LIVING WORLD
Journal of the Trinidad and Tobago Field Naturalists' Club
admin@ttfnc.org

ISSN 1029-3299

TRINIDAD AND TOBAGO
FIELD NATURALISTS' CLUB

The Skipper Butterflies (Hesperiidae) of Trinidad Part 16, Hesperiinae, Genera Group J, *Vettius* - *Naevolus*

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Cock, M.J.W. 2009. The Skipper Butterflies (Hesperiidae) of Trinidad Part 16, Hesperiinae, Genera Group J, *Vettius* - *Naevolus*. *Living World, Journal of The Trinidad and Tobago Field Naturalists' Club*, 2009, 11-31.

The Skipper Butterflies (Hesperiidae) of Trinidad
Part 16, Hesperiinae, Genera Group J, *Vettius* - *Naevolus*

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ABSTRACT
Trinidad skippers of the genera *Vettius*, *Turesis*, *Thoon*, *Justinia*, *Eutychide*, *Onophas* and *Naevolus* (Evans' Genera Group J; Moncini (part)) are treated. Details are given of the taxonomy, history, description, identification and biology of the 12 Trinidad species in these genera. Of these, only one species, *Vettius fantasos* (Stoll), occurs in Tobago. Adults of all species are illustrated, as are the male genitalia of *Vettius tertianus* (Herrich-Schäffer), *Eutychide complana* (Herrich-Schäffer) and *E. subcordata subcordata* (Herrich-Schäffer). The life histories of *Vettius phyllus phyllus* (Cramer) (from Colombian material), *Justinia justinianus hyperythrus* (Kaye), and *E. s. subcordata* are described and illustrated.

Key words: Trinidad, Hesperiidae, *Vettius*, *Turesis*, *Thoon*, *Justinia*, *Eutychide*, *Onophas, Naevolus,* life history.

INTRODUCTION

Over the years, I have treated the skipper butterflies of Trinidad in Living World (Cock 2007 and earlier) and all subfamilies and groups have now been covered apart from Evans' (1955) genera Groups I and J. These are a single group which Evans split on the pragmatic basis that Group I contains the "tawny" (orange marked) species. These groups contain many brown species with similar markings. They are relatively less well-known and collected than other Hesperiidae, and the life histories of most have not been documented.

Evans (1955) characterises these groups by the arrangement of the nudum (the greater portion is on the apiculus with only 3-4 segments on the club itself), and by the palpi, where the second segment is slender and cylindrical or quadrate, i.e. the inside width is equal to the width of the side against the head. Beyond this there is considerable variation. In practice, Trinidad collectors may find it simpler to consider these groups as all skippers that have not been treated in my earlier papers.

The present contribution covers the genera *Vettius* to *Naevolus* which Evans treats at the end of his Group J – my rationale being that these comprise some of the more obvious and larger species, which are more likely to be familiar to collectors, and relatively easily identified.

Infra-family classification of Hesperiidae is in a state of flux, as DNA methods and a global approach finally start to rationalise the subfamily and tribal classification (Warren *et al*. 2008). Below the subfamily level, the arrangement used by Evans (1955 and earlier works) was mostly a matter of conveniently grouping superficially similar species. Nevertheless, Evans' genera Group J mostly (or all) fall within the new tribe Moncini, together with some but not all species from genera Groups I, L, N and O (Warren *et al*. 2008). Of the general treated here, *Vettius* and *Eutychide* have been included in the new classification, but as yet not the others.

Increasingly, the internet provides a vehicle to make key rare works widely available, which might not otherwise have been consulted. The mammoth *Biologia Centrali-Americana* (Godman and Salvin 1879-1901) is a particular case in point. As their treatment of Hesperiidae includes colour figures of adults, accurate male genitalia drawings and drawings of male venation with brands and stigmas, it is a particularly useful resource. Volumes of Seitz's *Macrolepidoptera of the World* are starting to appear (Biodiversity Heritage Library 2009), and hopefully other important works such as Sepp (1843-48) which is referred to below, will also soon be available. This combined with the 2004 neotropical Butterfly Checklist (Mielke 2004), The Bibliography of neotropical Hesperiidae (Mielke 2005), and The Catalogue of Neotropical Butterfly Food Plants (Beccaloni *et al*. 2008) means that it is now possible to be confident that almost all works dealing with a particular Hesperiidae species can be identified, and in particular what illustrations and food life history information are available in the literature.

Similarly, internet based databases of plant names facilitate checking of names. Thus in this paper, the plant names used follow Tropicos (2009).

All specimens illustrated are in the author's collection unless indicated otherwise. Similarly, any specimens referred to without attributing a collector or collection, were collected by the author and are in either the author's collection or the collection of CAB International, Curepe, Trinidad. Other conventions and abbreviations follow earlier parts of this series (Cock 2007 and earlier papers). The museum abbreviations are given in the acknowledgements at the end of the paper.

Vettius Godman 1901

Most species of this genus have the UNH conspicu-

ously marked, making them relatively easy to recognise in the field. Several species feed on Marantaceae, Arecaceae or Poaceae, and have caterpillars with a pale head and strong dark lateral band from the apex to the ocelli. The caterpillar of *V. tertianus* (Herrich-Schäffer) is rather different in appearance and feeds on bromeliads in association with ant-gardens, suggesting it may not be congeneric.

184. J45/8 *Vettius phyllus phyllus* (Cramer 1777)

Figs. 1-6.

This species occurs in four subspecies from Panama to southern Brazil and Bolivia (Evans 1955; Mielke 2004). The nominate subspecies was described from Suriname, and its range extends to Panama in the north, through the Guianas to the Amazon and Matto Grosso in Brazil (Evans 1955). It was first recorded from Trinidad by Crowfoot (1893) as *Carystus phyllus*, and Kaye (1904, No. 280; 1921, No. 432) considered it "fairly frequent".

Sexes similar (Figs.1-2); female larger with more rounded wings; male with a triangular brand at base of space 2 and in adjacent space 1B UPF. UPF black, fringe concolorous; white hyaline spots in spaces 2, 3, 6, 7, lower cell; white spot lower space 1B; narrow orange streak space 12; blue streak basal half space 1A. UPH black; fringe concolorous, white at tornus; white discal spot across spaces 2-4, with veins dark, especially distally; basal half vein 1B white, blue hairs on basal half veins 1B, and to two-thirds on lower cell and vein 2. Thorax and abdomen black above with orange hairs on anterior thorax, blue hairs on posterior thorax and abdomen, pale blue scales on abdomen; head above black with white spots; collar orange-brown laterally; body white below, orange-brown immediately below the wings; legs black and white. UNF black, dark grey in spaces 1A and 1B; spots as UPF; a yellow sub-apical bar from space 4 at margin to space 8 at costa, dark on veins. UNH distinctive in black, yellow, white and orange-brown; ground colour black; fringe black, except white at tornus; costa narrowly black; a broad stripe from base of costa to margin of spaces 6, 7 and costa, orange-brown basal third, yellow distal two-thirds; a second broad yellow stripe from base of cell to margin of spaces 4-5, paler where the white discal spot lies UPH; a short white line on middle of vein 1B; space 1A orange-brown. F ♂ 16.5-17.5 mm; ♀ 19 mm. Illustrations in Godman and Salvin (1879-1901, ♂ venation and genitalia, Plate 102.28-29), Lewis (1973, ♂ UPS Fig. 88.26).

This species with its black, yellow and orange-brown striped UNS (Fig. 3, Colombia specimen) is unlikely to be confused with any other in the field, except *V. m. marcus* (Fig. 9). *Vettius p. phyllus* is larger, the yellow stripes are brighter yellow, and *V. m. marcus* does not have the orange-brown base to the yellow costal stripe UNH or space 1A UNH orange-brown.

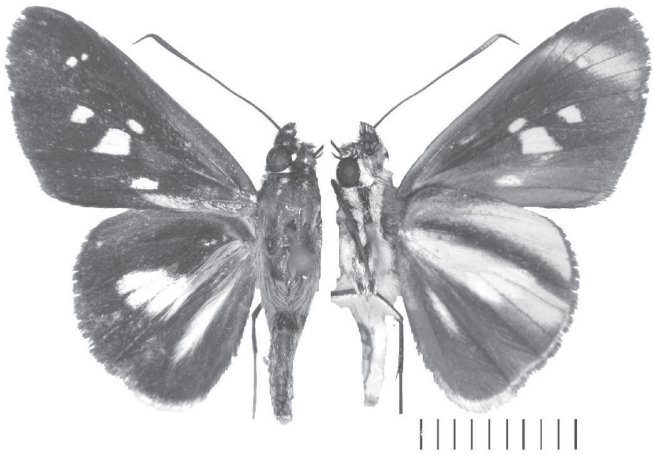

Fig. 1. Adult ♂ *Vettius phyllus phyllus* (Cramer), Arima-Blanchisseuse Road, milestone 9¾, Andrew's Trace, 17.iii.1982. Scale in mm.

Fig. 2. Adult ♀ *Vettius phyllus phyllus* (Cramer), Parrylands, 2.ii.1980. Scale in mm.

This is a species associated with forests in Trinidad. It is widespread, with records from the Northern Range including the drier forests of Morne Catherine and Point Gourde, as well as the southern forests. It seems to be commoner at lower altitudes, but is also found on the ridge-tops of the Northern Range. I have observed what appeared to be territorial behaviour in a forest clearing on the summit of Mt. Tabor (c. 570 m, 1860 ft.) between 09.30 and 10.30 (13.i.2004). Captures seem to be more frequent in the dry season, but it can probably be found in all months of the year.

Nothing seems to have been reported on the biology of this species (Mielke 2005) apart from my unpublished record of *Ctenanthe* sp. (Marantaceae) as a food plant in Chinchiná, Caldas, Colombia in Beccaloni *et al.* (2008) compilation of the food plants of Neotropical butterflies.

The following description is based on that rearing (MJWC 94/403).

Fig. 3. Newly emerged adult male *Vettius phyllus*, collected as caterpillar on *Ctenanthe* sp., Chinchiná, Colombia, 13.x.1994 (MJWC 94/403). This specimen is orange-brown at the base of the middle yellow stripe, which is not present in Trinidad specimens.

