Witch moths (Lepidoptera, Erebidae, Erebinae, Thermesiini) of Trinidad & Tobago

Matthew J.W. Cock
CABI, Bakeham Lane, Egham, Surrey TW20 9TY, UK.
m.cock@cabi.org / mjwcock@btinternet.com

ABSTRACT
An illustrated and annotated catalogue is presented of 17 species of the tribe Thermesiini (Lepidoptera, Erebidae, Erebinae) confirmed to occur in Trinidad, of which *Hemeroblemma dolon* (Cramer), *H. helima* (Stoll), *H. malitiosa* (Guenée) *H. ochrolinea* (Guenée), *Feigeria mycerina* (Cramer) and '*Letis*' *arcana* Feige are new records for the island. Seven species are recorded from Tobago, two for the first time. Images of 14 species of living adults are included. Almost nothing has recorded regarding food plants and early stages of Thermesiini in Trinidad, but known food plants from elsewhere in the Neotropics are tabulated.

Key words: *Ascalapha*, *Feigeria*, *Hemeroblemma*, *Letis*, *Thysania*, DNA barcodes, cacao

INTRODUCTION

The tribe Thermesiini is found predominantly in South America, with just a few species found in or straying into North America. It forms part of the subfamily Erebinae in the family Erebidae, one of the most species rich Lepidoptera families. Until about ten years ago, Erebidae were subsumed within the huge family Noctuidae. Thermesiini includes some of the largest moths in South America, such as *Thysania agrippina* (Linnaeus) which is credited with the greatest wingspan of any moth: up to 30cm or more. *Thysania agrippina* and another large Thermesiini moth, *Ascalapha odorata* (Linnaeus), are known in parts of their range as the white witch and the black witch respectively. In his website on Bolivian Lepidoptera, Andersen (2020) refers to this group as witches. It therefore seems appropriate to refer to the moths of this tribe collectively as witches or witch moths, as I cannot trace any other common names for this tribe.

The taxonomy of Thermesiini requires further work. The recent development and use of DNA barcodes has shed much new light on many groups of Lepidoptera (e.g. Janzen *et al.* 2009), showing that some apparent species are synonyms, but that other apparently good species encompass additional previously unrecognised cryptic species. This has been most convincing when evidence from DNA barcodes, adult morphology including genitalia, and biology studies are combined in an integrative taxonomy (e.g. Burns *et al.* 2008). In the case of Thermesiini, it seems certain that such studies across the Neotropical fauna will show that the Trinidad and Tobago fauna includes some species that are actually members of species complexes currently treated as a single species. Furthermore, bearing in mind that apparent relatedness based on DNA barcodes alone is not robust, there are areas amongst Thermesiini where this is not in concordance with current use of genera, so that changes to genera can be expected. Some areas where future changes are likely are indicated in the text below, but the current well-known names are retained.

The following account sets out the species recorded from Trinidad and Tobago with illustrations, and summarises what is known about them in the country. All published records are listed, of which Kaye and Lamont (1927) for Trinidad and Cock (2017) for Tobago are the most important. Four species are recorded from Trinidad for the first time, and two for Tobago. For general background on collecting and the methods used to compile this work, see Cock (2018). In preparing this work, I consulted the following collections, either in person or from images shared by their staff (see acknowledgements):

MJWC the private research collection of M.J.W. Cock, UK (records from all specimens and unpublished notes compiled and collated);

NHMUK Natural History Museum, London, UK, which contains much historical material collected by F. Birch, S.M. Klages and others (only selected records confirmed and included);

NMS National Museum of Scotland, Edinburgh, UK, which includes part of the collection of Sir N. Lamont (all records compiled and collated);

OUNHM Oxford University Natural History Museum, which includes material collected by R.M. Farmborough and others (records from many, but perhaps not all, specimens compiled and collated).

UWIZM University of the West Indies Zoology Museum, St. Augustine, Trinidad and Tobago, which includes part of the collections of Sir N. Lamont and D.J. Stradling as well as the former CABI collection containing material collected by the author, F.D. Bennett, R.E. Cruttwell (now McFadyen), R. Brown and T. Cassie, M. Morais and others (records from all specimens compiled and collated).

I have also examined images of live material from various contacts (see specimen listings and acknowledgements) as well as reviewing the records on iNaturalist (https://www.inaturalist.org/) and selected other websites.

Family Erebidae Leach, [1815]
Subfamily Erebinae Leach, [1815]
Tribe Thermesiini Guenée, 1852

The classification of Noctuoidea and the use and nomenclature of family and infrafamily names within it have changed greatly over time. I do not attempt to trace all developments relating to the group now known as Thermesiini (see Forbes 1952, Berio 1992, Zilli 2003, Kühne and Speidel 2004, Homziak *et al.* 2016, etc. for more detail), but only mention key points in the following. Guenée (1852) first used the suprageneric name Thermesidae within Noctuélites (his sixth division of moths) for a large group of genera now placed within the family Erebidae. The name was based on *Thermesia* Hübner, 1823, a junior subjective synonym of *Hemeroblemma* Hübner, 1818 (Poole 1989).

Subsequently Grote (1895) established the tribe Thysaniini: for *Thysania*, *Letis* (i.e. *Letis sensu lato*), and *Erebus* (i.e. *Ascalapha*), and referred to *Thysania agrippina* as the type species. He characterised the tribe thus: 'the extreme limits in size within the Order is reached; the fore wings are greatly elongated, the body vestiture lies close, the eyes are large, head and palpi well developed, while the large lateral expansion of the wings fit the moths for extended flights.' In his study of the noctuoid tympanum, Richards (1933) grouped *Hemeroblemma*, *Latebraria*, *Letis* (as *Blosyris*), *Ascalapha* (as *Erebus*) and *Thysania*, i.e. a slightly expanded version of Grote's Thysaniini.

In their checklist of the Noctuoidea of North America, Lafontaine and Schmidt (2010) include the genera *Hemeroblemma*, *Latebraria*, *Letis*, *Thysania* and *Ascalapha* in their treatment of the tribe Thermesiini. Because *Hemeroblemma* is now included in the tribe, Guenée's Thermesiini has priority over Grote's Thysaniini. These five genera, plus the genera split off from *Letis* (see under *Letis* below), are the same ones included in the classification of Thermesiini in the Barcode Of Life Database (BOLD 2020c).

Apart from Kirkpatrick's (1953) observations of *Hemeroblemma leontia* (Stoll) on cacao, almost nothing has been recorded regarding the food plants and early stages of this tribe in Trinidad. Food plants records from elsewhere are predominantly Fabaceae (Table 1).

Ascalapha Hübner, 1809
Type species: *Phalaena odorata* Linnaeus.
Synonym: *Otosema* Hübner 1823, type species *Phalaena odorata* Linnaeus.

This is a monotypic genus containing a single, large, sexually dimorphic species, which is widespread in the Americas.

***Ascalapha odorata* (Linnaeus, 1758)**
Linnaeus (1758): *Phalaena Bombyx odorata*, TL "America".
Erebus odora [sic] (Linnaeus): Druce (1881-1900), Wilson (1894)
Erebus odoratum [sic] (Linnaeus): Kaye (1901)
Otosema odora [sic] (Linnaeus): Kaye and Lamont (1927)
Ascalapha odorata (Linnaeus): Cock (2017)

Historical notes. Apart from the use of different genera and different spellings of *odorata*, this species has been unambiguously recognised in Trinidad since Wilson's (1894) list, and has been reported from Tobago (Cock 2017).

Identification. This is a sexually dimorphic species, which because of its size, wing shape and markings, is unlikely to mistaken in either sex. In case of doubt, the ε-shape at the hindwing tornus is a good diagnostic feature. Males are darker, and females have a white postdiscal band.

Biology in Trinidad. I have found no information on the biology in Trinidad, except that Kaye and Lamont (1927) mention a caterpillar from Trinidad in the NHMUK, which I have not seen. It is known to be highly vagile or migratory, spreading from the tropics north to Canada in some years (Holland 1903). The adults will feed on fruit, but Zenker *et al.* (2010) showed that the proboscis of *A. odorata* is not suitable for piercing fruit, although it is suitable for lacerating the pulp once there is an opening, as reported by Angeles and Requena (1966) in Venezuela.

Status in Trinidad and Tobago. An occasional species which could turn up anywhere, attracted to light or disturbed by day. Also found on Chacachacare Island.

Arima Valley, Asa Wright Nature Centre: ♀ 20.iv.2016 (D. Wendelken photo) [iNaturalist observation 20533225]
D'Abadie, 10.620 -61.308, at light: ♀ 30.xi.2019 (R. Deo photo) [iNaturalist observation 36216429]
Manzanilla: ♂ 22.xii.2018 (F. Mohammed photo) [iNaturalist observation 19180718]
Morne Bleu, Textel Installation, at light: ♂♀ 26.vii.1978 (M.J.W. Cock) [MJWC] (Figs. 1-2)

Table 1. Summary of available information on food plants of the Thermesiini found in Trinidad &Tobago, based on records from other countries.

Thermesiini species	Summary of food plants	References
Ascalapha odorata	Fabaceae trees such as *Acacia*, *Albizia, Cassia, Inga, Piptadenia*, *Prosopis,* etc.	Lima (1936), Comstock (1936)*, Bourquin (1945)*, Wolcott (1951), Zimmermann (1958)*, Quinn (2008)*, Janzen and Hallwachs (2019)*
Hemeroblemma dolon	Apparently unknown	
Hemeroblemma helima	Apparently unknown	
Hemeroblemma leontia	*Guettarda* (Rubiaceae) and *Machaerium* (Fabaceae)	Janzen and Hallwachs (2019)*
Hemeroblemma malitiosa	Fabaceae, especially *Inga* spp.	Janzen and Hallwachs (2019)*
Hemeroblemma ochrolinea	*Stryphnodendron* (Fabaceae)	Janzen and Hallwachs (2019)*
Hemeroblemma opigena pandrosa	Apparently unknown	
Feigeria buteo	*Caesalpinia*, *Senna* spp. (Fabaceae)	Robinson *et al.* (2020), Arlo (2012)*, Janzen and Hallwachs (2019)*
Feigeria herilia	*Inga* spp. such as *I. oerstediana* (Fabaceae)	Janzen and Hallwachs (2019)*
Feigeria magna	*Inga* spp. (Fabaceae)	Janzen and Hallwachs (2019)*
Feigeria mycerina	*Inga* spp. especially *I. oerstediana* and *I. vera* (Fabaceae); also recorded from coffee (*Coffea*, Rubiaceae) and mango (*Mangifera*, Anacardiaceae) but some of these could refer to adult feeding.	Wolcott (1951), Miller *et al.* (2007)*, Robinson *et al.* (2020), Janzen and Hallwachs (2019)*
Feigeria scops	Apparently unknown	
'Letis' arcana	Apparently unknown	
'Letis' doliaris	Apparently unknown	
'Letis' iphianasse	Apparently unknown	
Thysania agrippina[1]	*Senna spectabilis* and *Pterogyne nitens* (Fabaceae)	Pastrana (2004)
Thysania zenobia	*Cassia* spp., *Senna spp.* and *Pterogyne nitens* (Fabaceae)	Hillermann (2009)*, Pastrana (2004), Robinson *et al.* (2020), Janzen and Hallwachs (2019)*

[1] The caterpillar associated with the adult of *T. agrippina* in Merian (1705, plate 20) is that of a sphingid.
* These references also include images of early stages.

Palmiste: ♂ vii.1915 [N. Lamont] [NMS]; ♂ 24.v.1916 [N. Lamont] [NMS]; ♂ 25.v.1916 [N. Lamont] [UWIZM.2013.13.1537]; ♀ 1.ix.1916 [N. Lamont] [NMS];♂3.ix.1916[N.Lamont][UWIZM.2013.13.1536]; ♀ x.1916 [N. Lamont] [UWIZM.2013.13.1535]; ♀ 16.xii.1921 [N. Lamont] [NMS]; ♀ 29.iv.1934 [N. Lamont] [UWIZM.2013.13.1534]

Parrylands, al light: ♀ ii.1980 (J.O. Boos) [MJWC]

Trinidad: ♂ iv-v.1902 (E. Bourke) [OUNHM]

CHACACHACARE ISLAND, by day: ♂ 24.i.2015 (K. Sookdeo photo, moths58) (Fig. 3)

TOBAGO, Englishman's Bay, at light: ♀ (J. Ingraham) [M. Kelly photo]

TOBAGO, Mount Pleasant, 11.166-60.799: ♀ 10.vii.2020 (R. Williams-Littzen photo) [iNaturalist observation 52668676]

Fig. 1. Male *Ascalapha odorata,* Morne Bleu, Textel Installation, at light, 26.vii.1978 (M.J.W. Cock). The left hindwing is slightly greasy, obscuring the markings.

Fig. 2. Female *Ascalapha odorata,* Morne Bleu, Textel Installation, at light, 26.vii.1978 (M.J.W. Cock).

Fig. 3. Living male *Ascalapha odorata,* Chacachacare Island, 24.i.2015, K. Sookdeo photo, © K. Sookdeo with permission.

