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New distribution record of three butterflies: White Tiger, White-bar Bushbrown, and black prince (Lepidoptera) from Odisha, India

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Abstract

The present research reports the occurrence of new state records and range extension of three species of butterflies: *Danaus melanippus* Cramer, 1777 (White Tiger), *Mycalesis anaxias* Evans, 1920 (White-bar Bushbrown) and *Rohana parisatis* Westwood, 1850 (Black Prince) as new distributional records for the state of Odisha, India. All three new records are based on photographic evidence and the representative images can be considered as vouchers. Their distribution and ecology have been presented and conservation strategies have been recommended for this newly recorded lepidopteran fauna of Odisha.

Keywords: New state records, range extension, white tiger, white-bar Bushbrown, black prince, lepidopteran fauna, Odisha

1. Introduction

Butterflies (Class: Insecta Linnaeus 1758, Order: Lepidoptera Linnaeus 1758) are holometabolous groups of organisms as they complete metamorphosis cycles in four stages, viz. egg or embryo, larva or caterpillar, pupa or chrysalis and adult (Gullan and Cranston, 2004; Capinera, 2008) ^[1-2]. They have important roles in food web stability as herbivores (Rusman *et al.*, 2016) ^[3], pollinators (Mukherjee *et al.*, 2015) ^[4], parasitoid hosts (van Nouhuys and Hanski, 2002) ^[5], and predator-prey (Rusman *et al.*, 2016) ^[3]. Because of their susceptibility to habitat fragmentation and climate change (Kunte, 2000) ^[9], many species serve as biological indicators of environmental health and ecological changes (Thomas, 2005) ^[12]. Changes in abundance and distribution of butterflies have been linked to various factors, including habitat loss and fragmentation, land use, and climate changes. Odisha is a junction of four biotic provinces: The Eastern Ghats and Chhotanagpur plateau under the Deccan peninsular biogeographic zone, the lower Gangetic plain under the zone Gangetic-plain, and the coastline of 480km long under the province East coast in the zone of Coasts. Odisha is also known as the transitional zone for flora and fauna of Southern India and Northeast India. Similipal Biosphere Reserve, Bhitarkanika National Park, and Chilika Ramsar Wetland are considered as the most biodiversity-rich sites of Odisha due to its unique phytogeography. This is reflected by the studies on herpetofauna by Dutta *et al.* (2009), birds and butterflies by Nair (2007) ^[18]. India hosts 1,800 species of butterflies (Kunte *et al.*, 2022) ^[14]. However, the butterfly fauna of Odisha is poorly documented in comparison to other faunal groups. Sethy and Jena (2009) ^[19] documented 50 species of butterflies representing 35 genera from Gudgudia range of Similipal Tiger reserve. Mishra *et al.* (2010) ^[20] reported 93 species from Nandankanan Wildlife Sanctuary. Nair (2011) ^[21] recorded 188 species from Similipal Tiger Reserve. Mohapatra *et al.* (2012) ^[22] reported 157 species from Bonai. Latter 63 species of lepidoptera had been recorded from Utkal University campus by Mohapatra *et al.* (2013) ^[23]. Palei and Rath (2014) ^[24] reported 101 species from Sunabeda Wildlife Sanctuary. Payra *et al.* (2016) ^[25] recorded 136 species belonging to 87 genera from some selected fringe areas of Similipal Biosphere Reserve. Priyamvada and Mohapatra (2016) ^[26] listed 101 species from Regional Institute of Education campus, Bhubaneswar. Mahata and Palita reported 148 species from koraput district, Odisha. *Danaus melanippus*, *Mycalesis anaxias*, and *Rohana parisatis* have been recorded from three new localities of the state and are presented here as new distributional records of occurrence and extension of range for Odisha, India.

2. Materials and Methods

During a multi-seasonal survey of Lepidopteran diversity in different protected areas in Odisha (Fig. 1), Pollard walk method (Pollard, 1991) [10] was used for documenting the butterfly species. Depending on the season, field observations were conducted in the early mornings from sunrise to 11:00 hrs and in the evenings from 4:00 hrs to sunset. Ten belt transects were uniformly spaced over the study site. Each transect had a fixed path, length, and width. All transects were visited once in every month, and butterfly species were documented from both sides of the trail for 5 m to ensure a

consistent observation area. For identification and on spot photo documentation, transects were walked steadily, with shortstops Visual observation of butterfly species was made using Nikon monarch M7 10x42 binocular. Photographs of butterflies and their habitats were captured using Canon EOS 800D cameras equipped with a Canon 55–250 mm lens. Butterflies were identified using literature (Evans, 1932; Wynter-Blyth, 1957; Gay *et al.*, 1992; Lewington, 1999; Kunte, 2000; Parasharya and Jani, 2007; Kehimkar, 2016) [6, 7, 8, 9, 18].

