

# Night Walks Generate Unexpected New Observations of Moths (Lepidoptera) from Trinidad, West Indies.

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## ABSTRACT

During night walks in the forests of Trinidad, West Indies, the authors observed and photographed several moth species (Lepidoptera) not previously reported from the island and documented several interesting behaviours. *Belonoptera patercula* (Pagenstcher), *Siculodes avicula* Guenée (both Thyrididae) and *Sylepte coelivitta* (Walker) (Crambidae) are species not previously known from Trinidad. *Rejectaria niciasalis* (Walker) and *R. rosimonalis* (Walker) (Erebidae) were known from Trinidad, but their presence had not previously been reported in the literature. Feeding was noted at flowers, fallen fruit, bird droppings, diseased grass flowers and water.

**Key words:** *Belonoptera patercula*, *Siculodes avicula*, *Sylepte coelivitta*, new to Trinidad.

## INTRODUCTION

In the course of night walks to observe reptiles and amphibians in the forests of Trinidad, RND and HA observed and photographed a variety of other animals, most prominent amongst which were moths (Lepidoptera). Many of these were posted on iNaturalist ([www.inaturalist.org](http://www.inaturalist.org)), where MJWC identified them based on his detailed knowledge of the Lepidoptera of Trinidad & Tobago. In the process, it became apparent that hitherto rarely recorded species, including some new to the island, and previously unreported behaviours were being observed.

This paper describes the methods used and document some of the more interesting of our observations.

## METHODS

RND and HA undertook night collecting trips to several areas of Trinidad to collect data on reptiles and amphibians. Expeditions to some of the more remote areas lasted up to four nights. Night walks with 2–6 observers were conducted typically at 1900–2200h and again at 24.00–02.00h. Walks followed a planned route and covered 2km or more, depending on the activity of the wildlife on that night.

The foliage of shrubs and trees from ground level to approximately 3m above ground were closely inspected using headlamps. Observations of moths were recorded using a phone camera with flash. If necessary, the brightness of the flash on the camera was reduced to prevent too much white light being reflected off the moths. The white balance of the camera was set between 4000–5000K (fluorescent lamp spectrum) to capture more accurate colours. The image metadata included the precise time, but not GPS data. The locality data were estimated using Google Maps. Depending on the availability of landmarks

and the distance covered during the night walk, accuracy was typically within 100 m.

Based on observations of moths attracted to light, different species of moths are known to be active at different times of night, and sometimes this reveals clear differences between species which are otherwise very difficult to distinguish. We therefore include the time of each observation. MJWC was able to identify the majority of species photographed based on his personal reference collection of Trinidad Lepidoptera (MJWC coll.), identified by reference to the collections of the Natural History Museum, London (NHMUK), and the Smithsonian Institution, Washington (Cock 2003). The collection of the University of the West Indies Zoological Museum (UWIZM) could be used similarly. Species not previously known from Trinidad were identified from original sources, on-line resources or by specialists.

## RESULTS

Moths were readily spotted on the night walks because of their reflective eyes and the contrast in their colour with the background foliage. Many seemed to be simply resting on foliage, while others were active. Typically, resting moths were unbothered by the lights or flash, and would only fly off if their resting place was disturbed. A frequently observed resting position was on the underside of a hanging leaf, just above the tip (e.g. Fig. 1), but the significance of this position was not clear. Most moths were perched more than 1.5m above the ground. Moths actively feeding on flowers (especially Sphingidae) were more likely to be disturbed by the lights and flash.

Active caterpillars were frequently observed on the

night walks, but rarely could they be identified. It would be an interesting extension to these night walks to identify the food plants and rear caterpillars to adults for identification.

#### New or noteworthy records for Trinidad

The following were new or noteworthy records and observations of moths from night walks. Additional species yet to be identified are not presented.

#### *Belonoptera patercula* (Pagenstcher, 1892) (Thyrididae, Siculodinae)

This species was seen near the last house on the trail from Brasso Seco to Paria (approximately 10.768°, -61.274°) on 25 January 2020 at 21.08h (Fig. 1). It was perched on the underside of a leaf tip hanging over a drop, positioned so that only a photo of the ventral view could be safely obtained.

The image was identified from the dorsal view in Gaede (1936, plate 174g), as fortunately the ventral and dorsal wing markings are similar, and the wing shapes are distinctive. Only 11 species of Thyrididae are known from Trinidad, all of them rare in collections.



Fig. 1. Female *Belonoptera patercula* near Brasso Seco, 25 January 2020.