***Hemeroblemma* Hübner, 1818**

The type species is *Hemeroblemma amethystina* Hübner, 1818, which is a junior subjective synonym of *Phalaena Noctua dolon* Cramer, 1777. The following genera are currently considered synonyms (Poole 1989):

- *Blosyris* Hübner, [1822]; type species *Phalaena opigena* Drury, misidentified by Hübner; actually *Brujas malitiosa* Guenée
- *Thermesia* Guenée, 1852; type species *Thermesia abadirina* Hübner (a junior subjective synonym of *Phalaena Noctua pandrosa* Cramer) designated by Berio (1966)
- *Brujas* Guenée, 1852; type species *Brujas malitiosa* Guenée
- *Peosina* Guenée, 1852; type species *Phalaena leontia* Stoll
- *Obucola* Walker, 1858; type species *Obucola expandens* Walker

Poole (1989) lists 32 species for this genus, which is found throughout tropical America. Barbut and Lalanne-Cassou (2005) describe three new species and synonymise others so that they too list 32 species. Several species, in addition to *H. leontia* below, have been reported as occasional pests of cacao (Costa 1977, Feliz 1977, Gerónimo Cruz *et al.* 2015).

Taxonomic issues. There are public barcodes for ten named species of *Hemeroblemma* in BOLD (2020b), but not for the type species, *H. dolon*. The apparent relatedness based on these barcodes suggests that either *Hemeroblemma* will need to be divided into several genera, or it will necessary to include species currently placed in *Latebraria*, *Letis* / *Feigeria*, and perhaps *Ascalapha odorata* to create a monophyletic clade. Either way, there will need to be some reclassification of or within this genus in the future. As indicated above there are several synonyms available to define new genera or subgenera, but for the moment, it is appropriate to retain the existing nomenclature pending a definitive study.

***Hemeroblemma dolon* (Cramer, 1777)**

Cramer (1777): *Phalaena Noctua dolon*, TL Surinam.

Historical notes. This species has not previously been recorded from Trinidad, and is not known from Tobago (Cock 2017). My identification is based on a comparison with the type of *amethystina* Guenée (♂ French Guiana, NHMUK, a synonym) and NHMUK series.

Identification. There is modest sexual dimorphism, but I have not seen females from Trinidad. Figures of the female from mainland South America can be found in Barbut and Lalanne-Cassou (2005), and on the internet (Cahurel 2020). The dorsal discal bands of the female are arranged similarly to those of the male, but the ground colour is uniform with a purple-blue sheen, and a small yellow-white apical costal patch may be conspicuous.

Status in Trinidad. A rare species in Trinidad, known only from two males from lowland forest.

Bush Bush Reserve: ♂ 23.i.2016 (M.G. Rutherford photo) [iNaturalist observation 3901922] (Fig. 5)

Hollis Reservoir, at light: ♂ 2.xi.1978 (M.J.W. Cock) [MJWC] (Fig. 4)

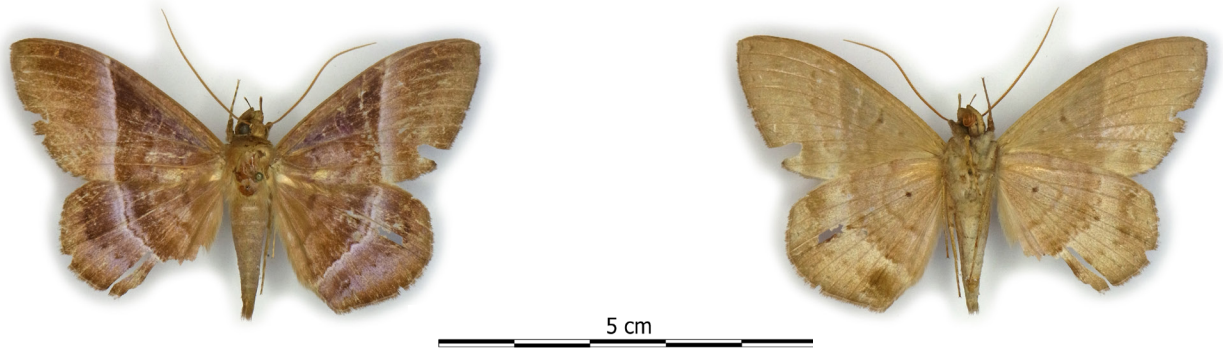

Fig. 4. Male *Hemeroblemma dolon*, Hollis Reservoir, at light, 2.xi.1978 (M.J.W. Cock).

Fig. 5. Living male *Hemeroblemma dolon*, Bush Bush Reserve: 23.i.2016, M.G. Rutherford photo, iNaturalist observation 3901922, © M.G. Rutherford, Creative Commons license CC-BY-NC.

Hemeroblemma helima (Stoll, 1782)

Stoll (1782): *Phalaena Noctua helima*, TL Sierra Leone in error [Tropical America].

Historical notes. This species has not previously been recorded from Trinidad, and is not known from Tobago (Cock 2017). My identification is based on a comparison with the NHMUK series. Stoll's original plate shows the sexually dimorphic female (reproduced here as Fig. 7). It seems a fair match to the male shown here from Trinidad (Figs. 6, 8), but there are several similar species in South America, so confirmation of the female from Trinidad would be desirable.

Identification. I have only seen males from Trinidad; the sharply defined predominantly white costal half of the dorsal forewing is distinctive. Stoll's original plate of the female (Fig. 7) shows that the costal half of the dorsal forewing is pale brown rather than white, and there are contrasting markings on the remainder of the dorsal surface.

Status in Trinidad. An uncommon species with scattered records from forested parts of the lower areas of the Northern Range.

Arima Valley, Simla, MVL: 2♂ 6.viii.1982 (M.J.W. Cock) [MJWC; UWIZM CABI.3808]

Cumaca Road, 4.6 miles, MVL: ♂ 21.x.1982 (M.J.W. Cock) [MJWC]

Grand Tacaribe: ♂ 30.viii.2014 (K. Sookdeo, moths 47) (Fig. 8)

Hollis Reservoir, at light: ♂ 2.xi.1978 (M.J.W. Cock) [MJWC] (Fig. 6)

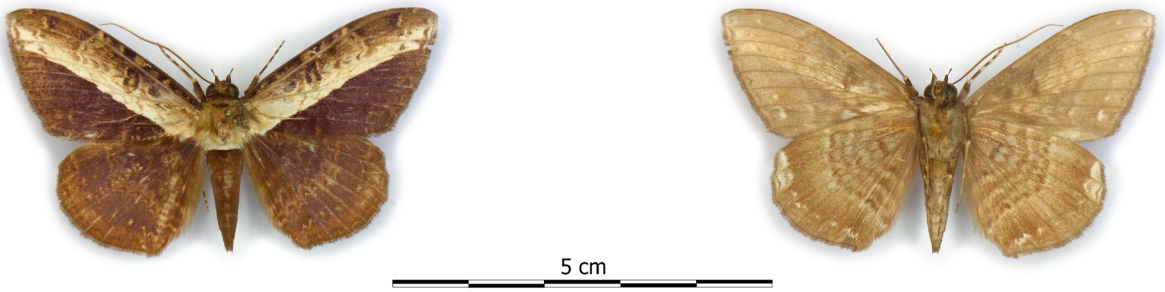

Fig. 6. Male *Hemeroblemma helima*, Hollis Reservoir, at light, 2.xi.1978 (M.J.W. Cock).

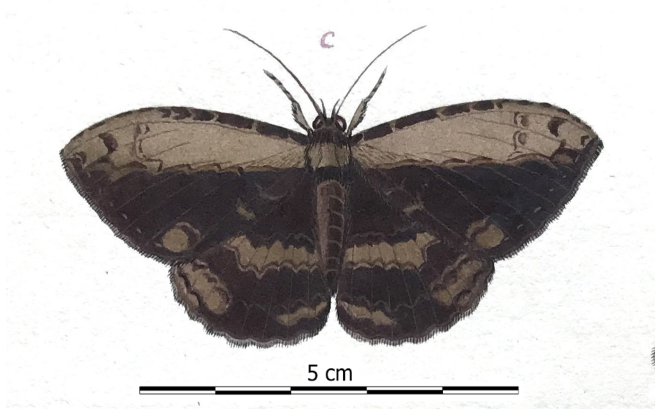

Fig. 7. The original figure for Stoll's (1782, pl. 309, Fig. D) plate of *Hemeroblemma helima* (female). From an image taken by Alberto Zilli, courtesy of Library and Archives of the Natural History Museum, © Trustees of the Natural History Museum, released under Creative Commons license CC BY 4.0 http://creativecommons.org/licenses/by/4.0/.

Fig. 8. Living male *Hemeroblemma helima*, Grand Tacaribe, 30.viii.2014 (K. Sookdeo photo), © K. Sookdeo with permission.

***Hemeroblemma leontia* (Stoll, 1790)**

Stoll (1790): *Phal[aena] Noct[ua] helima*, TL Brazil, Rio de Janeiro

Hemeroblemma helima var. *rengus* (Poey): Kaye (1901) [misidentification / synonym]

Pessina [sic] *leontia* (Stoll): Wilson (1894)

Peosina leontia (Stoll): Kaye (1901), Druce (1881-1900)

Melanchroia leontia (Stoll)*:* Kaye and Lamont (1927), Kirkpatrick (1953)

Hemeroblemma rengus (Poey): Kaye and Lamont (1927), Kirkpatrick (1953) [synonym]

Hemeroblemma leontia (Stoll): Cock (2017)

Historical notes. The marked sexual dimorphism in this species led early workers to believe that the male and female represented separate species (Kaye 1901, Kaye and Lamont 1927, Kirkpatrick 1953). In 1981, I was fortunate enough to encounter a mating pair (Fig. 9), which drew my attention to the association of the two sexes. It is also found in Tobago (Cock 2017).

Taxonomic issues. The name *leontia* Stoll was not included in Poole's (1989) catalogue of the world Noctuidae, perhaps because it had been placed in the geometrid genus *Melanchroia*. My identification was by comparison with the all-male NHMUK series. The *H. leontia* phenotype is male. The female has been treated as the Cuban *H. rengus* (Poey, 1832), which in turn has been treated a synonym of the male *H. numeria* (Drury, 1773) from Jamaica (Núñez Aguila and Barro Cañamero 2012). As Cock (2017) wrote, the female of *H. leontia* certainly resembles the female of *H. rengus*, and they were treated as the same species in the NHMUK. I have not investigated possible synonymy for this publication as *H. leontia*, described from Rio de Janeiro (given as Surinam in error in Cock (2017)), is the older name and satisfactory for use for the species that occurs in Trinidad and Tobago.

Identification. The male (Fig. 9 above) with its large, bright white apical areas of the dorsal and ventral hindwing contrasting with the dark brown-purple remainder of the wings cannot be mistaken for any other Trinidad species. The female (Fig. 9 below) is much less distinctive, and superficially resembles *H. malitiosa* (Fig. 11), but note the different wing shape and the pale brown markings near the tornus of the dorsal forewing.

Biology in Trinidad. In his study on Lepidoptera pests of cacao, Kirkpatrick (1953) treated the female as *H. rengus* and the male as *M. leontia.* He found the caterpillars not uncommon on flush cacao. Larvae of both 'species' were very similar except for the larger female (his *H. rengus*), and more slowly developing male (his *M. leontia*). Regarding the female he wrote 'Larva about 65 mm. long, reddish brown, finely reticulated with yellowish green, indistinct paler oval marks on the dorsal line; 8th abdominal segment with a pair of small conical protuberances, yellow at the apex and bearing a long dark hair; 9th segment with two pairs of long hairs; a minute yellow dorsal spot on the anterior margin of 2nd abdominal segment and on the outer sides of the protuberances. Abdominal feet only on the 4th, 5th, 6th and 10th segments. The early instars are black with sparse long hairs and without prolegs on the 4th segment. Duration of larval stages about 17 days, of pupa 12-14 days. Generally distributed and not uncommon throughout the year.' While of the male he wrote: 'Larva about 50 mm. long, very similar to that of *H. rengus* [i.e. the female]; the pale reticulations rather brighter yellow, and no yellow spot at the base of the tubercles on the 8th abdominal segment. Duration of the larval stage considerably longer than that of [the female], about 28 days; the pupal stage lasts 11-14 days. Throughout the year, not uncommon.'

Status in Trinidad and Tobago. Generally quite common and widespread in Trinidad and Tobago, in disturbed forest and suburban areas.

