The Skipper Butterflies (Hesperiidae) of Trinidad Part 7, Genera Group E (first section)

By MATIHEW J.W. COCK
International Institute of Biological Control, Kenya Station, P.O. Box 30148, Nairobi, Kenya.

Introduction

This is the seventh in a continuing series on the identification and biology of the Trinidad Hesperiidae. Based upon the classification of Evans (1952, 1953 etc.), three subfamilies and 14 genera groups are found in Trinidad: Pyrhopyginae (Group A), Pyrginae (Groups B-G) and Hesperiinae (Groups 1-M,O). This contribution covers the first 18 out of 43 species of Genera Group E, although three of the species covered here are considered to need confirmation.

In Cock (1984b), I introduced the subfamily Pyrginae, following the classification used in Evans (1952, 1953). The subfamily is defined by having vein SF generally nearer to vein 6 than to vein 4 (Figure 1). Evans (1952) divides the subfamily into two sections:

Section 1. Palpi erect; second segment held against the head, third segment not protruding in front of the second. Forewing cell generally long, equal to two-thirds of the length of the costa and equal to or longer than the dorsum. See figures in Cock (1984b).

Section 2. Palpi may be entirely forward pointing (porrect), and the third segment always protrudes in front of the second (Figures 2-3). Forewing cell generally short, less than two-thirds of the length of the costa and shorter than the dorsum (Figure 1).

I have now covered the three genera groups of Pyrginae Section 1 in the last four parts of this series: Group B (Cock 1984b), Group C (Cock 1986, 1988) and Group D (Cock & Alston-Smith 1990). Pyrginae Section 2 also includes three genera groups (E, F, G), all of which are represented in Trinidad.Group E. Abdomen shorter than the dorsum of the hind-wing. Antenna! club bent at or beyond its middle. Evans suggests that this group always rests with its wings spread flat, but this is not true of all genera. Most species rest with their wings held flat and open; *Spathilepia clonius* and *Cogia calchas* usually rest with them nearly shut. Evans (1953) further divides Group E into 7 sub-groups, but this is not included in my treatment.

Group F. Abdomen shorter than the dorsum of the hind-wing. Antenna) club bent before its middle. Under surface of the anterior portion of the forewing more concave than usual, giving rise to the name "batwing". Evans (1953) did not know their resting position, but all the species I have observed in the field rest with their wings held flat.

Group G. Abdomen as long as the dorsum of the hind-wing. Antenna) club blunt and generally bent at its commencement. The wings may be erect or flat in repose.

The habitats used by the genera are mostly primary or secondary forests, but a few species such as *Cogia calchas* have adapted to wasteland and open spaces. Most of the common species treated here come readily to flowers, but I have not seen *Telemiades, Polyctor, Myrinia* or *Cyclosemia* do so, while *Spioniades artemides* I have never seen.

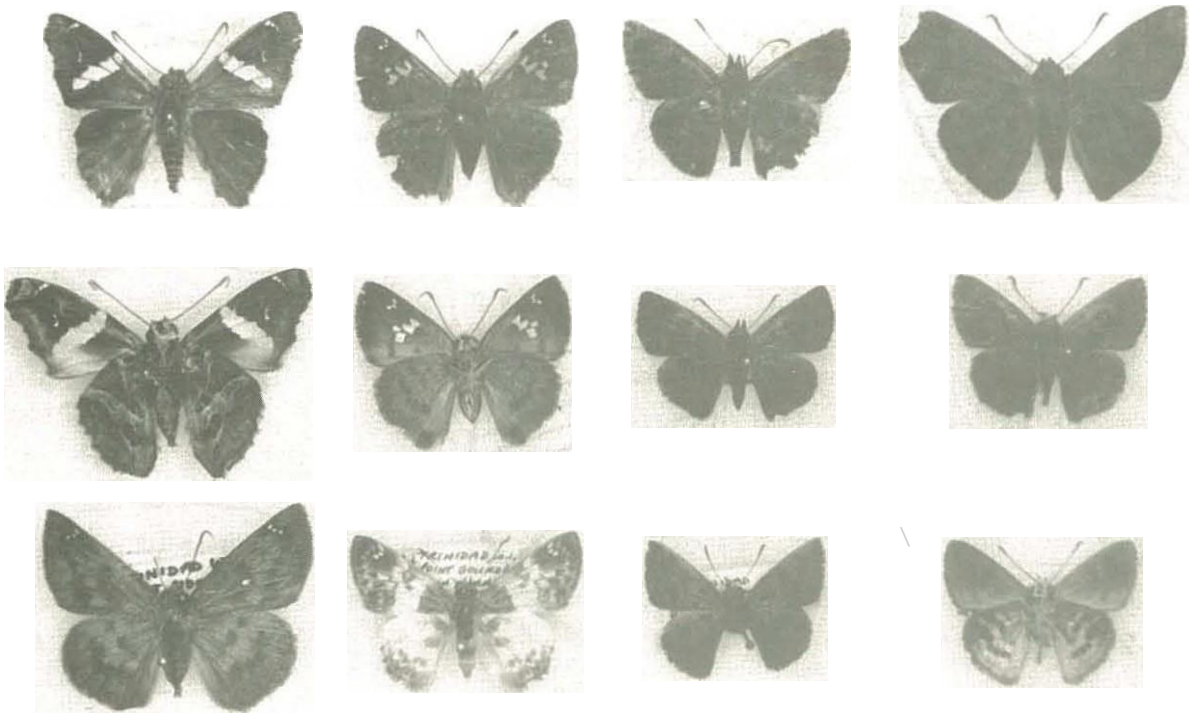
The food plants of the Pyrginae are almost all Dicotyledons, and the range of families used is quite wide. The Trinidad species of Genera Group E feed in Trinidad upon Convolvulaceae, Lauraceae, Leguminosae, Piperaceae, Rutaceae, Solanaceae, as well as the Monocotyledonous Zingiberaceae. They form a range of different shelters on these hosts, from the simple drawing together of leaves shown by *Cogia calchas*, to shelters ventilated with rows of holes by *Quadrus* spp., to the very complicated shelter described below for *Cyclosemia herennius.*

I would like to thank the following for their assistance: Dr. C. Dennis Adams, Mrs. Yasmin Comeau, Bhorai Kalloo and Winston Johnson of the National Herbarium 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 Department, Oxford University Museum (HD), Dr. Phillip Ackery 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).