An 11 mm third instar caterpillar was collected in a leaf shelter of *Ctenanthe* sp., 13.x.1994 and reared through to adult on an ornamental *Calathea* sp. (Marantaceae). The original shelter was made by making a cut from the margin of a leaf to the midrib, leaving 90 mm of leaf distal to this; the distal portion of the leaf hung down under the weight of the cut portion, which was rolled upwards in several rolls, forming a spiral in cross-section. The caterpillar sheltered in the innermost portion of the roll, and fed from the cut edge within the shelter – an unusual example of a hesperiid caterpillar using its shelter to hide its feeding site. The caterpillar had a black head (2.0 x 1.5 mm high x wide) and the body was shiny dark green.

The fourth instar caterpillar (Fig. 4) grew to 23 mm. The head was rounded triangular, narrower than most Hesperiinae (2.7 x 2.0 mm high x wide), slightly indent at vertex; shiny, rugose; black, except for a short paler streak from apex of each epicranium, down face. T1 with narrow black plate on posterior margin. Body dull translucent green; anal plate dark; all legs concolorous.

The fifth instar caterpillar (Fig. 5) was 25 mm long three days after moulting, but the final length was not recorded. Head 3.8 x 2.6 mm (high x wide), nearly oval, but narrower dorsally, and slightly indented at vertex; matt, rugose; translucent dull green, with a broad black stripe from the vertex, laterally to the mouthparts; posterior margin narrowly dark. T1 dorsal plate concolorous. Body dull translucent whitish green due to the underlying fat bodies; dorsal line darker due to absence of fat bodies; ventrally and ventro-laterally white, with diffuse margin to lateral band, which is darker and clear due to absence of fat bodies. Spiracles at the margin between the ventro-lateral area and lateral stripe; light brown, inconspicuous, except that of A8 which is surrounded by white area. Gonads yellow, hemispherical. All legs concolorous. Wax glands in mature larva a ventro-lateral area from the posterior margin of A3 to A8, interrupted behind prolegs A4, between prolegs A4 and A5, then continuous around prolegs to A8.

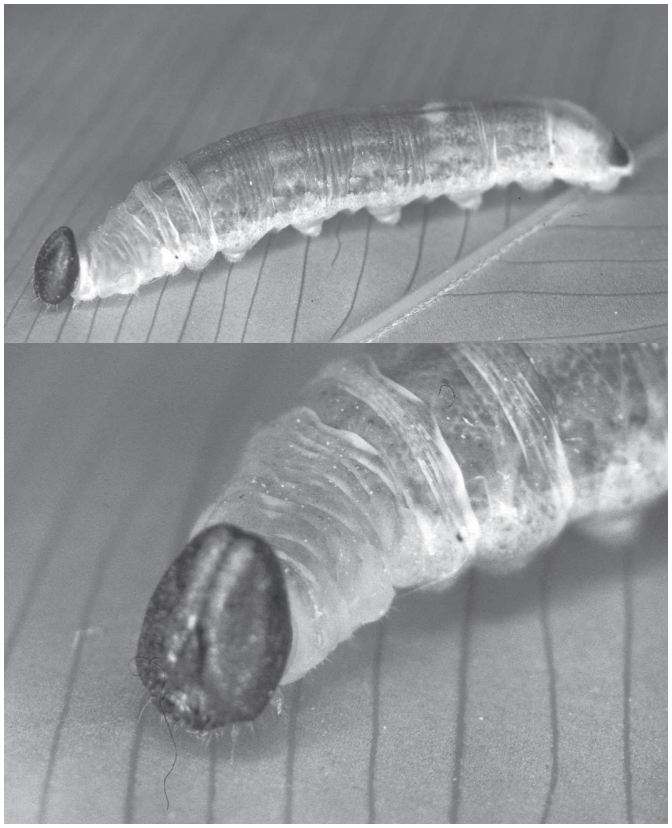

Fig. 4. Fourth instar caterpillar of *Vettius phyllus*, 23 mm. Collected on *Ctenanthe* sp., Chinchiná, Colombia, 13.x.1994 (MJWC 94/403). **Above**, dorso-lateral view; **below**, close up of head.

Pupa 19 mm, rather featureless, no frontal spike; proboscis extends to cremaster; light brown; lightly covered with white waxy powder, the lining of the shelter more so.

Subsequently, I found but failed to rear a caterpillar (Fig. 6) at Point Gourde, 14.vii.1996 (MJWC 96/7), which I could not distinguish from the fifth instar of my Colombian material. This caterpillar was on *Stromanthe tonckat* (Aubl.) Eichler (Marantaceae) in a shelter similar to that described for the Colombian caterpillar, so most likely was *V. phyllus*.

Fig. 5. Fifth instar caterpillar *Vettius phyllus*, 23 mm. Collected on *Ctenanthe* sp., Chinchiná, Colombia, 13.x.1994 (MJWC 94/403). **Above**, dorso-lateral view; **below**, close up of head.

Fig. 6. Fifth instar caterpillar probably of *Vettius phyllus*, 28 mm. Collected on *Stromanthe tonckat*, Point Gourde, 14.vii.1996 (MJWC 96/7). **Above**, dorso-lateral view; **below**, close up of head.

185. J45/9 *Vettius marcus marcus* (Fabricius 1787)
Figs. 7-9.

This species is treated as having two subspecies (Evans 1955; Mielke 2004). The nominate subspecies was described from Guyane (French Guiana), and ranges north to Guatemala and south to Argentina and Bolivia, whereas ssp. *aurelius* Plötz is found from Guatemala to western Venezuela and Colombia. Thus, the two subspecies seem to overlap in part of their range and their taxonomic status may justify further research.

Sexes similar (Figs. 7-8); female slightly larger with more rounded wings; male with no brand UPF. UPF dark brown; fringe concolorous; white hyaline spots in spaces 2, 3, 6, usually 7, and upper cell; small white spot in lower space 1B. UPH brown; fringe brown, except white in spaces 1B-1C; white discal spot from upper space 1C to 5; white tornal spot across upper space 1B and lower space 1C. Body dark above; head dark with white spots and orange-brown collar; white below; legs brown. UNF brown; yellow at base of costa; yellow sub-apical band from margin of space 4, to short of costa at space 7, veins dark brown; yellow-white spot across space 1B reaching white hyaline spot in space 2. UNH distinctive in brown, yellow and white; ground colour yellow; fringe brown, except white in spaces 1A to 1C; brown band from base to margin of space 5; brown band in distal half space 1A, distal third of space 1B, and from space 1B to margin at space 3 in a V shape with point at middle of UNH on vein 2; yellow ground colour paler where the white discal and tornal spots are UPH. F ♂ 15.5; ♀ 14.5-15.0. Illustrations in Godman and Salvin (1879-1901, ♂ genitalia, Plate 102.10), Lewis (1973, ♂ UPS Fig. 88.24, UNS Fig. 88.25), Canals (2003, p. 113 UPS and living adults).

In Trinidad, this species with its distinctive yellow and brown UNH (Fig. 9) is only likely to be confused with *V. p. phyllus* above, under which differences are discussed.

Fig. 7. Adult ♂ *Vettius marcus marcus* (Fabricius), Lower Morne Catherine, 17.i.1988. Scale in mm.

Fig. 8. Adult ♀ *Vettius marcus marcus* (Fabricius), Mt. Tabor, 1500 ft. (c. 460 m), 22.vii.1978. Scale in mm.

Kaye (1914; 1921, No. 430) reports *V. marcus* as "not rare in the island". It is a widespread and regularly encountered species in forests in both north and south Trinidad, including the north-west peninsula (Morne Catherine, Point Gourde). It does not seem to be found much on the ridge-tops and mountains of the Northern Range, although I have one specimen from about 1500 ft., on Mt. Tabor (22.vii.1978).

Fig. 9. Adult ♀ *Vettius marcus marcus* (Fabricius), Point Gourde, 27.ii.1994.

The recorded food plants are palms. Moss (1949) reared it from marajá palm (*Bactris* sp. according to MMPND (2009)) and cocínho palm, but does not record or illustrate any details of the early stages. Hayward (1969) states that the caterpillars feed on species of palms, but it is not clear whether this is based on fresh observations or on Moss (1949).

186. J45/12 *Vettius fantasos* (Stoll 1780)

Figs. 10-11.

Evans (1955) treated *V. fantasos* as having two subspecies, but these are now considered separate species: *V. fantasos* and *V. onaca* Evans (Monroe and Miller 1967; Mielke 2004). *Vettius fantasos* is found from Paraguay to Mexico (Evans 1955), and strays rarely into Texas (Scott 1986; Opler and Malikul 1992).

Kaye (1940, No. 428C) added *V. fantasos* (as *Carystus fantasos*) to the Trinidad list, based on "only one record so far of this fairly common and widely distributed species, i-ii.1926 (W. J. Kaye)". Before this, Sheldon (1936) had already recorded it from Speyside, Tobago, based on captures by A. Hall and himself.

Sexes similar (Figs. 10-11); female larger with more rounded wings; male with no brand UPF. UPF dark brown; fringe concolorous, paler in space 1B; white hyaline spots in spaces 2, 3, 6, 7, and a trace in 8; pale yellow-brown spot in lower space 1B. UPH brown; fringe paler; orange-brown discal spot from upper space 1C to space 5, with veins brown. Body dark above; white below; legs pale brown. UNF costa and distal third of wing chestnut brown, blackish on disc and dorsum; base of costa pale; diffuse pale patch in spaces 4-5; spot in space 1B white, extending across space in a narrow bar to spot in space 2. UNH distinctive in variegated chestnut brown and creamy white; veins brown; basal two-thirds of spaces 1B and 1C with a slight brown-grey tint; distal third of spaces 1B and 1C grey-brown. F ♂ 15-16 mm, a small individual of 12.5 mm; ♀ 16.5-17 mm. Illustrations in Godman and Salvin (1879-1901, ♂ genitalia, Plate 102.15), Lewis (1973, ♂ UNS Fig. 88.21), Riley (1975, ♂ Plate 23.10) and several internet sites.

A distinctive species – the chestnut and white variegated UNH with brown veins should serve to identify this species in the Trinidad fauna. Evans (1955) notes the UNH markings vary from largely chestnut to largely white, but they seem constant in Trinidad specimens examined.

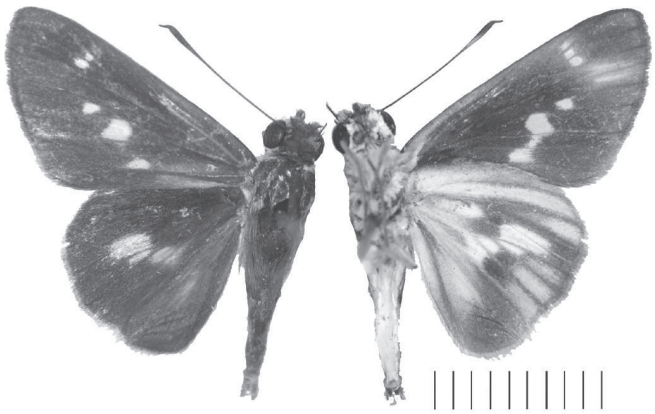

Fig. 10. Adult ♂ *Vettius fantasos* (Stoll), Lower Morne Catherine, 17.i.1988. Scale in mm.