Arima Valley, Simla, MVL: 2♀ 30.vii.1981 (M.J.W. Cock) [MJWC; UWIZM CABI.3809]

Near Brasso Seco, 10.739N 61.257W: ♂ 1.x.2016 (M.G. Rutherford photo) [iNaturalist observation 12466988]

Nr Centeno: ♂♀ in cop. 24.viii.1981 (M.J.W. Cock) [MJWC] (Fig. 9)

Curepe: ♂ 5.x.1978 (M.J.W. Cock) [MJWC]

Monte Video: ♀ 7.i.2014 (J. Morrall) [MJWC]

Morne Bleu, Textel Installation, at light: ♀ 20.xi.1978 (M.J.W. Cock) [MJWC]

Palmiste: ♂ undated [N. Lamont] [UWIZM.2013.13.1523, as *Melanchroia leontia*]; ♂ vii.1915 [N. Lamont] [UWIZM.2013.13.1520, as *Melanchroia leontia*]; ♀ x.1915 [N. Lamont] [NMS, as *Hemeroblemma rengus*]; ♀ 9.x.1917 [N. Lamont] [NMS, as *Hemeroblemma rengus*]; ♀ 14.ii.1926 [N. Lamont] [NMS, as *Hemeroblemma rengus*]; ♂ 13.iii.1932 [N. Lamont] [NMS]; ♀ 9.iii.1934 [UWIZM.2013.13.1510, as *Hemeroblemma rengus*]; ♀ 21.xii.1936 [N. Lamont] [UWIZM.2013.13.1512, as *Hemeroblemma rengus*]; ♀ 12.ii.1938 [N. Lamont] [NMS, as *Hemeroblemma rengus*]; ♀ 4.iv.1947 [N. Lamont] [UWIZM.2013.13.1513, as *Hemeroblemma rengus*]; ♀ 24.x.1947 [N. Lamont] [UWIZM.2013.13.2395, as *Hemeroblemma rengus*]

< 15 mi from Port of Spain, < 1,000 ft.: ♂ xii.1913-iv.1914 (F.W. Jackson) [OUNHM]

San Fernando: ♂ 1922 (R.W. Farmborough) [OUNHM]

Santa Cruz, on cacao: ♂ v.1951 (T.W. Kirkpatrick) [UWIZM.2014.9.371 (ICTA 15578) as *Melanchroia leontia*]; ♂, 2♀ vi.1951 (T.W. Kirkpatrick) [♂ UWIZM.2014.9.374 (ICTA 15580) as *Melanchroia leontia*; 2♀ UWIZM.2014.9.322-323 (ICTA15573, 15574), as *Hemeroblemma rengus*]; ♂ i.1952 (T.W. Kirkpatrick) [UWIZM.2014.9.372 (ICTA 15581) as *Melanchroia leontia*]

S. of S[an] Fernando, Palmiste, cult'd estate: ♂ 1922 (R.W. Farmborough) [OUNHM]

South Oropouche, Mondesir: ♂ 19.xi.2009 (T.P. Maharaj photo 1670658) (Fig. 10)

St. Augustine, on cacao: ♂ undated (T.W. Kirkpatrick) [UWIZM.2014.9.373 (ICTA 15579) as *Melanchroia leontia*]; ♂ v.1951 (T.W. Kirkpatrick) [UWIZM.2014.9.370 (ICTA 15577) as *Melanchroia leontia*]; ♀ vi.1951 (T.W. Kirkpatrick) [UWIZM.2014.9.324 (ICTA 15576) as *Hemeroblemma rengus*]; ♀ viii.1951 (T.W. Kirkpatrick) [UWIZM.2014.9.325 (ICTA15575) as *Hemeroblemma rengus*]

Trinidad: 6♂,4♀ (1 ♀ no abdomen) undated [N. Lamont] [4♂,3♀ NMS, ♂♂ as *Melanchroia leontia*, ♀♀ as *Hemeroblemma rengus*; 2♂ UWIZM.2013.13.1521-22, as *Melanchroia leontia,* ♀ UWIZM.2013.13.1511, as *Hemeroblemma rengus*]

[Trinidad]: ♀ [UWIZM.214.9.1440, ex ICTA]

TOBAGO, Englishman's Bay, at light: ♂ vi-xii. 2009, J. Ingraham [UWIZM.2015.15.156]

TOBAGO, near Parlatuvier, at light: ♂, ♀ i.2009 (A. Zheludev) [https://www.neutron.phys.ethz.ch/Lepidoptera/index.html AZ12-248, AZ12-0251]

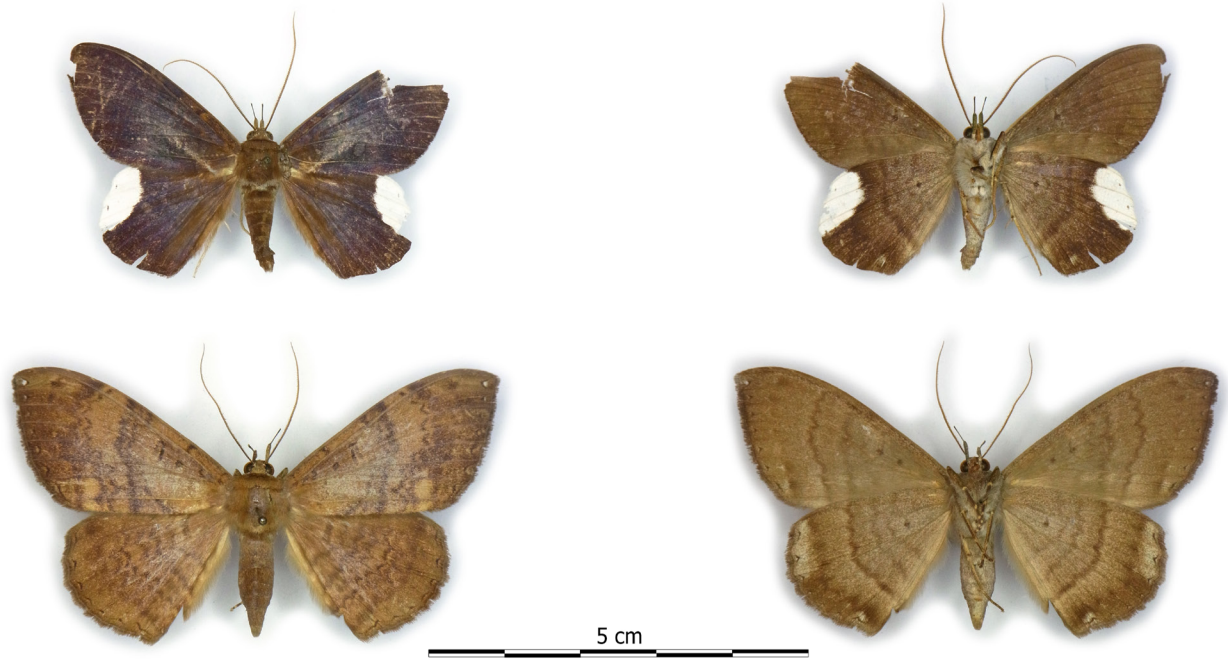

Fig. 9. Male and female *Hemeroblemma leontia* captured *in copulo,* Nr Centeno, 24.viii.1981 (M.J.W. Cock).

Fig. 10. Living male *Hemeroblemma leontia,* South Oropouche, Mondesir, 19.xi.2009, T.P. Maharaj photo, © T.P. Maharaj with permission.

***Hemeroblemma malitiosa* (Guenée, 1852)**

Guenée (1852): *Brujas malitiosa*, TL Brazil.

Historical notes. This represents a new record for both Trinidad and Tobago. It was identified by comparison with the NHMUK series.

Taxonomic issues. Janzen and Hallwachs (2019) indicate at least two species are mixed under this name in Costa Rica, but there is no information about this possibility from South America.

Identification. In the specimens available to me, the male is a darker brown than the female but they are otherwise similar. A rather undistinguished species, but note the distinctive shape of the submarginal line of the dorsal forewing. The wings are squarer and shorter than those of female *H. leontia* and the pale brown markings near the tornus of the dorsal forewing of that species are absent in *H. malitiosa*.

Status in Trinidad and Tobago. A rare species recorded from lowland forest in southern Trinidad and north eastern Tobago.

Parrylands Oilfield, MVL: ♂ 7.xi.1980 (M.J.W. Cock) [MJWC] (Fig. 11 above); ♀ 25.vii.1981 (M.J.W. Cock) [MJWC] (Fig. 11 below)

TOBAGO, near Parlatuvier, at light: ♀ i.2009 (A. Zheludev) [https://www.neutron.phys.ethz.ch/Lepidoptera/index.html AZ12-0252]

Hemeroblemma ochrolinea (Guenée, 1852)

Guenée (1852): *Peosina ochrolinea*, TL Brazil.

Historical notes. This species has not previously been recorded from Trinidad, and is not known from Tobago (Cock 2017). It was identified by comparison with NHMUK series.

Identification. There is strong sexual dimorphism in this species. The male is superficially similar to *H. opigena pandrosa* below, but note that the ventral wing markings are completely different, the line from base to apex of the dorsal forewing is yellow-brown (as implied in the specific name) rather than white, and the tornal area distal to this line is relatively uniform rather than sharply divided. The female lacks the yellow-brown line of the dorsal forewing, although there is a yellow-brown suffusion, particularly at

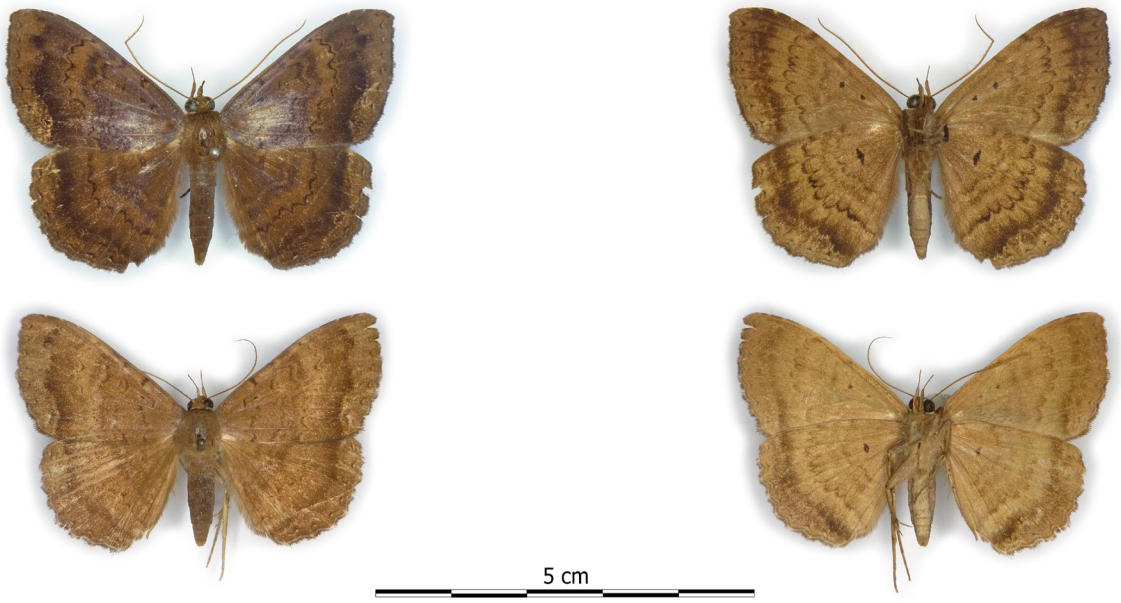

Fig. 11. Male (above) *Hemeroblemma malitiosa*, Parrylands Oilfield, MVL, 7.xi.1980 (M.J.W. Cock); female (below), Parrylands Oilfield, MVL, 25.vii.1981 (M.J.W. Cock).

the base of the forewing dorsum; ventrally it is similar to the male.

Status in Trinidad. A rare species in Trinidad, known from two specimens collected at light in lowland forested areas, and one photographic record from Brasso Seco in the Northern Range.

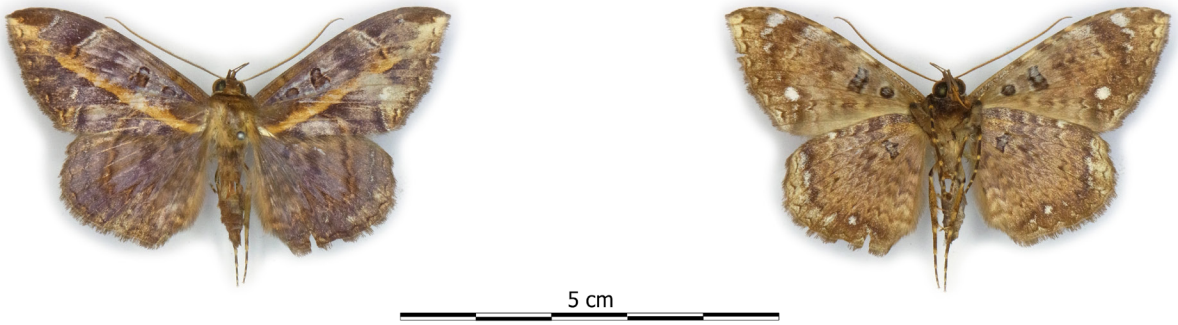

Fig. 12. Male *Hemeroblemma ochrolinea*, Cumaca Road, 4.6 miles, MVL, 21.x.1982 (M.J.W. Cock).

Fig. 13. Female *Hemeroblemma ochrolinea*, Brasso Seco: ♀ 12.iv.2020, R. Deo photo, iNaturalist observation 42283669, © R. Deo with permission.

***Hemeroblemma opigena* (Drury, 1773) *pandrosa* (Cramer, 1776)**

Drury (1773): *Phalaena Noctua opigena*, TL Jamaica.

Cramer (1776): *Phalaena Bombyx pandrosa*, TL Surinam, a subspecies (Barbut and Lalanne-Cassou 2005)

Peosina pandrosa (Cramer): Druce (1881-1990)

Hemeroblemma pandrosa (Cramer): Kaye and Lamont (1927)

Historical notes. Identified by comparison with NHMUK series. It is reported here from Tobago for the first time, based on a specimen collected by Andrey Zheludev.

Taxonomic notes. Almost identical DNA barcodes are available in BOLD (2020a) for this species from USA, Central America, Venezuela, French Guiana and Brazil, so that there is little doubt that a single widespread species is present on the mainland. There are no barcodes available for this species from Jamaica, so the treatment of the mainland *pandrosa* as a subspecies of the Jamaican *opigena* cannot yet be assessed based on barcodes.

Identification. This species shows strong sexual dimorphism in the dorsal view, although the ventral view is similar in both sexes. In dorsal view, the males are superficially similar to those of the last species, although the pale diagonal line is white rather than yellow, etc. However, the ventral view is very different, being rather plain in this species, and strongly mottled in *H. ochrolinea.* The size, wing shape, smooth margins and relatively uniform colour of the dorsal view of the female make it a distinctive species in Trinidad. In particular, the smooth wing margins compared to the crenulate margins of the last species are distinctive.

