RESEARCH ARTICLE

Butterflies of Athgarh Forest Division, Odisha, Eastern India, with notes on some significant records

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The present paper deals with first annotated list of butterflies from Athgarh Forest Division, Odisha, India. A total of 136 species belongs to six families were recorded during January 2015 to September 2015. Notes on some of the significant record of butterflies for the region, were provided along with their distribution. Among the recorded 136 species of butterflies, 14 species are legally protected under Indian Wildlife Protection Act, 1972.
Key words: Balikiari Reserve Forest; Tersing; butterfly; checklist; distribution

Introduction

Butterflies occupy vital position in natural ecosystem as their adults are very good pollinators and larvae act as primary herbivores (Choudhury et al., 2012). They directly depend on plants for their entire life span from larval host plant to nectar of flowers and their diversity may serve as a surrogate for plant diversity (Harisha & Hosetti, 2013). Due to their attractive coloured wings and fluttering flight, butterflies always attract the attention of naturalists, researchers, and conservationists. There are about 1501 species of butterflies in Indian subcontinent (Kunte et al., 1999), out of which 150 species have been recorded from Eastern Ghats (Gunathilagaraj et al., 1998), 334 species from Western Ghats (Tiple *et al.*, 2009) and 962 species from North East region (Evans, 1932). In Odisha, first faunistic study on butterfly fauna presented by Taylor & de Niceville (1888). They reported a list of butterflies from Khurda district. Later, Crawford (1921) noted some butterflies from Meghasani hills of Mayurbhanj district and at the same time, Annandale & Dover (1921) published a list on butterflies from the Barkuda Island of Chilka. Afterwards, many noticeable woks on butterflies have been carried out by several workers in different parts of the state (Mandal & Nandi 1984; Mandal & Moulik 1991; Sahu et al. 2006; Sethy et al. 2006; Sethy & Jana 2009; Nair, 2007, 2011; Das & Sahu 2011; Mohapatra et al. 2012; Palei & Rath, 2014; Payra et al. 2016; Paria et al. 2018; Boruah et al. 2019). As there is no literature available on butterfly diversity in Athgarh Forest Division, an attempt was made to strengthen the information on diversity and distribution of butterflies in Odisha through this present study.

Materials and Methods

Athgarh Forest Division situated in Cuttack district comprises of five Ranges i.e. Athgarh, Baramba, Khuntuni, Narasinghpur East and Narasinghpur West over an area of 1510 Km^2 (Fig. 1). It is located between latitude 20º21'19.2"N to 20º40'27.6"N and longitude 85º52'0.72" E to 84º55'42.8"E. There are 37 Reserve Forests in Athgarh Division. This division is surrounded by Satkosia Tiger Reserve in the West, Cuttack Forest Division and City Forest Division in the East, Chandaka Wild Life Sanctuary, Nayagarh Forest Division and some part of Mahanadi Wildlife Division in the South and Dhenkanal Forest Division in the North. In Athgarh Forest Division, forest types are mainly Peninsular Sal forest, Dry Mixed-deciduous Forest, small patches of Semi-evergreen forest and Scrub forest (Champion & Seth, 1968). The climate condition of the area experiences three distinct seasons: monsoon (July to September), winter (October to February) and summer (March to June). The area receives an average annual rainfall of 1400 mm to 1500 mm and the temperature ranges from 9°C in winter to 42°C in summer.

