A NEW GENUS AND SPECIES OF CYCLOPIDINAE FROM ZAMORA, ECUADOR (LEPIDOPTERA: HESPERIIDAE)

Andrew D. Warren [1]

Department of Entomology,
Oregon State University, Corvallis, Oregon 97331 USA

[1]Research Associate, Museo de Zoología.
Facultad de Ciencias, Universidad Nacional Autónoma de México,
Apdo. Postal 70-399, México, D.F. 04510 MEXICO

ABSTRACT

The taxonomic history of the subfamily Cyclopidinae and its status in relation to the name Heteropterinae is discussed. The New World genera included in the Cyclopidinae are summarized, and defining characters for each genus are reviewed. A new genus and species of Cyclopidinae is described from Ecuador.

KEY WORDS: Classification, cloud forest, distribution, nomenclature, paramo, skippers, taxonomy.

RESUMEN

Se discute la historia taxonómica de la subfamilia Cyclopidinae y su relación al nombre Heteropterinae. Se resume los géneros del Mundo Nuevo incluidos en

Cyclopidinae y se revisa caracteres difinitivos para cada género. Se describe un género nuevo y una especie nueva de Cyclopidinae de Ecuador.

PALABRAS CLAVE: Clasificación, bosque mesófilo de montaña, distribución, hespéridos, nomenclatura, páramo, taxonomía.

Taxonomic History of the Cyclopidinae Speyer 1879

The Cyclopidinae are a group of small, grass-feeding skippers distributed on all continents except Australia (and Antarctica). The taxonomic history of this group has been turbulent. In 1867, C. and R. Felder (p. 504) established the new genus *Eumesia* for a single species they also described, *semiargentea*. This "skipper" was so unusual in its head morphology that the Felder's also proposed the family Eumesiidae for this one species. This action would have little bearing on the nomenclature of the group until the 1950's (discussed below).

SPEYER (1879) recognized three subfamilies of skippers, or family "Hesperiden" in Europe, the Pyrginae, Pamphilinae, and Cyclopidinae, the last of which he authored (p. 483). This was the first time the European genera *Carterocephalus* Lederer, 1852, and *Cyclopides* Hübner, 1819 had been recognized as representing a subfamily distinct from the Pamphilinae. Speyer placed the species *Papilio morpheus* Pallas in *Cyclopides*, of which the type is *Papilio steropes* Denis & Schiffermüller, as restricted in 1870 (p. 96) by Butler (not *Papilio metis* L. as stated in 1893 by Watson, p. 90). *Papilio steropes* is now considered a synonym of *P. morpheus*, which is the type species of *Heteropterus* Duméril, 1806 (where *morpheus* currently resides).

Subsequent arrangements of skipper subfamilies, generally, did not follow Speyer. WATSON'S (1893) classification of the Hesperiidae did not recognize the Cyclopidinae as a distinct subfamily, but placed them within the Pamphilinae, in his "section A." The genera *Cyclopides* (consisting of African species), *Eumesia*, *Heteropterus* (with *morpheus*), and *Butleria* Kirby 1871 (which included species now placed in several genera) were all included in Watson's "section A." Watson's classification was widely followed by subsequent authors dealing with Hesperiidae (e.g. GODMAN & SALVIN 1879-1901, MABILLE 1903-04, DRAUDT 1917-1924, and with modifications by EVANS 1937a-1955). TUTT (1896, p. 300), however, recognized the Cyclopidi as a tribe within the "Hesperinae" (the only included subfamily in the "Hesperidae"), and later (1906, p. 197) treated the Cyclopidinae as a distinct subfamily within the Urbicolidae. WARREN (1926) followed the classification of TUTT (1906), but did not deal directly with any cyclopidines. AURIVILLIUS (1908-1925, p. 546) recognized the genera placed in the Cyclopidinae (sensu SPEYER1879, TUTT 1906) as distinct from the Pamphilinae, and proposed the name Heteropterinae as a new subfamily for them. Aurivillius included *Heteropterus* and *Cyclopides* in the subfamily, but made no comment on SPEYER'S(1879) previous proposal of Cyclopidinae as a subfamily for some of the same genera.