Status in Trinidad and Tobago. An occasional species in Trinidad found in forested areas to at least 700 m. Just one record from the north east of Tobago.

Arima Valley, 10.704 -61.283, at fallen fruit: ♂ 29.xi.2019 (R. Deo photo) [iNaturalist observation 36195538]

Arima Valley, Simla, MVL: ♂ 22.vii.1981 (M.J.W. Cock) [MJWC] (Fig. 14)

Fyzabad, oilfield, forest surrounded: ♂ 16.x.1917 (R.M. Farmborough) [OUNHM]

Upper Guanapo Valley, 10.710 -61.273: ♂ 29.xi.2019 (S. Manchouk photo) [iNaturalist observation 38096706]

Upper Guanapo Valley, at fallen fruit, 10.709 -61.274: ♂ 29.xi.2019 (S. Manchouk photo) [iNaturalist observation 38096707] (Fig. 16)

Upper Guanapo Valley, on ground, 10.710 -61.270: ♀ 29.xi.2019 (S. Manchouk photo) [iNaturalist observation 38096708] (Fig. 17)

Inniss Field, 10.171 -61.268: ♂ 3.viii.2019 (R. Deo photo) [iNaturalist observation 30270377] (Fig. 17)

Morne Bleu, Textel Installation, at light: ♀ 13.ix.1978

Brasso Seco: ♀ 12.iv.2020 (R. Deo photo) [iNaturalist observation 42283669] (Fig. 13)

Cumaca Road, 4.6 miles, MVL: ♂ 21.x.1982 (M.J.W. Cock) [MJWC] (Fig. 12)

Rio Claro-Guayaguayare Road, milestone 6.5, MVL: ♂ 30.ix.1978 (M.J.W. Cock) [MJWC]

(M.J.W. Cock) [MJWC] (Fig. 15)
Palmiste: ♂ 31.i.1917 [N. Lamont] [UWIZM.2013.13.1514, as *Hemeroblemma pandrosa*]
Valencia Forest, MVL: ♀ 5.viii.1981 (M.J.W. Cock) [MJWC]
Trinidad: ♂ undated [N. Lamont] [NMS, as *Hemeroblemma pandrosa*]; ♂ [N. Lamont] [UWIZM.2013.13.1515, as *Hemeroblemma pandrosa*]
TOBAGO, Englishman's Bay, at light: ♀ (J. Ingraham) [UWIZM.2015.15.161]
TOBAGO, near Parlatuvier, at light: ♂ i.2009 (A. Zheludev) [https://www.neutron.phys.ethz.ch/Lepidoptera/index.html AZ12-0253]

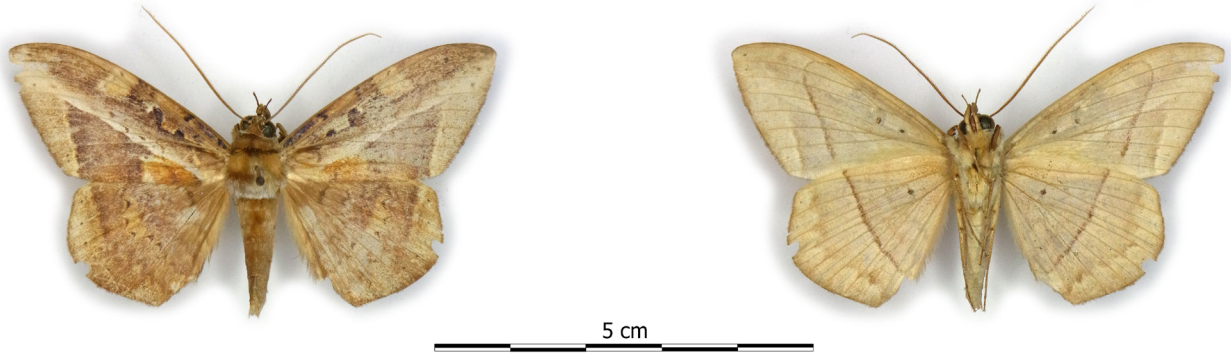

Fig. 14. Male *Hemeroblemma opigena,* Arima Valley, Simla, MVL, 22.vii.1981 (M.J.W. Cock).

Fig. 15. Female *Hemeroblemma opigena,* Morne Bleu, Textel Installation, at light, 13.ix.1978 (M.J.W. Cock).

Fig. 16. Living adult male *Hemeroblemma opigena,* Upper Guanapo Valley, 29.xi.2019, S. Manchouk photo, iNaturalist observation 38096706, © S. Manchouk with permission.

Fig. 17. Living adult female *Hemeroblemma opigena,* Upper Guanapo Valley, 29.xi.2019, S. Manchouk photo, iNaturalist observation 38096708, © S. Manchouk with permission.

Letis Hübner, 1821
Type species: *Letis specularis* Hübner 1821.
In the past, some species of this genus (in the broad sense) have been placed in *Blosyris* Hübner but that is a synonym of *Hemeroblemma*. The genus *Syrnia* Hübner, [1821] also appears in the Trinidad literature. It has been considered a synonym of *Letis*, but is now recognised as a valid genus. Thus, Berio (1991) revised the genus *Letis* and divided it into five genera based on the male genitalia, the distance between the eyes, and other characters of the head:

- *Letis* Hübner, [1821], type species *specularis* Hübner, [1821]
- *Syrnia* Hübner, [1821], type species *hypnois* Hübner, [1821]
- *Feigeria* Berio, 1991, type species *herilia* (Stoll, 1780)
- *Ronania* Berio, 1991, type species *marmorides* (Cramer, 1775)
- *Latebraria* Guenée, 1852, type species *amphipyroides* Guenée, 1852

Collectively the five genera have been referred to as *Letis sensu lato*, as not all workers adopted the new genera. Zilli (2003) raised concerns about the morphological characters that Berio used, but acknowledged that Berio's changes also relied heavily on the male genitalia illustrated posthumously by Feige [1991]. Barbut *et al.* (2012) studied the 17 *Letis* (*sensu lato*) spp. from French Guiana (which includes all the species recognised here from Trinidad) and based on male and female genitalia dissections concluded that Berio's genera were valid, but there were two more genera represented within *Letis* (*sensu lato*). However, they concluded that until molecular studies could be used to clarify and confirm the relationships, it would be premature to describe additional genera. Certainly, based on the public DNA barcodes available in BOLD (2020c), the genera within Thermesiini will need further work to create monophyletic groups. Here, I follow Zilli (2003) as modified by Barbut *et al.* (2012) with the reservations just alluded to, and recognise the following genera groups in Trinidad that were previously treated as *Letis* spp.:

- *Feigeria* Berio, with five species: *F. buteo* (Guenée), *F. herilia* (Stoll), *F. magna* (Gmelin), *F. mycerina* (Cramer), and *F. scops* (Guenée)
- *'Letis' incertae sedis* genus group 1, with one species, '*L'. doliaris* (Guenée)
- *'Letis' incertae sedis* genus group 2, with two species, '*L.*' *arcana* Feige, '*L'. iphianasse* (Cramer)

***Feigeria* Berio, 1991**
See the discussion above under *Letis*. The type species of the genus is *F. herilia*, which occurs in Trinidad. Four of the five Trinidad species are quite common, and are amongst the most photographed moth species in Trinidad, e.g. https://www.inaturalist.org/. All are large, and show slight to moderate sexual dimorphism, and some are quite variable in colour and contrast of their markings.

***Feigeria buteo* (Guenée, 1852)**
Guenée (1852): *Letis buteo*, TL Brazil.
Letis hercyna (Drury): Wilson (1894), Kaye (1901) [misidentification]
Blosyris buteo (Guenée): Kaye and Lamont (1927)
Feigeria buteo (Guenée): Cock (2017)
Historical notes. Identified by comparison with the NHMUK series. This species also occurs in Tobago (Cock 2017).
Taxonomic issues. Janzen and Hallwachs (2019) indicate there may be as many as four species under this name in Costa Rica but this possibility has not been evaluated for South America.
Identification. The size and more or less pale area from near the base of the dorsum to the apex should distinguish this species from others of the genus. It is quite variable with regard to the tone and contrast of the dorsal wings (compare Figs. 18-21), but the ventral wings are much more consistent. Females are larger than males, the forewings less pointed, and the pale area of the forewing is less white and contrasting, although usually sufficiently differentiated to distinguish female *F. buteo* from other *Feigeria* spp.
Status in Trinidad and Tobago. A common species, mainly found in forested areas to at least 700m in the Northern Range.
Arima: ♂ 7.ii.1938 [N. Lamont] [UWIZM.2013.13.1594]; ♀ 5.iii.1938 [N. Lamont] [NMS]
Arima Valley, 10.685N 61.290W: ♀ 7.ix.2015 (M.G. Rutherford photo) [iNaturalist observation 11332106]
Arima Valley, 10.701 -61.283: ♂ 29.xi.2019 (R. Deo photo) [iNaturalist observation 36195492]
Arima Valley, Asa Wright: ♀ 10.v.2007 (I. Woiwod) [photo]; ♂ 29.i.2009 (gavin_miller photo) [iNaturalist observation 49576413]; ♀ 22.viii.2009 (K. Zyskowski photo) [iNaturalist observation 7548928]; ♀ 8 or 11.xii.2013 (P. Prior) [iNaturalist observations 1788429 and 5429999]; ♀ 7.xii.2019 (jaredclarkenl photo) [iNaturalist observation 36535011]; ♀ 18.xii.2019 (N. Norman photo) [iNaturalist observation 36762278]
Arima Valley, Scott's Quarry: ♀ 25.xii.2018 (R. Deo photo) [iNaturalist observation 19268473]
Arima Valley, Simla, at light: ♂ 28.vi.2004 (M.G. Rutherford photo) [iNaturalist observation 52035947]; ♀ 28.viii.2016 (M.G. Rutherford photo) [iNaturalist

observation 12413927]
Caroni-Arima Road, 10.565 -61.292: ♀ 27.x.2019 (miriam_amy photo) [iNaturalist observation 47118711]
Curepe: ♂ undated (F.D. Bennett) [UWIZM CABI.4735]
Curepe, MVL: ♂ x.1979 (M.J.W. Cock) [MJWC]; ♂ 8-13.ix.1981 (M.J.W. Cock) [MJWC] (Fig. 18)
Curucaye, 10.683 -61.451: ♀ 1.viii.2019 (stefairy photo) [iNaturalist observation 29989291]
Cushe Village, Cunapo Southern Main Road, approximately mid-way between Biche and Rio Claro, +10.38, -61.18: ♀ 26.ix.2017 20.35h (Kamal Mahabir photo 20170926_203548-1.jpg)
Upper Guanapo Valley, 10.711 -61.275: ♀ 29.xi.2019 (S. Manchouk photo) [iNaturalist observation 38096714] (Fig. 24)
Maracas Valley, Avondale Gardens / Riverview Gardens, 10.677 -61.412: ♀ 21.ii.2020 (R. Williams-Littzen photo) [iNaturalist observation 39029778]
Morne Bleu, Textel Installation, at light: ♂ 26.vi.1978 (M.J.W. Cock) [UWIZM CABI.4738, TL-148]; ♀ 3.vii.1978 (M.J.W. Cock) [MJWC] (Fig. 21); ♂ 21.vii.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.4737]
Nr. Moruga, off Edwards Trace, 10.129 -61.259: ♂ 30.viii.2019 (S. Manchouk photo) [iNaturalist observation 33717141]
Palmiste: ♀ x.1915 [N. Lamont] [NMS]; ♂ 30.x.1946 [N. Lamont] [UWIZM.2013.13.1597]; ♂ 1.xi.1946 [N. Lamont] [UWIZM.2013.13.1595]; ♂ 11.iv.1948 [N. Lamont] [UWIZM.2013.13.1596]
Penal, at light: ♂ 8.i.2010 (K. Sookdeo photo, moths 22) (Fig. 22)
Port of Spain, Lady Chancellor Road, 10.687 -61.512: ♂ 7.ii.2020 (M. Gibson photo) [iNaturalist observation 38385892]
Santa Cruz: ♂ 9.vii.2020 (stefairy photo) [iNaturalist observation 52568013]
South Oropouche, Mondesir: ♂ 9.iii.2010 (T.P. Maharaj photo DSCN1554)
St Ann's, Fondes Amandes Road, 10.687 -61.502: ♀ 2.ix.2019 (sarah-lee photo) [iNaturalist observation 31980342]
Nr. St. Augustine: ♂ 24.ix.1924 (W.C. Lester-Smith) [OUNHM]
Tucker Valley, 10.730 -61.616: ? 29.xi.2019 (S. Manchouk photo) [iNaturalist observation 38096702]
Trinidad: ♂ iv-v.1902 (E. Bourke) [OUNHM]; ♂ undated [UWIZM CABI.4736]; ♀ undated [N. Lamont] [NMS]
TOBAGO, Cuffie River Nature Resort: ♂ 23.xi.2009 (C. Sexton photo) [iNaturalist observation 2510438]
TOBAGO, Englishman's Bay, at light: ♂ 20.iii.2019 (M. Kelly photo 4654) (Fig. 23)
TOBAGO, Runnemede Local Road [Cuffie River Nature Resort], 11.24N 60.70W: ♀ 14.x.2017 (tlaloc27 photo) [iNaturalist observation 8434698]
TOBAGO, Scarborough, Marden House, MVL: ♂ 9.i.1982 (M.J.W. Cock) [MJWC] (Fig. 20)
TOBAGO, Nr. Speyside, fruit trap: ♂ 17.v.1982 (M.J.W. Cock) [MJWC] (Fig. 19)

Fig. 18. *Feigeria buteo* ♂ Curepe, MVL, 8-13.ix.1981 (M.J.W. Cock).