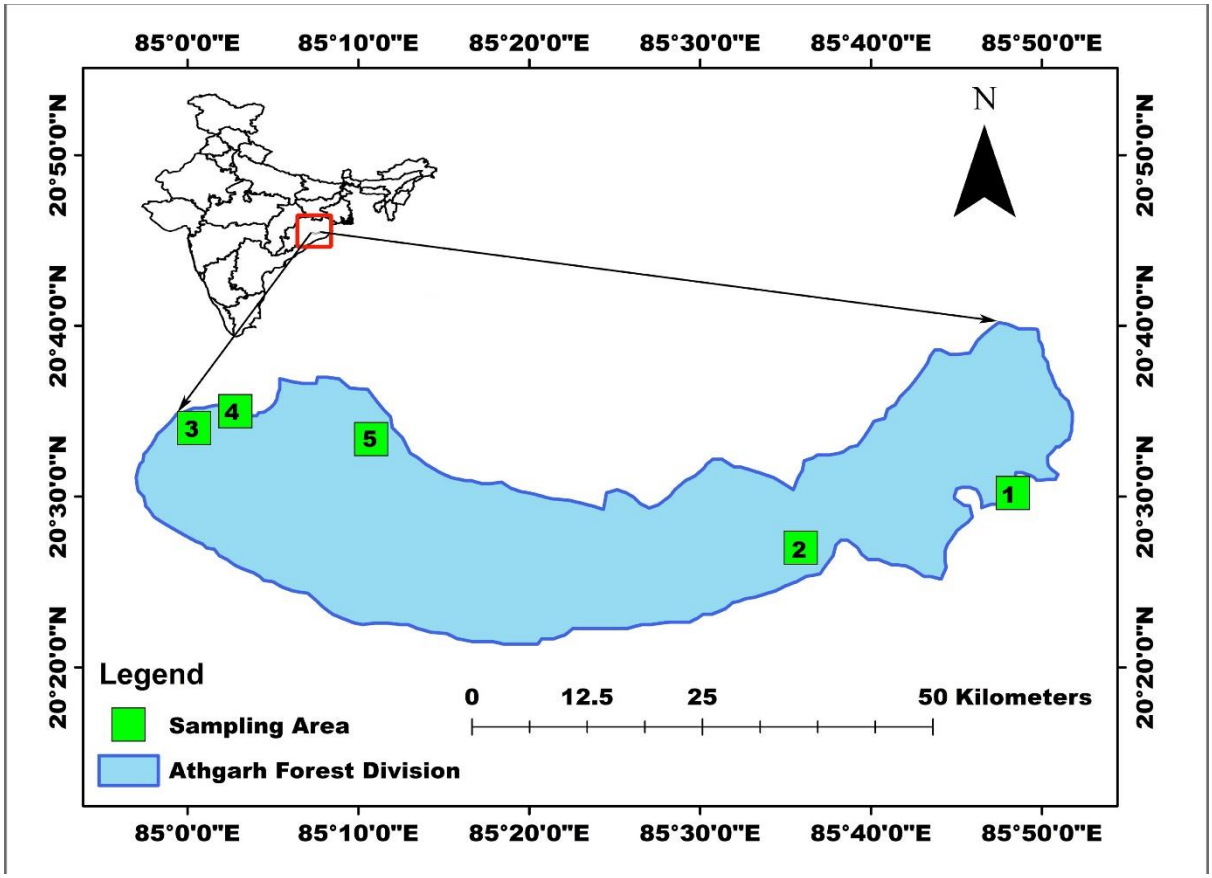

Fig. 1. Location map of study sites in Athgarh Forest Division, Odisha, Eastern India

Five sites were surveyed for the documentation of butterflies in Athgarh Forest Division.

Site 1 - Dhabaleswar Island (20.503°N, 85.805° E, 19 m a.s.l). It is a small island on Mahanadi River, comes under Khuntuni Range of Athgarh Forest Division. The frequently found plant species of this area are *Ficus bengalensis, Ficus religiosa, Cassia siamea, Sizigium cumuni, Polyalthia longifolia, Azadirachta indica* etc. Besides the above, the composites of the shrub forest are *Lantana camara, Sida spinosa, Justicia adhatoda, Calotropis gigantea etc.*

Site 2 – Ansupa Lake (20.459°N, 85.602°E, 30 m a.s.l). Ansupa lake is one of the largest freshwater lakes of Odisha spreading over 140 ha, situated at the left bank of Mahanadi River. It is surrounded by undulating plain and isolated hill ranges. The surrounding vegetation of the lake is mainly characterized by Cashew plantation, Agricultural land, patches of bamboo and hilly thorny scrub forest.

Site 3 – Balikiari Reserve Forest (20.552°N, 85.038°E, 233 m a.s.l.). With an area of 5217.87 hectare, this Reserve Forest (RF) is situated in Narsingpur West Range. Small streams flow within this RF mainly in rainy season, but mostly remain dry for rest of the seasons. *Mangifera indica*, *Shorea robusta*, *Aegle marmelos*, *Anogeissus latifolia*, *Dalbergia latifolia*, *Diospyros sp*, *Azadirachta indica* are dominated floral components of this region.

Site 4 – Tersing (20.582°N, 85.047°E, 435 m a.s.l.). This is the bordering area between Athgarh Forest Division and Satkosia Tiger Reserve. It lies at an altitude of about 450 m. The dominant trees are mainly *Aegle marmelos*, *Terminalia tomentosa*, *Shorea robusta*, *Ficus religiosa*, *Diosspyros melanoxylon*, *Syzigium cumini, Cicus* sp etc.

Site 5 – Deobhuin Reserve Forest (20.556°N, 85.179°E, 160 m a.s.l.). This reserve forest is situated in Narsingpur East Range with an area of 6082.23 ha. Slow flowing streams, and one waterfall is present within this reserve forest. The vegetation is dominated by *Shorea robusta*, *Xilia xylocarpa*, *Terminalia tomentosa*, *Schleichera oleosa*, *Lagerstroemia parviflora* etc.