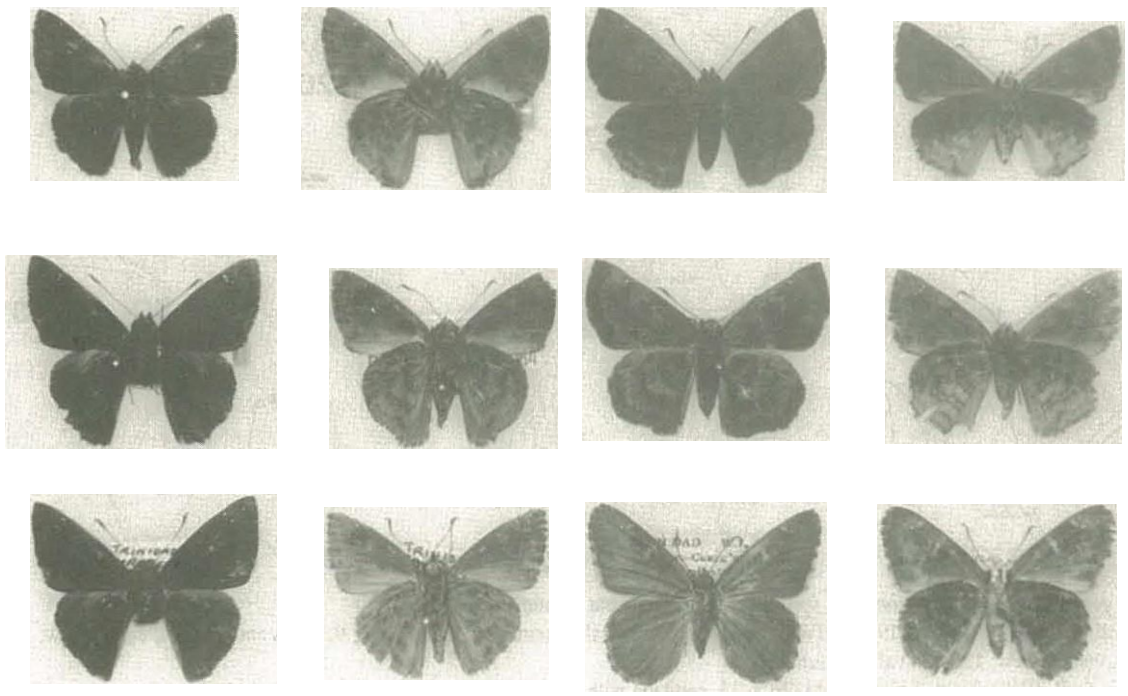
77. El/1 *Spathilepia clonius* Cramer 1775
Plates 1-2

This species is found fairly commonly from Mexico to Argentina (TL Surinam). It was first recorded from Trinidad by Kaye (1904).

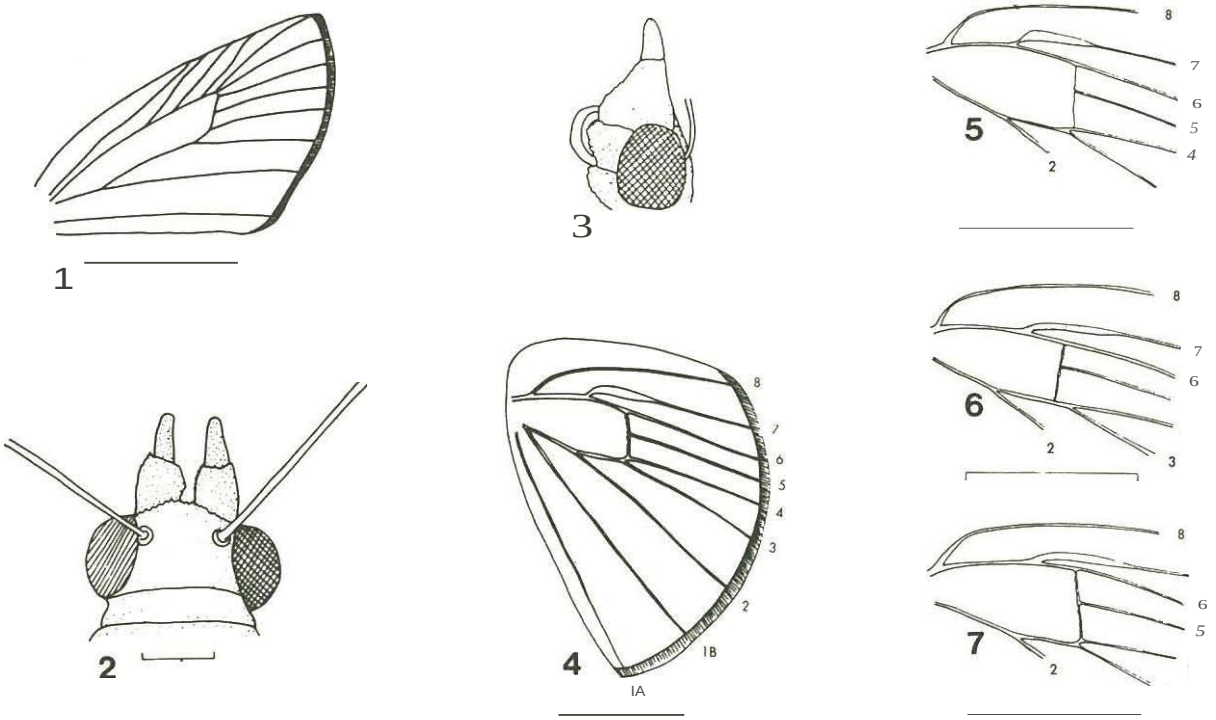
UPS brown; hyaline spots white. UNF brown; pale brown margin narrowly interrupted at vein 5; apex of spaces 6 and 7 dark brown; white area from spot in space 1B to dorsum. UNH pale brown with two macular white-edged brown bands, basal one expanded greatly at costa;