EVANS(1955, p. 9) noted for his *Carterocephalus* group (within the Hesperiinae) that "As far as America is concerned, the group could be accorded subfamily status, but in Palaearctic Eurasia (*Heteropterus* group) and in Africa (*Astictopterus* group) there are links with the *Ampitta* group, which render separation undesirable." Thus the denial of subfamily status for this group continued. Evans examined the type specimen of *Eumesia semiargentea* and revealed (p. 19) that it was a skipper with the head of an unknown satyrid glued to the thorax. For that reason, he incorrectly made *Eumesia* a synonym of *Dalla* Mabille 1904. HEMMING (1967, p. 177) commented on the misconceived nature of Evans' action and restored *Eumesia* to full generic status (but did not comment on the apparent subjective synonymy of *Dalla* and *Eumesia*).
In 1975, HIGGINS recognized the Heteropterinae as a distinct subfamily, and in 1981, MILLER & BROWN did the same. Many regional faunal treatments in Europe and North America since these works have treated the Heteropterinae as a distinct subfamily. Our most modern estimations of butterfly phylogeny continue to recognize the Heteropterinae as a distinct subfamily (see DE JONG et al. 1996, HEPPNER 1998, ACKERY et al. 1999).
Stemming from confusion over the synonymy of *Eumesia* and *Dalla*, Stainhauser et al. (1990) petitioned the ICZN to suppress *Eumesia* and Eumesiidae (an unused senior synonym of Heteropterinae). In 1992 the ICZN accepted the petition (Anonymous 1992), and placed *Eumesia* and Eumesiidae on the Official Indices of Rejected and Invalid Generic and Family-Group Names in Zoology (respectively). WARREN (2000, p. 536) described details of the ruling by the ICZN, discussed the history of the usage of the name Heteropterinae, and reintroduced the name Cyclopedinae [sic!] as a senior synonym of Heteropterinae. Detailed study of original literature (SPEYER 1879) has confirmed Cyclopidinae as the correct spelling of the name.

Genera included in the Cyclopidinae

EVAN'S (1955) reviewed New World taxa in his "*Carterocephalus* group," which includes all members of the Cyclopidinae in the New World. Members of Evans' *Carterocephalus* group are characterized by having porrect, hairy palpi (with a slender third segment), a stout antennal club, a long discal cell on the hindwing (compared to other groups of skippers), and by lacking secondary sexual characters. SPEYER (1897) and AURIVILLIUS (1925) provided very similar diagnoses of the group. No genitalic characters have been used to define the cyclopidines or to distinguish between included genera. There are, however, some genitalic characters that separate genera within the group discussed below. Evans included 6 genera in the *Carterocephalus* group.
Carterocephalus, a Holarctic genus of about 20 species, is represented in the New World only by the Holarctic species, *Carterocephalus palaemon* (Pallas). This species occurs mostly in cool, partly shaded wetlands in North America. *Carterocephalus* are characterized by having a blunt, slightly tapered apiculus (on a stout club), anten-

nae less than half the length of the costa of the forewing, spined mesothoracic tibiae, and prothoracic tibiae with a short, slender epiphysis. Additionally, *Carterocephalus* are distinguished by having the upper spurs on the metathoracic tibiae replaced by spines, having a nudum count of 6 to 10 (9 in *palaemon*), and spots in forewing spaces M1-M2 and M2-M3 (in addition to most other wing cells). The ventral hindwing is spotted and often quite colorful. The palpi are longer than the length of the head. According to EVANS (1949), *Carterocephalus* males have a fairly narrow, usually constricted uncus, which is often, but not always, bifurcate at the distal end. The gnathos is generally long, well developed and bifurcate. The valvae are long, usually rather broad with a broad ampulla and harpe; the harpe is produced dorsally at its distal end and is narrowed in a few species. The ampulla and harpe overlap (in lateral view) only basally or not at all in males of *Carterocephalus*, and are almost always well separated at their distal ends. Female genitalia of *Carterocephalus* (and of most other cyclopidines) have not been extensively illustrated or discussed in the literature, and it is beyond the scope of this study to describe female genitalia of all cyclopidine genera when the female of the genus described below remains unknown.