Data Collection and Identification

Butterflies were observed through opportunistic survey from January 2015 to September 2015. During this inventory all possible and suitable habitats of butterflies, like agricultural land, forest trails, streams, waterfall, nectaring plants were surveyed. All observations were mainly carried out between 7.00 am to 11.00 am and 2.30 pm to 4.30 pm. Most of the species were photographed in the field by using Nikon D3200 Camera with Tamron 70-300 mm lens. Coordinates and elevations of study sites were obtained by using Garmine eTrex and Google earth. An entomological net was also used for capturing butterflies, which were released immediately at the spot of capture without any harm. Butterflies were identified using available literature of Evans (1932, 1949), and photographic guidebooks of Haribal (1992) and Kehimkar (2008, 2016) together with website of Indian butterflies (https://www.ifoundbutterflies.org/). Scientific names and common names presented according to Kunte et al. (2019), Varshney & Smetacek, (2015).

Results

A total of 136 species of butterflies belonging to six families were recorded in the study area (See Table 1). The most dominant family was Lycaenidae with 41 species (30.15%), followed by Nymphalidae (28.68%, 39 species), Hesperiidae (19.85%, 27 species), Pieridae (11.76%, 16 species), Papilionidae (8.82%, 12 species) and Riodinidae (1 species, 0.74%). Notes on some of the significant records of butterflies were provided below along with their distribution.

Table 1. List of the recorded butterflies from Athgarh Forest Division, Odisha, Eastern India

Sl.No	Family / Scientific Name	Common Name	Study Sites					Figure number
			S1	S2	S3	S4	S5	
Family Hesperiidae								
1	*Hasora chromus* (Cramer, [1780])	Common Banded Awl		+	+	+		2a
2	*Hasora vitta* (Butler, 1870)	Plain Banded Awl					+	2o
3	*Badamia exclamationis* (Fabricius, 1775)	Brown Awl		+	+		+	2b
4	*Celaenorrhinus leucocera* (Kollar, [1844])	Common Spotted Flat			+			
5	*Coladenia indrani* (Moore, [1866])	Tricolour Pied Flat			+	+	+	2c
6	*Tagiades litigiosa* Möschler, 1878	Water Snow Flat			+	+	+	2d
7	*Tagiades japetus* (Stoll, [1781])	Common Snow Flat	+	+	+	+	+	
8	*Caprona ransonnettii* (R. Felder, 1868)	Golden Angle		+	+	+	+	2e
9	*Sarangesa dasahara* (Moore, [1866])	Common Small Flat		+	+	+	+	2f
10	*Spialia galba* (Fabricius, 1793)	Indian Skipper	+	+				
11	*Ampittia dioscorides* (Fabricius, 1793)	Bush Hopper		+	+		+	2g
12	*Iambrix salsala* (Moore, [1866])	Chestnut Bob	+	+	+	+	+	
13	*Suastus gremius* (Fabricius, 1798)	Indian Palm Bob	+	+	+		+	
14	*Zographetus satwa* de Nicéville, 1884	Purple-and-gold Flitter			+			2h
15	*Udaspes folus* (Cramer, [1775])	Grass Demon	+		+		+	2i
16	*Notocrypta curvifascia* (C. & R. Felder, 1862)	Restricted Demon				+		2j
17	*Notocrypta paralysos* (Wood-Mason & de Nicéville, 1881)	Common Banded Demon				+	+	
18	*Hyarotis adrastus* (Stoll, [1780])	Tree Flitter		+				
19	*Matapa aria* (Moore, [1866])	Common Redeye	+	+	+	+	+	
20	*Oriens goloides* (Moore, [1881])	Ceylon Dartlet			+	+	+	
21	*Potanthus sp.*	Dart				+		2k
22	*Telicota sp.*	Palm Dart			+	+	+	
23	*Parnara sp.*	Swift	+	+	+		+	
24	*Pelopidas mathias* (Fabricius, 1798)	Small Branded Swift	+	+	+		+	2n
25	*Baoris farri* (Moore, 1878)	Paint-brush Swift			+	+	+	2l
26	*Halpe porus* (Mabille, [1877])	Moore's Ace			+	+	+	2m
27	*Caltoris sp.*	Swift			+			
Family Papilionidae								
28	*Graphium doson* (C. & R. Felder, 1864)	Common Jay	+	+	+	+	+	
29	*Graphium agamemnon* (Linnaeus, 1758)	Tailed Jay	+	+	+	+	+	
30	*Graphium nomius* (Esper, 1799)	Spot Swordtail			+	+	+	3a
31	*Graphium antiphates* (Cramer, [1775])	Five-bar Swordtail					+	
32	*Papilio polymnestor* Cramer, [1775]	Blue Mormon	+	+	+	+	+	3b
33	*Papilio crino* Fabricius, 1793	Common Banded Peacock	+	+	+	+	+	3c
34	*Papilio nephelus* Boisduval, 1836	Yellow Helen				+	+	
35	*Papilio polytes* Linnaeus, 1758	Common Mormon	+	+	+	+	+	3d
36	*Papilio clytia* Linnaeus, 1758	Common Mime	+	+	+	+	+	3f, 3g
37	*Pachliopta hector* (Linnaeus, 1758)	Crimson Rose	+	+				3j
38	*Pachliopta aristolochiae* (Fabricius, 1775)	Common Rose	+	+	+		+	3i