Fig. 19. *Feigeria buteo* ♂, Tobago, Nr. Speyside, fruit trap, 17.v.1982 (M.J.W. Cock).

Fig. 20. Male *Feigeria buteo* ♂, Tobago, Scarborough, Marden House, MVL, 9.i.1982 (M.J.W. Cock).

Fig. 21. Female *Feigeria buteo,* Morne Bleu, Textel Installation, at light, 3.vii.1978 (M.J.W. Cock).

Fig. 22. Living adult male *Feigeria buteo*, Penal, 8.i.2010, K. Sookdeo photo, © K. Sookdeo with permission.

Fig. 23. Living adult male *Feigeria buteo*, Tobago, Englishman's Bay, at light, 20.iii.2019, M. Kelly photo, © M. Kelly with permission.

Fig. 24 Living adult female *Feigeria buteo*, Upper Guanapo Valley, 29.xi.2019, S. Manchouk photo, iNaturalist observation 38096714, © S. Manchouk with permission.

Feigeria herilia (Stoll, 1780)

Stoll (1780): *Phalaena Noctua herilia*, TL Surinam.

Blosyris herilia (Stoll): Kaye and Lamont (1927)

Historical notes. My identification is based on a comparison with the NHMUK series. There may be confusion in some of the old records as three *F. herilia* in Sir Norman Lamont's collection in UWIZM were identified as *L. alauda.* Not known from Tobago (Cock 2017).

Identification. This is a large distinctive species, by virtue of the pale brown or white patches on the dorsal forewing costa and termen and hindwing apex (Figs. 25-27).

Status in Trinidad. An occasional species in forested areas.

Arima Valley, Asa Wright Nature Centre, at light: ♀ 29.i.2009 (gavin_miller photo) [iNaturalist observation 50324081]; ♂ 21.ix.2013 (K. Sookdeo photo, moths 15) (Fig. 25); ♀ 11.ii.2017 (J. Muddeman, photo 0497); ?♂ 23.xii.2019 (M. McFarlane photo) [iNaturalist observation 36900418]; ?♀ 25.xii.2019 (M. McFarlane photo) [iNaturalist observation 36953344]

Arima Valley, near Temple Village, 10.674 -61.290, at light: ?♂ 22.iii.2020 (plups photo) [iNaturalist observation 40560870]

Clearwater Village, 1.5km from Rio Claro on Naparima-Mayaro Rd: ♀ 10.x.2017 (Savetree Dhanpat photo, img-20171010-wa0000.jpg)

Curepe: ♀ 22.v.1989 (T. Cassie) [UWIZM CABI.4729]

Cushe Village, Cunapo Southern Main Road, approximately mid-way between Biche and Rio Claro, +10.38, -61.18: ♀ ix.2017 (Kamal Mahabir, image P)

Morne Bleu, Textel Installation, at light: ♀ 28.viii.1978 (M. Dookie) [MJWC] (Fig. 27); ♀ 6.xii.1980 (M.J.W. Cock) [MJWC]; ♀ 3.iii.1981 (M.J.W. Cock) [MJWC]; ♀ 5.v.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.4730]; ♂ 21.vii.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.4739]; ♂ 25.iii.2016 (R. Heathcote photo) [iNaturalist observation 52071432]

Palmiste: ♂ 20.i.1917 [N. Lamont] [UWIZM.2013.13.1599, as *Blosyris alauda*]; ♂ 8.iii.1917 [N. Lamont] [UWIZM.2013.13.1598, as *Blosyris alauda*]

Above St Benedict's, 10.665N 61.400W: ? 4.xii.2010 (M.G. Rutherford photo) [iNaturalist observation 9861725]

Trinidad: ♂ undated [N. Lamont] [UWIZM.2013.13.1600, as *Blosyris alauda*] (Fig. 26)

Fig. 25. Living adult male *Feigeria herilia,* Arima Valley, Asa Wright Nature Centre, at light, 21.ix.2013, K. Sookdeo photo, © K. Sookdeo with permission.

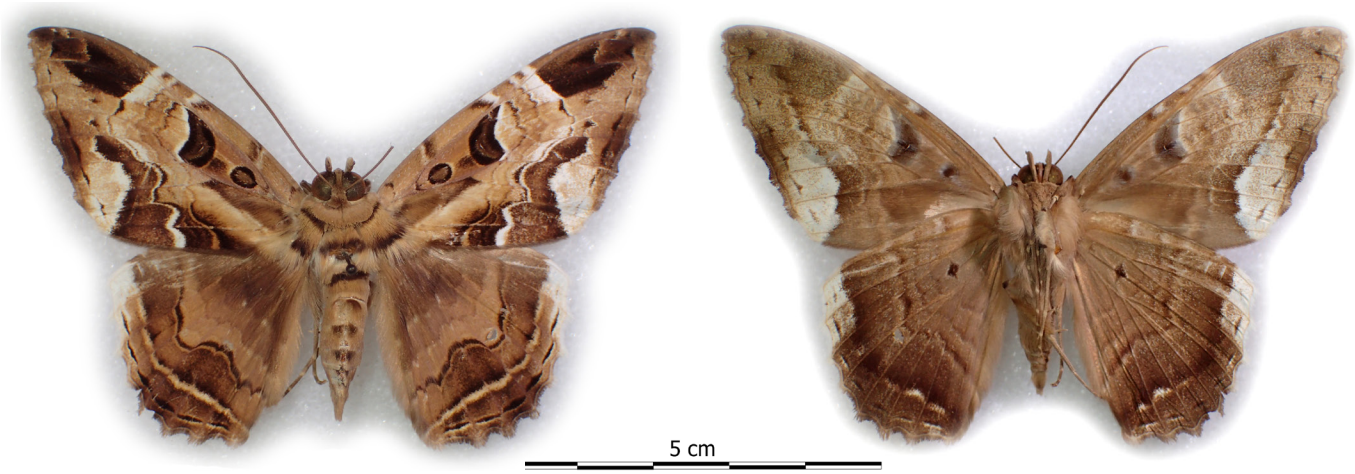

Fig. 26. Male *Feigeria herilia,* Trinidad, undated [N. Lamont] [UWIZM.2013.13.1600]. © UWIZM.

Fig. 27. Female *Feigeria herilia,* Morne Bleu, Textel Installation, at light, 28.viii.1978 (M. Dookie).

***Feigeria magna* (Gmelin, 1790)**

Gmelin [1790]: *Phalaena Noctua magna*, TL "Extra European".

Letis magna (Gmelin): Kaye (1901)

Blosyris magna (Gmelin): Kaye and Lamont (1927)

Feigeria magna (Gmelin): Cock (2017)

Historical notes. My identification is based on a comparison with the NHMUK series. There may be confusion in the old records as I note that the four specimens in Sir Norman Lamont's collection [UWIZM] curated as this species are a male and three female *L. scops*. Also found in Tobago (Cock 2017).

Identification. Sexual dimorphism is strong with regard to wing shape and markings. The male is rather uniformly dark apart from the two forewing cell spots. The male of *F. mycerina* is also dark, but usually darker with the marginal areas clearly demarcated and paler. The female is dorsally quite variable with regard to the tone and contrast although the markings are fairly constant (Figs. 29-30, 32); ventrally they are more constant.

Status in Trinidad and Tobago. An occasional or common species mostly found in forested areas to at least 700m.

Arima Valley, Asa Wright Nature Centre: ♂ 8.xii.2018 (C.D. Jones photo) [iNaturalist observation 19047676]

Arima Valley, Simla, at light: ♂ i.2012 (D.J. Stradling photo, SAM_3785); ♂ 8.vii.2017 (N. Block photo) [iNaturalist observation 7152373]

Brigand Hill, lighthouse security MVL lights: Brigand Hill, lighthouse security MVL lights: ♂ 14.v.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.4733]; ♂ 17.i.2004 (M.J.W. Cock) [MJWC] (Fig. 28)

Cushe Village, Cunapo Southern Main Road, approximately mid-way between Biche and Rio Claro, +10.38, -61.18: ♀ 14.ix.2017, 01.08h (Kamal Mahabir, image A)

Fonrose (south of), 10.267 -61.217: ♀ 31.xii.2018 (B. Hjelle photo) [iNaturalist observation 19383408] (Fig. 32)

Inniss Field, 10.173 -61.270: ♂ 30.viii.2019 (R. Deo photo) [iNaturalist observation 31788340]

Morne Bleu, Textel Installation, at light: ♂ 3.vii.1978

(M.J.W. Cock) [UWIZM CABI.4732]; ♀ 26.vii.1978 (M.J.W. Cock) [MJWC] (Fig. 29)
Parrylands Oilfield, MVL: ♂ 13.xi.1980 (M.J.W. Cock) [UWIZM CABI.4734]
South Oropouche, Mondesir: ♂ 23.i.2010 (T.P. Maharaj photo 1780185)
St Augustine, UWI: ♂ 7.ii.2018 (M.G. Rutherford photo) [iNaturalist observation 9761756]
Trinidad: ♂ undated [N. Lamont] [NMS, as *Blosyris abrupta*]
TOBAGO, Englishman's Bay, at light: 2♀ vi-xii. 2009, J. Ingraham (UWIZM.2015.15.159-160)
TOBAGO, Flagstaff Hill: ♂ 22.vi.2015 (M.G. Rutherford photo) [iNaturalist observation 11331365] (Fig. 31)
TOBAGO, near Parlatuvier, at light: 2♂, ♀ i.2009 (A. Zheludev) [https://www.neutron.phys.ethz.ch/Lepidoptera/index.html AZ12-0249, AZ12-02545, AZ12-0247] (Fig. 30)
TOBAGO, Parlatuvier, Pine Hill Trace 11.293 -60.651: ♀ 30.xii.2019 (M. McFarlane photo) [iNaturalist observation 37116915]

Fig. 28. Male *Feigeria magna* ♂, Brigand Hill, lighthouse security MVL lights, 17.i.2004 (M.J.W. Cock).

Fig. 29. Female *Feigeria magna,* Morne Bleu, Textel Installation, at light, 26.vii.1978 (M.J.W. Cock).

Fig. 30. Female *Feigeria magna,* Tobago, near Parlatuvier, at light, i.2009 (A. Zheludev) [coll. A. Zheludev] © A. Zheludev.

Fig. 31. Living adult male *Feigeria magna*, Tobago, Flagstaff Hill, 22.vi.2015, M.G. Rutherford photo, cropped from iNaturalist observation 11331365, Creative Commons licence CC-BY-NC.

Fig. 32. Living adult female *Feigeria magna*, south of Fonrose, 31.xii.2018, B. Hjelle photo, iNaturalist observation 19383408, Creative Commons license CC-BY-NC-ND.

***Feigeria mycerina* (Cramer, 1777)**

Cramer (1777): *Phalaena attacus mycerina*, TL Surinam
Letis mycerina (Cramer): Kaye (1901)
Feigeria mycerina (Cramer): Bhukal and Rutherford (2017)

Historical notes. Kaye (1901) recorded this species from Trinidad based on a male from Verdant Vale (i.e. Simla) which his brother, Steven Kaye, captured in the late 19th century. Kaye and Lamont (1927) did not mention this species. It is likely that the original identification was a misidentification since Kaye and Lamont (1927) listed a specimen of *F. buteo* which S. Kaye collected at Verdant Vale, which was not mentioned in Kaye (1901). I have checked the NHMUK collection and confirmed that there are no specimens of *F. mycerina* from Trinidad in the main collection, and there is one specimen of *F. buteo* of the right vintage, but without locality, which may well be S. Kaye's specimen. There were no subsequent records *F. mycerina* until M.G. Rutherford photographed a male on Soldado Rock, 10 km off Icacos Point, in November 2017 during the TTFNC Icacos Bioblitz (Bhukal and Rutherford 2017). There are no records from Tobago (Cock 2017). I identified the moth in Rutherford's photograph (Fig. 33) from Barbut *et al.* (2012).

Identification. This species shows strong sexual dimorphism. The dark male is most likely to be confused with *L. magna*, under which species differences are highlighted. The female is not known from Trinidad, but it is illustrated in Barbut *et al.* (2012) and an image from Brazil is included here to facilitate identification (Fig. 34). It is similar to the female of *F. buteo*, but a dark submarginal band, weakly interrupted beyond the cell on both wings should help to distinguish this species.

Status in Trinidad. Just the single confirmed record from Soldado Rock suggests this species may not be resident in Trinidad, rather a stray from the mainland.

SOLDADO ROCK: ♂ 4.xi.2017 (M. Rutherford photo, TTFNC Bioblitz) (Fig. 33)

Fig. 33. Living adult male *Feigeria mycerina*, Soldado Rock, 4.xi.2017, M. Rutherford photo, © M. Rutherford with permission.

Fig. 34. Living adult female *Feigeria mycerina*, Rio de Janeiro, Brazil, claudiomartins photo, © claudiomartins (iNaturalist name). Edited from https://www.inaturalist.org/observations/41011032, Creative Commons License CC-BY-NC.