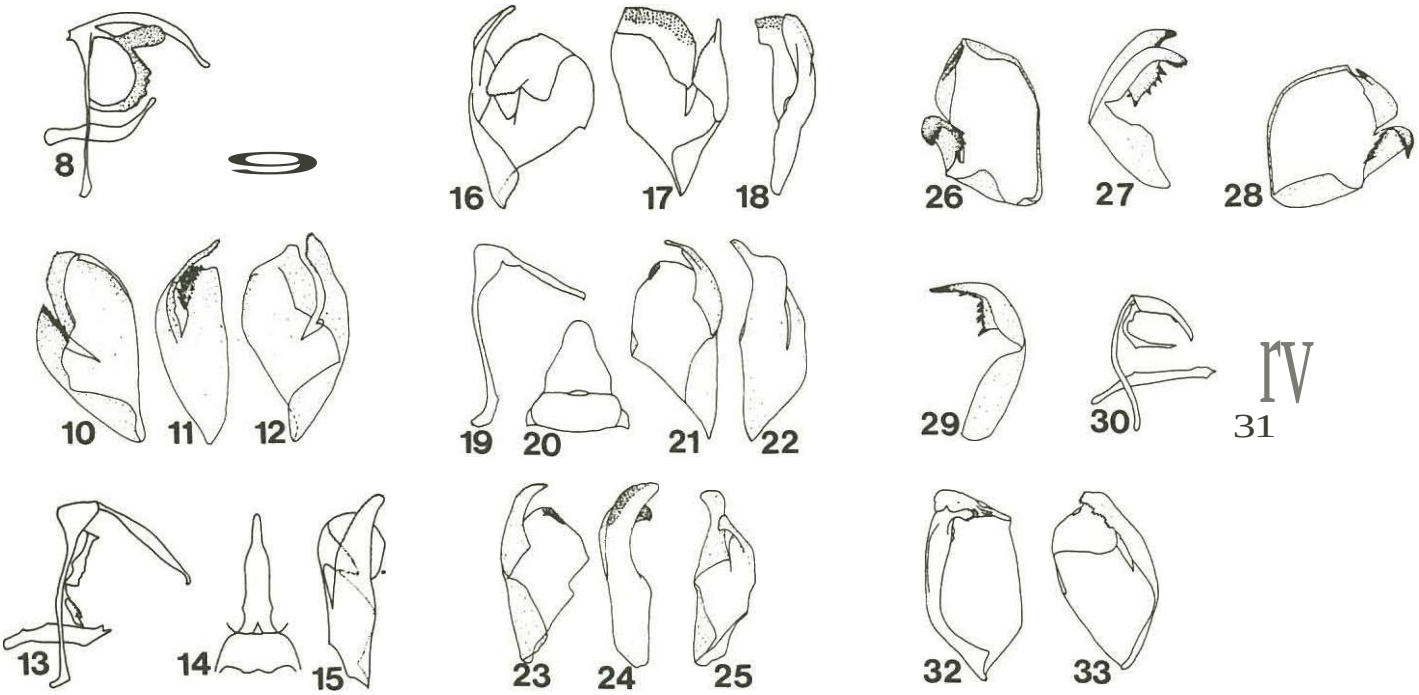
Plates 1-12. Adult Hesperiidae, Genera Group E. Specimens from Trinidad, in coll. MJWC. Specimens shown UPS except where stated UNS.
1, *Spathilepia clonius* <:J (Waller Field, 2.xii.1980); 2, *S. clonius* 9 UNS (Parrylands, x.1979, J.0. Boos); 3, *Telemiades e. epicalus* 9 (West Moreau, 31.xii.1979); 4, T. *a. antiope* <:J (Andrews Trace, 17.ix.1980); 5, *T. a. antiope* 9 UNS (Mome Catherine, 24.iii.1982); 6, *Polyctor p. polyctor* <:J (Pointe Gourde, 17.i.1988); 7, *Pellicia c. costimacula* <:J (Grande Ravine, 13.ix.1980); 8, *P. tlteon tonga* 9 (Parrylands, 13.ix.1980); 9, *P. d. dimidiata* <:J (Spanish Farm, 2.viii.1981); 10, *Myrinia myris* <:J (Trinity Hills, Morne Derrick summit, 4.iv.1982); 11, *Cyclosemia h. herenni11s* <:J (Andrews Trace, 9.iv.1980); 12, C. *h. herenni11s* <:J UNS (Parrylands, 13.ix.1980).



Plates 13-24. Adult Hesperiidae, Genera Group E. Specimens from Trinidad, in coll. MJWC. Specimens shown UPS except where stated UNS.
13, *Nisoniades bessus* <:J (Pointe Gourde, 17.i.1988); 14, *N. bessus* <:J UNS (Spanish Farm, 27.ix.1981); 15, *N. bess11s* 9 (Morne Catherine, 24.iii.1982); 16, *N. bessus* 9 UNS (Mome Catherine, 31.iii.1982); 17, *N. rubescens* <:J (Waller Field, 2.xii.1980); 18, *N. rubescens* <:J UNS (Curepe, 9.iii.1980); 19, *N. rubescens* 9 (Arima-Blanchisseuse Road, milestone 9 3/4, 10.x.1979); 20, *N. mbescens* 9 UNS (Curepe, MVL, 14-20.ix.1981); 21, *N. epltora* <:J (Maracas Valley, 10.iii.1982); 22, *N. ephora* <:J UNS (Parrylands, 2.ii.1980); 23, *Cogia calcltas* 9 (Rio Claro – Guayaguayare Road, milestone 4 1/2, 4.viii.1979); 24, C. *calc/1as* 9 UNS (Grande Ravine, 21.vi.1979).



Figures 1-7. Morphology of Trinidad Pyrginae.
1. Forewing venation of *My/on menippus* Fabricius (Genera Group E); bar = 1cm;
2, head of *Pellicia theon tonga* Evans to show porrect palpi. dorsal view; bar = 1mm; 3, same, lateral view; 4, complete UNH venation of *Nisoniades bessus* (Las Lomas, Spanish Farm, 27.ix.1981), bar = 1cm; 5, detail of 4; bar = $ mm; 6, detail of UNH venation of *N. rubescens* (Curepe, 9.iii.1980); bar = 5 mm; 7, detail of UNH venation *of N. ephora* (Parrylands, 2.ii.1980); bar = 5 mm.



Figures 8-33. Male genitalia of Trinidad *Nisoniades* spp. and *Pellicia* spp.; bar = 1mm.
8-12, *N. bessus* (coll. Spanish Farm, 27.ix.1981, MJWq. 8, genitalia with valves removed, lateral view; 9, uncus and gnathos, dorsal view; 10, left valve, internal view; 11, left valve, ventral view; 12, right valve, internal view.
13-19, *N. rubescens* (coll. Waller field, 2.xii.1980, MJWC). 13, genitalia with valves and aedeagus removed, lateral view; 14, uncus and gnathos, dorsal view; 15, right valve, internal view; 16, right valve, ventral view; 17, left valve, internal view; 18, left valve, ventral view; 19, left valve, dorsal view.
20-25, *N. ephora* (coll. Maracas Valley, Ortinola Estate, 10.iii.1982, MJWC). 20, genitalia with valves removed, lateral view; 21, uncus and gnathos, dorsal view; 22, left valve, ventral view; 23, left valve, internal view; 24, right valve, internal view; 25, right valve, ventral view.
26-29, *P. costimacula costimacula* (coll. Grande Ravine, 13.ix.1980, MJWC). 26, left valve, internal view; 27; left valve, ventral view; 28, right valve, internal view; 29, right valve, ventral view.
30-33, *P. dimidiata dimidiata* (coll. Las Lomas, Spanish Farm, 2.viii.1981, MJWC). 30, genitalia with valves removed, lateral view; 31, uncus and gnathos, dorsal view; 32, left valve, internal view; 33, right valve, internal view.

dark brown spot at base of costa. Cilia concolorous, but pale at space 1B F. Sexes similar, but female larger and with H margin at end vein 1B more or less lobed, Fd' 19.5 mm, 21-24 mm. Illustration in Lewis (1973, plate 87, No. 11). The UPS ma rkings are remi niscen t of *Autochton* spp. (Cock 1988) and *Celaenorrhinus* spp. (Cock & Alston-Smith 1990), but the UNH markings and truncate F are abundantly distinct.

Although Kaye (1904, 1921) lists *S. clonius* as common, I have found it to be only an occasional species, found at low altitudes and sometimes taken at flowers where it feeds with its wings nearly closed. In Belem, Brazil, Moss (1949) reared this species from a yellow larva with a brown x-shaped dorsal pattern on a *Phaseolus* sp. (Leguminosae) and from a pupa covered in spikes of white wax-powd er in a leaf fold on *Inga edulis* (Leguminosae). Biezanko & Mielke (1973) record three species of *Inga* as food plants in Rio Grande do Sul, Brazil: *I. sessilis, I. ajfinis* and *I. striata* (Legminosae).

78. ES/9 *Cogia calchas* Herrich-Schaffer 1869
Plates 23-24

This common and widespread species is found from Mexico to Argentina (TL unspecified). Kaye (1904, 1921) lists C. *calchas* on the basis of Crowfoot 's (1983) record. Ka ye (1904, 1921) also includes *Thorybus bathyllus* Smith, again from Crowfoot (1893), which I believe has been confused with C. *calchas* in Trinidad usage (see e.g. Cock 1982, p. 33). Although not known from Tobago, the biology of this species suggests that it could easily become established.

