius</i>	
	<i>Rhapis humilis</i> Blume	<i>Telicota colon</i>	
		<i>Elymnias hypermnestra</i>	Robinson et al., 2010
		<i>Suastus gremius</i>	Kunte et al., 2021
		<i>Telicota colon</i>	Robinson et al., 2010
	<i>Cocos nucifera</i> L.	<i>Suastus gremius</i>	
		<i>Elymnias hypermnestra</i>	Kunte et al., 2021
<i>Areca catechu</i> L.	<i>Elymnias hypermnestra</i>	Kunte et al., 2021	
<i>Borassus flabellifer</i> L.	<i>Suastus gremius</i>	Robinson et al., 2010	
Apocynaceae	<i>Calotropis gigantea</i> (L.) Dryand.	<i>Danaus genutia</i>	Robinson et al., 2010
Malvaceae	<i>Sida rhombifolia</i> L.	<i>Spialia galba</i>	Robinson et al., 2010
Capparaceae	<i>Capparis zeylanica</i> L.	<i>Cepora nerissa</i>	Kunte et al., 2021; Robinson et al., 2010
		<i>Pareronia hippia</i>	Robinson et al., 2010
		<i>Leptosia nina</i>	Kunte et al., 2021; Robinson et al., 2010
		<i>Appias libythea</i>	Robinson et al., 2010
Brassicaceae	<i>Sinapis arvensis</i> L.	?	Kunte et al., 2021
Rhamnaceae	<i>Ziziphus jujuba</i> Mill.	<i>Castalius rosimon</i>	Kunte et al., 2021
		<i>Spindasis vulcanus</i>	
Lamiaceae	<i>Clerodendrum infortunatum</i> L.	<i>Rapala manea</i>	Kunte et al., 2021
Mimosaseae	<i>Mimosa pudica</i> L.	<i>Prosotas dubiosa</i>	Kunte et al., 2021
		<i>Eurema hecabe</i>	
Oxalidaceae	<i>Oxalis corniculata</i> L.	<i>Pseudozizeeria maha</i>	Robinson et al., 2010

Family	Larval host plant	Butterfly species	References
Poaceae	<i>Oryza sativa</i> L.	<i>Udaspes folus</i>	Robinson et al., 2010
	<i>Saccharum officinarum</i> L.	<i>Pelopidas</i> sp.	Robinson et al., 2010
	<i>Bambusa</i> sp.	<i>Lethe europa</i>	Kunte et al., 2021
	<i>Cynodon dactylon</i> (L.) Pers.	<i>Melanitis leda</i>	Kunte et al., 2021
		<i>Ypthima baldus</i>	Robinson et al., 2010
	<i>Eleusine indica</i> (L.) Gaertn.	<i>Ypthima huebneri</i>	Kunte et al., 2021
		<i>Melanitis leda</i>	
	<i>Setaria</i> sp.	<i>Borbo cinnara</i>	Kunte et al., 2021
	<i>Axonopus compressus</i> (Sw.) P.Beauv.	<i>Borbo cinnara</i>	Kunte et al., 2021
		<i>Melanitis leda</i>	
<i>Imperata cylindrica</i> (L.) Raeusch.	<i>Pelopidas</i> sp.	Dey, 2020	
	<i>Parnara</i> sp.		
	<i>Borbo cinnara</i>		
Zingiberaceae	<i>Curcuma longa</i> L.	<i>Udaspes folus</i>	Kunte et al., 2021
	<i>Hedychium coronarium</i> J.Koenig	<i>Udaspes folus</i>	Kunte et al., 2021
Meliaceae	<i>Azadirachta indica</i> A.Juss.	<i>Delias eucharis</i>	Kunte et al., 2021
Myrtaceae	<i>Psidium guajava</i> L.	<i>Suastus gremius</i>	Robinson et al., 2010
Musaceae	<i>Musa acuminata</i> Colla	?	
Moraceae	<i>Ficus racemosa</i> L.	<i>Euploea core</i>	Robinson et al., 2010
		<i>Danaus chrysippus</i>	
	<i>Ficus benghalensis</i> L.	<i>Euploea core</i>	Robinson et al., 2010
Cycadaceae	<i>Cycas circinalis</i> L.	<i>Chilades pandava</i>	Nitin et al., 2018
Cannabeceae	<i>Trema orientalis</i> (L.) Blume	<i>Rapala manea</i>	Kunte et al., 2021