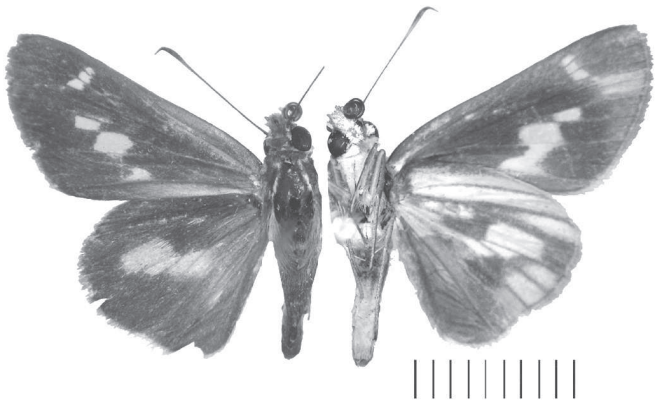

Fig. 11. Adult ♀ *Vettius fantasos* (Stoll), Lower Morne Catherine, 17.i.1988. Scale in mm.

In Trinidad, this species is restricted to the north-west peninsula, where it can sometimes be quite common on the lower slopes of Morne Catherine and on Point Gourde. It also occurs on Gasparee (S. Alston-Smith, ii. 2006). The association seems to be with drier forest.

Sepp (1843-48: 1847 p. 188, Plate 82) illustrates the life history and food plant from Suriname, and states that the food plant is the grass, *Panicum ramosum* L. This is an Asian grass now widely introduced and established throughout the tropics, and is usually known as *Urochloa ramosa* (L.) T. Q. Nguyen, but also sometimes as *Brachiaria ramosa* (L.) Stapf. Most probably based on Sepp's record, Draudt (1921-1924) states the caterpillars feed on grasses such as *P. ramosum,* and Hayward (1947) cites Draudt with the same information. Subsequent records of *B. ramosa* as the food plant (e.g. Scott 1986) are most likely also derived ultimately from Sepp. The grass in Sepp's plate is unlikely to be *U. ramosa* as the arrangement of the inflorescence is different, and it appears to be a *Lasiacis* sp. (Poaceae) (Y. Baksh-Comeau, pers. comm. 2008). Given that *Lasiacis* spp. are the normal food plants of *V. fantasos* (see below), Sepp's food plant record of *U. ramosa* is likely to be a misidentification.

Kendall (1976) collected caterpillars in Mexico on *Lasiacis* sp. "(? *ruscifolia*)" and reared one through. Subsequently, he stated that this was *Lasiacis* sp. "probably *divaricata*" (Kendall and McGuire 1984), which is now considered a synonym of *L. ligulata* Hitchc. and Chase. Janzen and Hallwachs (2009) include 38 rearing records in their database, nearly all from *Lasiacis procerrima* (Hack.) Hitchc. and *L. maculata* (Aubl.) Urb. (= *L. sorghoidea*), but also from *Olyra latifolia* L., two *Panicum* spp. and other grasses, and illustrate the caterpillar and pupa. The life history is not known from Trinidad or Tobago, but one or more of several recorded *Lasiacis* spp. grasses (Hitchcock 1936), including *L. ligulata* are most probably the main food plants.

Sepp (1843-48) states that the larvae hide between leaves, and that having fed upon one leaf, move to another to make a new shelter. He illustrates the caterpillar and pupa. The caterpillar is dull grey-green with a darker dorsal line, and paler ventrally including prolegs; the head is wider ventrally and indent at the vertex; it is similar in colour to the body, with what appears to be a strong dark line from vertex laterally to ocelli, and narrow dark lines close to the epicranial suture and along adfrontals. The pupa, which is shown in an opened leaf shelter, is slender with the abdomen rather elongate; there is a stout slightly upturned frontal spike; the colour is dull grey-green.

Janzen and Hallwachs (2009) include photographs of the final instar caterpillar in their database of Costa Rican rearing. The head is rounded triangular, indent at the vertex; translucent whitish green; a black stripe from vertex, laterally to the ocelli; a broad white stripe in front of this occupying about two-thirds of the width of the epicranium; the epicranial and adfrontal sutures narrowly dark; mouthparts reddish brown. The body is white due to underlying fat bodies; dorsal line darker; spiracles pale; legs concolorous. Although not an exact match to Sepp's (1843-48) painting – the head is broader in the latter and shows narrow black lines each side of the epicranial suture rather than along the suture – they are close enough that they are likely to represent the same species.

187. J45/13 *Vettius artona* (Hewitson 1868)
Fig. 12.

No subspecies are recognised for *Vettius artona* (Evans 1955; Mielke 2004), which was described from Brazil (Rio de Janeiro) and is found from Nicaragua to south Brazil (Evans 1955).

Sexes similar (Fig. 12); female larger with more rounded wings; male with no brand UPF. UPF dark brown; fringe concolorous; white hyaline spots in spaces 2, 3, 6-8 and an upper and lower cell spot; small white spot in lower space 1B. UPH brown; fringe paler; white spots in a row across spaces 1C or 2-4. Body dark brown above; collar weakly orange-brown; body white below; legs-brown. UNF costa light brown; distal third of wing lilac-brown with pale lines in middle of each space; disc and dorsum blackish brown; spot in space 1B larger than UPF, extending beyond spot in space 2, with diffuse margin. UNH ground colour lilac-brown, strongly infused with white on costa and dorsum; veins white; white spots in spaces 1C to 6, the last displaced inwards; white line down the middle of spaces 1C-6 distal to the white spots. F ♂ 16-17 mm; ♀ 17-17.5 mm Illustrations in Godman and Salvin (1879-1901, ♂ and genitalia, Plate 102.16-18), Lewis (1973, UNS Fig. 88.17), Canals (2003, p. 114 UPS, UNS).

The lilac-brown UNH with white veins, lines and spots

is distinctive in the Trinidad fauna, and easily recognised in the field. *Vehilius stictomenes stictomenes* (Butler) has similar markings but is a much smaller and darker butterfly.

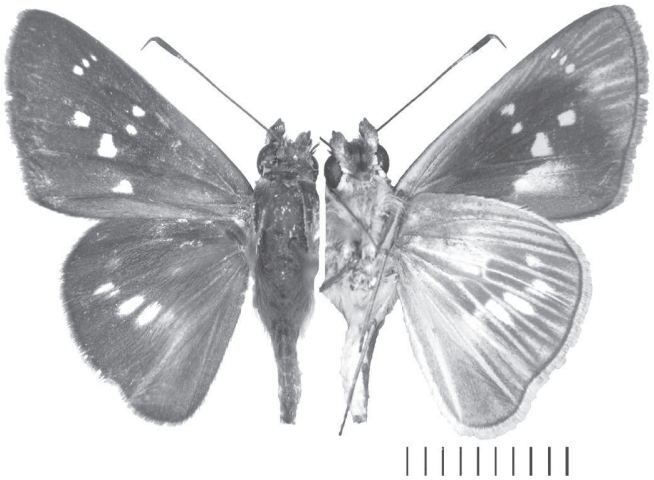

Fig. 12. Adult ♂ *Vettius artona* (Hewitson), Lalaja Ridge, 17.iii.1972. Scale in mm.

Kaye (1904, No. 279; 1921, No. 429) records this species from Trinidad based on "a single specimen from Tunapuna (P. L. Guppy)". This gives the impression that *V. artona* is not a common species, but actually it is a widespread and regularly encountered species in forests in both north and south Trinidad, including the north-west peninsula. It can be found at all altitudes, up to and including the summit of El Tucuche (19.vi.1979). Capture dates suggest a slight bias towards the dry season, but probably it can be found at all times of the year.

According to Beccaloni *et al*. (2008), Zikán and Zikán (1968) give *Bromelia* sp. (Bromeliaceae) as a food plant in Brazil.

187a. J45/21 *Vettius tertianus* (Herrich-Schäffer 1869)
Figs. 13-15.

There are no recognised subspecies of *V. tertianus* (Evans 1955; Mielke 2004), which was described from an unknown locality. However, Godman and Salvin (1879-1901) note that the male which they illustrate from Central America has the UNH more extensively white than South American specimens, and Steinhauser (1974) noted differences between the females from Central America and Colombia (and illustrated the genitalia from both). This is a rare but widespread species - there are specimens in the NHM from Costa Rica, Colombia and Trinidad, and synonyms were described from Suriname and Belem, Brazil (Evans 1955).

Strong sexual dimorphism. Male (Figs. 13-14). UPS and fringe dark brown. UNS body pale brown; legs brown. UNF brown distally, blackish brown on disc and dorsum; diffuse pale brown area at end cell to costa; costal vein of cell pale. UNH in shades of brown and white-brown: basal half of costa brown; a band from base of wing margin of spaces 6 and 7, white-brown basally, pale brown distally; brown band from base of wing to margin of spaces 2-5; pale brown in spaces 1B-1C, the basal part of space 1C paler; space 1A brown. F ♂ 15.5-16 mm. Illustration in Godman and Salvin (1879-1901, ♂ UNS 98.28).

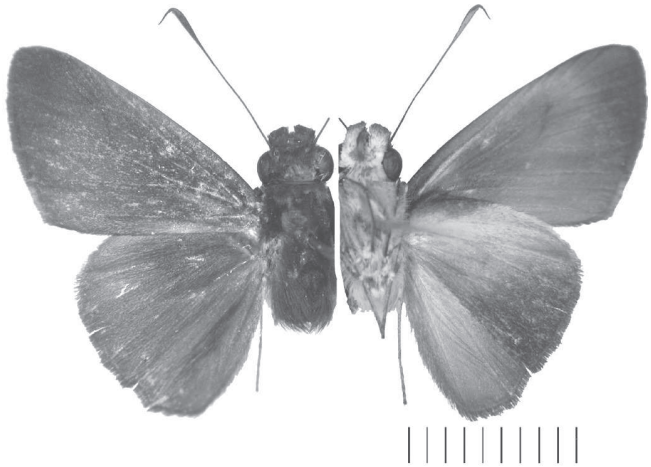

Fig. 13. Adult ♂ *Vettius tertianus* (Herrich-Schäffer), Mal d'Estomac Bay Trace, 5.ix.1982. Scale in mm.