UPS brown, faint white non-hyaline spots space 3, 6-9 and cell (double). UNS brown, but texture grainy; two indistinct pa le brown-bordered grey discal bands UNH. UNS head pale brown. Cilia light brown, dark at end of veins. Hair tuft near base of vein 1B UPH in male; no costal fold; Fd' 18 mm, 19 mm. Illustrations in Lewis (1973, Plate 81, No. 52; UNS) and Riley (1975, p. 168, Fig. 19). Although undistinguished, the combination of wing shape, F obscure markings and texture UNH will serve to identify this species. *Cabares potrillo* reducta Mabille & Boullet is similar (see Cock 1988) but the F has hyaline markings in that species, whereas those of *Cogia calchas* are obscure.

This skipper is common throughout the island at roadsides and on disturbed ground. It frequents flowers of *Bidens pilosa*, feeding with its wings held slightly open above its head, and has a moderatel y stong bu t low skipping flight. Moss (1949) records the larva as stumpy, yellowish covered with fine white dots, and the food plan ts as *Schrankia* sp. and *I ndigo/era* sp. (Leguminosae) in Brazil. In Texas, Kendall (1966) found the food plant to be *Mimosa pigra;* he records that the mature larva pupates on the ground in a shelter of debris. In Trinidad the larva is known to feed upon Ti-Marie, *Mimosa pudica* (Leguminosae) (Cock 1985), but no details have been recorded. I have found a skipper larva on this food pla nt (Parryla nds, i.1988), but did not successfully rear it; most likely it was this species. The larva was found in a shelter made by joining together two leaves, with the leaflets spread. The leaves of the shelter were starting to turn yellow, and when the plant was touched, all the other leaves collapsed normally leaving just the shelter which then became quite conspicuous. In what was probably the final instar, the larva measured 10 mm when newly moulted. The head is chordate, and measures approximately 3 mm x 3 mm; strongly and regularly rugose; light dull green with pale brown stripes, one down the centre of the head, one angled to meet this above the mouth-parts, and a short third one passing laterally and posteriorly from this junction. Body greenish yellow with the dorsal line translucent dark green, and a narrow, white dorso-lateral line; true legs pale brown. In the previous instar the head is shiny dark brown with faint pale streaks, one each side of the central line, and a short one at the apices of the head.

79. E6/9 *Telemiades epicalus epicalus* Hubner 1819
Plate 3

Generally scarce, this subspecies is found from Trinidad through the Guyanas and the Amazon Basin to South Brazil (TL unspecified). Evans (1953) records one male from Trinidad, which is the extreme North of its range. Separate subspecies are found in Central America and North-eastern South America including Venezuela. The Evans (1953) listing is the first published record from Trinidad.

Male, UPF brown, basal half to tornus overlaid with khaki hairs; brown spots in cell, spaces 1B (2) and 2 owing to absence of khaki hairs; white hyaline apical spots. UPH brown with khaki hairs except in spaces 6 and 7; cell spot and submarginal band of brown spots in spaces lC to 5 owing to absence of ha irs. UNF dark reddish brown; khaki hairs in cell; darker brown spots in cell and spaces lB to 5. UNH dark reddish brown with scattering of yellow-khaki scales and hairs; discal and submarginal bands of brown. Costal fold filled with light brown scales; Fd' 19 mm.

Female, UPF brown wi t h purple tin t; hyaline apical spots white; basal 1/3 and submarginal band darker. UPH brown with tawny tint; margin and two discal bands brown. UNS coppery brown with bands of UPS repeated but more distinct; UNH heavily dusted with grey scales in spaces 1A, 1B and lightly in space lC. UNS abdomen with double white longitudinal line. R;? 21 mm. The size,

wing shape, colouring and apical spots characterise this species.

This is a very rare species in Trinidad. I know of just three records; an F.W. Jackson male in the NHM ('Trinidad') which Evans (1953) recorded, a male from Hololo Mount ain Road (vii. 1982, SAS) and a female from West Moreau (31.xii. 1979). Life history and food plants unknown.

80. E6/12 *Telemiades antiope antiope* PlOtz 1882
Plates 4-5

Evans (1953) records just a few specimens of the subspecies *antiope* from Nicaragua, Colombia (TL) and northern Brazil (?). A second subspecies is found along the Amazon. Iadded this species to the Trinidad list (Cock 1982).

UPS brown; hyaline spots white; two indistinct brown discal bands UPH just extend to UPF. UNS brown, heavily dusted with grey scales except distal 1/3 UNF; margin and two discal bands UNH brown; termen at end vein lB UNH dark brown. UNS head pale brown; double white line UNS abdomen. Costal fold containing orange-brown scales; *Fd'* 17 mm, <:;? 14-17 mm. The cell spot UPF has a deeply excavate distal margin, in common with only some species of *Quadrus* and *Clito*. The former have hyaline spots mid costa F, and the latter hyaline spots in spaces 4 and 5 F, none of which are present in *T. antiope*.

This is a rare species in Trinidad, only recently recorded for the first time. Jn Cock (1982) Irecorded captu res from Parryla nds, And rews Trace and Cumberland Hill. Since then Ihave taken another female on Ma rne Catherine (iii.1982). The specimen from Parrylands, a male, was captured resting upon the upper surface of a leaf with its wings spread. This species seems to be associated with open paths in forested areas. Life history and food plant unknown.

[ES *Mimia phidyle* Godman & Salvio 1884]

Evans lists two subspecies: *phidyle* (TL Panama) of which the NHM holds only the type, and *pazana* Evans, known only from three males from Bolivia. Kaye (1940) lists the capture of a specimen from Tabaqu ite by F.W. Jackson (3.iv.1922). I have not been able to locate Jackson's specimen in the HD or NHM. I am inclined to think there has been a misidentification, but *M. phidyle* is so distinct I cannot suggest which species is involved. Until the record can be substantiated I drop this species from the Trinidad list.

81. E14/2 *Spioniades arlemides* Stoll 1782

This species is found from Pana ma t o South Bra zil (TL Sur ina m) and is genera lly scarce. First recorded from Tr inidad from a capt u re by A. Ha l l (Symonds Valley, x-xii.1920) (Kaye 1921).

This d ist inct ive species h as t he wings predominan tl y dark brown w ith small w h ite hyaline markings, and with the posterior half of the UPS hind-wings white. Illustrations in Lewis (1973, Plate 87, No. 12) and Barcant (1970, Fig. 4, No. 9).

Ihave never t aken t h is species in Trin ida d, a lthough Ibelieve Isaw a specimen on Chacachacare Island near the lighthouse (i.1982). Evans records two males in the NHM, but Iwas able to locate only a female collected by A. Hall in the Northern Range (xii.38-i.39). There is at least one in the Angostura-Barcant collection.

In Brazil, Moss (1949) records the la rval food plants as *Uncaria tomentosa* (Rubiaceae) and once on *Sabicea aspersa* (Rubiaceae). The larva is grub-like, dirty yellow to green with a flat ochreous head, and the early shelters are triangular and conspicuous.