***Feigeria scops* (Guenée, 1852)**

Guenée (1852): *Letis scops*, TL Uruguay.

Letis scops Guenée: Druce (1881-1900)

Letis alauda (Guenée): Kaye (1901) [misidentification]

Blosyris alauda (Guenée): Kaye and Lamont (1927) [misidentification]

Historical notes. I identified this species by comparison with the NHMUK series. Earlier records by Kaye (1901) and Kaye and Lamont (1927) were misidentified as *F. alauda*. Their records are based on specimens from Tabaquite (W.J. Kaye) and Palmiste, 22.xi.1915, 20.i.1917, 8.iii.1917, 22.x.1918, 21.i.1922 (N.L.). Two of the specimens from Palmiste are in the series of six in Sir Norman Lamont's collection in NMS; they had been identified as *Blosyris alauda* by Sir Norman Lamont, but are female *F. scops*. This species is not reported from Tobago (Cock 2017).

Identification. *Feigeria scops* and *F. alauda* are very similar in colour and markings, but *F. alauda* is fairly constant (comparable to Figs. 35 and 38 of *F. scops*) and significantly smaller (wingspan ♂ 65-75 mm, ♀ 80-90 mm) whereas *F. scops* is variable in the intensity and contrast of its markings and is larger (wingspan ♂ 85-95 mm, ♀ 65-105 mm) (Barbut *et al.* 2012). Furthermore, as Barbut *et al.* (2012) point out, the male of *F. scops* has an area of yellow-orange scent hairs in the basal half of space 1B of the ventral forewing and a purple sheen to the ventral hind wing, both of which are absent in *F. alauda*.

Status in Trinidad. This is one of the common *Feigeria* spp. in Trinidad, found in forested and suburban areas to at least 700m.

Arima Valley, Asa Wright Nature Centre, at light: ♀ 7.xii.2010 (P. Prior photo) [iNaturalist observation 29826641]; ♂ 21.ix.2013 (K. Sookdeo photo, moths 22) (Fig. 41)

Bayshore, Cedar Avenue: ♀ 6.x.2018 (Barbara_st_ photo)

Fig. 35. *Feigeria scops* ♂, Curepe, MVL, 8-13.ix.1981 (M.J.W. Cock).

Fig. 36. *Feigeria scops* ♂, Cumaca Road, 4.6 miles, MVL, 21.x.1982 (M.J.W. Cock).

[iNaturalist observation 35935921] (Fig. 43)

Brigand Hill, lighthouse security MVL lights: ♀ 17.i.2004 (M.J.W. Cock) [MJWC]

Carapo, 10.599 -61.298: ♂ 13.xii.2019 (stefairy photo) [iNaturalist observation 36633407]

Cumaca Road, 4.6 miles, MVL: ♂ 21.x.1982 (M.J.W. Cock) [MJWC] (Fig. 36)

Curepe, MVL: ♀ 1-7.ix.1981 (M.J.W. Cock) [MJWC]; ♂ 8-13.ix.1981 (M.J.W. Cock) [MJWC] (Fig. 35); ♀ 13-20.ix.1981 (M.J.W. Cock) [MJWC] (Fig. 38)

Cumaca Road, 4.6 miles, MVL: ♂ 21.x.1982 (M.J.W. Cock) [MJWC]

Macqueripe Bay, 10.738 -61.611: ?♀ (S. Manchouk photo) [iNaturalist observation 26822810]

Fig. 37. *Feigeria scops* ♀, Morne Bleu, Textel Installation, at light, 30.viii.1978 (M.J.W. Cock).

Fig. 38. *Feigeria scops* ♀, Curepe, MVL, 13-20.ix.1981 (M.J.W. Cock).

Fig. 39. *Feigeria scops* ♀, Palmiste, 22.x.1918, [N. Lamont] [NMS], photos A. Whiffen, © NMS.

Fig. 40. *Feigeria scops* ♀, Palmiste, 22.x.1918, [N. Lamont] [NMS], photos A. Whiffen, © NMS.

Fig. 41. Living adult male *Feigeria scops*, Arima Valley, Asa Wright Nature Centre, at light, 21.ix.2013, K. Sookdeo photo, © K. Sookdeo with permission.

Fig. 42. Living adult female *Feigeria scops*, San Rafael, 18.vii.2010, T.P. Maharaj photo, © T.P. Maharaj with permission.

Fig. 43. Living adult female *Feigeria scops*, Trinidad, Bayshore, 6.x.2018, barbara_st_ photo, iNaturalist observation 35935921, Creative Commons license CC-BY-NC.

Morne Bleu, Textel Installation, at light: ♀ 30.viii.1978 (M.J.W. Cock) [MJWC] (Fig. 37)

Palmiste:3♀undated[N.Lamont][UWIZM.2013.13.1591-93, as *Blosyris magna*]; ♀ 22.xi.1915 [N. Lamont] [NMS, as *Blosyris alauda*]; 2♀ 22.x.1918 [N. Lamont] [NMS, as *Blosyris alauda*] (Figs. 39,40); ♀ 15.ix.1947 [N. Lamont] [UWIZM.2013.13.2392]; ♂ 11.x.1947 [N. Lamont] [UWIZM.2013.13.1590, as *Blosyris magna*]

San Rafael: ♀ 18.vii.2010 (T.P. Maharaj photo P1860337) (Fig. 42)

South Oropouche, Mondesir: ♀ 4.i.2009 (T.P. Maharaj photo P1560911)

Trinidad: 2♂,♀ (♀ no abdomen) undated [N. Lamont] [NMS, as *Blosyris alauda*]

'Letis' doliaris (Guenée, 1852)

Guenée (1852): *Syrnia doliaris*, TL unknown.

Blosyris doliaris (Guenée): Kaye and Lamont (1927)

Historical notes. I identified this species by comparison with the NHMUK series. Cock (2017) does not record it from Tobago.

Identification. This is the smallest of the Trinidad species formerly placed in *Letis*, and this alone should distinguish it. Where the size is not known, e.g. photos of living moths (Fig. 46), it might be confused with female *F. buteo*, *F. scops* or female *F. mycerina*. The less pointed wings will help to distinguish it, as will the pale submarginal lines on both wings of *F. buteo* (Figs. 18-24), the paler and more translucent wings of *F. scops* (Figs. 35-43), and the more contrasting markings and stronger cell spots in the female of *F. mycerina* (Fig. 34).

Biology in Trinidad. I captured two males in a fruit trap set for butterflies, indicating that this genera group will also feed at fruit.

Status in Trinidad. An uncommon species, with records mostly from forested areas of the Northern Range to 700 m.

Arima Valley, Asa Wright Nature Centre: ♂ 22.iii.2015 (S. Nanz, photo 3436) (Fig. 46); ?♀ 26.vii.2017 (E. Rooks photo) [iNaturalist observation 9104198]

Arima Valley, Simla, fruit trap: 2♂ 12.vi.1982 (M.J.W. Cock) [MJWC] (Fig. 44)

Nr. Moruga, off Edwards Trace, 10.129 -61.259: ♂ 30.viii.2019 (S. Manchouk photo) [iNaturalist observation 33717136]

Morne Bleu, Textel Installation, at light: ♀ 20.xi.1978 (M.J.W. Cock) [MJWC] (Fig. 45)

Palmiste: ♂ 5.vi.1917 [N. Lamont] [UWIZM.2013.13.1586]

Trinidad: ♀ iv-v.1902 (E. Bourke) [OUNHM]; ♂ undated [N. Lamont] [NMS]

Fig. 44. Male *'Letis' doliaris,* Arima Valley, Simla, fruit trap, 12.vi.1982 (M.J.W. Cock).

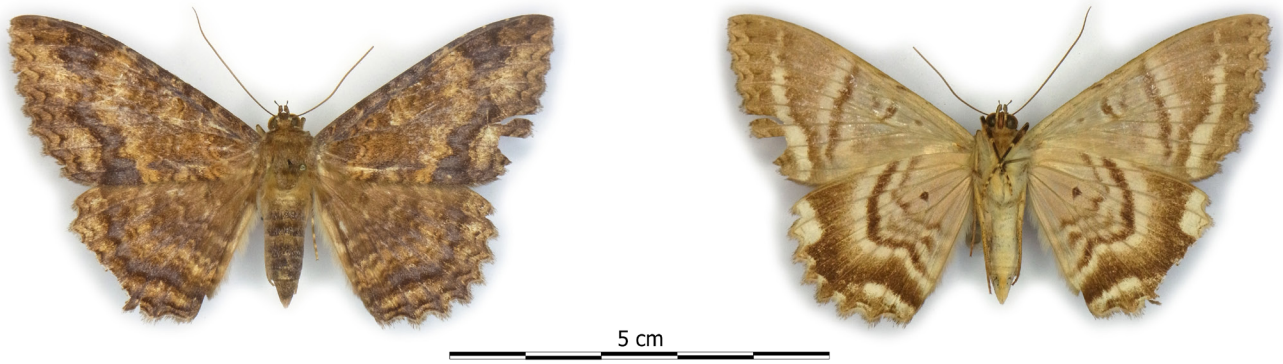

Fig. 45. Female *'Letis' doliaris,* Morne Bleu, Textel Installation, at light, 20.xi.1978 (M.J.W. Cock).

Fig. 46. Living adult male *'Letis' doliaris* Arima Valley, Asa Wright Nature Centre, 22.iii.2015, S. Nanz photo, © S. Nanz with permission.

'Letis' arcana Feige, 1974

Feige (1974) *Letis arcana*, TL French Guiana.

Historical notes. My identification of the male in Fig. 47 is based on a comparison with the female illustrated by Barbut *et al.* (2012). Not known from Tobago (Cock 2017).

Identification. This is a moderately large species, about the same size as *F. magna* (Fig. 28) with a wingspan of 75 mm in the male and 80 mm in the female (Barbut *et al.* 2012). On the dorsal forewing, the pale bar from where the post discal line meets the dorsum at about two-thirds, to just short of the narrow cell spot, together with the cell spot which is at a slight angle, forms a pale bar across the

wing. This combined with the dark areas each side of this line, interrupted by a broad brown streak from the base of the wing to the termen, and the dark area on the costa before the apex, should help to recognise this species. There is modest sexual dimorphism in wing shape and based on the single images I have seen of each sex, in the male the more contrasting dark areas on both dorsal wings are much more obvious, while the colouring of the female apart from the pale band across the wing is much more homogenous.

Status in Trinidad. The only Trinidad record is a photograph taken by R. Deo by night in the forest of the Northern Range. This species is very rarely collected in its known range in French Guiana and northern Brazil (Feige 1974, Barbut *et al.* 2012).

Brasso Seco, 10.756 -61.260: ♂ 18.iv.2020 (R. Deo photo) [iNaturalist observation 42649233]

Fig. 47. Living male *'Letis' arcana*, Brasso Seco, 8.i.2020, R. Deo photo, iNaturalist observation 42649233, © R. Deo with permission.

'Letis' iphianasse (Cramer, 1777)

Cramer (1777) *Phalaena Attacus iphianasse*, TL Surinam.
Syrnia iphianasse (Cramer): Wilson (1894), Kaye (1901)
Blosyris iphianasse (Cramer): Kaye and Lamont (1927)

Historical notes. My identification is based on a comparison with the NHMUK series, and Barbut *et al.* (2012). Not known from Tobago (Cock 2017).

Identification. This large, dark species with red and blue bands dorsally, should not be mistaken for any other in Trinidad. The purple-blue colouring is at least partly refractive, which means that images of living moths, particularly taken with a flash, readily distort these colours (compare Figs. 50 and 51). There is slight sexual dimorphism in wing shape and the female has a heavier purple-blue sheen dorsally.

Status in Trinidad. An occasional species in forested and suburban areas.