Piruna Evans, 1955, is a mega-Mexican genus with about 20 described species; most species occupy moist, grassy areas at moderate and high elevations, often along small rivers and streams, or on grassy slopes. New species of *Piruna* are frequently found in montane Mexico as high elevational areas are becoming better known (see FREEMAN 1990, 1991a, STEINHAUSER 1991b; WARREN & GONZALEZ 1998). *Piruna* species have antennae that are less than or about equal to half the length of the costa of the forewing and a stout club with the apiculus slightly tapered at the distal end to a minute, triangular point. The nudum count on *Piruna* varies from 7 to 10, and the club is usually somewhat flattened laterally. The prothoracic tibiae have a short, stout central epiphysis; the mesothoracic tibiae with a distal pair of spurs and a row of spines; the metathoracic tibiae are decorated with two normal pairs of spurs. Males of few or no *Piruna* species have spines on the metathoracic tibiae, while females have one or more spines between the distal pairs of spurs. The porrect, hairy palpi are longer than the head. The forewing lacks spots in spaces M1-M2 and M2-M3, and the ventral hindwing may be spotted or nearly devoid of markings. The uncus of male *Piruna* is broad and bifurcate. The arms are usually shortened (see WARREN & GONZALEZ 1998), being fairly long only in a few species (see STEINHAUSER 1991b), and when long, broadly bifurcate. The gnathos is well developed, bifurcate, and generally produced distally to a rounded point or points. The valvae of described *Piruna* species are remarkably similar, being long, and usually broader at the distal end than the proximal end due to a broad, rounded ampulla. The harpe is narrower than the ampulla (usually very much so), and overlaps the ampulla for at least part of its length (often at the distal end).

Dardarina Evans, 1937b, is a genus of tiny skippers with about a dozen members distributed from Mexico through South America in various habitat types. *Dardarina* are characterized by having antennae that are about half the length of the costa of the

forewing, with a stout club and apiculus very tapered to a blunt tip. The antennal nudum varies from 11 to 12. The prothoracic tibiae bear a short, stout epiphysis, and the mesothoracic tibiae of *Dardarina* are spined with a single, distal pair of spurs. The metathoracic tibiae similarly bear one distal pair of spurs and spines. The palpi have a shorter third segment than other cyclopidines in the Americas (generally), and are about the length of the head. The forewing has spots in spaces M1-M2 and M2-M3, and often in most other wing spaces. The ventral hindwing is spotted. The male genitalia of *Dardarina* species are rather variable. The uncas may be narrow or broad, is bifurcate but the arms may be fused or widely separated. The gnathos is well developed, generally bifurcate and often produced dorsally. The valvae are long, and usually quite narrow. Some species have a well developed, broad ampulla but most have a narrow and often rather pointed ampulla; the narrow harpe usually overlaps with the ampulla for part of its length, and is short in a few species.

Butleria is a genus of just under 10 species, confined to grassy areas in southern Chile and Argentina. These skippers have antennae that are greater than or about half the length of the costa of the forewing, a stout club, with an apiculus tapering to a blunt point. Some *Butleria* species examined have a "slightly tapered" apiculus (see Fig. 3A), while others have a "very tapered" apiculus (see Fig. 3B)- these are the species with the greater nudum counts. The nudum count varies from 10 to 17. Prothoracic tibiae have a fairly long, slender, central epiphysis, mesothoracic tibiae are spined with two distal spurs, and metathoracic tibiae bear two pairs of spurs and spines. The palpi on *Butleria* are longer than the length of the head. The forewing generally has spots in spaces M1-M2 and M2-M3 (almost always with a single spot in one space or the other), and the ventral hindwing is spotted (or yellow with a silver stripe). Male *Butleria* have rather uniform genitalia. The uncus is usually narrow, lanceolate, and very constricted at its distal end. The gnathos is very well developed, and often longer than the uncus. The valvae are unusual among cyclopidines in having a large, swollen harpe, which is often very irregular in shape. The rather broad ampulla is generally produced dorsally and overlaps the harpe for much of its length.