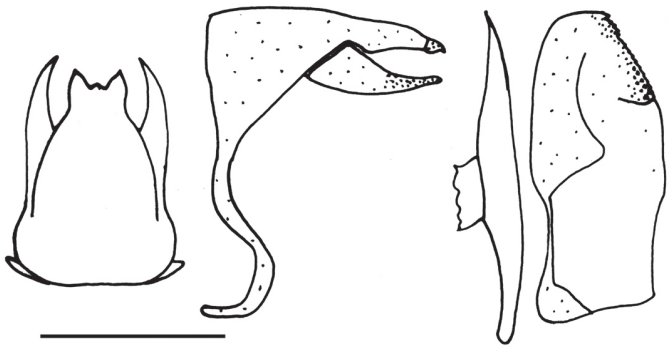

Fig. 14. ♂ genitalia of *Vettius tertianus* (Herrich-Schäffer), Mal d'Estomac Bay Trace, 5.ix.1982. From left to right: uncus and gnathos, dorsal view; uncus and gnathos, lateral view; aedaeagus, lateral view; left valve, internal view. Bar = 1 mm.

Female (Fig. 15). UPF brown; white hyaline spots in spaces 2, 3, 6 and 7; white spot in lower space 1B. UPH brown; diffuse white band from space 1C to 4, veins brown. Body brown above; white below; legs brown. UNF brown, paler on distal half of costa; spot in space 1B slightly larger than UPF; costal vein of cell pale. UNH predominantly white; fringe brown, white at apex; basal half of costa brown; brown band from base of upper space 1C across cell to space 5; broad brown margin widest in

space 2, narrowing and paler brown with increasingly diffuse margin to apex; spaces 1B and 1C with diffuse pale brown margin. Illustration in Steinhauser (1974, ♀ and ♀ genitalia).

Fig. 15. Adult ♀ *Vettius tertianus*, Las Lomas, 25.ii.1981, S. Alston-Smith, (specimen in SAS). Scale in mm.

Both male and female are distinctive amongst Trinidad skippers: the male by virtue of its plain brown UPS and unusual brown and white UNS, and the female by virtue of its distinctive UNS, particularly the white UNH marked with brown.

A male specimen listed by Evans (1955) in the NHM is the first published record of this species from Trinidad. I could not locate this specimen in the NHM, although there was an empty space over a "Trinidad" label. I overlooked Evans' record when compiling my 1982 list of the Trinidad and Tobago Hesperiidae (Cock 1982). I have taken a male (Mal d'Estomac Bay Trace, 5.ix.1982; Fig. 13) and Scott Alston-Smith (pers. comm.) has caught males at, Morne Catherine (i.1983, v.1986, iii.1984) and Edward's Trace, Moruga (v.1992), and females at Las Lomas, Spanish Farm (25.ii.1981; Fig. 15), Lalaja Ridge (viii.1990) and Inniss Field (v.2003). Thus unlike other species of this genus in Trinidad, this is one of the island's rarities, and it is difficult to suggest a pattern as to where it can be found, except that it will frequent forests where the epiphytic bromeliad, *Aechmea mertensii* (G. Mey.) Schult. & Schult. f., occurs in ant gardens (see below).

Moss (1949) bred this species once from "tiririca grande" (*Scleria* sp. Cyperaceae), reporting that "The pupa is brown and rounded at the extremities and is tightly packed in a closed web", but providing no information on the caterpillar. There is no preserved material of the early stages of this species from Moss' collection in the NHM.

An interesting study by Orivel and Dejean (2000) in Guyane showed that *V. tertianus* develops exclusively on the leaves of *Aechmea mertensii*, a bromeliad epiphyte restricted to ant gardens – the first record of myrmecophily by a hesperiid in the Americas. Plants of *A. mertensii* in gardens of *Pachycondyla goeldii* (Forel) (Ponerinae) are preferred, which is also unusual as this subfamily of ants do not normally interact with other arthropods in this way. Orivel and Dejean (2000) describe and illustrate the egg, caterpillar and pupa. The egg is large, approximately 2 mm in diameter, orange with a purple micropyle and is laid on the leaf upper surface, near the base. The caterpillars are green, lightly speckled with black, black spiracles and a brown head, darker posteriorly and darker in the earlier instars. However, there is no illustration of the face or description of any markings on the face, cf. Janzen and Hallwachs (2009) below. The caterpillars make a minimal shelter at the base of a leaf by pulling the sides together with a few threads of silk. The pupa is speckled yellow-brown, the head darker, with a short, stout pale brown frontal spike. It is formed on leaves or on the carton nest of the ant garden. The ants ignore the caterpillars and pupae, but the exact chemical mechanism was not identified.

From their work in Costa Rica, Janzen and Hallwachs (2009) include ten rearing records, all from *Catopsis floribunda* L.B. Sm. (= *C. nutans*) (Bromeliaceae), and illustrate the caterpillar and pupa. Their photographs show that the caterpillar has a dark patch each side of the anal plate and that the head is obscurely marked in shades of brown, showing a darker brown cross on the face with yellow-brown patches at the apex of each epicranium and in front of the ocelli. The pupa in their photographs is green with dark spiracles and the proboscis sheath extending to the cremaster, but basically similar to that illustrated by Orivel and Dejean (2000) – the difference in colour probably being attributable to age and lighting.

The well documented records of bromeliads as food plants for this species (Orivel and Dejean 2000; Janzen and Hallwachs 2009) suggest that Moss' (1949) record from a sedge may be incorrect. Furthermore, since Moss states there is no frontal spike on the pupa, whereas the above papers show that there is one, it seems that the early stages reported by Moss are not correctly associated with *V. tertianus*.

188. J47/1 *Turesis complanula* (Herrich-Schäffer 1869) Fig. 16.

This species has long been known as *T. lucas* (Fabricius) (e.g. Evans 1955; Cock 1982), but this was a long-standing misidentification as *lucas* has now been shown to be a senior synonym of *Panoquina sylvicola* (Herrich-Schäffer) (Robbins *et al*. 1996; Mielke and Casagrande 2002; Mielke 2004). The next available name is *complanula* (Herrich-Schäffer). It is found from

Guatemala to South Brazil, but is generally uncommon (Evans 1955).

Sexes similar (Fig. 16); female slightly larger, with wings more rounded. UPF brown, with ferruginous hairs basally; fringe brown; large yellow hyaline spots in spaces 2, 3, 6, 7 and upper and lower cell; yellow spot in lower space 1B. UPH brown, with ferruginous hairs over base and disc; fringe brown, paler at tornus; yellow hyaline spot in space 3 and a trace of one in space 2. Body brown above with ferruginous hairs; pale yellow-brown below on head and thorax, yellowish white on abdomen, with a weak darker ventral line basally. UNF chestnut on costa and apex, blackish brown on disc and dorsum; fringe concolorous except paler in space 1B; yellow spot in space 1B larger than UPF with a diffuse distal margin. UNH dark chestnut, space 1B less ferruginous; fringe paler; yellow hyaline spot in space 3, but only a trace in space 2. F ♂ 18 mm. Illustrations in Godman and Salvin (1879-1901, ♂ Plate 104.22-23).

Fig. 16. Adult ♂ *Turesis complanula* (Herrich-Schäffer), Arima-Blanchisseuse Road, milestone 9¾, Andrew's Trace, 3.xi.1980. Scale in mm.

The large yellow hyaline spots F, hyaline spot in space 3 UNH and chestnut UNS will serve to recognise this species in Trinidad.

A single male listed by Evans (1955) from Trinidad in the NHM is the first record of *T. complanula* from the island. I have seen just five specimens from the island, two from the north (♂ Andrew's Trace, 3.xi.1980; ♂ Mt. Tabor, c. 1000ft., 22.xi.1981), one from Central Trinidad (♂ Caparo, F. Birch, NHM, listed by vans (1955)) and two from the south (♂ Parrylands, 13.ii. 1980; ♀ Rio Claro, 15.ii. 1926 (N. Lamont) NMS). Scott Alston-Smith (pers. comm.) has captured six specimens from scattered locations, mostly southern forests and one from Mt. Tamana. Thus, this is a rare species associated with forest situations and could probably turn up in forests anywhere in the island.

Janzen and Hallwachs (2009) have reared more than 200 specimens in Costa Rica, mostly on *Pharus latifolius* L. and *P. mezii* Prod. (Poaceae). Their photos of the head capsules of the final instar are variable in colour and intensity, but show a pale ground colour, dark epicranial suture which may extend along adfrontals, dark band from vertex laterally to ocelli and yellow or red area anterior to ocelli. Dyer and Gentry (2009) illustrate the caterpillar found on *Pharus* sp. in Costa Rica under this name, but note that more than one species may be involved. Observations from Trinidad would be of interest.

Pharus latifolius and *P. parvifolius* Nash occur in Trinidad (Hitchcock 1936) and *P. latifolius* or both are likely to be the food plants of this uncommon skipper in Trinidad.

189. J48/5 *Thoon taxes* Godman 1900

Figs. 17-19.

This species was described from Panama, and is found from there through the Guianas to south Brazil (Evans 1995), with no subspecies (Mielke 2004). Evans (1955) lists a male and two females from Trinidad, and this was the first record of this species from Trinidad. I have examined these specimens in the NHM. The male is discussed below, but in my opinion, the two females curated as *T. taxes* are females of *Arita arita* Schaus, a forest species in Evans' Group J, with confusingly similar females, which I will treat in a future contribution.

Male. UPS brown; fringe brown, paler UPH. UPF white hyaline spots in spaces 2, 3, 6 and upper cell; yellow spot in lower space 1B. Brand conspicuous, black, in two parts: the upper part covering the base of space 2, 2 mm long against vein 2, external margin in an arc extending in a very fine upper point to half the width of the base of space 2; the lower part under vein 2 just below and parallel to but slightly shorter than the lower margin of the upper part. All other specimens in the NHM have the outer margin of the upper brand truncate with no extension along the base of space 2. Body brown above; head pale below, palpi segment 2 slightly tawny; thorax pale brown below; abdomen white below with a thin ventral dark line. UNF brown; blackish brown on disc and dorsum; spot in space 1B on UPF is not present UNF, but there is a diffuse white area, with a sharp diagonal basal margin which at the upper end aligns with the middle of the white hyaline spot in space 2. UNH brown, fringe paler; pale spots in spaces 1C-5 and cell; a pale spot in space 1B, with the base pointed. Illustrations in Godman and Salvin (1879-1901, ♂ UPS and UNS Plate 97.39-40), Lewis (1973, ♂ UPS Fig. 87.36).

