

Further additions to the list of light attracted butterflies from India

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ABSTRACT

Most nocturnal insects, including moths show attraction towards artificial lights at night. Butterflies, being mostly diurnal occasionally respond to this phenomenon of light attraction. The present article reports an addition of four butterfly species, *Papilio polymnestor*, *Tajuria cippus*, *Euthalia duda* and *Udaspes folus* to the existing list of 35 butterflies from different parts of India. A seasonal predisposition has been observed, particularly during the monsoon - post monsoon months, when most of these unique phototactic nocturnal events by the butterflies were recorded.

Keywords: Light-attraction, Artificial light, Butterfly, India.

1. INTRODUCTION

Most of the nocturnal and crepuscular insects are known to be attracted by artificial lights at night (Shimoda and Honda, 2013; Owens and Lewis, 2018). Among the lepidopteran insects, moths (Heterocera) are well-known for this 'light-attraction' behavior as they are mostly nocturnal (Willey, 1867). Butterflies (Lepidoptera: Rhopalocera), otherwise are known to be diurnal (some being crepuscular) (Singh, 2011), with occasional reports of attraction towards different light sources (Chowdhury and Soren, 2011). From the Indian subcontinent, a total of 35 species belonging to five families (Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperidae) have been reported for occasional light-attraction phenomenon (Chowdhury and Soren, 2011; Nag et al., 2013). In this article, the authors report some additions to the existing list of light-attracted butterflies from Indian region.

2. MATERIALS AND METHODS

The present observations were made by the authors in two different states of Indian region (viz. West Bengal and Arunachal Pradesh) while carrying out nocturnal survey for moths by the usual light trapping method during the monsoon (September) and post-monsoon months (October and November) of 2014 - 2022 (Table 1). The details of the artificial light source as well the place and time for the species recorded are provided in Table 1.

Table 1 New records of light-attracted butterfly species from Indian region, with details of the source of artificial light, site and date of record of the events for each species.

Family and Species	Site of Observation	Month (& Year) of Observation	Source of artificial light
Family: Papilionidae			
1. Blue Mormon (<i>Papilio polymnestor</i> Cramer, 1775)	Budge Budge (West Bengal) [22°28'07.3"N; 88°09'52.8"E]	October (2016)	Fluorescent Tube Light
Family: Lycaenidae			
2. Peacock Royal (<i>Tajuria cippus</i> Fabricius, 1798)	Rathtala (West Bengal) [22°25'42.5"N; 88°24'19.2"E]	November (2021)	Mercury vapour Lamp
Family: Nymphalidae			
3. Blue Dutchess (<i>Euthalia duda</i> Staudinger, 1886)	Thembaung (Arunachal Pradesh) [27°22'32.1"N; 92°21'53.8"E]	September (2022)	Actinic lamp
Family: Hesperidae			
4. Grass Demon (<i>Udaspes folus</i> Cramer, 1775)	Garia (West Bengal) [22°28'10.5"N; 88°22'48.4"E]	November (2014)	Fluorescent Tube Light

3. RESULTS AND DISCUSSION

Four species of butterflies, viz. *Papilio polymnestor* Cramer, *Tajuria cippus* Fabricius, *Euthalia duda* Staudinger and *Udaspes folus* Cramer, each recorded as a single individual and belonging to four different families: Papilionidae, Lycaenidae, Nymphalidae and Hesperidae respectively were observed to be attracted to different types of artificial light sources during the wet-seasons of respective years (Table 1). Of these, the observation of *E. duda* (size: 50-75mm) – a rare butterfly in the wild, from Thembaung, Arunachal Pradesh is the first record of light attracted butterfly species from North-Eastern India (Figure 1). With this record, butterflies, although occasionally, have been reported from all corners of the Indian Subcontinent by different authors from 1951 – 2009 that respond and fly to various artificial light sources at night. Another rare as well the smallest of the four presently recorded butterflies to observe in the wild was *Tajuria cippus* Fab. (Size: 3.3-4.3 cm), especially in the urban outskirts of Kolkata (Rathtala in South 24 Parganas district in West Bengal) that has responded to a nocturnal flight towards artificial light (Figure 2). Of the four butterflies, only *T. cippus* exhibited a spiralling flight pattern, orbiting around the light source; while the other three species approached the light sources directly and settled down under respective artificial lights for variable time periods. Thus, the present observation, supplementing the previous reports (Chowdhury and Soren, 2011; Nag et al., 2013) gives a total of 39 light-attracted butterfly species from the Indian region.

Though many lepidopterists are of the idea that mainly disturbance during night time can invoke light attraction in butterflies (Wilkinson, 1967), but with nearly 40 species of butterflies being recorded to get attracted to artificial light from different habitats in the Indian subcontinent the longevous idea of butterflies being mostly diurnal is being questioned. Thus, more research and experimental studies are needed to effectively elucidate the mechanisms underlying the phototactic nocturnal behaviours of butterflies.



Figure 1 Blue Dutchess butterfly (*Euthalia duda*) attracted to actinic light at night in Thembang, Arunachal Pradesh on 11 September, 2022.



Figure 2 Peacock Royal butterfly (*Tajuria cippus*) attracted to mercury vapour lamp at night in Rathtala, West Bengal on 17 November, 2021.

Donahue, (1962) and Chowdhury and Soren, (2011) stated that this type of activity mainly occurred during monsoon months. But new observations are indicating such behaviour to be occurring beyond the scheduled monsoon months (June-September), which could have resulted from their population peak during monsoon as well as post-monsoon (October-December) months (IMD, 2021) and/or sudden drop in night temperature than the prevailing one during the specific time of record of such unique behaviour. Saunders, (2012) was of the opinion that sufficiently intense and/or sustained artificial light sources at night and of a specific spectral composition can desynchronize the internal clock of insects, thus disorienting the same in a nocturnal landscape (Owens and Lewis, 2018).

Author's contributions

Soumyajit Chowdhury contributed in situ data on the three butterfly species, namely *Papilio polymnestor* Cramer, *Tajuria cippus* Fabricius and *Udaspes folus* Cramer from different parts of West Bengal, including behavioural notes and associated data related to light attraction phenomenon at night.

Avishek Talukdar contributed in situ data on the butterfly species, *Euthalia duda* Staudinger from Thembang in Arunachal Pradesh, including behavioural notes and associated data related to light attraction phenomenon at night.

Regarding the preparation of the manuscript, both authors have contributed equally.

Ethical approval

Four butterfly species, *Papilio polymnestor*, *Tajuria cippus*, *Euthalia duda* and *Udaspes folus* was observed from two different states of Indian region (viz. West Bengal and Arunachal Pradesh). Applicable Animal ethical guidelines were followed in the study for species observation and identification.

Informed consent

Not applicable.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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