Argopteron Watson, 1893, is a genus of brightly marked skippers also confined to southern Chile and Argentina. Males of both described *Argopteron* species have an unmarked, shiny, golden ventral surface to the wings, making them highly distinctive and unmistakable. Females have unmarked, shiny, golden ventral hindwings but have spots and a dark ground color on the ventral forewing (with a gold apex). The antennae are about half as long as the costa of the forewing. The antennal club is stout; the apiculus is slightly bent, flattened and hollowed or grooved ventrally, ending in a flattened, blunt point with a nudum of 8 to 9 segments. The prothoracic tibiae bear a long, slender epiphysis, the mesothoracic tibiae have a small distal pair of spurs and minute spines, and the metathoracic tibiae have a long pair of distal spurs and a shorter pair of upper spurs. Metathoracic tibiae on males have very few spines while on females they have many spines. The hairy palpi are longer than the head. The apex of the forewing is produced, and the forewing is decorated with large yellow

spots or a band, including parts of cells M1-M2 and / or M2-M3. Genitalia of the male are overall rather similar to *Butleria* species, with a narrow, bifurcate uncus tapered to a fine point, well developed (but short) gnathos, and valvae with a broad ampulla and broad or rather narrow harpe.

Dalla includes a myriad of species (possibly over 130 species) that EVAN'S (1955) divided into 7 groups of species. There are no characters on the wings that unite all of these species, yet all species apparently share the "very tapered" antennal apiculus. *Dalla* merits much future study. There are several more or less distinct groupings within *Dalla* that may be monophyletic and worthy of generic recognition. *Dalla* species occur mostly at high elevational areas, and are often found along small creeks and at mud. Numerous undescribed and "lost" species have recently been found in high elevation habitats from Mexico to Ecuador (see FREEMAN 1991b; STEINHAUSER 1991a, b; WARREN & GONZALEZ, 1996; WARREN 1997). *Dalla* species generally have antennae that are about half the length of the costa of the forewing, a stout (or swollen) antennal club, with a "very tapered" apiculus and a nudum of 11-14 segments (see figure of apiculus of *Dalla faula* (Godman) in Fig. 3B). A few species have a swollen club (nearly as swollen as in the genus described below), but the apiculus in these species is very tapered and the nudum counts are typical for *Dalla*. Considerable variation exists in the leg structure between the species groups. The epiphysis on the prothoracic tibiae may be short and slender (as in *Carterocephalus*), long and slender (as in *Butleria*), or relatively short and stout. The mesothoracic tibiae are spined, with a distal pair of spurs. The metathoracic tibiae bear two pairs of spurs, or an upper pair of spines and a lower pair of spurs. Males of some *Dalla* species have spines on the metathoracic tibiae while males of others do not; females apparently always have these spines. Markings on the ventral hindwing are variable, ranging from very well marked with bright, colorful spots, to immaculate yellow or brown. Forewing spaces M1-M2 and M2-M3 may be with or without spots. The porrect palpi are about as long as the head. There is no "average" genitalia type for male *Dalla*, although most species have a fairly narrow uncus (usually bifurcate but sometimes fused), and often have a well-developed gnathos (although this is poorly developed in *bubobon* (Dyar) and related species, also in some South American species). The valvae are long and rather narrow; the harpe is irregularly shaped in some species, the ampulla is broad or narrow, and also may be irregularly shaped.

While collecting Lepidoptera on a Carnegie Museum expedition to the province of Zamora-Chinchipe, Ecuador, in 1981, John Rawlins and his colleagues collected a series of a very unusual skipper that clearly belongs in the Cyclopidinae yet does not fit into any of the described genera. These specimens were sent to Hugh Avery Freeman (Garland, Texas) for determination in the early 1990's, when they were determined to most likely represent an undescribed genus and species. The specimens were subsequently sent to this author for examination and eventual description. After having examined members of all the genera in the Cyclopidinae that occur in the New World (and many Old World genera), it is now clear that these specimens represent a

previously unrecognized genus. The gender of the following generil name is feminine.

Freemania A. D. Warren, new genus

Type Species: *Freemania rawlinsi* A. D. Warren, new species

Description: *Male*: Tiny, unmarked brown / black. Palpi of typical cyclopidine form, long, porrect, longer than the length of head; densely clothed in long, hair-like scales. Antennae long, about ¾ the length of forewing costa (including club). Club extremely swollen, fairly long, slightly tapered at distal end to a blunt, rounded point (Fig. 3A). Nudum count of 7 or 8 segments in *Freemania rawlinsi*. Prothoracic tibiae with a tiny, stout, deciduous epiphysis. Mesothoracic tibiae with a distal pair of spurs and a single row of spines; metathoracic tibiae with a single distal pair of spurs and a few spines. Forewing length under 10 mm., very slightly produced at apex. Sparse overscaling of single, yellow (dorsal surface) or whitish-violet (ventral surface) scales visible on wings under magnification. Ventral hindwing with slight indication of dark black cell spot. Wings otherwise completely unmarked; long hindwing cell. Genitalia tiny and compact. Uncus long, slender, bifurcate with arms closely aligned. Gnathos vestigial, sclerotized only at proximal end under tegumen; saccus rather short. Juxta well developed and prominent. Penis simple, bare, without cornutus. Valvae symmetrical, long, of nearly uniform width. Caudal end of narrow ampulla and cephalad end of broad harpe overlap; distal end of ampulla produced to a rounded point and distal end of harpe recurved dorso-anteriorly with small spines near tip.