82. El8/1 *Polyctor polyclor polyctor* Prittwitz 1868
Plate 6

Although found from Costa Rica to Argentina, this subspecies would appear to be common only in South Brazil (TL) and Paraguay. Separate subspecies are found in Colombia and f rom Mexico to Cost a R ica. First recorded by Kaye (1921) from a specimen in the Miller collection from the Northern Range.

This distinct ive species is whi te, with the base and the distal parts of the wings brown with light brown and white markings. The spots in spaces 6-8 F are white hyaline. UNS with the wing bases white and the distal dark markings less extensive. Illustration in Lewis (1973, Plate 85, No 23). *Fd'* 16-17 mm, <:;? 18 mm.

This species seems to be extremely localised in Trinidad, being found only on, and adjacent to, Pointe Gou rde. Ihave seen specimens from G aspa ree (<:;? , 5.ii.1922, N. La mon t in RSM), Cha gu a ra mas (<:;? , 17.x.1981, J. & F. Preston), and Point Gourde itself (2d', 17.i.1988; also specimens in coll. SAS). My two males were taken while feeding at a mud pud dle in dappled sunlight in a damp area of forest on Pointe Gourde.

This species has been reared from a larva on *Ipomoea* sp. in Brazil (Moss 1949), and Scott Alston-Smith (pers. comm.) reports seeing a female showing oviposit ion behaviour on a member of t he same genus growing some 7 m above the ground in a tree.

Nisoniades Hubner

Members of this sexually dimorphic genus are all rather similar for the same sex. Correctly associating the

males and females without access to a reference collection may be difficult. I have associated the males and females for the two com moner species, *N. bessus* and *N. rubescens,* and confirmed this by rearing both, but Ihave not recognised the female of *N. ephora* or seen any specimens of the two species, *N. ma carius* and *N. laurentina*.

The males are dark brown to black with indistinct darker discal bands, and 2-3 apical spots F. The presence of these apical spots distinguishes *Nisoniades* spp. from *Pellicia* spp. w hich are otherwise similar, and the combination of the wing shape, dark colouring and the swollen base of vein 7 UNH distinguish male *Nisoniades* spp. from other Trinidad species. The females are lighter in colour than the corresponding males, the markings stand out more, the wings are much more rounded and generally the tornal area UNH is relatively pale. The size, wing shape, dark colour and apical spots will distinguish all female *Nisoniades* spp. from other Trinidad species except the female of *Bolla cupreiceps* Mabille which has no trace of the discal bands UPF or UNF, and UNH the macular discal bands are nearer the margin and are of pale spots on a dark ground colour, rather than vice versa.

The males can largely be identified from features of their secondary sexual characters: the hair tuft in the cell UPH, and details of the swollen basal portion of vein 7 UNH (Figures 4-7).

N. bessus – UPH tuft short, inconspicuous. Vein 7 divergent from the radius (costal side of cell) from its origin; origin of vein 7 mid way between origin vein 8 and end cell; swollen to slightly beyond end cell (Figures 4-5).

N. laurentina – as *N. bessus.*

N. rubescens – UPH tuft long, conspicuous. Vein 7 divergent from the radius from its origin; origin of vein 7 nearer end cell than origin of vein 8; swollen portion slender and extending well beyond end cell (Figure 6).

N. ephora – UPH tuft long, pale brown, conspicuous. Vein 7 parallel to radius and vein 6 to the end of the swollen portion where they diverge; origin of vein 7 closer to end cell than origin of vein 8; swollen portion extends well beyond end cell (Figure 7).

N. macarius -Vein 7 coalesced with radius and vein 6 to end of swollen area.

83. E19/1 *Nisoniades bessus* Moschler 1876
Plates 13-16, Figures 4-5, 8-12

Evans (1953) treated *N. bessus* as a complex of nine subspecies. However, Steinhauser (1989) recognised Evans's subspecies as valid species, based u pon differences in genitalia and overlap in range. The Trinidad representative seems to be *N. bessus* which should therefore now be treated as having no subspecies. *N. bessus* is found from Venezuela to the Amazon (TL Surinam). The male genitalia are asymmetrical, complicated and variable. The markings of the UNH are also variable, especially in the female, but in Trinidad they are reasonably constant. Evans (1953) points out that the female UNS is palest in Trinidad material. Recorded from Trinidad by Kaye (1921) from specimens collected by F.W. Jackson and A. Hall.

Males UPS near black, discal bands black but very indistinct . UNS uniform brown, slightly paler dorsum UNF; UNH a double discal line of dark brown, interrupted at the veins. Female dark brown, discal bands darker; UNH tornal 1/2 whitish brown; discal band as male. Illustration in Riley (1975, Plate 22, No. 4, (Jo). Male with weak tuft in cell UPH; vein 7 UNH diverges from radius from origin, and swollen to just beyond end cell (Figures 4-5); no costal fold; *F(J'* 15.5 - 17 mm, *Q* 17-18.5 mm.

The females of *N. bessus* and *N. rubescens* can be separated by their colour and markings. The UNH double discal band is more continuous in *N. rubescens,* but more distinctive is the definite coppery tint to both the UPS and more strongly the UNS of *N. rubescens.* With the two species side by side it is difficult to confuse them. Unfortunately, Icannot as yet offer such clear guidelines for the females of the other *Nisoniades* spp., as they are not familiar to me.

The male genita lia (Figu res 8-12) show an asymmetrical development of the dorsal spike of the gnathos: a large disc on the left but only a small spike on the right The cuiller of the left valve is shorter than that in the diagram of ssp. *bessus* given by Evans (1953, Plate 30), resembling *N. hecale* Hayward from Ecuador in this respect; it is also very heavily spined, a feature not evident in Evans's diagrams.

Ihave taken a male of this species in flight (Maracas Valley, 10.ix.1982) which proved to have no genitalia. Ibelieve tha t it had ma ted bu t that the complicated genitalia became stuck so that in order to separate from the female, it pulled out its genitalia. It would be nice to think that the female partner was of another *Nisoniades* sp. and that this demonstrated how closely related species are unable to interbreed, but this is only speculation.

Sheldon (1949) records this species from Tobago (Bacolet), but Ihave not seen any specimens. Given the difficulties of identification which prevailed regarding this genus, this record needs confirmation, although there is no reason why it should not occur in Tobago. In Trinidad, *N. bessus* is widespread and moderately common around secondary forest where its food plants occur. Both sexes come readily to flowers.

Moss (1949) records the food plants as Piperaceae and Malphigiaceae in Brazil, but his material would have to be checked to confirm that it is actually *N. bessus.* I have found larvae in circular leaf flaps on *Solanum bicolor* (xi.1981, Spanish Farm), *S. stramonifolium* (20.iii.1980, Arima-Blanchisseuse Road, milestone 10 1/2) and *Dunalia arborescens* (23.i.1982, Sangre Grande) (all Solanaceae). Because of the difference in colour between the undersurface and uppersurface of the leaves *(bicolor),* these flaps are conspicuous. The mature larva is 27-30 mm long; the head black, chordate (almost flat dorsally), shiny, rugose, with inconspicuous white setae; Tl with very narrow dark band; rest of body dark translucent green with white and yellow speckling; AS internal developing gonads not conspicuous; dorsal vessel fairly conspicuous; tracheae show as faint yellow lateral line. Pupa 13 mm; yellow, brown dorsally and anteriorly; spiracles darker; Tl spiracles developed as a pair of short black spikes dorsally, posterior to eyes. Pupation of one specimen was noted in a folded-over portion of leaf; the pupa was suspended level, but up side down and held by a Y-shaped support of silk. A larva collected 6.ix.1981, pupated 8.xi. and a male emerged 17.xi; another pupated 13.xi and a male emerged 23.xi.1981. The larvae are attacked by a tachinid parasitoid.