SAS has a specimen which probably belongs to this species (Fig. 18), but it lacks the white hyaline cell spot

UPF, and has dots in spaces 6-8; the upper arm of the brand in space 2 extends to the base of space 3, unlike any other specimens I have seen; UNH has more of an olive tint; UNH spots more diffuse; spot in cell UNH closer to end cell; UNS abdomen has no dark ventral line. They may well be different species, but if so, I could not match it in the NHM.

Fig. 17. Adult ♂ *Thoon taxes* Godman, Arima Dist., xii.1931-ii.1932, A. Hall, (specimen in NHM). Scale in mm.

Fig. 18. Adult ♂ *Thoon taxes* Godman, Trinidad, S. Alston-Smith, (specimen in SAS). Scale in mm.

Female, similar to male, but without the brand, and wings more rounded: the yellow spot in space 1B UPF is more pronounced; apical spots are present in spaces 6-8, that in space 8 displaced apically; the inner margin of the white area in space 1B UNF is diagonal.

Moss (1949) bred this species "from *Carex* sp. [Cyperaceae] and from a ground bamboo [*Olyra* sp. Poaceae]", but does not illustrate any early stages. His preserved material in the NHM includes three emerged pupae in leaf shelters, one with an associated cast caterpillar skin covered in white waxy powder. The head capsule is about 3.5 mm high, and 2.5 mm wide; pale brown, with a dark band from the vertex to the ocelli, and another along the epicranial suture and the afrontals. The pupal shelter is

Fig. 19. Adult ♀ *Thoon taxes* Godman, Brazil, Pará, reared on *Carex* sp., A. M. Moss, (specimen in NHM). Scale in mm.

made in a folded leaf of what appears to be *Olyra* sp. The inside of the shelter and the pupa are covered with white waxy powder. The pupa is 20 mm long, pale brown; no frontal spike; the proboscis sheath extends to the cremaster. There is another head capsule pinned with this pupa, which is incorrectly associated, as it does not match the one I have described which was within the shelter wedged against the cremaster. Moss labelled this material "*Rhinthon cynea*", and applied the same name to reared male and female *T. taxes* (in the NHM), so not only the immature stages, but the two sexes of this species should be correctly associated. I have not located any other information on the food plants or early stages.

***Justinia* Evans**

Males of *Justinia* and *Eutychide* (treated next) have distinctive brands at the base of space 2, over and under vein 2 and over vein 1. These brands, the relatively long antennae, and the reasonably distinctive UNH markings should help to identify these species.

190. J49/3 *Justinia gava* Evans 1955

Figs. 20-21.

Evans (1955) described this species from Guyana (formerly British Guiana), and its range is restricted to the Guianas and Trinidad (Cock 1982).

Sexes similar (Figs. 20-21); female larger, with more rounded wings; male with a three-part brown brand: a V shape along base of space 2 (2.5 mm) and above basal part of vein 2 (1.5 mm), below basal part of vein 2 (1.8 mm) and above vein 1 (2.0 mm). UPF dark brown; fringe concolorous, paler in space 1B; white hyaline spots in spaces 2, 3, 6, 7 and upper cell; semi-hyaline spot in space 1B. UPH brown; fringe paler. Body above dark brown; head orange-brown laterally; head pale brown below; thorax dark brown below; abdomen pale below with dark ventral line; legs dark brown. UPF basal half of costa chestnut; yellow spots at mid costa and end of space 8;

apex chestnut, paler and slightly lilac at the ends of spaces 3-5; disc and dorsum blackish brown, paler distal to the white spot in space 1B; thin black line along margin. UNH dark chestnut brown; space 1B grey-brown; a diffuse whitish band from base of space 1C, across cell to mid costa; marginal area of spaces 2-5 paler; one female has fine yellowish streaks at margin in middle of each spaces 2-5; a distinct white spot at mid space 1C; a thin black line along margin. F ♂ 15.5-16 mm; ♀ 16.5-17 mm.

The white bar UNH against a dark chestnut ground colour, together with the spot mid space 1C should suffice to distinguish this species in Trinidad. Evans (1955) states that the forewing length of this species is 18 mm and the material in the NHM curated by Evans are consistently distinctly larger than the Trinidad material that I have seen. It may be that the specimens from Trinidad represent a small strain, perhaps restricted to the island, or possibly a distinct species.

Fig. 20. Adult ♂ *Justinia gava* Evans, Morne Catherine, 24.iii.1982. Scale in mm.

Fig. 21. Adult ♀ *Justinia gava* Evans, Mal d'Estomac Bay Trace, 6.ix.1983. Scale in mm.

I added this species to the Trinidad list (Cock 1982) based on specimens from Morne Catherine (♂ 24.iii.1982), Upper Lady Chancellor Road (♀ 28.i.1979), the summit of El Tucuche (♂ 19.vi.1979), and Guanapo Valley (♂ 16.ii.1980). Since then I have seen specimens from Andrew's Trace (♂ 19.iv.1982) and Mal d'Estomac Bay Trace (♀ 6.ix.1983), and there is an undated specimen in HEC collected by F. W. Jackson from "Trinidad forests & mountains". Thus, this seems to be a fairly uncommon species of the Northern Range and immediate vicinity, usually associated with forest.

The biology and food plants do not seem to have been recorded (Mielke 2005; Beccaloni *et al*. 2008). Given the observations on the next species, the food plant is likely to be sedges, such as a *Scleria* spp.

191. J49/4 *Justinia justinianus hyperythrus* (Kaye 1914)
Figs. 22-27.

There are four subspecies of *Justinia justinianus* (Latreille) (Mielke 2004), which is recorded from Venezuela to Argentina (Evans 1955) Kaye (1914) described the Trinidad subspecies as *Euroto hyperythrus* based on the type which he collected near Port-of-Spain, in June 1898; the male type is in MGCL. Bell (1932) also described it from Trinidad, as *Eutychide insulanus*, and illustrated the male genitalia (Evans 1955; Mielke 2004). Evans (1955), and hence Cock (1982), treated the Trinidad subspecies as *tavola* Schaus, which was described from Trinidad (Schaus 1902). However, having examined the type specimen, Mielke (1994) reported that *tavola* had been misidentified by Evans (1955) and was another species - the one that Evans treated as *Phanes hoffmanni* Bell, which is restricted to Brazil and not found in Trinidad. Accordingly, the type specimen of *tavola* must have been incorrectly labelled as from Trinidad. Hence, *hyperythrus* Kaye is the senior name available for the subspecies of *Justinia justinianus* found in Trinidad (Mielke 2004), with *insulanus* a synonym. At present, it is reported only as an endemic subspecies.

This species occurs in the Trinidad literature under several names. Kaye (1904, No. 259; 1921, No. 405) first reports it as *Phanis* [sic!] *justinianus* based on "a single specimen in July", but this is actually *Phanes aletes* (Geyer), which Kaye incorrectly lists as a synonym, probably based on Godman and Salvin (1879-1901, Plate 99.24-27) who illustrate *Phanes aletes* (Geyer) as *justinianus*.

Then, as stated above, Kaye described it as *Euroto hyperythrus* (Kaye 1914; 1921, No. 408). In the same publications he also lists it as *Eutychide cingulicornis* (Herrich-Schäffer) from "St. Ann's (G. E. Tryhane)" (Kaye 1914; 1921, No. 403), which may reflect the uncritical inclusion of G. E. Tryhane's identification without seeing the specimen - since *cingulicornis* is a synonym of ssp. *justinianus* from south Brazil and Argentina.

Sexes similar (Figs. 22-23); female larger with more rounded wings, and may have a white spot in space 1B UPF; male has brands similar to those described for *J. gava* above. UPF dark brown; fringe concolorous; white hyaline spots in spaces 2 (narrow), 3, 6 and 7. UPH dark brown; fringe concolorous. Body dark brown above; head pale brown below; thorax brown below; abdomen dark brown with a pair of pale brown sub-ventral lines; legs brown. UNF dark orange-brown basal half of costa; dark chestnut brown with purple tint apically; black-brown on disc and dorsum; diffuse white spot in space 1B; a thin black line along margin. UNH dark chestnut with purple tint, paler basally and at margin; space 1B grey-brown; a thin black line along margin. F ♂ 15 mm – a small individual of 12 mm; ♀ 15.5 mm – a small individual of 13 mm. Illustrations in Lewis (1973, ♂ UNS Fig. 83.19).

A less distinctive species than others treated here. The male brands, narrow spot in space 2, purple tint UNS and especially the UNH with slightly paler base and margin (Fig. 24), should help to recognise it.

Fig. 22. Adult ♂ *Justinia justinianus hyperythrus* (Kaye), Lopinot-Arima Ridge, [Andrew's Trace] 8.ix.1979. Scale in mm.

Fig. 23. Adult ♀ *Justinia justinianus hyperythrus* (Kaye), edge of Aripo Savannah, 12.viii.1979. Scale in mm.

This is an occasional species in forests of Trinidad. Most records are from the Northern Range, including Morne Catherine, and it can be found to at least 2800 ft. (c. 850 m) on El Tucuche. I also have records from Las Cuevas, Aripo Savannah and Mt. Harris, but not from the south of the island.

Fig. 24. Female of newly emerged *Justinia justinianus hyperythrus*. Collected as pupa on *Scleria* ?*mitis*, swamp behind beach at Las Cuevas Bay, 17.01.2004 (MJWC 04/46A). The pale margin UNH is an artefact, as the butterfly has emerged from the pupa with scales missing here, perhaps due to some deformation of the pupa (although not visible, the right forewing is also slightly crumpled).

Nothing seems to have been recorded hitherto about the biology and food plants (Mielke 2005; Beccaloni *et al*. 2008). In the NHM collection there are five emerged pupae identified as *J. justinianus*, which represent two different species, neither of which match the material I describe below, one having no frontal spike, and the other a 2.5 mm forward pointing frontal spike.

In January 2004, in the swampy area immediately behind the beach at Las Cuevas Bay, I found a caterpillar and a pupa (MJWC 04/46) on a non-flowering sedge which I think was the same as one I collected from the same area in 2003 and was identified as *Scleria mitis* P. J. Bergius (MJWC 0267). The caterpillar completed its development on *Carex* spp. and I was able to rear through two females from this material. The account below is based on this collection.

