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NOTE

A CHECKLIST OF BUTTERFLIES (INSECTA: LEPIDOPTERA) FROM TALEIGAO PLATEAU, GOA, INDIA

Dipak Bowalkar, Nadar Anal Gracy Michael, Kiran Gaude & I.K. Pai

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Plateaus are characteristic features of Goa (Alvares 2002). They are intermediate areas between the Western Ghats and the coastal plains and are known to harbor endemic plants of the Western Ghats (Joshi & Janarthanam 2004). The most prominent plateaus in Goa are Pernem, Mopa, Morgim, Assonora, Ponda, Kundaim, Betul,

Sanvordem and Quepem. Plateaus are often considered as barren lands and hence they were the natural choice for setting up developmental projects (Alvares 2002; Desai & Shanbhag 2012). Taleigao plateau (Fig. 1) is not an exception to this and several state institutions, hostels and residential areas have been set up in this area. It covers an area of about 296ha with moist deciduous forest mixed with evergreen species, scrub jungle and lateritic vegetation and is surrounded by sloping valleys and alluvial plains of two rivers-Mandovi in the north and Zuari in the south (Desai & Shanbhag 2012). This plateau encompasses Goa University campus spanning an area of 173ha, residential buildings and Dr. Shyama Prasad Mukherjee Indoor Stadium. With regards to the biodiversity of Taleigao plateau, the flora (Joshi & Janarthanam 2004) and avifauna (Shanbhag & Gramopadhye 1993; Shyama & Gowthaman 1995; Desai & Shanbhag 2012) is well documented.

Gaonkar (1996) documented 251 species from the state. Subsequently, Pai & Mehndiratta (2001) have documented 52 species. Later Borkar & Komarpant (2004) reported 97 butterfly species from Bondla Wildlife Sanctuary. Recently, Gaude & Janarthanam (2015) reported 33 butterfly species from four sacred groves of Goa, viz., Nirankarachi Rai, Alvatinichi Rai, Mharinginichi Rai and Azobachi Rai. Rangnekar (2007)

A CHECKLIST OF BUTTERFLIES (INSECTA: LEPIDOPTERA) FROM TALEIGAO PLATEAU, GOA, INDIA

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in his photographic guide dealt with common butterfly species of Goa, though he did not mention the total number of species. Recently Rangnekar & Dharwadkar (2009) reported three new butterfly species, Black-Vein Sergeant *Athyma ranga* Moore, White-banded Awl *Hasora taminatus* (Hubner) and Coon *Psolos fuligo* (Mabille), making a total of 254 species to the butterfly fauna of Goa. However, there is hardly any report of butterfly diversity from this regions. It was in this context that the present work was undertaken.

Field investigations at Taleigao plateau (Fig. 1) at 15.4588333 N & 073.8340556 E carried out from June 2014 to July 2015. During the study period Sunday mornings between 07:00–10:30 hr were utilized for the study purpose. The butterflies were documented by direct observation, random walks and opportunistic sightings (Murugesan et al. 2013). Visually encountered butterflies were identified on the field using photographic guides of Rangnekar (2007) and Kehimkar (2008).

A total of 98 species belonging to 72 genera were recorded (Table 1), which constitutes about 39% of the known butterfly fauna for the state. This includes 34 species of Nymphalidae, followed by Lycaenidae (25

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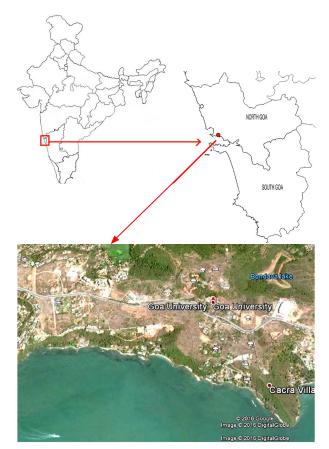