39	*Papilio demoleus* Linnaeus, 1758	Lime Butterfly	+	+	+	+	+	3h
Family Pieridae								
40	*Belenois aurota* Fabricius, 1793	Pioneer	+	+				4a
41	*Cepora nerissa* Fabricius, 1775	Common Gull	+	+	+	+	+	4b
42	*Delias eucharis* Drury, 1773	Common Jezebel	+	+	+	+	+	
43	*Delias hyparete* Linnaeus, 1758	Painted Jezebel		+				4c
44	*Appias olferna* Swinhoe, 1890	Eastern Striped Albatross	+	+	+		+	
45	*Leptosia nina* Fabricius, 1793	Psyche	+	+	+	+	+	
46	*Ixias marianne* (Cramer, [1779])	White Orange-tip		+				4d
47	*Ixias pyrene* (Linnaeus, 1764)	Yellow Orange-tip	+	+	+			
48	*Pareronia hippia* Fabricius, 1787	Common Wanderer	+	+	+	+	+	4e
49	*Catopsilia pomona* Fabricius, 1775	Lemon Emigrant	+	+	+	+	+	4f
50	*Catopsilia pyranthe* Linnaeus, 1758	Mottled Emigrant	+	+	+	+	+	
51	*Eurema brigitta* Stoll, 1780	Small Grass Yellow	+	+	+	+	+	
52	*Eurema laeta* Boisduval, 1836	Spotless Grass Yellow			+	+	+	
53	*Eurema blanda* Boisduval, 1836	Threespot Grass Yellow		+	+	+	+	4i
54	*Eurema hecabe* Linnaeus, 1758	Common Grass Yellow	+	+	+	+	+	4g
55	*Eurema andersonii* (Moore, 1886)	Onespot Grass Yellow			+	+	+	4h
Family Riodinidae								
56	*Abisara bifasciata* Moore, 1877	Double-banded Judy			+	+	+	5a
Family Lycaenidae								
57	*Spalgis epeus* (Westwood, [1851])	Apefly	+	+				
58	*Curetis thetis* (Drury, [1773])	Indian Sunbeam	+		+	+	+	
59	*Prosotas nora* Felder, 1860	Common Lineblue		+	+	+	+	
60	*Prosotas dubiosa* Semper, 1879	Tailless Lineblue		+	+	+	+	5c
61	*Petrelaea dana* (de Nicéville, [1884])	Dingy Lineblue						5b
62	*Caleta decidia* (Hewitson, 1876)	Angled Pierrot			+	+	+	5d
63	*Jamides bochus* Stoll, 1782	Dark Cerulean	+	+	+	+	+	5e
64	*Jamides celeno* Cramer, 1775	Common Cerulean	+	+	+	+	+	
65	*Catochrysops Strabo* (Fabricius, 1793)	Forgetmenot	+	+	+		+	5f
66	*Lampides boeticus* (Linnaeus, 1767)	Pea Blue	+	+	+		+	
67	*Leptotes plinius* (Fabricius, 1793)	Zebra Blue	+	+	+		+	5g
68	*Castalius rosimon* (Fabricius, 1775)	Common Pierrot	+	+	+	+	+	
69	*Tarucus sp.*	Pierrot	+	+	+		+	5h
70	*Tarucus ananda* (de Nicéville, [1884])	Dark Pierrot				+		5i
71	*Zizeeria karsandra* (Moore, 1865)	Dark Grass Blue	+	+	+		+	
72	*Pseudozizeeria maha* Kollar, 1844	Pale Grass Blue	+	+	+	+	+	
73	*Zizina otis* Fabricius, 1787	Lesser Grass Blue	+	+	+	+	+	
74	*Zizula hylax* (Fabricius, 1775)	Tiny Grass Blue	+	+				
75	*Everes lacturnus* Godart, 1824	Indian Cupid			+	+	+	5j
76	*Neopithecops zalmora* Butler, 1870	Quaker	+	+	+	+	+	
77	*Megisba malaya* (Horsfield, [1828])	Malayan			+	+	+	5k
78	*Acytolepis puspa* (Horsfield, [1828])	Common Hedge Blue			+	+	+	5l
79	*Euchrysops cnejus* (Fabricius, 1798)	Gram Blue	+	+	+		+	
80	*Chilades lajus* (Stoll, [1780])	Lime Blue	+	+	+	+	+	
81	*Chilades pandava* (Horsfield, [1829])	Plains Cupid	+	+	+	+	+	
82	*Chilades parrhasius* Fabricius, 1793	Small Cupid			+			5m
83	*Freyeria putli* (Kollar, [1844])	Grass Jewel	+	+	+		+	
84	*Anthene emolus* (Godart, [1824])	Ciliate Blue	+	+	+		+	
85	*Anthene lycaenina* (R. Felder, 1868)	Pointed Ciliate Blue	+					
86	*Spindasis vulcanus* (Fabricius, 1775)	Common Silverline	+	+	+	+	+	
87	*Spindasis syama* (Horsfield, [1829])	Club Silverline			+		+	5n
88	*Spindasis lohita* (Horsfield, [1829])	Long-banded Silverline			+			5o