#### *Hemeroblemma ochrolinea* (Guenée, 1852) (Erebidae, Erebininae, Thermesiini)

Cock (2020) recorded this species from Trinidad based on two male specimens and RND's image of a female taken at rest under a leaf, near Brasso Seco during a night walk on 12 April 2020 at 19.46h. This photo (Cock 2020, Fig. 13. This issue, p. 17) remains the only record of the female of this species from Trinidad.

#### '*Letis*' *arcana* Feige, 1974 (Erebidae, Erebininae, Thermesiini)

Species belonging to the Thermesiini are amongst the more noticeable moths on night walks due to their large size, reflective eyes and in some species iridescent colours.

The only Trinidad record of '*Letis*' *arcana*<sup>1</sup> is a photograph taken during a night walk near Brasso Seco on 18 April 2020 at 21.20h. Cock (2020, Fig. 47. This issue p. 30) included it in his account of the Trinidad Thermesiini, where it is noted that this species is very rarely collected in its known range in French Guiana and northern Brazil. Since Thermesiini are amongst the larger and most frequently seen, collected and photographed moths in Trinidad, this record is all the more remarkable.

#### *Rejectaria niciasalis* (Walker, [1859]) (Erebidae, Herminiinae)

This species was not previously recorded from Trinidad. MJWC captured a male at the Morne Bleu Textel Installation, 13 September 1978 [MJWC coll.], and identified it by comparison with the type and NHMUK series. K. Sookdeo (pers. comm.) subsequently photographed a female at Brasso Seco, 11 January 2014. RND photographed a mating pair near Brasso Seco at 01.18h on a night walk on 15 February 2020 (Fig. 2). The female is resting on the underside of a leaf, and the male is hanging free beneath her.



Fig. 2. Mating pair of *Rejectaria niciasalis*, Brasso Seco, 15 February 2020, female above.

#### *Rejectaria rosimonalis* (Walker, [1859]) (Erebidae, Erebininae)

There are two specimens of this species collected by MJWC at the lights of the Morne Bleu, Textel Installation, 10 July 1987 [NHMUK] and 17 October 1979 [MJWC

<sup>1</sup>The use of inverted commas for *Letis* reflects that this species is not correctly placed in the genus and is expected to be placed in a new genus when the group is next revised (Cock 2020).



coll.]. They were identified by comparison with the NHMUK series. A further specimen was photographed on a night walk near Brasso Seco, 24 December 2019 at 22.25h (Fig. 3). This species was not previously recorded from Trinidad.



**Fig. 3.** *Rejectaria rosimonialis* near Brasso Seco, 24 December 2019.

***Siculodes avicula* Guenée, 1877 (Thyrididae, Siculodinae)**

The moth in Fig. 4. was photographed at rest on a *Heliconia* sp. leaf on a night walk near Brasso Seco, 27 September 2020 at 00.14h. Hampson (1897, p. 630) lists this species as occurring in Tobago, presumably based on a specimen in NHMUK. Cock (2017) overlooked this record in his checklist of Tobago moths, and it has not previously been recorded from Trinidad. The species was identified by comparison with colour figures in Druce (1881-1900, plate 59.8) of the synonym *S. macropterana* Druce, 1889, and Gaede (1936, plate 175d).



**Fig. 4.** *Siculodes avicula* near Brasso Seco, 27 September 2020.

***Syllepte coelivitta* (Walker, 1866) (Crambidae, Spilomelinae)**

The brilliant blue reflective markings of this species (Fig. 5) were noticed on the underside of a leaf near a slow-

moving stream in rain forest near Brasso Seco at 22.20h, on 12 April 2020.

This species was identified by M. Alma Solis based on Fig. 5. It appears to be a mimic of *Euagra intercesa* Butler (Erebidae, Arctiidae, Ctenuchina), which is rare in Trinidad with just two records (Kaye and Lamont 1927). The wings



**Fig. 5.** Male *Syllepte coelivitta* near Brasso Seco, 12 April 2020.

of the two species are a close match, although *E. intercesa* has bipectinate antennae and a shorter, broader abdomen.