Diagnosis: *Freemania* is immediately recognized as a member of the Cyclopidinae by its very long, hairy palpi, stout antennal club, lack of secondary sexual characters, and the long discal cell of the hindwing (Figs. 1-2). *Freemania* is distinguished from other Cyclopidine genera by its tiny size (FW length under 10 mm), lack of markings on the wings, extremely swollen, slightly tapered antennal club (Fig. 3A), and vestigial gnathos (Fig. 4A, F). The antennae (including club) of *Freemania* are proportionally longer than on other American cyclopidine genera, when compared to forewing length. At this time, only *Freemania rawlinsi* is included in the genus, but a careful study of poorly known *Dalla* species might identify other members.

Freemania rawlinsi A. D. Warren, new species
(Figs. 1-2, 3A, 4)

Description: *Male* (Figs. 1-2): Head black, covered with long, hair-like scales, concentrated between antennae. Antennal shaft colored black with small white rings at the base of each segment in dorsal view, uniform yellowish in ventral view (including club). Antennae long, shaft longer than ½ the length of forewing costa, shaft + club at least ¾ the length of forewing costa. Antennal club prominently swollen dorsally, very slightly compressed laterally, black in dorsal view and yellow in ventral

view. Tip of apiculus slightly tapered to a blunt, rounded point (Fig. 3a). Antennal club appears "stiff," with virtually no notable curvature. Nudum of the holotype is 8 segments, averaging 7.7 among 7 paratypes with intact antennal clubs (all counts of 7 and 8). Palpi very long, longer than head, densely clothed in long, hair-like scales with few short, yellowish scales intermixed in dorsal view. Sides and bottom of palpi densely clothed in long, hair-like and short scales, white and black; third palpal segment long and pointed. Thorax sparsely clothed in long, black, hair-like scales dorsally, densely clothed in white and black, hair-like scales ventrally. Prothoracic legs with femur clothed in short, flat, golden scales dorsally, densely clothed in long, white, gold, and brown, hair-like scales ventrally. Tibiae with a minute, rather broad epiphysis (apparently deciduous), a pair of distal spurs and a few spines; clothed in short scales, golden and brown dorsally and golden ventrally. Tarsi golden-brown, decorated with short scales, 4 longitudinal rows of spurs, with claw accompanied by two long, sensory hairs. Mesothoracic legs clothed and colored as the prothoracic legs, but lacking the tibial epiphysis. Tibiae with a longitudinal row of spines and a distal pair of spurs. Metathoracic legs similarly colored and clothed; tibiae with a distal pair of spurs and a few spines (replacing upper spurs). Abdomen colored as thorax, with short, flat scales on dorsal and ventral surfaces. *Wings*: Forewing length x width of holotype = 9 ½ mm x 5 mm, which equals the average for the 9 type specimens. *Upperside*: Forewing unmarked brown / black, very slightly produced at apex. Very sparse overscaling of bright yellow scales (obvious only under magnification) concentrated at apex and base. Fringes long, slightly paler than ground color. Hindwing unmarked brown / black, colored as on forewing, with sparse yellow overscaling present only towards tornus along margin and at base of wing. Base clothed in long, black, hair-like scales. Fringes as on forewing. *Underside*: Forewing unmarked brown / black as on upperside, being only slightly paler than upperside and ground color not noticeably paler in spaces Cu2-2A. Apex sparsely overscaled with single, whitish-violet scales (replacing yellow scales of upperside, but more densely distributed). Hindwing same ground color as forewing, with a uniform distribution of whitish-violet overscaling (as on forewing apex), and vague indication of a dark black central cell spot (discernable in specimens in fresh condition only). Base with few, long, white, hair-like scales. *Genitalia* (Fig. 4): Uncus narrow, long, with bifurcate arms closely aligned their entire length but not fused; sparsely capped with short hairs. Tegumen broader, rounded; saccus short. Gnathos nearly absent, developed only at its proximal end under tegumen and very weakly sclerotized. Valvae symmetrical, fairly long, of nearly uniform width. Ampulla rather narrow, produced distally, overlapping cephalad end of harpe. Harpe well developed, rather broad, recurved dorso-anteriorly at distal end where it overlaps ampulla in lateral view and is covered in tiny, irregular spines at distal end. Edges of ampulla and harpe sparsely clothed in transparent hairs. Juxta very well developed, with dorsal half produced anteriorly to a fine point, broad and rounded at distal end; the ventral half is produced distally, evenly rounded at distal end and concave at anterior end. Penis is fairly long (about same length as valvae), slender, and of nearly