89	*Arhopala atrax* (Hewitson, 1862)	Indian Oakblue		+	+	+	+	
90	*Arhopala amantes* Hewitson, 1862	Large Oakblue			+	+	+	
91	*Amblypodia anita* Hewitson, 1862	Purple Leaf Blue		+	+	+	+	
92	*Loxura atymnus* Stoll, 1780	Yamfly	+	+	+	+	+	
93	*Chliaria othona* (Hewitson, 1865)	Orchid Tit			+			5p
94	*Virachola isocrates* (Fabricius, 1793)	Common Guava Blue	+		+			5q
95	*Rapala varuna* Horsfield, 1829	Indigo Flash		+	+			5r
96	*Rapala manea* Hewitson, 1863	Slate Flash	+	+	+		+	
97	*Rapala iarbus* (Fabricius, 1787)	Indian Red Flash	+		+			
Family Nymphalidae								
98	*Parantica aglea* Stoll, 1782	Glassy Tiger		+	+			6a
99	*Tirumala limniace* Cramer, 1775	Blue Tiger	+	+	+	+	+	
100	*Danaus genutia* Cramer 1779	Common Tiger	+	+	+	+	+	
101	*Danaus chrysippus* Linnaeus, 1758	Plain Tiger	+	+	+	+	+	
102	*Euploea core* (Cramer, [1780])	Common Indian Crow	+	+	+	+	+	6b
103	*Melanitis leda* Linnaeus, 1758	Common Evening Brown	+	+	+	+	+	
104	*Elymnias hypermnestra* Linnaeus,1763	Common Palmfly	+	+	+	+	+	
105	*Lethe europa* (Fabricius, 1775)	Bamboo Treebrown	+	+	+			
106	*Lethe rohria* Fabricius, 1787	Common Treebrown			+			6c
107	*Mycalesis perseus* Fabricius, 1775	Common Bushbrown	+	+	+	+	+	6d
108	*Orsotriaena medus* Fabricius, 1775	Nigger			+	+		
109	*Ypthima huebneri* Kirby, 1871	Common Fourring	+	+	+	+	+	
110	*Ariadne ariadne* Linnaeus, 1763	Angled Castor	+	+	+	+	+	
111	*Ariadne merione* Cramer, 1777	Common Castor	+				+	
112	*Phalanta phalantha* Drury, 1773	Common Leopard	+	+	+	+	+	
113	*Vanessa cardui* Linnaeus, 1758	Painted Lady	+	+				
114	*Junonia hierta* Fabricius, 1798	Yellow Pansy	+	+	+		+	
115	*Junonia orithya* Linnaeus, 1758	Blue Pansy	+	+	+		+	
116	*Junonia lemonias* Linnaeus, 1758	Lemon Pansy	+	+	+	+	+	
117	*Junonia almana* Linnaeus, 1758	Peacock Pansy	+	+	+	+	+	
118	*Junonia atlites* Linnaeus, 1763	Grey Pansy	+	+	+	+	+	
119	*Junonia iphita* Cramer, 1779	Chocolate Pansy	+	+	+	+	+	
120	*Kallima inachus* Doyere, 1840	Orange Oakleaf			+	+	+	
121	*Hypolimnas misippus* (Linnaeus, 1764)	Danaid Eggfly		+				6e
122	*Hypolimnas bolina* Linnaeus, 1758	Great Eggfly	+	+	+	+	+	
123	*Cyrestis thyodamas* Doyère, 1840	Common Map				+	+	
124	*Neptis hylas* Linnaeus, 1758	Common Sailer	+	+	+	+	+	
125	*Neptis sappho* Pallas, 1771	Pallas Sailer	+			+	+	6f, 6g
126	*Pantoporia hordonia* Stoll, 1790	Common Lascar			+	+	+	6h
127	*Athyma perius* Linnaeus, 1758	Common Sergeant			+	+	+	
128	*Moduza procris* Cramer, 1777	Commander	+	+	+	+	+	
129	*Tanaecia lepidea* Butler, 1868	Grey Count		+	+	+	+	6i
130	*Symphaedra nais* (Forster, 1771)	Baronet			+	+	+	6j
131	*Euthalia aconthea* Cramer, 1777	Baron	+	+	+		+	6k
132	*Euthalia lubentina* Cramer, 1777	Gaudy Baron					+	
133	*Polyura athamas* (Drury, [1773])	Common Nawab			+	+	+	6l
134	*Charaxes solon* Fabricius, 1793	Black Rajah			+		+	
135	*Charaxes bernardus* Fabricius, 1793	Tawny Rajah			+			
136	*Acraea terpsicore* (Linnaeus, 1758)	Tawny Coster	+	+	+	+	+	