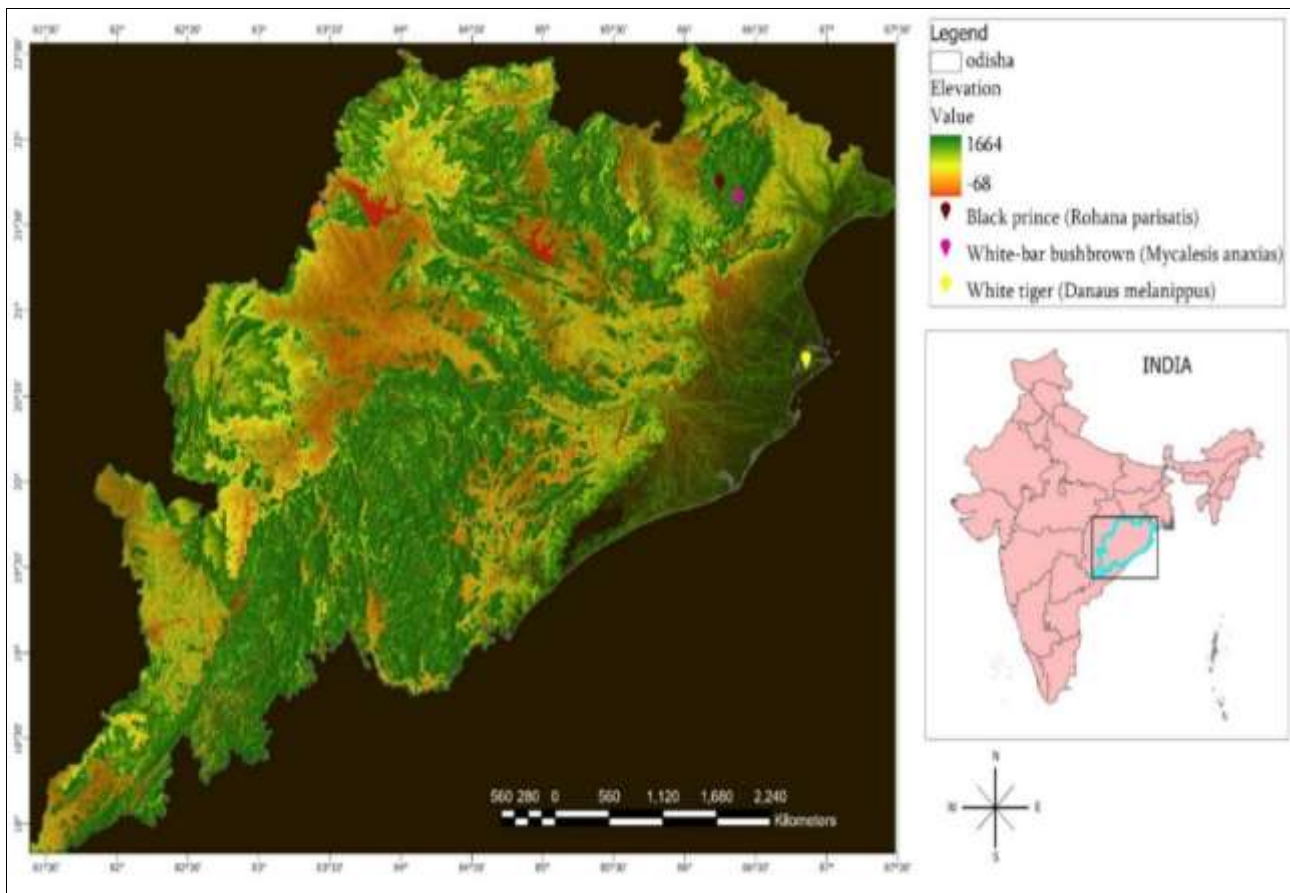


Fig 1: Map showing location of *Danaus melanippus* (Cramer, [1777]), *Mycalesis anaxias* Evans, 1920 and *Rohana parisatis* (Westwood, [1851])

3. Result and discussion

Danaus melanippus (Bhitarkanika National Park), *Mycalesis anaxias* (Similipal National Park) and *Rohana parisatis* (Similipal Tiger Reserve) have been recorded from the above two Protected Areas (PAs) are reported here as new distributional record of occurrence for the Eastern Ghats and Odisha state respectively. This current report also confirms the extension of the distributional range from northern eastern India and Western Ghats to Eastern Ghats in general and Odisha, India in particular.