uniform width (base only slightly wider than distal end). Cornutus absent.

Female: unknown.

Diagnosis: This species is immediately distinguished by its very long, densely clothed palpi, basically unmarked, brown / black wings, a forewing length of less than 10 mm, and swollen antennal club, which is only slightly tapered at its distal end. Two slightly larger species of nearly unmarked, brown *Dalla* may be initially confused with *Freemania rawlinsi*. *Dalla sepia* Evans, 1955, is considerably larger (FW length = 13 mm) and has very different genitalia (with a long, sclerotized gnathos). *Dalla tona* Evans, 1955 is very small (FW length = 10 mm), and also has very different genitalia. The gnathos of *D. tona* is well developed and longer than the uncus. Both of these species have very tapered antennae (see Fig. 3B), unlike *F. rawlinsi* with only slightly tapered antennae (Fig. 3A).

Types: Holotype male with the following labels: white, printed- ECUADOR: Zamora- / Chinchipe, 36km / NW Zamora, 2730m / 29 October 1987; white, printed- R. Davidson / J. Rawlins, C. Young / Scrub cloudforest / subparamo habitat; red, handwitten- HOLOTYPE / Freemania rawlinsi / A. D. Warren. There are 8 paratype males, all from the same locality, collected on the same day by the three collectors from the Carnegie Museum expedition. The types will be deposited in the Carnegie Museum of Natural History (Pittsburgh, PA). According to John Rawlins, collecting was conducted NW of Zamora along the old road, which is now basically out of service. The habitat consisted of a very wet, heavy cloud forest of various heights. The locality where the specimens were taken was essentially above Potocarpus National Park, a locality that should be investigated in the future for the presence of *Freemania*.

Remarks

The distribution of characters discussed above among the New World genera of the Cyclopidinae are summarized in Table 1. Character states that are especially diagnostic for certain genera are listed in bold. These include the shorter antennae on *Carterocephalus*, lack of spots in forewing spaces M1-M2, M2-M3, and the broad uncus in *Piruna*. The shorter palpi in *Dardarina*, swollen, irregular harpe in *Butleria*, bright gold ventral hindwing, and grooved antennal club with flattened apiculus in *Argopteron* are all characteristic. While some *Butleria* and *Dardarina* species may have antennae as tapered as *Dalla* species (see Fig. 3B), this character is apparently surprisingly constant across the 7 species groups in *Dalla* and can often be used as a distinguishing character. Figure 3A is typical of a "slightly tapered" apiculus, and 3B is typical of a "very tapered" apiculus. Diagnostic characters of *Freemania* include the unmarked wings, very swollen antennal club, slightly tapered apiculus, long antennae and the vestigial gnathos. Species in all of these genera appear to have similar mesothoracic tibiae, with one distal pair of spurs and a longitudinal row of spines. Similarly, the prothoracic tibial epiphysis appears to be deciduous in members of all of these genera, as it cannot be found on some specimens.

It is impossible to speculate on the true distribution of *Freemania*. Access to high elevational habitats in Ecuador has been limited by the lack of roads in many high ranges. Because of harsh conditions at these high elevations, the temporal occurrence of *Freemania* is likely to be quite specific. Special attention should be paid to any small skippers encountered in paramo or subparamo habitats in all parts of Ecuador, Colombia, Venezuela and Peru. There are undoubtedly many additional species of Cyclopidinae that remain to be discovered and described at high elevations in South America, especially in remote areas in Colombia, Venezuela, and Ecuador.