Hasora vitta (Butler, 1870) – Plain Banded Awl (Hesperiidae) (Fig. 2o)

A single individual was photographed at 11:25 (here and below local time, UTC+05:30) on 04.10.2015 in Deobhuin Reserve forest. This hesprid butterfly was perching under the leaf, at about 2 m height from the ground, along the forest trail. This butterfly ranges from Sikkim to Northeast India; Maharashtra to Goa up to Kerala (Varshney & Smetacek, 2015). From Odisha, previously it was recorded from single locality, Mundasaru in Kandhamal District by Vivek Sarkar on 08.06.2013

(Kunte, 2019). Most recently this species has been reported from Maredumill, and Jalatarangini area of the adjoining state, Andhra Pradesh (Goswami et al., 2018). Apart from the record of Vivek Sarkar from Kandhamal District, no such decisive record of this butterfly is available from Odisha.

Fig. 2. Photographs of Hesperidae butterflies: a - *Hasora chromus*; b - *Badamia exclamationis*; c - *Coladenia indrani*; d - *Tagiades litigiosa* Möschler, 1878; e - *Caprona ransonnettii*; f - *Sarangesa dasahara*; g - *Ampittia dioscorides*; h - *Zographetus satwa*; i - *Udaspes folus*; j - *Notocrypta curvifascia*; k - *Potanthus sp.*; l - *Baoris farri*; m - *Halpe porus*; n - *Pelopidas mathias*; o - *Hasora vitta*

Zographetus satwa **de Nicéville, 1884 – Purple and Gold Flitter (Hesperiidae) (Fig. 2h)**

We have recorded this species several times from different places of Balikiari Reserve Forest, during September 2015. On 01.09 we recorded two individuals. First, we spotted it at 11:50, near a stream. It was perching on shrubs at about 1m above the ground. Later it was recorded during 15:05, at about 1km distance from the first place of observation. It was perching on shrubs under dense canopy cover. On 02.09, we have encountered this species twice, Near the Sishupathra dam. This butterfly ranges from Uttarakhand to Northeast India (Varshney & Smetacek, 2015). Previously, from Odisha only single record was available from same locality, i.e., Balikiari Reserve Forest, by Vivek Sarkar during September 2012 (Anonymous, 2019).

Fig 3. Photographs of Papilionidae butterflies: a - *Graphium nomius*; b - *Papilio polymnestor*; c - *Papilio crino*; d - *Papilio polytes*; f - *Papilio clytia* (form dissimilis); g - *Papilio clytia* (form clytia); h - *Papilio demoleus*; i - *Pachliopta aristolochiae*; j - *Pachliopta hector*

Fig 4. Photographs of Pieridae butterflies: a - *Belenois aurota*; b - *Cepora nerissa*; c - *Delias hyparete*; d - *Ixias marianne*; e - *Pareronia hippia*; f - *Catopsilia pomona*; g - *Eurema hecabe*; h - *Eurema andersonii*; i - *Eurema blanda*

Potanthus sp. – Dart (Hesperiidae) (Fig. 2k)

One individual was photographed near Tersing on 03.09.2015 at 09:35 it was perching on the small shrubs, near the fast-flowing hill stream. Until this date, no record is available of *Potanthus sp.* from Odisha. Recently the Genus has been reported from adjacent state Andhra Pradesh (Goswami et al., 2018). As Goswami et al. (2018) mentioned, without examination of genitalia species the identification is very difficult in this butterfly group. Further examination of specimen is required to validate the occurrence of this species in Odisha.