84. E19/3 *Nisoniades laurentina* Williams & Bell 1939

Evans (1953) records a curious distribution for this species; 14 specimens from French Guyana (TL) and singletons from Guyana, Trinid ad, Costa Rica and Mexico. This is the only specimen record ed from Trinidad, and Evans (1953) is the first published record.

Characterising this species, Evans (1953) notes that the UPH submnrginal band of paler brown spots is clearly defined, and the UNH is u niform with t he markings small and the tomal spot conspicuous. Without named reference material, it would be difficult to separate this species from *N. bessus* on these characters. The male genitalia are distinct: the cuiller of the right clasp is broadly bifid, whereas in *N. bessus* it is single.

Evans records a female in the NHM from Trinidad, but Iam unable to locate this specimen and I know of no other records. Until further material is located, t he presence of t his species in Trinidad must be considered dou btful. Life history and food plants unknown.

85. El9/S *Nisoniades rubescens* Moschler 1876
Plates 17-20, Figures 6, 13-19

The species is found from Mexico to the Amazon (TL Surinam). Kaye (1940) lists this species under a synonym, *bromias* Godman & Salvin.

Male resembles that of *N. bessus* ; bands UNS brown with double line of discal bands more widely separated than for *N. bessus* ; tornal 1/2 UNH coppery brown. Female sim ilar, bu t larger, t he wings more rounded, and the copper tint usually stronger, especially UNH. In the male, the tuft in cell UPH conspicuous; vein 7 UNH divergent from radius from its origin which is nearer end cell than base and swollen to well beyond end cell (Figure 6); no costal fold; *Fer* 16.5-17 mm, 9 18-18.5 mm. The separation of females of *N. bessus* and *N. rubescens* is treated under *N. bessus* above.

The male genitalia are shown in Figures 13-19. They match the diagrams of Evans (1953, Plate 32), but the curvature of the valves demonstrated in my ventral and dorsal views is not apparent in his.

Although Sheldon (1949) lists this species from Roxborough, Tobago (as its synonym, *Pellicea bromias),* there are no specimens in the NHM. However, I have ta ken a pair on the Speyside-Cha rlo tteville col (15.v.1981), so can confirm this species for Tobago.

In Trinidad *N. rubescens* is as common as *N. bessus,* but found in rather more open situations. It is commoner in lowland areas, but I have found it up to 600 m. I have also taken a male (19.i.1980) and a female (14-20.ix. 1981) in my MV light trap at Curepe.

In Mexico, Kendall (1976) found this species feeding on *Exogonium luteum* and sweet potato, *Ipomoea batatas,* (both Convolvulaceae). In Trinidad the larvae feed upon wild *Ipomoea* spp., and shelter when young in circular leaf flaps. The mature larva measures 28 mm; head brown, chord ate, very rugose; Tl with thin, dark dorsal band; body dirty green with yellow speckles; dorsal line clear; tracheae show as faint lateral line. The pupa is pale brown, rounded with no distinguishing features. 1\vo larvae collected 28.xi.1981 (Curepe) pupated 4.xii. 1982, and a male and female emerged 13.xii. 1982. Although *N. bessus* and *N. rubescens* are very similar in the adult and the larva, it is striking how different the food plants are: *Solanum* and *lpomoea* respectively.

86. E19/8 *Nisoniades ephora* Herrich-Schaffer 1870
Plates 21-22, Figures 7, 20-25

Females of this species are not common in collections – none is known from Trinidad. It is found from Mexico to Peru and the Guyanas (TL Nicaragua). Kaye (1940) is the first record of this species from Trinidad.

Male UPS as *N. bessus*. UNF brown, uniform except slightly paler at dorsum. UNH brown, dark brown discal bands consist of single thick line. UPH tuft long, pale brown, conspicuous. Vein 7 parallel to radius and vein 6 to the end of the swollen port ion where they

diverge; origin of vein 7 closer to end cell than origin of vein 8; swollen portion extends well beyond end cell (Figure 7). *Fd'* 16 mm. Illustration in Lewis (1973, Plate 84, No. 14; as *"Niconiades" ephora).*

The male genitalia are shown in Figures 20-25. Compared to the diagram given by Evans (1953, Plate 31), the left valve appears to be more deeply divided between the cuiller and the valve, and the valve is rather shorter; furthermore the shape of the cuillers and the quite marked curvature of the valves becomes apparent with the ventral views.

Nisoniades ephora is much Jess common than *N. bessus* and *N. rubescens.* Kaye (1940) lists specimens from Port of Spain (15.iii.1922, F.W. Jackson), Ma u pertu is (12.i.1926, W.J. Ka ye) and St. An ns (31.ii i.1929, Hu n t ingdon). In t he NHM t here ar e specimens from the Northern Range, St. Anns and Arima district. Ihave taken two males at *Eupatorium* flowers in Parrylands (2.ii .1980) and one in Ma r acas Va lley (10.ii.1982). Life history and food plant unknown.

-E19/12 *Nisoniades macarius* Herricb-Schaffer 1870

The Evan s (1953) cata logue of the NHM collection includes a single female of this species from Tobago, but Iwas unable to locate any specimens in the NHM. Similarly, Iknow of no specimens from Trinidad. Its ra nge ext ends from Hond uras to Argent ina (TL Venezuela). Kaye (1940) writes that t his species was recorded by Fulda (20.iii.1927) but this identifica tion could well be in error. A specimen labelled *"Pellicia macareus"* by F.W. Jackson (nr. Port of Spain, vii.1919-iv.1920 in HD) proved to be a male N. *bessus.*

Evans (1953, p.51) characterises this species thus: "Above grading from a very dark form to a pale one. The dark form has the central band more or less isolated; UPH and UNH uniform dark brown. The pale form has the central and discal bands Y-wise: UPH pale yellowish-brown and the spots of the central band are pale centred: UNH tornal half pale yellow."

Moss (1949) reared this species on *Ipomoea* sp. in Brazil, but the identification should be confirmed.

87. E21/3 *Pellicia costimacula costimacu/a* Herrich-Schaffer 1870
Plate 7, Figures 26-29

The nominate subspecies is found from Panama t o Par agu ay (TL Venez u ela), bu t is not genera lly common. The range is extended to Argenti na with two additional subspecies (Evans 1953, Steinhauser 1989). Kaye (1940) added this species to the Trinidad list from Sir N. Lamont's specimen taken at Palmiste "19.xi" (see below).

This species closely resembles the *Nisoniades* spp. above, but can be easily distinguished since it lacks the apical spots F. U PS dark brown with faint very indistinct lighter basal and discal bands. UNH brown; termen U NF pa le; U NH wit h lighter d isca l and submarginal bands. Illustration in Lewis (1973, Plate 84, No. 51, *Q*). *Fd'* 16 mm, 9 17-18 mm.