Figure 1. Study Area - Taleigao Plateau

species), Hesperiidae (16 species), Pieridae (13 species), and Papilionidae with 11 species. Of the 98 butterfly species, two species, the Malabar-banded Peacock Papilio buddha (Image 1e) and the Southern Birdwing Troides minos (Image 1h) are endemic to the Western Ghats and 10 species, viz., Southern Birdwing, Crimson Rose Altrophaneura hector (Image 1d), Common Pierrot Castalius rosimon (Image g), Danied Eggfly Hypolimnas misippus, Pea Blue Lampides boeticus, Gram Blue Euchrysops cnejus (Image 1f), Common Cerulean Jamides celeno, Common Wanderer Pareronia valeria (Image 1c), Common Gull Cepora nerissa (Image 1b), Common Crow Euploea core (Image 1a) are protected under the Indian Wildlife (Protection) Act (1972). Of these, Troides minos, Altrophaneura hector, Castalius rosimon, Hypolimnas misippus have been placed as Schedule I; Lampides boeticus, (Euchrysops cnejus), Jamides celeno, Pareronia valeria, and Cepora nerisa in Schedule II and *Euploea core* under Schedule III species.

Family Nymphalidae was the most dominant among the families reported. Availability of larval host plants and adult nectar plants could be one of the reasons for its dominancy (Murugesan et al. 2013). Different authors Bowalkar et al.

in their respective studies observed a similar pattern of dominance (Kunte 1997; Kunte et al. 1999; Eswaran & Pramod 2005; Dolia et al. 2008; Krishnakumar et al. 2008; Gaude & Janarthanam 2015). Plateaus in Goa are known for their rich floral diversity (Joshi & Janarthanam 2004). In the present study, family Lycaenidae was the second largest family, with 25 butterfly species; Nimbalkar et al. (2011) got similar results. It is known that members of Lycaenidae largely feed on grasses (Nimbalkar et al. 2011) and the vegetation of Taleigao Plateau is also dominated by herbs, shrubs and rough grass species interspersed with trees. At the study site grass species persist from June to late December, hence it could be a good host for the members of the Lycaenidae family. This is followed by the family Hesperiidae with 16 species. This clearly indicates the importance of the plateaus for the members of the family Hesperiidae. This plateau is infested with invasive plant species such as Chromolaena odorata, i.e., known for its high nectar production (Laxmi & Raju 2011) and Lantana camara that flowers throughout the year and is a good source of nectar for butterflies (Day et al. 2003), which could be some of the reasons for the wide assemblage of butterfly species.

Findings of the present study underline the importance of Taleigao plateau as a preferred habitat for butterflies. The presence of endemic and schedule butterfly species, viz., Papilio Buddha, Troides minos, Altrophaneura hector, Castalius rosimon, Hypolimnas misippus, Lampides boeticus, Euchrysops cnejus, Jamides celeno, Pareronia valeria, Cepora nerissa, Euploea core also indicates the importance of this plateau for butterflies. The management of landscape, as well as of their food plants, may help to maintain and increase the butterfly diversity on the plateau. In the present scenario, plateau after plateau has been encroached upon for various mega projects, which doesn't bode well for conservation of biodiversity of these unique habitats. It is imperative to carry out systematic studies on the flora and fauna on a number of plateaus in the region, identify them as protected sites, such that, these plateaus with grassland patches can be conserved.

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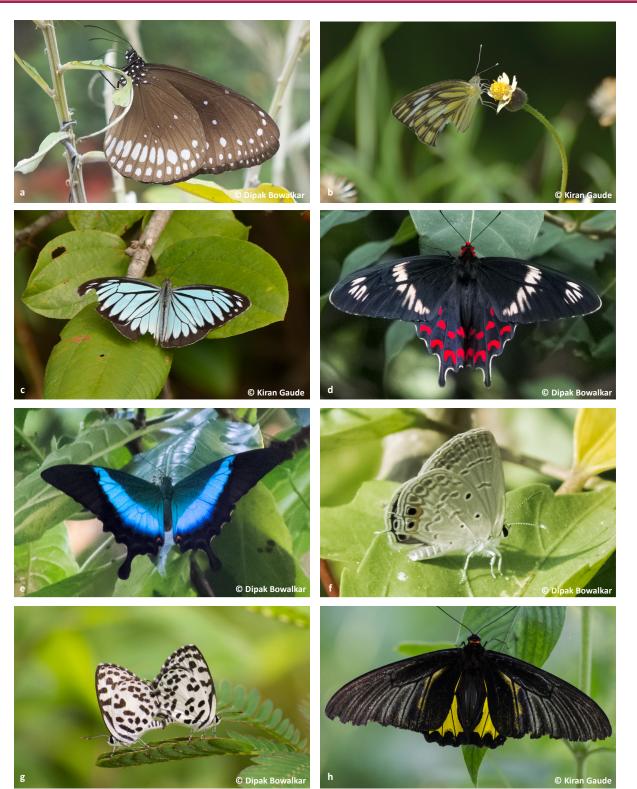