Tarucus ananda (de Nicéville, [1884]) – Dark Pierrot (Lycaenidae) (Fig. 5i)

On 03.09.2015, a single individual of Dark Pierrot *Tarucus ananda* was sighted from Tersing (Site 4) at 11:40. It was puddling on pond side sandy soil, along with other butterflies such as Common Mormon *Papilio polytes*, Angled Pierrot *Caleta decidia* and Common Nawab *Polyura athamas*. The distribution of this tiny butterfly is mainly from South-West India to North Maharastra, Sikkim to Arunachal Pradesh, Central Nepal, North East India and Burma to Dawnas (Evans, 1932; Kehimkar, 2008; Varshney & Smetacek, 2015). In Odisha previously Vivek Sarkar recorded it during June 2013 from Balgaon Range of Khordha district (Churi, 2019). Our present record confirms its occurrence in Odisha.

Chliaria othona (Hewitson, 1865) – Orchid Tit (Lycaenidae) (Fig. 5p)

Single individual was recoded from Balikiari Reserve Forest, on 05.03.2015, at 11:35. It was puddling on sandy streambed. Place was covered by dense canopy cover. According to Varshney & Smetacek (2015), this species ranges from Uttarakhand to Northeast India, Maharashtra to Karala. In Odisha previously Vivek Sarkar recorded it during June 2013 from Balgaon Range of Khordha district. Most recently, Subhajit Roy records it during June 2019 from Similipal National Park of Mayurbhanj District (Ogale et al., 2019).

Neptis sappho Pallas, 1771 – Pallas Sailer (Nymphalidae) (Fig. 6f & 6g)

Fig 5. Photographs of Riodinidae and Lycaenidae butterflies: a - *Abisara bifasciata*; b - *Petrelaea dana*; c - *Prosotas dubiosa*; d - *Caleta decidia*; e - *Jamides bochus*; f - *Catochrysops Strabo*; g - *Leptotes plinius*; h - *Tarucus sp*; i - *Tarucus ananda*; j - *Everes lacturnus*; k - *Megisba malaya*; l - *Acytolepis puspa*; m - *Chilades parrhasius*; n - *Spindasis syama*; o - *Spindasis lohita*; p - *Chliaria othona*; q - *Virachola isocrates*; r - *Rapala varuna*

Fig. 6. Photographs of Nymphalidae butterflies: a - *Parantica aglea*; b - *Euploea core*; c - *Lethe rohria*; d - *Mycalesis perseus*; e - *Hypolimnas misippus* ; f - *Neptis Sappho* (upper side); g - *Neptis Sappho* (under side); h - *Pantoporia hordonia* ; i - *Tanaecia lepidea*; j - *Symphaedra nais*; k - *Euthalia aconthea*; l - *Polyura athamas*