The valves of the male genit a l ia of the only specimen Ihave examined (Figures 26-29) differ slightly from those shown in the diagram by Evans (1953, Plate 33). The apex of the cuiller of the left valve is more strongly developed, while the cuiller of the right valve is strongly curved and bears one rather than two points. The valves themselves are strongly curved, even angled, which is apparent in the ventral view.

This is a rare species, so far found only in the South. Lamont took specimens at Palmiste (d' 13.i.1920 in UW I; 9 19.xi.1931 in RSM – presu ma bl y t he specimen listed by Kaye (1940) and Moreau (Q 2.i.1938 in RSM). Itook a male on flowers of black sage, *Cordia curassavica,* at Grande Ravine (13.ix.1980). Life history and food plant unknown.

87a. E21/7 *Pel/icia theon tonga* Evans 1953
Plate 8, Figures 2-3

This rare subspecies is found in Venezuela, Colombia (TL) and Panama. TWo more rare subspecies are represented by specimens from the Andes to Bolivia. I recen tly added t his species to the Trinidad list (Cock 1984a).

Above, this species is very und istingu ished, bei ng dark brown, with faint, indistinct mauve-brown basal and discal bands. UNF brown with tcrmen narrowly white. UNH costal half brown, tornal half white; double row of brown discal spots extends into white area as far as space lC. Body and head dark brown above; whi te ventra lly, incl uding palpi. F *Q* 14 mm. The lack of markings UPS and white area UNH d istingu ishes *P theon tonga* from most other Trinidad skippers, but could cause confusion with *Ouleus fridericus Irina* Evans. In *0.fridericus* the wings are more rounded, and the palpi are smaller, and black beneath. *Gorgythion* spp. arc also quite similar hut have white apical spots.

The single female of this very rare species which has been captured in Trin idad was taken in Parrylands (13.ix.1980). Life history and food plants unknown.

88. E21/9 *Pellicia dimidiata dimidiata* Herrich-Schiiffer 1870
Plate 9, Figures 30-33

The nomina te subspecies is fa i rl y com mon i n Central America (TL Mexico), hut scarce in the rest of its range to the Upper Amazon. TWo more subspecies extend

the range to Argentina. Huntingdon took specimens at St. Anns·Santa Cruz Valley (21-31.iii.1929) which Kaye (1940) lists. Although Sheldon (1949) does not record this species from Tobago, Evans (1953) lists two specimens in the NHM, and I have also captured a female on the road between Roxborough and Speyside (15.v.1981). The NHM specimens may have been known to Sheldon but misidentified under one of the doubtful records of *Nisoniades* spp. recorded from the island.

This is a small brown species with fairly distinct bands of darker brown. In fresh specimens, the colouring is much darker than in old museum specimens (as is the case with many skippers). Compared with *P. costimacula* this species is smaller, has more rounded wings, and more distinct markings. It lacks the white area UNH of *P. theon* and *Ouleus fridericus trina* Evans which it otherwise resembles. It might be confused with the plain brown *Staphylus* spp., but they are distinctly more slender, and all have apical spots, albeit often weakly. The male has a dark hair tuft near the base of the UPH, and the wings are more pointed than in the female. Fct 13.5-14 mm, ♀ 13-15 mm.

One character by which Evans distinguishes the subspecies *dimidiata* is the presence of two equal projecting spined limbs on the left cuiller. In the only Trinidad specimen I have examined (Figures 30-33) the basal of these two limbs is reduced to a very small flange, resembling in this respect, but not others, ssp. *meno* Mabille from Brazil.

This species is captured occasionally in disturbed, open situations, mostly in lower areas, but extending as high as 500 m in disturbed areas of the Northern Range. It seems to be scarce in the South. Moss (1949) records ssp. *meno* Mabille in Brazil as having a maroon larva with eleven spotted bands and feeding on *Ipomoea* sp.

89. E22/4 *Noctuana stator* Godman & Salvio 1899

The range of this species extends from Mexico (TL) to Peru and Trinidad. Kaye (1940) lists several captures from Trinidad.

This species has quite pointed forewings, although they appear truncate owing to the F termen being angled at the end of vein 6. Similarly the termen H is angled at the end of vein 3. UPF dark brown, with two white apical spots in spaces 8 and 9; disc mottled with markings of black, brown and russet; a russet patch just before the apical spots is quite prominent. UPH more uniform dark brown; indistinct marginal and discal bands of brown. UNS light brown; UNF with yellow-brown crescent distal to apical spots; UNH with irregular yellow-brown submarginal spots in spaces 1C-5, and indistinct discal band of the same colour. Body and head dark brown above, brown below, UNS palpi yellow brown.

Kaye (1940) list captures from Maracas Valley (15.iii.1922, F.W. Jackson), Maupertuis (15.i.1926, W.J. Kaye) and St. Anns (31.iii.1931, Huntingdon). There is another specimen from St. Anns in the NHM (A. Hall, i-iii.1932), but the five others recorded by Evans (1953) were on loan when I checked the collection. I have not seen this species in Trinidad. Life history and food plants unknown.

90. E24/2 *Myrinia myris* Mabille 1897
Plate 10

This species was described from Brazil and there are only six specimens in the NHM which extend its range to Bolivia, Peru and French Guyana. Irecently added it to the Trinidad list (Cock 1982).

UPS dark brown; round black spot end cell UPF containing two tiny white spots, the lower stronger than the upper. UNS brown with purple-coppery tint; two brown discal bands UNS, lower white cell spot as UPF; margin UNH at end spaces 1B and lC black. UNS head, base of legs pale brown; UNS abdomen two longitudinal whitish lines. No costal fold; Fct 21 mm. The colour, wing shape and particularly the marking in cell UPF are unique in the Trinidad fauna.

The only three specimens that I have seen from Trinidad are males caught on the open summits of forested hills – one on Marne Derrick, Trinity Hills (4.iv.1982), and the others on Brigand Hill (7.iv.1982; 8.x.1982). They rested quite high on trees on the uppersurface of leaves with their wings spread, and were quite conspicuous.

91. E27/7 *Cyclosemia herennius herennius* Stoll 1782
Plates 11-12, Figure 34

The nominate subspecies, described from Surinam, is known only from the Guyanas, Trinidad and Belem at the mouth of the Amazon. It is represented by different subspecies in Costa Rica to Ecuador and in Peru and the Upper Amazon, and seems to be scarce throughout its range. Kaye (1921) records several specimens he captured.

UPF greyish brown, brown distal and submarginal bands; a round black spot end cell containing two tiny white spots. UPH brown with macular grey-brown discal bands. UNF brown, paler at dorsum; weak discal bands. UNH bright, light blue except more or less extensive brown area at apex; two macular dark brown discal bands. UNS head white; UNS abdomen with two blue-white lines. I have one male (San Miguel Valley, 17.x.1979) in which the blue colouring is completely replaced by dull grey-brown. Sexes identical; *Fa"* 12-14 mm, ♀ (reared) 13 mm. The cell marking UPF and blue

colour UNH distinguish this from all other Trinidad species.