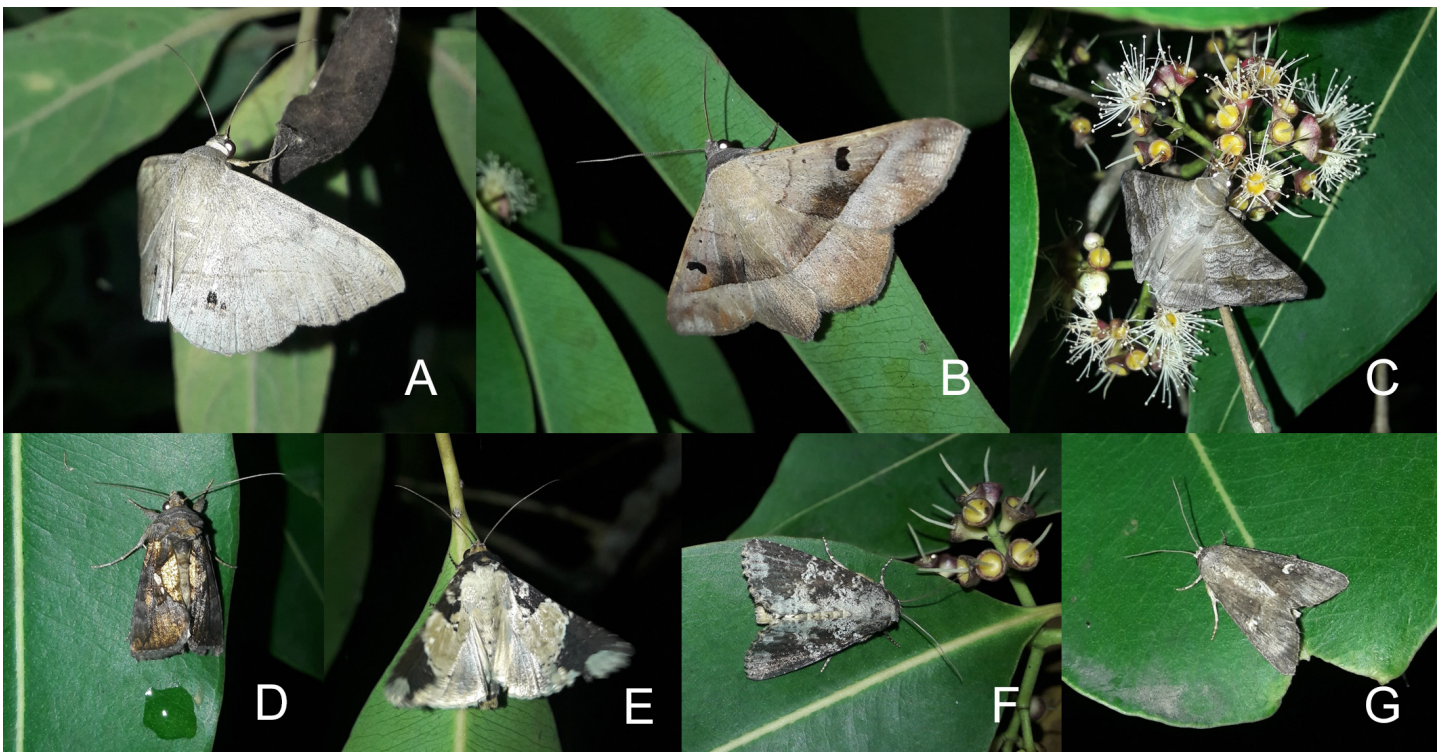
**Behavioural observations**

The following are examples of behaviour observed on the night walks. Most relate to different types of attractants, whereas courtship and oviposition have yet to be recorded, and mating has been rarely observed (e.g. Fig. 2).

**Flowers attracting moths: Java plum, *Syzygium cumini* (Myrtaceae)**

Moths are known to visit flowers, but because they are mostly nocturnal this is much less observed than with butterflies. Many moths were observed being attracted to a flowering Java plum tree near the Caroni Swamp Visitor Centre between 21.06h and 21.40h on 25 July 2020. The species photographed included *Anticarsia gemmatalis* Hübner, *Epidromia pannosa* Guenée, *Mocis latipes* (Guenée) (Erebidae), *Argyrogramma verruca* (Fabricius), *Condica cupentia* (Cramer), and *Neomilichia caternaultii* (Guenée) (Noctuidae) (Fig. 6). Some were photographed resting on the foliage rather than feeding, but we assume they were attracted by the flowers. These species were all identified by comparison with the NHMUK collection and previously recorded from Trinidad by Kaye and Lamont (1927). They are all fairly common species, apart from *N. caternaultii*, which is rarely collected.





**Fig 6.** Moths attracted to a flowering Java plum, Caroni Visitor Centre, 25 July 2020. A, *Anticarsia gemmatalis*; B, *Epidromia pannosa*; C, *Mocis latipes* (Erebidae); D, *Argyrogramma verruca*; E, *Condica cupentia* male; F female; G, *Neomilichia caternaultii* (Noctuidae).