I have also found a fourth instar caterpillar (Fig. 25) and an emerged pupa (MJWC 03/229) that may be this species on a large *Scleria* sp. (MJWC 0278) on Mt. Harris, 25.iii.2003. I was not able to rear the caterpillar, but I could not distinguish the caterpillar and pupa remains and photos from those of *J. justinianus hyperythrus*.

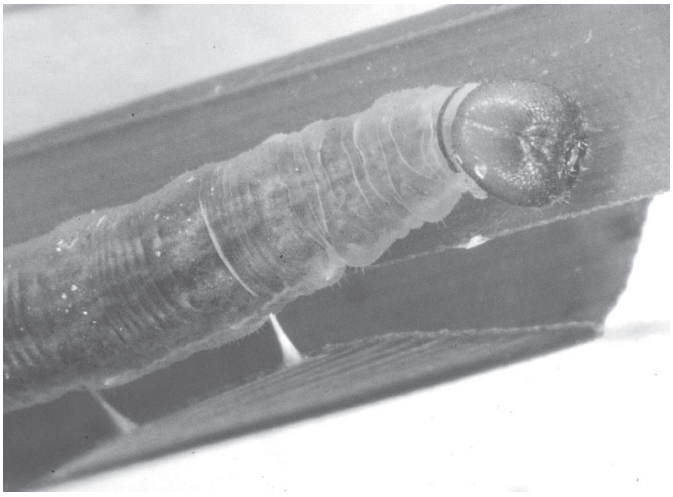

Fig. 25. Fourth instar caterpillar of *Justinia ? justinianus hyperythrus*, head and anterior body segments. Collected on *Scleria* sp. (MJWC 0278), Mt. Harris, 25.iii.2003 (MJWC 03/229).

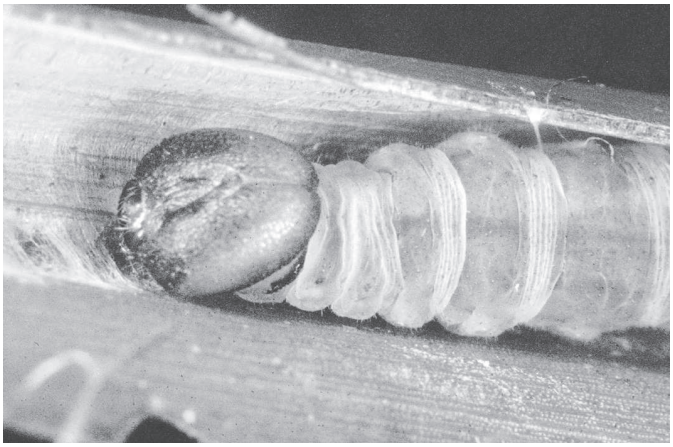

Fig. 26. Fifth instar caterpillar of *Justinia justinianus hyperythrus*, head and anterior body segments. Collected on *Scleria* ?*mitis*, swamp behind beach at Las Cuevas Bay, 17.01.2004 (MJWC 04/46B).

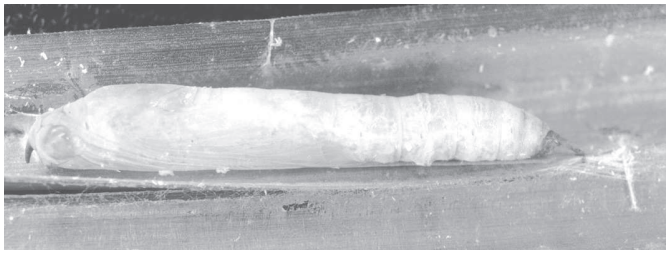

Fig. 27. Pupa of *Justinia justinianus hyperythrus*, lateral view. Collected on *Scleria* ?*mitis*, swamp behind beach at Las Cuevas Bay, 17.01.2004 (MJWC 04/46A).

Scleria mitis is widespread in Trinidad, as are several other *Scleria* spp. (Adams 1992), so there is no reason not to expect *J. justinianus hyperythrus* to occur in the south of the island as well.

The leaf shelter of the caterpillar and pupa was simply formed by pulling the edges of a leaf downwards to make a tube held by several strands of silk. The newly moulted fifth instar caterpillar (Fig. 26) measured 18 mm and grew to 24 mm. Head 2.6 x 2.2 mm (high x wide); oval, narrower at the top and slightly indent at vertex; ground colour light brown; brown ventrally, over clypeus and adjacent epicranium to the width of the clypeus, with a diffuse margin to this area. T1 with a narrow dark dorsal plate. Body dull dark, translucent green; trachea evident; spiracles pale; all legs concolorous. In the mature caterpillar, wax glands develop ventro-laterally behind the prolegs on A3-A6 and on the anterior margin of A7. The head of the fourth instar caterpillar (1.8 x 1.7 mm high x wide) is similar to that of the fifth instar.

The pupal shelter is lined with silk, and the rolled tube is blocked 12-17 mm behind the cremaster and 5-10 mm in front of the head with a loose tangle of silk threads mixed with white flocculence. There was no white waxy powder on the pupa, although there was on the cast caterpillar head. The pupa (Fig. 27) was attached by the cremaster directly to the silk lining, and there was no girdle. The pupa is very slender with a down-turned cremaster and a distinctive very short, downward directed frontal spike; cuticle almost transparent, so that body contents provide the colour, and will change over time as the pupa develops; when collected (18 days before emergence) ground colour pale, head with a brown tint, thorax with a yellow-green tint and abdomen with a creamy yellow tint; frontal spike and cremaster dark; spiracles inconspicuous.

192. J50/2 *Eutychide complana* (Herrich-Schäffer 1869)
Figs. 28-29.

This species can be found from Mexico south to the Amazon and Bolivia (Evans 1955), with no subspecies recognised (Mielke 2004).

Sexes similar (Fig. 28). UPS dark brown with yellow hyaline spots in spaces 2, 3, 6-8; fringe pale brown on termen H, spaces 1 and 2 F and brown for the rest of F. UNF brown, darker at base of disc; UNH brown with a variable purple sheen, margin slightly paler beyond dot in space 3; fringe as UPS. The ♀ often has a spot in space 1B against vein 1 UPF, and a dot in space 4. The ♂ is smaller with more pointed wings and grey-brown brands: a 2.5 mm long V above vein 2 and against cell, a 5 mm streak below origin vein 2, and a matching 4 mm streak above vein 1. F ♂ 22 mm. Illustrations in Godman and Salvin (1879-1901, ♂ venation and genitalia as *E. midia*

(Hewitson), a synonym, Plate 99.10-13) and Lewis (1973, ♂ UPS Fig. 82.58).

This species can be recognised by its size, arrangement of the brands in the ♂, yellow hyaline spots and lack of other markings. It is only likely to be confused with *E. subcordata*, which is treated next. These two species are not so easily distinguished, except by the yellow hyaline markings of *E. complana* compared to the white ones of *E. subcordata* – at least in fresh specimens. In addition, *E. subcordata* is slightly smaller; the spots in spaces 2 and 3 are not as wide as the space between them, whereas in *E. complana*, these spots are wider than the space between them; and the UNH of *E. subcordata* is darker and more uniform than that of *E. complana*. Godman and Salvin (1879-1901) point out that the genitalia are rather similar – the differences are more a matter of degree than qualitative, but they are clear in the claspers shown in Fig. 29.

Fig. 28. Adult ♂ *Eutychide complana*, nr. Moruga Bouffe, 12.iii.1981. Scale in mm.

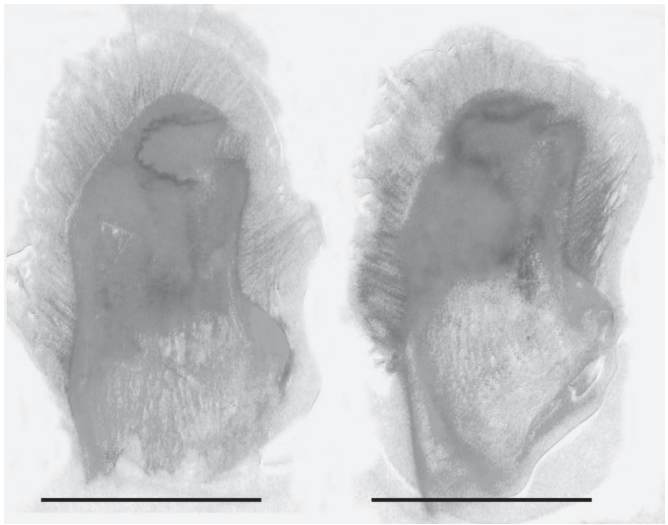

Fig. 29. Left claspers of *Eutychide* spp. **Left**, *E. complana*, Moruga Bouffe, 12.iii.1981; **right**, *E. subcordata*, Moruga East, 24.ii.1980. Bar = 1 mm.

I added this species to the Trinidad list based on my capture of a male near Moruga Bouffe, 12.iii.1981 (Cock 1982) and a previously unrecognised ♀ from Palmiste, 7.x.1947, in Sir Norman Lamont's collection in UWI. There have been no subsequent records, although this species could easily be overlooked as *E. subcordata* (Herrich-Schäffer) treated next. It does seem to be a rare species in Trinidad with no clear habitat association, except that given the intensity of collecting in the north of the island it may be that it is not found in the north.

Moss (1949) notes that the biology and food plants of *E. complana* are similar to those of *E. subcordata* (below), i.e. "on sugar cane, wild cane and on bamboo". I have found no other information regarding the life history of this species.

193. J50/3 *Eutychide subcordata subcordata* (Herrich-Schäffer 1869) Figs. 30-33, 35-38.

Eutychide subcordata occurs in two subspecies: *ochus* Godman from Central America and the nominate *subcordata* from Colombia, the Guianas and Amazon (Evans 1955; Mielke 2004). Kaye (1914) described and illustrated *Cobalopsis rogersi* from a male taken in Emperor Valley, 28.i.1913 by K. St. A. Rogers, but which Evans (1955) recognised as a subspecies of *E. s. subcordata*. Kaye (1914; 1921, No. 402) also included the Central American subspecies as *Eutychide ochus* based on a record from St. Ann's (G. E. Tryhane). As suggested for *J. justinianus* above, this may represent the uncritical inclusion by Kaye of an identification by G. E. Tryhane, without actually seeing the specimen(s), as he would surely have recognised that Tryhane's specimen and his *rogersi* were the same species.

This species (Figs. 30-31) is confusingly similar to *E. complana* and is discussed under that species above.