Arima: ♀ 9.i.1938 [N. Lamont] [NMS]

Arima Valley, Asa Wright Nature Centre: ♀ 29.i.2009 (gavin_miller photo) [iNaturalist observation 49576221]; ♀ 24.x.2010 (J. Ryan photo) [iNaturalist observation 40127276]; ♂ 25.xii.2010 (D.L. Schulman photo) [https://www.flickr.com/photos/queensgirl/8308998934/]; ?♂ 22.iii.2013 (R. Sargent photo) [https://www.flickr.com/photos/onemoreshotrog/8692630375]; ♀ 11.i.2014 (J. Schefski photo) [https://www.flickr.com/photos/125114464@N04/16181310777/]; ♀ 9.iii.2016 (J. Perry photo, iGoTerra) [https://igoterra.com/#!/taxon/view/125377/Letis-iphianasse]; ♂ 24.xii.2019 (M. McFarlane photo) [iNaturalist observation 36953341] Arima Valley, St. Patrick's Estate: ♀ 24.ii.1932 [N. Lamont] [UWIZM.2013.13.1587]; ♀ 1.iv.1934 [N. Lamont] [UWIZM.2013.13.1588]

Chaguanas, 10.517 -61.411: ♀ 8.i.2020 (D. Gunn photo) [iNaturalist observation 37409411] (Fig. 50)

Chatham, at light: ♀ undated (M. Alkins) [UWIZM CABI.4728]

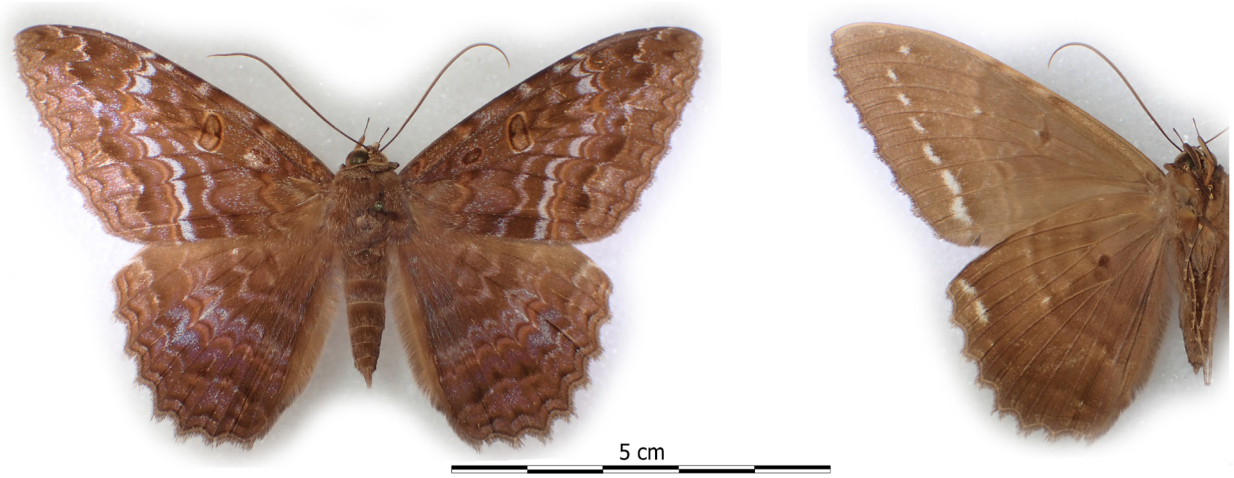

Fig. 48. Male *'Letis' iphianasse*, Morne Bleu, Textel Installation, at light, 29.iii.1979 (M.J.W. Cock) [UWIZM CABI.4725], © UWIZM.

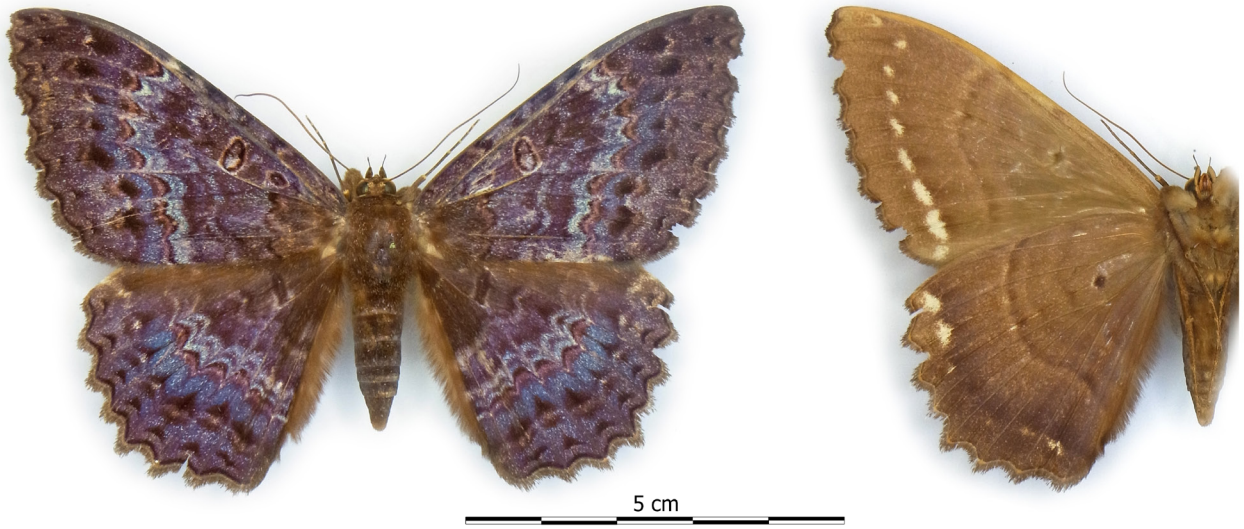

Fig. 49. Female *'Letis' iphianasse*, Curepe, MVL, 17.viii.1978 (M.J.W. Cock).

Fig. 50. Living female *'Letis' iphianasse*, Chaguanas, 8.i.2020, D. Gunn photo, iNaturalist observation 37409411, © D. Gunn, Creative Commons license CC-BY-NC.

Fig. 51. Living female *'Letis' iphianasse*, Inniss Field, 9.v.2020, R. Deo photo, iNaturalist observation 45921369, © R. Deo, with permission.

Curepe, MVL: ♂ undated (F.D. Bennett) [UWIZM CABI.4723]; ♀ 17.viii.1978 (M.J.W. Cock) [MJWC] (Fig. 49); ♀ 24.iv.1981 (M.J.W. Cock) [UWIZM CABI.4726]

Fishing Pond: ♂ 1.iv.2020 (R. Boyce) [based on photo]

Inniss Field: ♀ 9.v.2020 (R. Deo photo) [iNaturalist observation 45921369] (Fig. 51)

Lalaja Ridge, 10.706 -61.280: ♂ 18.x.2019 (S. Manchouk photo) [iNaturalist observation 34543455]

Morne Bleu, Textel Installation, at light: ♂ 29.iii.1979 (M.J.W. Cock) [UWIZM CABI.4725] (Fig. 48); ♂ 6.xii.1980 (M.J.W. Cock) [UWIZM CABI.4724]; ♀ 14.vii.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.4727]

Palmiste: ♀ 1915 [N. Lamont] [UWIZM.2013.13.1589]; ♀ vii.1915 [N. Lamont] [NMS]; ♀ 24.viii.1917 [N. Lamont] [NMS]; ♀ 13.xii.1917 [N. Lamont] [NMS]; ♀ 27.v.1921 [N. Lamont] [NMS]

St. Patrick's: ♀ (no abdomen) 14.iv.1928 [N. Lamont] [NMS]

Trinidad: ♀ iv-v.1902 (E. Bourke) [OUNHM]

Thysania Dalman, 1824

Type species: *Thysania agrippina* Cramer

Two species are reported from Trinidad: *Thysania agrippina* and *T. zenobia*. Although DNA barcodes cannot be used to generate phylogenies, the neighbour-joining functions in BOLD suggests that *T. agrippina* and *T. zenobia* are not as closely related to each other as to some *Letis* / *Feigeria* spp. and some different generic groupings may be needed. I do not attempt to resolve these issues here, but flag them for future attention.

***Thysania agrippina* (Cramer, 1776)**

Cramer (1776): *Phalaena Noctua agrippina*, TL Surinam.
Noctua strix Linnaeus: Kaye (1901) [misinterpretation, see below]
Thysania agrippina (Cramer): Kaye and Lamont (1927), Plester (1994)

Historical notes. Linnaeus (1758, p. 508) described *Phalaena Noctua strix* from South America (*America meridionali*), referring to MLU (i.e. a specimen in 'Museum Ludovicae Ulricae', the Museum of Queen Louisa Ulrika of Sweden) and plate 20 of Merian (1705), based on which he included a note on the caterpillar. Subsequently, Linnaeus (1767, p. 833) refined this by citing Clerck's (1759) plate 51, figure 1, of the MLU specimen. Clerck's figure shows an Asian cossid, now referred to as *Xyleutes strix* (Linnaeus), whereas Merian's plate 20, shows the adult of *Thysania agrippina* and the caterpillar of a sphingid. The first citation (MLU) is taken as defining the species, so this name should not be applied to the species which Merian illustrated and Cramer subsequently described as *Thysania agrippina*. Hence, Kaye's (1901) inclusion of *Noctua strix* is taken to refer to *T. agrippina*. Later, Kaye and Lamont (1927) included *T. agrippina*, but did not mention *N. strix*. Plester's (1994) record of this species from Tobago is considered to be a misidentification (Cock 2017).

Identification. Adults typically rest with the long wing axis vertical (e.g. http://www.arthurgrosset.com/mammals/photos/thyagr10784.jpg). The male shown here (Fig. 52) is darker than the female (Fig. 53), but I have not examined enough material to be confident whether this represents sexual dimorphism or individual variation.

Status in Trinidad. This is an uncommon species in Trinidad that could turn up anywhere, but is more usually found in forested areas.

Arima Valley, Asa Wright Nature Centre: ?♀ 24.vi.2011 (G. Watkins-Colwell photo) [iNaturalist observation 45253501]; ? 7.vii.2011 (C. McNamee photo) [iNaturalist observation 4993002]; ?♀ 10.vii.2011 (Harald from Heidelberg photo) [https://www.whatsthatbug.com/2011/07/10/white-witch-from-trinidad-2/]

Arima Valley, Simla: ? 28.vi.2004 (M.G. Rutherford photo) [iNaturalist observation 52035932]

Curepe, MVL: ♂ viii.1970 (F.D. Bennett) [UWIZM CABI.7217]; ♀ 10.viii.1974 (F.D. Bennett) [UWIZM CABI.7221]; ♀ 27.ix.1978 (M.J.W. Cock) [UWIZM CABI.7220]

Diego Martin: ♀ xii.1970 [UWIZM CABI.7216]

Morne Bleu, Textel Installation, at light: ♀ 17.xi.1978 [MJWC] (Fig. 53); ♂ 5.vii.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.7218]; ♀ 21.vii.1989 (R.G. Brown & T. Cassie) [UWIZM CABI.7219]

Santa Cruz, 10.720 -61.481: at light: ♀ (A. Ganasa photo) [iNaturalist observation 44675492]

[St. Augustine], Santa Margarita, in house: ♀ 31.i.1954 (F. Bennett) [UWIZM.2014.9.391]

Valsayn Park, at light: ♂ 22.ix.1979 (M.J.W. Cock) [MJWC] (Fig. 52)

Trinidad: ♀ undated [UWIZM.2013.13.1743]; ♂,♀ 1978-1982 [MJWC papered]

***Thysania zenobia* (Cramer, 1777)**

Cramer (1777): *Phalaena Attacus zenobia*, TL Surinam.
Thysania zenobia (Cramer): Druce (1881-1900), Wilson (1894), Kaye and Lamont (1927), Cock (2017)

Historical notes. There has been no ambiguity about the records of this moth going back to the first list of Trinidad moths (Wilson 1894). It also occurs in Tobago (Cock 2017).

Identification. The large size, grey dorsal colouring and salmon-pink ventral colouring make this species easily recognisable in Trinidad and Tobago. There is some sexual dimorphism, the males having darker, more strongly contrasting diagonal lines dorsally on both forewings and hindwings.

Status in Trinidad and Tobago. An occasional species in both Trinidad and Tobago, that is more often found in forested situations, but can be found in suburban areas too.

Curepe, BLT: ♀ 21-28.ii.1982 (F.D. Bennett) [MJWC] (Fig. 55)

Curepe, MVL: ♀ 10.ii.1970 (F.D. Bennett) [UWIZM CABI.7222]; ♂ 22.v.1981 (M.J.W. Cock) [MJWC]

Fyzabad: ♂ ix.1917-vi.1918 (R.W. Farmborough) [OUNHM]

Morne Bleu, Textel Installation, at light: ♀ 31.vii.1979 (M. Dookie) [UWIZM CABI.7223]; ♂ 28.viii.1978 (M. Dookie) [MJWC] (Fig. 54)

TOBAGO, Black Rock, 11.197 -60.789, at light: ♀ 22.xi.2019 (figtree photo) [iNaturalist observation 36219406]

TOBAGO, Englishman's Bay, at light: ♀ (J. Ingraham) [M. Kelly photos 10880, 10881]

TOBAGO, near Parlatuvier, at light: ♂ i.2009 (A. Zheludev) [https://www.neutron.phys.ethz.ch/Lepidoptera/index.html AZ12-0259]

Fig. 52. Male *Thysania Agrippina*, Valsayn Park, at light, 22.ix.1979 (M.J.W. Cock).

Fig. 53. Female *Thysania agrippina,* Morne Bleu, Textel Installation, at light, 17.xi.1978.

Fig. 54. Male *Thysania zenobia,* Morne Bleu, Textel Installation, at light, 28.viii.1978 (M. Dookie).

ACKNOWLEDGEMENTS

This work has depending heavily on visits I have made to museums, which were facilitated by curators as follows: National Museums of Scotland (Keith Bland, Ashley Whiffin), The Natural History Museum (Martin Honey, Alberto Zilli), Oxford University Natural History Museum (George McGavin, Darren Mann, James Hogan), United States National Museum (Scott Miller, Marc Epstein, Michael Pogue), and University of the West Indies Zoological Museum (various UWI staff over the years, but most recently Mike G. Rutherford and colleagues).

I have also benefitted from the willingness of naturalists to share their images for this paper (either through direct contact, or through making images available under a Creative Commons license on iNaturalist.org – or both) and specifically thank them the following: Rainer Deo, Davis Gunn, Bjorn Hjelle, Matt Kelly, Tarran P. Maharaj, Shane Manchouk, Steve Nanz, Mike G. Rutherford, Kris Sookdeo, Andrey Zheludev, barbara_st_ (iNaturalist name), claudiomartins (iNaturalist name). I thank Alberto Zilli and the Library and Archives of the Natural History Museum for the image used in Fig. 7. Alberto Zilli also kindly read through and commented on a draft of this paper.

Fig. 55. Female *Thysania zenobia,* Curepe, black light trap, 21-28.ii.1982 (F.D. Bennett).