3.1 Systematics and Ecology

3.1.1 White Tiger (*Danaus melanippus* (Cramer, [1777])) (Image C)

Family: Nymphalidae

Danaus melanippus (Cramer, [1777]) belongs to the largest family of butterflies i.e. Nymphalidae, also known as the Black Veined Tiger, White Tiger, Common Tiger, or Eastern Common Tiger, is a butterfly species native to tropical Asia

that belongs to the "crows and tigers" group of the brush-footed butterfly family measuring 80-95 mm wingspan similar to striped tiger, but under hind wing is white instead of tawny and veins broadly shaded with black. This species is mostly found in mangrove areas. This species mostly resides in mangrove ecosystems and the flight period of this species is January to December (Kehimkar, 2016) [8]. *Danaus melanippus* is reported to occur in India (West Bengal), Bangladesh and Myanmar (Kehimkar, 2016) [8].

Danaus melanippus was sighted at 14.45 hrs on 10 November 2021, nectaring on *Tagetes erecta* near Gupti Forest Rest House (FRH) garden, Rajnagar (20° 39' 9.13" N 86° 51' 19.12" E), Bhitarkanika National Park, Kendrapada, Odisha.

3.1.2 White-bar Bushbrown (*Mycalesis anaxias* Evans, 1920) (Image B)

Family: Nymphalidae

Mycalesis anaxias Evans, 1920 belongs to the family Nymphalidae. *Mycalesis anaxias*, popularly known as the

white-bar bush brown, is a butterfly species endemic to South and Southeast Asia that belongs to the brush-footed butterfly family's "satyrid butterfly" group and is 48-55 mm in wingspan. It has sexual dimorphism, with males having brighter and more colorful wings in colours orange, brown, and black. Females, on the other hand, have duller, more cryptic wing patterns. It prefers environments like woodlands and grassy clearings. The species prefer to abode in forested areas from 300 m up to 1950 m and the flight period is January to December (Kehimkar, 2016) [8]. In India, *Mycalesis anaxias* found in the Western Ghats (Maharashtra, Kerala, Tamil Nadu, Karnataka) and North India (West Bengal, Sikkim to Arunachal Pradesh, and Uttarakhand) (Kehimkar, 2016) [8].

Two individuals of *Mycalesis anaxias* were observed near bhanjabasa range office areas at 13.03 hrs on 12th April 2022 in Bhanjabasa Range of Similipal National Park (21° 35' 59.89" N, 86° 22' 36.5" E), Mayurbhanj, Odisha.

3.1.3 Black Prince (*Rohana parisatis* (Westwood, [1851])) (Image A)

Family: Nymphalidae

Rohana parisatis (Westwood, [1851]) belongs to the family Nymphalidae, and is native to Southeast Asia measuring 45-

50 mm wingspan. It is known for its glossy black wings with iridescent markings, male with one-minute snow-white apical spot on the forewing and female upper side yellowish brown with paler band and small white apical spots. The species prefer to abode forested areas from 300 m up to 2400 m and the flight period is from March to November (Kehimkar, 2016) [8]. In India, *Rohana parisatis* is recorded from Maharashtra, Karnataka, Kerala, Himachal Pradesh to Assam, and Sikkim to Arunachal Pradesh (Kehimkar, 2016) [8].

An individual of *Rohana parisatis* was sighted while basking on a rock surface at 9:45hrs. on 8th April 2022 in Patbil (21° 41' 19.2" N, 86° 14' 46.86"E), Similipal Tiger Reserve, Mayurbhanj, Odisha.

The present report of new distributional records of three species of butterflies from three new localities of Bhitarkanika and Similipal indicate that Odisha state provides a conducive habitat and environment for rich and diverse butterfly species. Our findings show *Mycalesis anaxias* and *Rohana parisatis* are primarily present in moist habitats while *Danaus melanippus* prefer humid habitats, which may facilitate the spreading of these species. Local species with restricted geographic distribution and presumably small populations are far more vulnerable to extinction than more widespread ones (Sodhi and Ehrlich, 2010) [11].



Fig 2: Newly butterfly species recorded in Odisha, India A. *Rohana parisatis* B. *Mycalesis anaxias* C. *Danaus melanippus*

4. Conclusion

As very small populations of these three species have been recorded with restricted distributions in the above two protected areas, their micro-habitats need to be protected and further investigations may be carried out for their long-term protection and conservation.

Detailed research and inventory on Lepidopteran fauna are needed in the state of Odisha. Awareness camps like Butterfly Meet, Butterfly Walk, and Butterfly ecotourism in butterfly-rich areas may be conducted involving the local communities,

eco-guides naturalists, and forest department officials to protect these pollinators.

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