Fig. 30. Adult ♂ *Eutychide subcordata subcordata*, Moruga east, 24.ii.1980. Scale in mm.

F ♂ 20-20.5 mm – rather larger than the 18 mm given by Evans (1955); ♀ 19.5-21.5 mm. Illustrations in Godman and Salvin (1879-1901, ♂ venation and genitalia of ssp. *ochus,* Plate 99.10-13) and Kaye (1914 as *C. rogersi*).

This species is quite common and widespread in lowland situations in Trinidad, not extending to any great

Fig. 31. Adult ♀ *Eutychide subcordata subcordata*, collected as pupa on *Bambusa vulgaris*, Arima Valley, milestone 3¾, by river, 18.xii.1981 (MJWC 30B). Scale in mm.

altitude – the highest locality I have seen being 600 ft (c. 180 m; ♂ Hololo Mountain Road, 17.i.1928, F. W. Jackson, HEC). I have one record of a female attracted to a MV light trap (Curepe, 6-11.xii.1981, F. D. Bennett). It does not seem to be attracted to flowers, resting quietly in shady situations.

Moss (1949) reared this species "from an ugly lead-coloured caterpillar with a dull brown pupa with rounded end. They were found on sugar cane, wild cane and on

Fig. 32. Adult ♂ *Eutychide subcordata subcordata,* collected as caterpillar on *Bambusa vulgaris*, 16.i.2004, Inniss Field (MJWC 04/26B).

Fig. 33. Adult ♀ *Eutychide subcordata subcordata,* collected as caterpillar on *Bambusa vulgaris*, 16.i.2004, Inniss Field (MJWC 04/26G).

bamboo" and illustrates the caterpillar (Moss 1949, Fig. V.15). Beccaloni *et al*. (2008) add records from grass and *Bambusa vulgaris* Schrad. ex J.C. Wendl. from Trinidad based on (Cock pers. comm.). Margaret E. Fontaine reared this species in Trinidad (specimens in NHM), but did not paint the early stages or include the food plant on the specimen labels.

My unpublished record of "grass" in Beccaloni *et al*. (2008) is an error that I made when reference numbers on two specimens from Curepe were transposed. Hence the record from an unidentified broad-leaved grass (MJWC41) is actually *Cobalopsis nero* (Herrich-Schäffer), and the record of *C. nero* from bamboo in the same compilation should be *E. subcordata*. Fortunately, my notes and the associated larval and pupal remains with the two specimens leave no room for doubt as to the correct association. Similarly, Beccaloni *et al*. (2008) list an unpublished record of mine of *Enosis angularis*? (Möschler) (Cock 2005) on *B. vulgaris*, whereas closer examination of the remains of the early stages and the adult that I dissected from the dead pupa show that it is a female *E. subcordata*.

Thus, I have reared *E. subcordata* only from *B. vulgaris* (Fig. 34) in Trinidad as follows: Arima Valley, milest. 3¾, by river, MJWC 30B; Inniss Field, MJWC 04/26; Lower Morne Catherine, MJWC 94/13; and Inniss Field, MJWC 04/26, 04/35. The following account is based mostly on a collection made at Inniss Field, 16.i.2004 (MJWC 04/26) of seven caterpillars of instars 3-5, three of which were reared through to adult.

Fig. 34. Seven caterpillars of *Eutychide subcordata* were collected from leaves of *Bambusa vulgaris* in this roadside patch, Inniss Field, 16.i.2004 (MJWC 04/26).

An egg laid on the edge of a young leaf, was probably that of *E. subcordata subcordata* (Fig. 35). It was hemispherical with a slight rim around the base, 1.27 mm diameter, 0.74 mm height, finely reticulated except at apex, and white. The irregular dark internal markings suggest that it was infertile.

Fig. 35. Egg found on *Bambusa vulgaris* in the vicinity of several shelters and caterpillars of *Eutychide subcordata subcordata*, and assumed to be of the same species, Inniss Field, 16.i.2004 (MJWC 04/26H), 1.37 mm in diameter.

The shelters of the larger caterpillars were mostly formed by making a cut from the edge of a leaf, fairly near the base, folding the distal portion over upwards and tying with silk (Fig. 36); the basal flap was closed neatly, and often the caterpillar fed on the basal portion of the leaf below the cut. However, the caterpillar did not normally feed on the distal portion of the leaf, but rather fed on adjacent leaves (Fig. 36), thereby making the leaf with the shelter less conspicuous (at least to this human searcher).

One shelter (MJWC 04/26D) was made by rolling the whole leaflet downwards with no cuts or feeding. However,

Fig. 36. Leaves of *Bambusa vulgaris* with a typical shelter of *Eutychide subcordata subcordata* on the distal leaf, and extensive feeding on three of the four next leaves.

the caterpillar that made this shelter was parasitized by a tachinid macro-type egg layer and did not feed before dying, and so may not have been behaving normally.

The caterpillars of instars 3, 4 and 5 are similar (Fig. 37). Newly moulted, instar 4 measured 19 mm and instar 5 measured 22 mm, and grew to 35 mm. The head capsules of the three instars measured 1.9 x 1.8 mm, 2.6 x 2.4 mm and 3.3 x 2.9 mm (high x wide, +/- 0.1 mm) in one individual (MJWC 06/26E). Head colour varied from brown to dark black-brown, sometimes paler towards apex of epicranium, epicranial suture darker; head surface slightly shiny, rugose, no setae. T1 with a short, narrow diffuse dark band. Body dull translucent green; spiracles pale, surrounded by star of trachea visible through cuticle; legs concolorous. The wax glands of the mature larva are a pair of short transverse ventro-lateral bars on each side, between the prolegs, on the posterior margin of segment with prolegs (A3-A6) running onto the anterior margin of the next segment (A4-7).

The pupal shelter is lined with white waxy powder, as is the cast caterpillar skin, but the pupa itself is only very finely covered. There is a simple silk girdle near the posterior margin of the thorax. The pupa (Fig. 38) is 22 mm long, slender and rounded in outline, the thorax slightly bulbous; no frontal spike, but a slight bulge on the frons; the proboscis sheath is light brown distally and extends at least two abdomen segments beyond the wing cases. Short, brown setae on the anterior and posterior parts of the eye; longer erect brown setae on anterior part of thorax in a band on each side, running anterior-lateral to posterior-dorsal. Colour yellow-white; spiracle T1 light brown, slightly protuberant; other spiracles inconspicuous, concolorous. The empty pupa is transparent and flimsy. Pupation lasted 19-21 days in captivity.

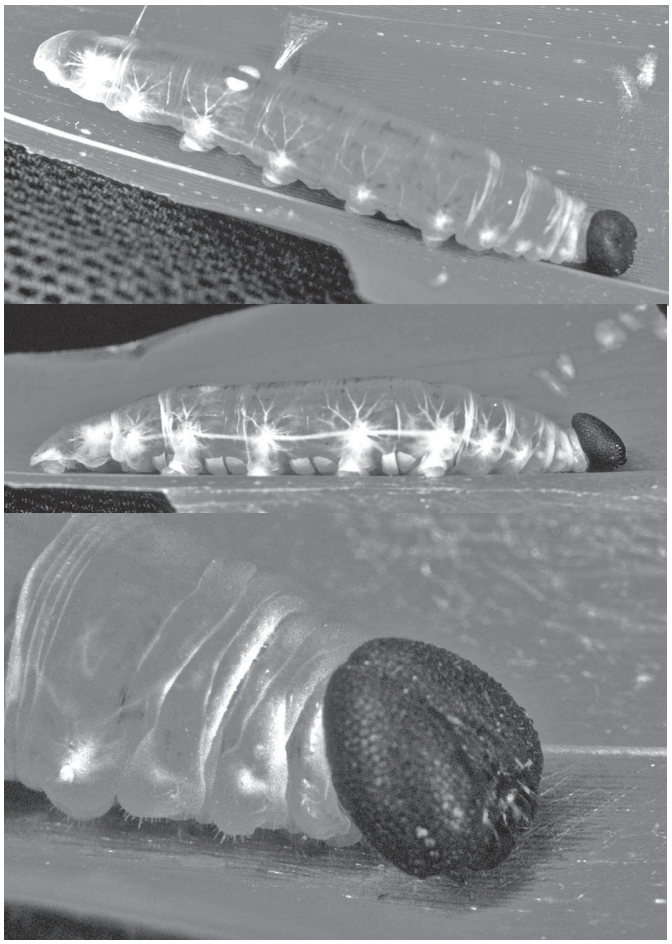

Fig. 37. Fifth instar caterpillar of *Eutychide subcordata subcordata* collected on *Bambusa vulgaris*, 16.i.2004, Inniss Field (MJWC 04/26B). **Top**, dorso-lateral view; **middle**, lateral view (note ventro-lateral wax glands); **bottom**, close up of head.

Two of the caterpillars collected at Inniss Field were parasitized by tachinids. One fifth instar caterpillar (MJWC 04/26D) had four macrotype eggs on its thorax, and died soon after collection, and the tachinids failed to complete their development. Another caterpillar (MJWC 04/26F), also collected as a fifth instar, pupated successfully although there was some discoloration visible ventrally on the thorax (Fig. 38); a tachinid puparium formed in the head and thorax of the pupa, leaving the abdomen empty, and the adult fly emerged two weeks after pupation of the host. As yet, it has not been identified.

This is perhaps the commonest hesperiid on bamboo in Trinidad, but other species feed on this food plant, including *Flaccilla aecas* (Stoll) (= *Aecas aecas*) (author's unpublished observations). The mature larva of *F. aecas* is similar to that of *E. subcordata*, but the head is narrower, the apices are distinctly paler brown, and the body has a subcutaneous layer of fat with darker spots, giving a rather different appearance. The pupa of *F. aecas* is relatively robust, light brown, with a very small, dark, downward turned frontal protuberance.