**Feeding at fallen flowers: *Oxidercia fuscapurpurea* (Kaye, 1927) (Erebidae, Calpinae)**

A male of this species was photographed near Brasso Seco on 27 December 2019 at 21.12h feeding on an unidentified fallen purple flower (Fig. 7). Presumably the freshly fallen flower retained attractive scent and nectar.

Kaye (1901) described *Catamelas fusca-purpurea* [sic] from Trinidad, and subsequently transferred it to the genus *Oxidercia* (Kaye and Lamont 1927), which Poole (1989) overlooked in his catalogue of Noctuidae (as then defined). This species was identified by comparison with Kaye's original type in NHMUK and is an occasional species of forested areas of Trinidad.



**Fig. 7.** Male *Oxidercia fuscapurpurea* feeding at an unidentified fallen flower, near Brasso Seco, 27 December 2019.

**Feeding on fallen fruit: *Hemeroblemma opigena pandrosa* (Cramer) (Erebidae, Erebiniae)**

Several species of witch moths (tribe Thermesiini) have been recorded feeding on fallen fruit (Cock 2020). We include here a record of a male *H. opigena pandrosa* feeding on fallen fruit of *Flacourtia indica* (governor plum or cerise) (Salicaceae), photographed on Lalaja South Road at 24.53h on 29 November 2019 as one example (Fig. 8).

Feeding on fallen fruit is a common behaviour observed in many nymphalid butterflies, so it is likely that many moths will be found to do this.



**Fig. 8.** Male *Hemeroblemma opigena pandrosa* at fallen fruit of *Flacourtia indica*, Lalaja South Road, 29 November 2019.



**Feeding on cacao seed pulp: *Gorgone augusta* (Stoll) (Erebidae, Calpinae) and *Coremagnatha cyanocraspis* Hampson (Erebidae, Herminiinae)**

In an abandoned cacao estate near Brasso Seco, two moths were photographed feeding on the pulp around a cacao seed at 20.41h on 27 December 2019 (Fig. 9). They were a male *G. augusta* and a female *C. cyanocraspis*. Both were recorded from Trinidad by Kaye and Lamont (1927) and are occasional species in forested areas.



**Fig. 9.** Male *Gorgone augusta* feeding on cacao seed pulp, Brasso Seco, 27 December 2019.



**Fig. 10.** Female *Coremagnatha cyanocraspis* feeding on cacao seed pulp, Brasso Seco, 27 December 2019. A *Gorgone augusta* (Fig. 9) can be seen feeding at the top of the picture.

RND has observed squirrels (*Sciurus granatensis* Humbolt) opening cacao pods and feeding on the seeds, and it is likely that the seed was dropped by a squirrel. We are not aware of other observations of moths feeding in this way, but other species are likely to feed on the pulp around cacao seeds on an opportunistic basis.

**Feeding on bird droppings: *Aglaonice deldonalis* (Walker, 1859) (Erebidae, Herminiinae)**

A male of this species was photographed feeding at what appears to be a bird dropping containing seeds at Inniss Field on 22 August 2020 at 21.02h (Fig. 11). Butterflies are well known to feed on bird droppings, but very little seems to have been published regarding this habit by nocturnal moths. See Cock (2017) regarding the identification of this species.



**Fig. 11.** Male *Aglaonice deldonalis* feeding at seed-filled bird dropping, Inniss Field, 22 August 2020.

**Feeding on diseased grass flowers: *Lesmone* spp. (Erebidae, Erebininae)**

On 26 August 2020, on a night walk in mangrove at the end of Bernhard Road, Caroni Swamp, at 21.36h, numerous moths were observed apparently feeding on flowers of a *Paspalum* sp. grass. Two were photographed (Figs. 12, 13) and identified as *Lesmone formularis* (Geyer) and *L. duplicans* (Möschler), both common species in Trinidad (Kaye and Lamont 1927, M.J.W. Cock unpublished).