DISCUSSION

The main objective of the study was to prepare a comprehensive list of butterfly species, determine which species were most abundant during the time of sampling, and document the available host and feeding plants in suburban Bongaon town. Our study confirms the presence of a wide variety of butterflies in the suburban town despite a large influx of human population and anthropogenic disturbances. The highest number of butterflies was recorded in Site 1 with the least human interferences and dense vegetation among the other sites. The availability of larval host plants and adult nectar plants could be one reason for its dominance (Murugesan et al., 2013). The least number of species were recorded from Site 4. High anthropogenic disturbance and the least vegetation might be a reason for this (Samal et al., 2021). The highest similar species assemblage was observed between Site 1 and Site 2 possibly due to their close proximity and the lowest similarity of species was

recorded between Site 3 and Site 4 due to heterogeneity in habitat types (Table 3). Butterflies in high frequency were seen nectaring on flowering plants (*Lantana camara*, *Nerium oleander*, *Ixora* sp. etc.), planted by Bongaon Municipality to beautify the roads. The parks of the town, personal gardens also serve as potential resource sites for butterflies. However, seasonal slash and burn of vegetation poses a threat to the availability of both the host and feeding plants in the study area (Cleary & Genner, 2004). The presence of ten species listed under the Indian Wildlife (Protection) Act, 1972 demands necessary conservation measures to avoid regional extirpation.

Table 3. Sorensen's similarity index of butterfly species recorded in the study sites

	Site 1	Site 2	Site 3	Site 4
Site 1		0.86	0.76	0.70
Site 2			0.81	0.73
Site 3				0.69
Site 4				