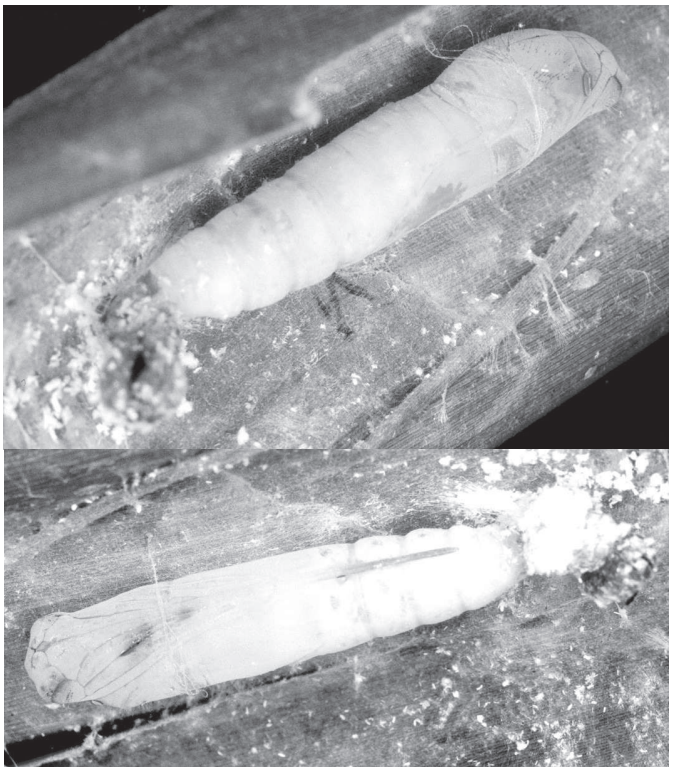

Fig. 38. Pupa of *Eutychide subcordata subcordata*, lateral view and ventral view; collected as caterpillar on *Bambusa vulgaris*, Inniss Field, 16.01.2004 (MJWC 04/26E). **Above**, lateral view; **below**, ventral view (the discoloration in the thorax is the larva of a tachinid parasitoid).

194. J51/1 *Onophas columbaria columbaria* (Herrich-Schäffer 1870) Figs. 39-41.

This subspecies is found from Panama to Ecuador and the Amazon, but is uncommon everywhere except Trinidad (Evans 1955). Two further subspecies are restricted to south Brazil and Peru (Evans 1955; Mielke 2004). Kaye (1914; 1921, No. 399) recorded this species from Trinidad based on one or more specimens "in coll. H. J. Adams" (now in NHM).

Sexes similar (Figs. 39-40); female is larger with more rounded wings; male has a narrow black tripartite stigma, which runs from just before origin of vein 3, across spaces 2 and 1B to vein 1, interrupted at vein 2, and in the middle of space 1B. UPS brown, with a strong blue gloss on thorax, head and base of wings, weaker on abdomen; fringe concolorous. UPF with diffuse pale brown spots in space 1B (above vein 1 and below vein 2), 2 and 3; the spot in lower space 1B is stronger in the female. UNS of thorax and head whitish with blue tints; UNS of abdomen white with a single dark ventral line; legs brown. UNF yellow-brown on costa, pale brown distally, and blackish brown on disc; fringe concolorous; diffuse whitish brown spots to match the UPS, that in space 1B stronger and extending further towards termen. UNH yellow-brown, shading to brown at margin, especially in spaces 1C and

2; fringe concolorous. F ♂ 15-16.5 mm; ♀ 16.5-17 mm. Illustrations in Godman and Salvin (1879-1901, ♂ venation and genitalia, Plate 98.34-37), Lewis (1973, ♀ UPS Fig. 84.23).

The strong blue gloss is noticeable in the field (Fig. 41), and together with the plain yellow-brown UNS, makes this species distinctive in Trinidad.

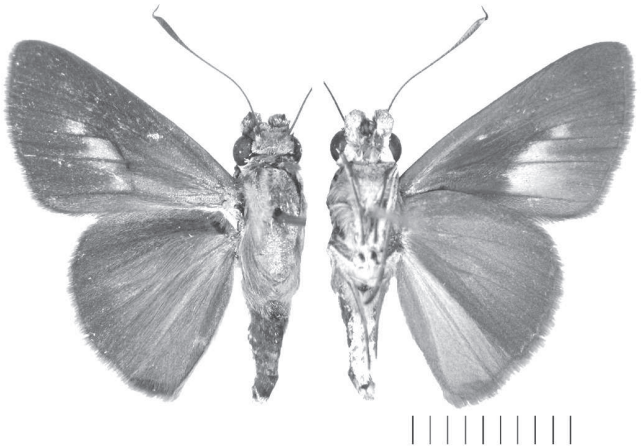

Fig. 39. Adult ♂ *Onophas columbaria columbaria*, North Coast Road, milestone 2, 1.i.1980. Scale in mm.

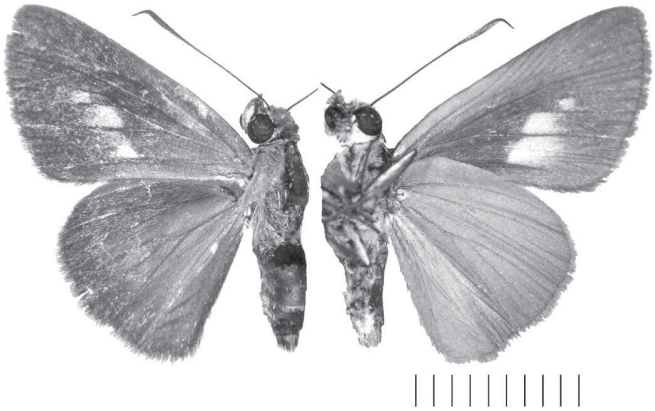

Fig. 40. Adult ♀ *Onophas columbaria columbaria*, Irois Beach, 8.xii.1980. Scale in mm.

Evans (1955) lists 29 ♂, 7 ♀ from Trinidad in the NHM, and I have seen a further 19 specimens. Nevertheless, I would consider this species to be occasional rather than common – it may that it is caught disproportionately more often because it is a distinctive species. It is generally found in forest clearings or forest edges, and is widespread in Trinidad. It mostly occurs at lower to medium altitudes - I have one record from the summit ridge of Mt. Tamana (♂ 12.xi.1995), as well as from lower parts of the Northern Range (Fort George, Mt. Tabor, Hololo Mountain Road, North Coast Road milestone 2). Dates of capture are between November and March, suggesting this species flies mainly in the dry season.

Moss (1949) records that "one specimen was reared

Fig. 41. Mating pair of *Onophas columbaria columbaria*, Trinidad (K. Preston-Mafham, Premaphotos).

from wild cane" but does not illustrate the early stages. There are no preserved early stages of this species from Moss' collection in the NHM. I am not aware of any further published information.

195. J53 *Naevolus orius orius* (Mabille 1883)
Figs. 42-44.

The nominate subspecies is found from Mexico to South Brazil, and a second subspecies, *naevus* Evans is found in Ecuador (Evans 1955; Mielke 2004).

Kaye (1940, No. 386A) added this species to the Trinidad list (as *Cydrus naevolus* (Godman), a synonym), based on a specimen from Fondes Amandes, 10.iv.1922, F. W. Jackson. This is a common species in Trinidad – Evans (1955) lists 12 ♂, 6 ♀ in the NHM, and I have seen a further 20 specimens, including one of Sir Norman Lamont's dating back to 1916 (♂ Palmiste, 3.xii.1916, NMS). It is strange that W. J. Kaye was not aware of this species in his earlier catalogues (Kaye 1904, 1921).

Sexes similar (Figs. 42-43); male has a strong black tripartite stigma UPF along base of space 2, wider at base; under vein 2 in line with bottom of stigma in space 2, and in a broad arc below this extending to near vein 1. UPF dark brown; fringe concolorous, pale in spaces 1B and 2; white hyaline spots in spaces 2, 3, 6-9 and double cell spot; white semi-hyaline spot in space 1B. UPH dark brown; fringe pale, weakly chequered brown at end of veins; faint pale spots in spaces 2-5. Body dark brown above; head white-brown below; body brown below; abdomen white ventrally with a single dark ventral line; legs brown. UNF brown; blackish base to disc; fringe concolorous, pale in spaces 1B and 2. UNH purple-brown ground colour; margin beyond spots brown; space 1B brown; diffuse pale spots in spaces 1C-6, base of space 6 and end cell. F ♂

20.5-22 mm; ♀ 23 mm. Illustrations in Godman and Salvin (1879-1901, ♂ UPS, UNS and genitalia, Plate 97.19-21 as *Cydrus naevolus*) and Lewis (1973, UNS Fig. 84.9, as *Naevolus naevolus*, Fig. 84.8 in legend).

This is a relatively large species, and this together with the arrangement of spots F and UNH, and the black tripartite stigma in the male should serve to identify this species in Trinidad. In the field, the size and arrangement of the UNH spots on a purplish ground colour are distinctive (Fig. 44).

This species is common and widespread in lowland forests, disturbed situations and gardens. Adults come to flowers, including bougainvillea (Fig. 44). They probably

Fig. 42. Adult ♂ *Naevolus orius orius*, Curepe, at light, 6.ix.1978. Scale in mm.

Fig. 43. Adult ♀ *Naevolus orius orius*, St. Augustine, at flowers, 25.x.1979. Scale in mm.

also fly at dusk or in the early evening since I have three records from my house lights in Curepe (♂ 6.ix.1978; ♂ 28.vi.1979; ♂ 15.ix.1980) and one from a MV light trap (♂ St. Augustine, iv.1981, F. D. Bennett, CABI).

Janzen and Hallwachs (2009) have reared this species twice from a bamboo, *Guadua paniculata* Munro, but do not include photographs of the early stages. Nothing else seems to have been recorded regarding the biology and food plants of this species (Mielke 2005).

Fig. 44. Adult *Naevolus orius orius* feeding at flower of bougainvillea, St. Benedict's, 16.x.1993.

ACKNOWLEDGEMENTS

I reiterate my thanks to Dr. C. Dennis Adams, Dr. Yasmin Comeau, Mr. Bhorai Kalloo and Mr.Winston Johnson of the National Herbarium who identified the plants from which I reared Hesperiidae in Trinidad. The following have very kindly assisted in providing access to the collections in their care: Dr. George McGavin of the Hope Entomological Collections, Oxford University Museum (HEC); Dr. Phillip Ackery and Blanca Huertas of the Natural History Museum (NHM) (formerly British Museum (Natural History)); Dr. Mark Shaw of the Royal Scottish Museum (RSM); Mr. Scott Alston-Smith to his private collection (SAS); Professor Julian Kenny and Dr. Gene Pollard of the University of the West Indies, St. Augustine (UWI); Dr. Gerald Legg of the Booth Museum, Brighton (BM); Drs. Lee and Jacqueline Miller of the Allyn Museum of Entomology, Sarasota, Florida (AME), now incorporated into McGuire Center for Lepidoptera and Biodiversity (MGCL). Figs. 15 and 18 are of specimens in SAS, and Figs. 17 and 19 are of specimens in the NHM.

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