Image 1 a–h. (a) Common Crow *Euploea core*; (b) Common Gull *Cepora nerisa*; (c) Common Wanderer *Pareronia valeria*; (d) Crimson Rose *Altrophaneura hector*, (e) Malabar-banded Peacock *Papilio buddha*; (f) Gram Blue *Euchrysops cnejus*; (g) Common Pierrot *Castalius rosimon*; (h) Southern Birdwing *Troides minos*

Table 1. Checklist of butterflies of Taleigao Plateau

	Common name	Scientific name
	Family: Papilionidae	
	Subfamily: Papilioninae	
1	Common Blue bottle	Graphium sarpedon (Linnaeus)
2	Tailed Jay	Graphium agamemnon (Linnaeus)
3	Common Mime	Chilasa clytia (Linnaeus)
4	Malabar-banded Peacock [#]	Papilio buddha Westwood
5	Common Mormon	Papilio polytes Cramer
6	Red Helen	Papilio helenus Linnaeus
7	Blue Mormon	Papilio polymnestor Cramer
8	Lime Butterfly	Papilio demoleus Linnaeus
9	Common Rose	Atrophaneura aristolochiae (Fabricius)
10	Crimson Rose	Atrophaneura hector (Linnaeus)*
11	Southern Birdwing#	Troides minos (Cramer)*
	Family: Pieridae	
	Subfamily: Coliadinae	
12	Small Grass Yellow	Eurema brigitta (Cramer)
13	Common Grass Yellow	Eurema hecabe (Linnaeus)
14	Spotless Grass Yellow	<i>Eurema ta</i> (Boisduval)
15	Common Emigrant	Catopsilia pomona (Fabricius)
16	Mottled Emigrant	Catopsilia pyranthe (Linnaeus)
	Subfamily: Pierinae	
17	Small Salmon Arab	Colotis amata (Fabricius)
18	Great Orange Tip	Hebomoia glaucippe (Linnaeus)
19	Dark wanderer	Pareronia ceylanica (C. & R. Felder)
20	Common Wonderer	Pareronia valeria (Cramer)**
21	Common Gull	Cepora nerisa (Fabricius)**
22	Common Jezebel	Delias eucharis (Drury)
23	Psyche	Leptosia nina (Fabricius)
	Family: Lycaenidae	
	Subfamily :Miletinae	
24	Apefly	Spalgis epius (Westwood)
	Subfamily : Curetinae	
25	Indian sunbeam	Curetis thetis (Drury)
	Subfamily: Theclinae	
26	Large Oakblue	Arhopala amantes (Hewitson)
27	Yamfly	Loxura atymnus (Stoll)
28	Monkey Puzzle	Rathinda amor (Fabricius)
29	Common Silverline	Spindasis vulcanus (Fabricius)
	Subfamily: Polyommatinae	
30	Angled pierrot	Caleta caleta Hewitson
31	Common pierrot	Castalius rosimon (Fabricius)*
32	Zebra Blue	Leptotes plinius Fabricius
33	Rounded Pierrot	Tarucus nara Kollar
34	Common Cerulean	Jamides celeno (Cramer)**