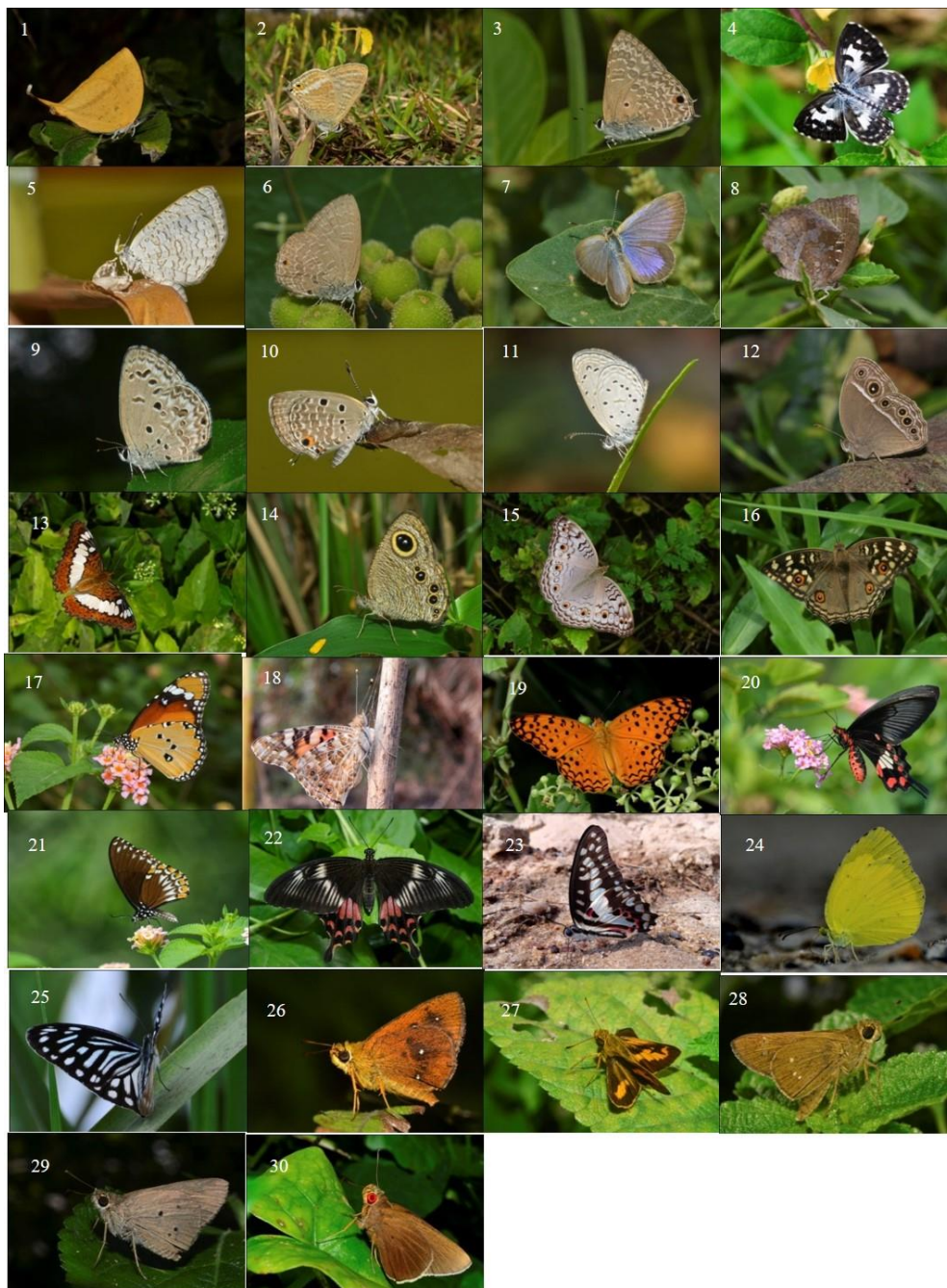


Figure 4. Some butterflies recorded from the study site

1. *Loxura atymnus*; 2. *Lampides boeticus*; 3. *Anthene lycaenina*; 4. *Castalius rosimon*; 5. *Spalgis epius*;
6. *Anthene emolus*; 7. *Zizeeria karsandra*; 8. *Mahathala ameria*; 9. *Chilades lajus*; 10. *Chilades pandava*;
11. *Zizula hylax*; 12. *Mycalesis* sp.; 13. *Moduza procris*; 14. *Ypthima baldus*; 15. *Junonia atlites*;
16. *Junonia lemonias*; 17. *Danaus chrysippus*; 18. *Venessa cardui*; 19. *Phalanta phalantha*;
20. *Pachliopta aristolochiae*; 21. *Papilio clytia*; 22. *Papilio polytes*; 23. *Graphium doson*;
24. *Eurema hecabe*; 25. *Pereronia valeria*; 26. *Iambrix salsala*; 27. *Oriens gola*;
28. *Borbo cinnara*; 29. *Suastus gremius*; 30. *Matapa aria*