This species is to be found occasionally in forested areas up to 600 m throughout the island. Dates of capture of the ten specimens I have seen do not indicate any seasonality. Males are captured more frequently than females and rest secretively beneath leaves with their wings spread. Because of the blue colouring UNH they can be mistaken for some of the *Quadrus* or *Sostrata* spp. in the field.

The biology is unusual and interesting. Firstly, the food plant in Trinidad is *Costus scaber* (Zingiberaceae); this is one of very few Neotropical species of t he subfamily Pyrginae to feed on a Monocotyledon rather than a Dicot yledon (cf . *Urbanus* in Cock 1986). Secondly, the larval shelter found on *C. scaber* (Trinity Hills, 29.xii.1981) is unique in my experience. The leaf is cut in three pairs of equidistant straight lines from the margin to near the midrib, and the basal pair of cuts is extended adjacent and parallel to the midrib towards the leaf apex; a flattened out leaf is shown diagrammatically in Figure 34. The basal and distal parts of the leaf (1 & 4 in Figure 34) remain extended as normal, and the larvae shelter in the section between the middle and the distal cuts (3 in Figure 34), which are folded upwards and held by silk. The shelter droops from the basal section of leaf (1 in Figure 34) at the bared section of midrib arising from the basal cut. The sections of leaf between the basal and middle cuts die and dry up because the vascular supply is cut by the basal cuts, and they droop over the larval shelter effectively disguising its shape. The total effect is of a leaf that has been accidentally broken near its base and is dangling by its midrib as it dries up. The larva is translucent green, turning yellow shortly before pu pation, with a dark, dull, rugose, chordate head distinguished by a pair of shiny stripes running down the 'face', converging towards the mouth parts. The pupa is also unusual. It measures 17.5 mm and is attached to the

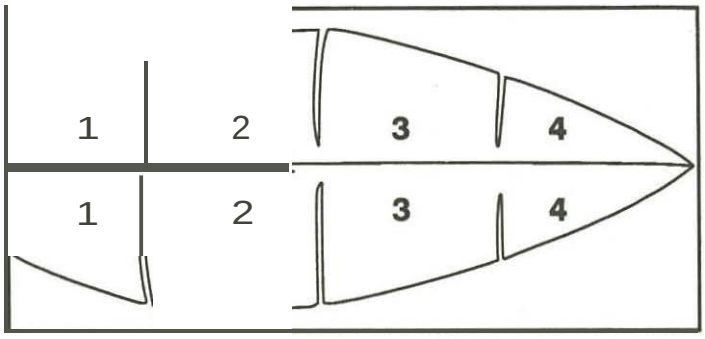


Figure 34. Diagrammatic representation of the opend.out arval shlter of *Cyclosemia h. herennius* on *Costus scaber* (coll. Tnruty Hills, 29xu. 1981, MJWq.

silk lining of the shelter by its cremaster through the larval head capsule; it is pale brown, darker above with the head dark brown; the abdomen has pale backward directed hairs. The most striking feature, however, is a spatulate frontal projection with laterally at the base a widening with a sharp anterior angle; this projection measures 2 mm and is dark in colour with short dark hairs. Hence the larval food plant, the leaf shelter and pu pa structure combine to make this a most unusual species.

Moss (1949) also found this species exceptional. In Brazil he recorded the food plant as *Canna coccinea* (Cannaceae) – a Monocotyledon again, bu t not in the same family as *Costus*. He notes the same features of the pupa and records that the young larvae make small round leaf shelters, but that "the final shelter consists of a piece of the leaf doubled back and around which are a number of small loose pieces of the leaf that have been attached by silken threads. These cut pieces of the leaf tum brown whilst the actual shelter remains green, the whole thus becoming somewhat inconspicuous." Interestingly, Moss (1949) records the congeneric *C. earina* Hewitson to feed upon a member of the Melastomataceae and to have a normal pupa.

References

Barcant, M. (1970). ButterRles orTrlnJdad and Tobago. Collins, London.

Biezanko, C.M. & Mielke, O.H.H. (1973). Contrlbul o ao estudo raunistlco dos Hesperildae Amerlcanos. IV Especles do Rio Grande Do Sul, Brasil, com notas taxonomlcas e desciies de especles novas (Lepldoptera). Acta Biol. Par., Curitiba, 2, 51-102.

Cock, M.J.W. (1982). The skipper buttrerRles (Hesperlldae) or TrinJdad. Part II. Systematic list of the Trinidad and Tobago species. Occasional papers of the Department of Z.OOlogy, UWI, St. Augustine, No.5, 49 pp

Cock, M.J.W. (1984a). Lepldoptera notes I-VI. Living World. Journal of the Trinidad and Tobago Field Naturalists' Club, 1983-1984, 35-37.

Cock, M.J.W. (1984b). The skipper butterRles (Hesperlldae) or Trinidad Part 3 Pyrginae (ftrst section). Living World. Journal of the Trinidad and Tobago Field Naturalists' Club, 1983-1984, 38-42.

Cock, M.J.W. (Ed.) (1985). A review of biological control or pests In the Commonwealth Caribbean and Bermuda u p to 1982. Technical Communication No. 9, Commonwealth Institute of Biological Control. Fam.ham Royal, U.K.; Commonwealth Agricultural Bureaux, 218 pp.

Cock, M.J.W. (1986). The skipper butterntes (Hesperlldae) or Trinidad. Part 4 Pyrginae (second section). Living World. Journal of the Trinidad and Tobago Field Naturalists' Club, 1985-1986, 33-47.

Cock, M.J.W. (1988). The skipper butterntes (Hesperlldae) or Trinidad. Part 5: Pyrglnae, genera group C concluded. Living World. Journal of the Trinidad and Tobago Field Naturalists' Club, 1987-1988, 24-31.

Cock, M.J.W. & Alston-Smith, S. (1990). The skipper butterfiles (Hesperlldae) or Trinidad. Part 6: Pyrglnae, genera group D. Living World. Journal of the Trinidad and Tobago Field Naturalists' Club, 1989-1990, 25-35.

Crowfoot, W.M. (1893). Preliminary list or Trinidad butternle$. Journal of the Trinidad Field Naturalists' Club, 1, 173-174.

Evans, W.H. (1952). A catalogue or the American Hesperlldae Indicating the classification and nomenclature adopted In the British Museum (Natural History). Part II (Groups B, C, D) Pyrglnae. Section 1. London; British Museum (Natural History), 246 pp, 53 plates.

Evans, W.H. (1953). A catalogue or the American Hesperildae lndkatlng the classtncatlon and nomenclature adopted In the British Museum (Natural History).Part ID (Groups E, F, G) Pyrglnae.Section 2. London; British Museum (Natural History), 246 pp, 53 plates.
Kaye, W.J. (1904). A catalogue or the Lepldoptera Rhopalocera or Trinidad. Transactions of the Entomological Society of London, 1904, 159- 224.
Kaye, W.J. (1921). Catalogue of the Trinidad Lepldoptera Rhophalocera.
Memoirs of the Department of Agriculture, Trinidad and Tobago, 2, 163pp. Kaye, W.J. (1940). Additions and corrections to the recorded species of Trinidad butternte s. Transactions of the Royal Entomological Society of London, 90, 551-573.
Kendall, R.O.(1966).Larval rooctplants ror nve Texas Hesperildae. Journal of the Lepidopterists' society, 20,35-41.