REFERENCES

Andersen, L. 2020. Mariposas de Bolivia, sitio 63, Witches from Bolivia, Erebidae family. [Online]. Available at http://www.danske-natur.dk/bolere.htm (Accessed 28 May 2020)

Angeles, N. and **Requena, J.** 1966. Moth injury of mangoes in Venezuela. *FAO Plant Protection Bulletin*, 14: 86-87.

Arlo 2012. *Letis buteo* - caterpillar and adult. [A blog]. [Online]. Available at http://quaoarpowerzoo.blogspot.com/2012/06/mushroom-wings.html (Accessed 28 May 2020)

Barbut, J., Iurettigh, J.-M. and **Lalanne-Cassou, B.** 2012. Le Genre *Letis* Hübner, [1821] sensu lato en Guyane française (Lepidoptera : Erebidae ; Erebinae). *Lépidoptères de Guyane*, 6: 39-56.

Barbut, J. and **Lalanne-Cassou, B.** 2005. Description de trois nouvelles espèces d'*Hemeroblemma* Hübner, 1818 [Lepidoptera, Noctuidae, Catocalinae]. *Revue française d'Entomologie (N.S.)*, 27(4): 161-170.

Berio, E. 1966. Nomi generici polispecifici di Noctuidae del globo con scelte di specie tipo e osservazioni. *Annali del Museo civico di storia naturale Giacomo Doria*, 76: 42-67.

Berio, E. 1991. La sistematica dell'antico genere neotropicale *Letis* Hbn. (e *Blosyris* Hbn.) (Lepidoptera, Noctuidae, Catocalinae, Ophiderini) con descrizione di 2 nuove specie. *Frustula Entomologica (N.S.)*, 11: 31-40.

Berio, E. 1992. Ricerca di possibili modelli sistematici per le Catocalinae e Ophiderinae del Globo (Lepidoptera Noctuidae). *Memorie della Societa Entomologica Italiana*, 70(2) (1991): 287-303.

Bhukal, R. and **Rutherford, M.G.** 2017. Terrestrial invertebrate reports. *Field Naturalist,* 2017(4): 16-19. [Online]. Available at https://ttfnc.org/publication/field-naturalist/ (Accessed 28 May 2020)

BOLD(BarcodeOfLifeDatabase)2020a.*Hemeroblemma opigena*. [Online]. Available at http://v3.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=69640 (Accessed 28 May 2020)

BOLD(BarcodeOfLifeDatabase)2020b.*Hemeroblemma*. [Online]. Available at http://v3.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=33723 (Accessed 28 May 2020)

BOLD (Barcode Of Life Database) 2020c. Thermesiini. [Online]. Available at http://v3.boldsystems.org/index.php/TaxBrowser_Taxonpage?taxid=486929 (Accessed 28 May 2020)

Bourquin, F. 1945. XXVIII. Observaciones sobre *Erebus odoratus* (Linné) 1758 Lep. Fam. Noctuidae. p. 105-107. *In* **Bourquin, F.** Mariposas Argentinas. Buenos Aires, Argentina: The Author. 209 p.

Burns, J.M., Janzen, D.H., Hajibabaei, M., Hallwachs, W. and **Hebert, P.D.N.** 2008. DNA barcodes and cryptic species of skipper butterflies in the genus *Perichares* in Area de Conservación Guanacaste, Costa Rica. *Proceedings of the National Academy of Sciences of the United States of America*, 105: 6350-6355.

Cahurel, A. 2020. Papillons et Insectes du Monde. [Online]. Available at https://cahurel-entomologie.com/gs/index.php?id=hemeroblemma (Accessed 28 May 2020)

Clerck, C.A. 1759-[1764]. Icones insectorum rariorum cum nominibus eorum trivialibus, locisque a C. Linnaei Arch: R: et Equ: Aur: Syst: Nat: allegatis. Holmiae [Stokholm, Sweden]. 1: [12] pp., pls. 1-16 (1759); 2: [8] + [3] pp., pls. 17-55 + [7] ([1764])

Cock, M.J.W. 2017. A preliminary catalogue of the moths (Lepidoptera except Papilionoidea) of Tobago, West Indies. *Insecta Mundi*, 0585: 58 p.

Cock, M.J.W. 2018. Hawk-moths (Sphingidae) of Trinidad, West Indies: an illustrated and annotated catalogue. *Living World, Journal of the Trinidad and Tobago Field Naturalists' Club*, 2018: 10-81.

Comstock, J.A. 1936. Notes on the early stages of *Erebus odora* L. (Lepidopt.). *Bulletin of the Southern California Academy of Sciences*, 35: 95-98.

Costa, A. da S. 1977. Principais pragas do cacaueiro no Estado do Para. *Cacau Atualidades*, 14(4): 13-22.

Druce, H. 1881–1900. Insecta. Lepidoptera-Heterocera. Biologia Centrali-Americana, Vol. I (text.) 490 pp., Vol. II. (text.) 622 pp., Vol. III. (plates.) 101 plates.

Feige, K.R. [1991]. Drawings of the male genitalia of genus *Letis* species. *Frustula Entomologica (N.S.)*, 11: 19-29.

Feige, R. 1974. *Letis arcana* spec. nov (Lep. Noctuidae). *Deutsche Entomologische Zeitschrift* 21(1-3), 149-150.

Feliz, M. 1977. *Hemeroblema* [sic] *rengus* on cocoa. *FAO Plant Protection Bulletin*, 25(1): 41.

Forbes, W.T.M. 1954. Lepidoptera of New York and neighboring states 3. Noctuidae. *Cornell University Agricultural Experiment Station, Memoir*, 329: 1-433.

Gerónimo Cruz, A.M.G., Hernández, J.H.R.M., Soto, S.S., Martínez, A.E. and **Cruz, M.P.** 2015. Fluctuación poblacional y período de ataque de *Hemeroblemma* spp. (Lepidoptera: Noctuidae) en una plantación de cacao en Tabasco, México. *Entomotropica*, 30(6): 49-56.

Grote, A.R. 1895. The hypenoid moths and allied groups. *Proceedings of the American Philosophical Society*, 34: 416-436.

Guenée, A. 1852. Noctuélites. Tome III. In: **[J.B.A.D. de] Boisduval** and **[A.] Guenée**. Histoire naturelle des Insectes. Species general des Lépidoptères. Tome septième. Paris: Roret. 442 p.

Hillermann, W.W. 2009. *Thysania zenobia*, Ophiderinae -Noctuidae - 30 dias - Luc. [Online]. Available at https://www.flickr.com/photos/37957896 (Accessed 28 May 2020)

Holland, W.J. 1903. The moth book: A popular guide to a knowledge of the moths of North America. New York: Doubleday, Page & Co., xxiv, 479 p., xlviii pl. [Also available in various reprints, and title variants].

Homziak, N.T., Breinholt, J.W. and **Kawahara, A.Y.** 2016. A historical review of the classification of Erebinae (Lepidoptera: Erebidae). *Zootaxa*, 4189(3): 516-542.

Janzen, D. H. and **Hallwachs, W.** 2019. Dynamic database for an inventory of the macrocaterpillar fauna, and its food plants and parasitoids, of Area de Conservacion Guanacaste (ACG), northwestern Costa Rica. [Online]. Available at http://janzen.sas.upenn.edu (Accessed: 1 November 2019).

Janzen, D.H., Hallwachs, W., Blandin, P., Burns, J.M., Cadiou, J.-M., Chacon, I., Dapkey, T., Deans, A.R., Epstein, M.E., Espinoza, B., Franclemont, J.G., Haber, W.A., Hajibabaei, M., Hall, J.P.W., Hebert, P.D.N., Gauld, I.D., Harvey, D.J. , Hausmann, A. , Kitching, I.J. , Lafontaine, D. , Landry, J.-F., Lemaire, C. , Miller, J.Y., Miller, J.S., Miller, L., Miller, S.E., Montero, J., Munroe, E., Green, S.R., Ratnasingham, S., Rawlins,

J.E., Robbins, R.K., Rodriguez, J.J., Rougerie, R., Sharkey, M.J., Smith, M.A., Solis, M.A., Sullivan, J.B., Thiaucourt, P., Wahl, D.B., Weller, S.J., Whitfield, J.B., Willmott, K.R., Wood, D.M., Woodley, N.E. and **Wilson, J.J.** 2009. Integration of DNA barcoding into an ongoing inventory of complex tropical biodiversity. *Molecular Ecology Resources*, 9(Suppl. 1): 1-26.

Kaye, W.J. 1901. A preliminary catalogue of the Lepidoptera Heterocera of Trinidad. *Transactions of the Entomological Society of London*, 1901: 115-158, 2 pls.

Kaye, W.J. and **Lamont, N.** 1927. A catalogue of the Trinidad Lepidoptera Heterocera (moths). *Memoirs of the Department of Agriculture, Trinidad and Tobago*, 3: 144 p.

Kirkpatrick, T.W. 1953. Notes on minor insect pests of cacao in Trinidad. Part 2. Lepidoptera (butterflies and moths). p. 67-72. *In* ICTA, A Report on Cacao Research 1953. St. Augustine, Trinidad: Imperial College of Tropical Agriculture (ICTA).

Kühne, L. and **Speidel, W.** 2004. The system of the Catocalinae – a historical survey (Lepidoptera, Noctuidae). *Beiträge zur Entomologie*, 54(1): 147-184.

Lafontaine, J.D. and **Schmidt, B.C.** 2010. Annotated check list of the Noctuoidea (Insecta, Lepidoptera) of North America north of Mexico. *ZooKeys*, 40: 1-239.

Lima, A.M da C. 1936. Terceiro catalogo dos insectos que vivem nas plantas do Brasil. Rio de Janeiro,: Diretoria de Estatistica da Produção. 460 p.

Linnaeus, C. 1758. Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synomymis, locis. Editio Decima, reformata. Holmiae: Laurentius Salvius. 1: iv + 823 + [1] p.

Linnaeus, C. 1767. Systema naturae. Editio duodecima reformata. Holmiae: Laurentius Salvius. 1(2): [ii] + 533-1328 + [36] p.

Merian, M.S. 1705. Metamorphosis insectorum surinamensium. In qua erucae ac vermes surinamenses, cum omnibus suis transformationibus, ad vivum delineantur et describuntur, singulis eorum in plantas, flores et fructus collocatis, in quibus reperta sunt; tunc etiam generatio ranarum, bufonum rariorum, lacertarum, serpentum, araneorum et formicarum exhibetur; omnia in America ad vivum naturali magnitudine picta atque descripta. Amsterdam, Netherlands: Gerard Valk. [iv], 60 p., 60 pl. [Also available in multiple editions and facsimile reprints].

Miller, J.C., Janzen, D.H. and **Hallwachs, W.H.** 2007. 100 butterflies and moths: portraits from the tropical forests of Costa Rica. Cambridge, Massachusetts, USA: Belknap Press of Harvard University Press. 256 p.

Núñez Aguila, R. and **Barro Cañamero, A.** 2012. A list of Cuban Lepidoptera (Arthropoda: Insecta). *Zootaxa*, 3384: 1-59.

Pastrana, J.A. 2004. Los Lepidópteros Argentinos sus Plantas Hospedoras y otros Substratos Alimenticios. Tucuman, Argentina: South American Biological Control Laboratory USDA-ARS and Sociedad Entomológica Argentina. xvi + 334 p.

Plester, L. 1994. De fus' time in Tobago. *Bulletin of the Amateur Entomologists' Society*, 53: 89-96, 99-103, 151-156.

Poole, R.W. 1989. Noctuidae. Lepidopterorum catalogus. (New Series, edited by J. B. Heppner, Fasc. 118, 3 vols). Leiden, Netherlands: E. J. Brill. 1314 p.

Quinn, M. 2008. Black witch moth *Ascalapha odorata* (Linnaeus, 1758) life cycle photographs & rearing note. [Online]. Available at http://texasento.net/witch_pix.htm (Accessed 28 May 2020)

Richards, A.G. 1933. Comparative skeletal morphology of the noctuid tympanum. *Entomologica Americana (n.s.)*, 13 (1932): 1-43, pls 1-20.

Robinson, G.S., Ackery, P.R., Kitching, I.J., Beccaloni, G.W. and **Hernández, L.M.** 2020. HOSTS - A Database of the World's Lepidopteran Hostplants. Natural History Museum, London. [Online]. Available at http://www.nhm.ac.uk/hosts (Accessed 28 May 2020)

Wilson, H.F. 1894. A list of Trinidad butterflies and moths. *Journal of the Field Naturalists' Club*, 2(4): 102-104.

Wolcott, G.N. 1951. The Insects of Puerto Rico. Lepidoptera. *Journal of Agriculture of the University of Puerto Rico*, 32: 537-748.

Zenker, M.M., Botton, M., Teston, J.A. and **Specht, A.** 2010 Noctuidae moths occurring in grape orchards in Serra Gaúcha, Brazil and their relation to fruit-piercing. *Revista Brasileira de Entomologia*, 54(2): 288-297.

Zilli, A. 2003. A new species of the late genus *Letis* Hübner, [1821] from Ecuador: an exercise of symmetry (Lepidoptera: Noctuidae). *Quadrifina*, 6: 141-152.

Zimmerman, E.C. 1958. Insects of Hawaii. A Manual of the Insects of the Hawaiian Islands, including an Enumeration of the Species and Notes on their Origin, Distribution, Hosts, Parasites, etc. Volume 7 Macrolepidoptera. Honolulu, Hawaii, USA: University of Hawaii Press. ix, 542 p.