Grasses are wind pollinated, so there is no obvious reason why potential pollinators such as moths should be attracted to the flowers. However, closer examination of the images suggests that the inflorescences were diseased and are glistening with moisture, which must be what attracted the moths. There are some suggestions of similar behaviour in the literature. Moths are attracted to a sugary exudate produced by, or due to, an ergot fungus (*Claviceps*



**Fig. 12.** *Lesmone duplicans* feeding on diseased grass inflorescence, Caroni Swamp, 26 August 2020.



**Fig. 13.** Female *Lesmone formularis* feeding on diseased grass inflorescence, Caroni Swamp, 26 August 2020.

*paspali*) infecting inflorescences of *Paspalum* spp. grasses in the USA (Neerwinkle *et al.* 1993, Feldman *et al.* 2008), Japan (Sugiura and Yamazaki 2007) and probably widely elsewhere. Moths are implied as vectors of endophytes and mycoparasitic fungi, which in turn attack the ergot (Feldman *et al.* 2008). Nearly 50 species of moths were observed to visit diseased inflorescences in Japan (Sugiura and Yamazaki 2007); Noctuidae and Crambidae were the

most commonly sampled, along with several species of Erebidae and Geometridae. Further species can be expected to show this behaviour in Trinidad.

*Claviceps paspali* is widespread in North and South America, but does not seem to have been recorded from Trinidad (Baker and Dale 1951, Guzmán *et al.* 1998). Nevertheless, it seems likely that this is the species involved in this observation.

#### **Drinking water: *Ergavia drucei* Schaus (Geometridae, Sterrhinae)**

This behaviour is well known in day-flying butterflies, but there have been limited observations of moths showing this behaviour by night, and these were mostly in temperate regions (Adler 1982). When individuals continuously imbibe water through their proboscis, pass it through the gut and discharge it in spurts, this is often termed pumping, and is associated with absorbing sodium ions. Pumping is usually shown by male Lepidoptera, and the sodium is transferred to the female at copulation and used in reproduction (Boggs and Dau 2004, and references therein).

A male *Ergavia drucei* was observed showing this behaviour in the forest at Inniss Field at 19.38h on 6 September 2020 (Fig. 14).

*Ergavia drucei* was identified by comparison with a specimen in UWIZM and the series in NHMUK and USNM. It is rarely recorded in Trinidad; Kaye and Lamont (1927) record a specimen from Palmiste (19.ix.1947) [UWIZM 2013.13.2043], and there is another from Caparo (F. Birch) in NHMUK. *Ergavia* was transferred from Oenochrominae to Sterrhinae by Murillo-Ramos *et al.* (2019).



**Fig. 14.** Male *Ergavia drucei* drinking and showing pumping action, Inniss Field, 6 September 2020. Ejected water is visible for at least two body lengths behind this individual.



## DISCUSSION

Moths are one of the most species-rich insect groups in Trinidad & Tobago. The moths of Trinidad have been relatively well studied, and Cock (2003) indicated that about 2275 species are known and suggested a true total of about 3500 species. The Tobago fauna is less well known with only 400 species recorded so far (Cock 2017, Cock and Kelly 2020). Understandably, it is therefore not uncommon to come across species that have not previously been recorded from the islands, although many of these are found in collections (Cock 2003). However, records of species that have never previously been collected in Trinidad are likely to be considerably less common. Nevertheless, *Belonoptera patercula*, *Siculodes avicula* and *Sylepte coelivitta* were all new records for Trinidad, and our observation of '*Letis*' *arcana* was a new record reported by Cock (2020).

MJWC has been able to identify almost all photographs of Trinidad moths posted on iNaturalist, but several times images from the night walks represented species new to him and previously unknown from the islands. Identification of these species from photographs, without a voucher specimen, is not ideal, but proved possible in some cases, at least on an interim basis.

Although many species of moths fly by day, the great majority are nocturnal, so that most species recorded from the islands are based on specimens attracted to light by night. Night walks provide a new method to observe (and potentially collect) moths, but the observations recorded here include an unexpectedly large number of new or unusual records, especially considering that moths were not the primary focus of the exercise and were made by observers with scant knowledge of these insects.

There are virtually no observations on how moths behave at night in Trinidad and relatively few elsewhere, particularly in the tropics. The only exception is some groups of Arctiini (Erebidae) which can be attracted to drying plants of *Heliotropium* spp. by day and by night (Beebe 1955, M.J.W. Cock unpublished). Although many species photographed on night walks were at rest, showing no obvious behaviour, sometimes individuals were observed feeding and drinking at various attractants. Natural feeding attractants for adult moths include nectar, over-ripe and rotting fruit, juices of sound fruit, exuding plant sap, honeydew, water, animal excreta (Norris 1936) and perhaps pollen and carrion, which are known to be attractive to some groups of butterflies. We include observations from several of these categories.

In conclusion, night walks provide a novel, potentially fruitful way to record moths and their behaviour. Taking photographs provides an explicit voucher for the record

and facilitates subsequent identification. As the moth fauna of Trinidad is relatively well known, it is often not necessary to collect specimens.

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