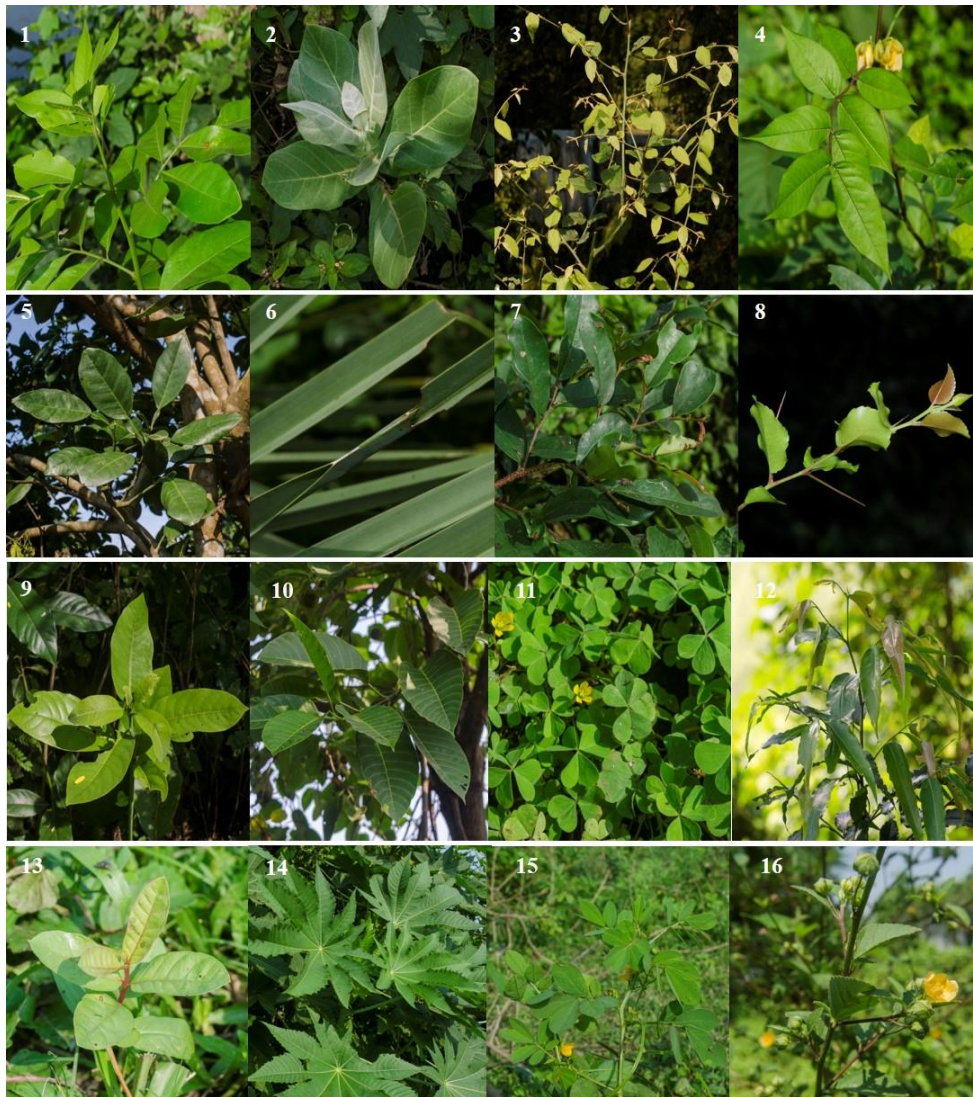


Figure 5. Some larval host plants recorded from the study site

1. *Glycosmis pentaphylla*; 2. *Calotropis gigantea*; 3. *Capparis zeylanica*; 4. *Cassia fistula*;
 5. *Citrus* sp.; 6. *Phoenix sylvestris*; 7. *Polyalthia suberosa*; 8. *Flacourtia indica*; 9. *Litsea glutinosa*;
 10. *Neolamarckia cadamba*; 11. *Oxalis corniculata*; 12. *Polyalthia longifolia*;
 13. *Psidium guajava*; 14. *Ricinus communis*; 15. *Senna tora*; 16. *Sida rhombifolia*

Species like *Pieris canidia*, *Charaxes solon* (Dey, 2021), *Iraota timoleon* (Sourabh Biswas observed from IISER Kolkata Campus, Nadia, West Bengal) were reported within 40 km radius of Bongaon. The host plants of these three species i.e., *Sinapis arvensis*, *Tamarindus indica*, *Ficus bengalensis* respectively were present in abundance at the study site. Further exploration might reveal the presence of these

butterflies in the area. As the study provides a checklist of butterfly species, their feeding and larval host plants available in the area, it can be regarded as the maiden step towards forming a butterfly garden. Research and systematic monitoring will be helpful to better understand the influence of different landscape elements on butterfly community structure and their conservation needs.

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