	1	
	Common name	Scientific name
35	Forget me not	Catochrysops strabo (Fabricius)
36	Pea Blue	Lampides boeticus (Linnaeus)**
37	Dark Grass Blue	Zizeeria karsandra (Moore)
38	Pale Grass Blue	Pseudozizeeria maha (Kollar)
39	Lesser Grass Blue	Zizina otis (Fabricius)
40	Tiny grass blue	Zizula hylax (Fabricius)
41	Indian Cupid	Everes lacturnus (Godart)
42	Red pierrot	Talicada nyseus (Guerin-Meneville)
43	Quaker	Neopithecops zalmora (Butler)
44	Common Hudge Blue	Acytolepis puspa (Horsfield)
45	Gram Blue	Euchrysops cnejus (Fabricius)**
46	Plains Cupid	Chilades pandava (Horsfield)
47	Suffused double banded Judy	Abisara bifasciata suffuse (Moore)
48	Dakhan Common Acacia Blue	Surendra quercetorum biplagiata Butler
	Family : Nymphalidae	
	Subfamily : Danainae	
49	Blue Tiger	Tirumala limniace (Cramer)
50	Dark Blue Tiger	Tirumala septentrionis (Butler)
51	Stripped Tiger	Danaus gnutia (Cramer)
52	Plain Tiger	Danaus chrysippus (Linnaeus)
53	Glassy Tiger	Parantica aglea (Stoll)
54	Common Crow	Euploea core (Cramer)***
	Subfamily: Charaxinae	
55	Common Nawab	Polyura athamas (Drury)
56	Black Raja	Charaxes solon (Fabricius)
	Subfamily: Satyrinae	
57	Common Evening Brown	Melanitis leda (Linnaeus)
58	Common Treebrown	Lethe rohria (Fabricius)
59	Common Palmfly	Elymnias hypermnestra (Linnaeus)
60	Common Bushbrown	Mycalesis perseus (Fabricius)
61	Dark Banded Bushbrown	Mycalesis mineus (Linnaeus)
62	Common Four ringed	Ypthima huebneri Kirby
	Subfamily: Heliconinae	
63	Towny Coster	Acraea violae (Fabricius)
64	Rustic	Cupha erymanthis (Drury)
65	Common Leopard	Phalanta phalantha (Drury)
	SabFaamily: Limenitinae	
66	Commander	Moduza procris (Cramer)
67	Common Lascar	Pantoporia hordonia (Stoll)
68	Common Sailer	Neptis hylas (Linnaeus)
69	Common Baron	Euthalia aconthea (Cramer)
70	Grey Count	Tanaecia lepidea (Butler)
	Subfamily: Biblidinae	
71	Angled Castor	Ariadne ariadne (Linnaeus)

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Subfamily: Nymphalinae 73 Painted Lady Vanessa card 74 Blue Pansy Junonia orith 75 Yellow Pansy Junonia iphit 76 Chocolate Pansy Junonia iphit 77 Grey Pansy Junonia athit 78 Lemon Pansy Junonia athit 78 Lemon Pansy Junonia athit 79 Peacock Pansy Junonia athit 80 Great Eggfly Hypolimnas athit 81 Daniad Eggfly Hypolimnas athit 82 Autumn Leaf Doleschallia 83 Common Banded Awl Hasora chronoma athit 84 Brown Awl Badamia excel 85 Common banded redeye Gangara leb 86 Chestnut Bob Lambrix sals	a (Cramer)
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86 Chestnut Bob Lambrix sals	
	adea (Hewitson)
87 Giant redeye Gangara thy	ala (Moore)
	vrsis (Fabricius)
88 Grass Demon Udaspes folu	us (Cramer)
89 Pygmy Scrub hopper Aeromachus	s pygmaeus (Fabricius)
90 Bush hopper Ampittia dio	scorides (Fabricius)
91 Tamil grass dart Taractrocera	ceramas (Hewitson)
92 Rice Swift Borbo cinnar	ra (Wallace)
Subfamily : Pyrginae	
93 Golden Angle Caprona ran. Felder)	sonnetti (C. & R.
94 Fulvous piedflat Pseudocolad	<i>lenia dan</i> (Fabricius)
95 Tricolour Flat Coladenia in	drani (Moore)
96 Common small Flat Tagiades jap	etus (Stoll)
97 Water snow Flat Tagiades litig	aiosa Moschler
98 Indian Skipper Spialia galba	giosa ivioscillei

* - Schedule I; ** - Schedule II; *** - Schedule III;

[#] - Endemic to the Western Ghats

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