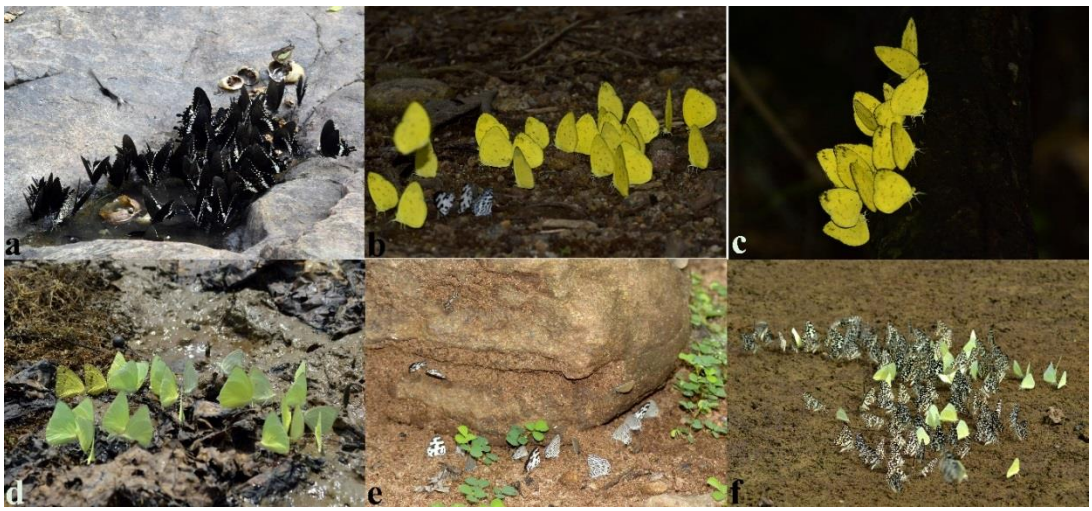

Fig. 7. Photographs of some butterfly congregation: a - *Papilio polytes*, *Graphium doson, Papilio demoleus* and *Polyura athamas* at Deobhuin Reserve Forest feeding on crab carcass and crab carcass mixed water; b - *Eurema blanda*, *Eurema hecabe*, *Eurema andersonii*, *Caleta decidia* and *Castalius rosimon* at Deobhin Reserve Forest puddling on forest trail; c - *E. andersonii* feeding on tree trunk sap; d - *Catopsilia pomona*, *Catopsilia pyranthe* and *Ixias marianne* puddling on mud at Ansupa Lake; e - *Prosotas dubiosa*, *Petrelaea dana*, *C. decidia*, *Leptotes plinius*, *Megisba malaya* and *Chilades pandava* puddling at Balikiari Reserve Forest; f - *P. demoleus* and *C. pomona* puddling on mud, near Sishupathra dam of Balikiari Beat

So far, this species has been known to distribute from Indian Himalaya and Northeastern India (Varshney & Smetacek, 2015). Recently, the species has been recorded from Araku Valley and Maredumilli of Andhra Pradesh (Goswami et al., 2018). We spotted two individuals near Tersing on 03.09.2015 at 09:40. As Goswami et al. (2018) mentioned, this species can be differentiated from closely relative *N. hylas*, by "the veins in under-hindwing is not blackened and, in the forewing not blackened at least till cell" (Evans, 1932). Hence, our present record confirms its occurrence in Odisha for the first time.

Discussion

The dominant occurrence of Lycenidae and Nymphalidae butterflies in the study area might be due to the availability of host plants and nectaring plants (Mimosaceae, Acanthaceae, Poaceae, Malvaceae, Fabaceae), as the habitat association of butterflies can be directly related to the availability of larval host plants, vegetation cover of herbs, shrubs and trees for nectaring (Thomas, 1995; Kunte, 2000).

Among the recorded 136 species, 113 species of butterflies were found from Balikiari Reserve Forest (Site 3), 105 species from Deobhuin Reserve Forest (Site 5), 88 from Ansupa Lake (Site 2), 84 from Tersing (Site 4) and 78 species from Dhabaleswar Island (Site 1). Result of high number of species in Balikiari and Deobhuin Reserve Forest compare to other sites like Tersing and Dhabaleswar Island, may be due to the longer period of surveys rather than true species richness. As site Tersing also endowed with pristine habitats, which can be suitable for many butterfly species those are yet to explore. Out of 136 species of butterflies, 14 species are legally protected under Indian Wildlife Protection Act, 1972 (see Table 2).

Table 2. Legally protected butterflies of Athgarh Forest Division under the Wildlife (Protection) Act, 1972 (WPA).

WPA Schedule	Family	Scientific Name
Schedule I	Papilionidae	*Pachliopta hector* (Linnaeus, 1758)
Schedule I	Lycaenidae	*Chliaria othona* (Hewitson, 1865)
Schedule II	Lycaenidae	*Euchrysops cnejus* (Fabricius, 1798)
Schedule II	Lycaenidae	*Lampides boeticus* (Linnaeus, 1767)
Schedule II	Lycaenidae	*Rapala varuna* Horsfield, 1829
Schedule II	Lycaenidae	*Spindasis lohita* (Horsfield, [1829])
Schedule II	Nymphalidae	*Tanaecia lepidea* Butler, 1868
Schedule II	Nymphalidae	*Hypolimnas misippus* (Linnaeus, 1764)
Schedule IV	Hesperiidae	*Hasora vitta* (Butler, 1870)
Schedule IV	Hesperiidae	*Hyarotis adrastus* (Stoll, [1780])
Schedule IV	Hesperiidae	*Baoris farri* (Moore, 1878)
Schedule IV	Lycaenidae	*Tarucus ananda* (de Nicéville, [1884])
Schedule IV	Nymphalidae	*Euthalia lubentina* Cramer, 1777
Schedule IV	Nymphalidae	*Euploea core* (Cramer, [1780])

In Athgarh Forest division various anthropogenic activities (e.g. wood cutting, grazing, logging, looping, herb collection etc.) by local villagers is a matter of concern, which leads to the destruction of suitable habitats of Butterfly fauna around Athgarh Forest Division. Butterflies are very sensitive insects. A little change in environmental condition and habitat alteration can influence their distribution and abundance (Wynter-Blyth, 1957). Therefore, habitat fragmentation, vegetation loss, grazing pressure, human settlement or any other damaging activities are mainly responsible for loss of diversity of both butterflies and plants in the study area must be regulated. Public awareness is also very important to conserve the suitable habitats of these ecologically important invertebrate organisms. However, the present study provides the baseline information of butterfly fauna of Athgarh Forest Division and enriches the butterfly checklist of Odisha. Further studies on Butterfly fauna is very necessary to understand the seasonal variation and population dynamics of butterflies in this precise geographical area.

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