ACKNOWLEDGMENTS

Thanks are due to John Rawlins for making the effort to collect a series of such a diminutive skipper as *Freemania rawlinsi*, and for confirming the availability of *Freemania*. Thanks to Avery Freeman for forwarding the type series, inspiring the generic name, and for his continuing advice on Neotropical skipper taxonomy and endless encouragement. Thanks to Andrew V. Z. Brower (Oregon State University), George T. Austin (Las Vegas, NV), Avery Freeman, Ray E. Stanford (Denver, CO), and Stephen R. Steinhauser (Bradenton, FL) for reviewing versions of this manuscript and offering valuable suggestions. Boris C. Kondratieff (Colorado State University, Fort Collins) enthusiastically provided access to the camera lucida used to prepare the genitalia figures illustrated herein. Richard S. Peigler (San Antonio, TX) helped obtain literature vital for the completion of this study.

BIBLIOGRAPHY

ACKERY, P.R., R. DE JONG & R. I. VANE WRIGHT. 1999. The butterflies: Hedyloidea, Hesperioidea and Papilionoidea. Pp. 263-300, In: Kristensen, N. P. (Ed.). Lepidoptera, Moths and Butterflies. 1. Evolution, systematics and biogeography. Handbook of Zoology. 4(35), Lepidoptera. Berlin: de Gruyter. x + 491 pp.

ANONYMOUS. 1992. Opinion 1669- *Dalla* Mabille, 1904 (Insecta, Lepidoptera): conserved. Bull. Zool. Nomen. 49:88-89.

AURIVILLIUS, C. 1908-1925. Die afrikanischen Tagfalter. In Seitz, A. (Ed.). Grossschmetterlinge der Erde. Stuttgart, Alfred Kemen. 13:11-613.

BUTLER, A. G. 1870. The genera of Hesperiidae in the collection of the British Museum. Ent. mon. Mag. 7:55-58, 92-99.

DE JONG R., R. I. VANE-WRIGHT & P. ACKERY. 1996. The higher classification of the butterflies: problems and prospects. Ent. Scand. 27:65-101.

DRAUDT M. 1917-1924. Die amerikanischen Tagfalter. Lycaenidae and Grypocera. In Seitz, A. (Ed.). Grossschmetterlinge der Erde. Stuttgart, Alfred Kemen. 5:744-999.

DUMERIL, A. M. C. 1806. Zoologie analytique, ou méthode naturelle de classifica tion des animaux, rendue plus facile à l'aide de tableaux synoptiques. Paris, Allais. xxxii + 344 pp.

EVANS, W. H. 1937a. A catalogue of the African Hesperiidae. London, British Museum (Natural History). 212 pp. + 30 pls.

_____. 1937b. A new genus and a new species of South American Hesperiidae (Lep.). Revta. Ent. Rio de J. 7:88-89.

_____. 1949. A Catalogue of the Hesperiidae from Europe, Asia and Australia in the British Museum (Natural History). London, British Museum (Natural History). 502 pp. + pls. 1-53.

_____. 1951. A Catalogue of the American Hesperiidae indicating the classifica tion and nomenclature adopted in the British Museum (Natural History). Part I. Pyrrhopyginae. London, British Museum (Natural History). 92 pp. + pls. 1-9.

_____. 1952. A Catalogue of the American Hesperiidae indicating the classifica tion and nomenclature adopted in the British Museum (Natural History). Part II, Pyrginae, Section I. London, British Museum (Natural History). 178 pp. + pls. 10-25.

_____. 1953. A Catalogue of the American Hesperiidae indicating the classifica tion and nomenclature adopted in the British Museum (Natural History). Part III, Pyrginae, Section II. London, British Museum (Natural History). 246 pp. + pls. 26-53.

_____. 1955. A Catalogue of the American Hesperiidae indicating the classifica tion and nomenclature adopted in the British Museum (Natural History). Part IV, Hesperiinae and Megathyminae. London, British Museum (Natural History). 499 pp. + pls. 54-88.

FELDER, C. & R. FELDER. 1865-1867. Rhopalocera. In: Reise der Österreichischen Fregatte "Novara" um die Erde in den Jahren 1857, 1858, 1859 unter den

Befehlen Commodore B. von Wüllerstorf-Urbair. Vienna, Zoologischer Theil. Zweiter Band, Abtheilung. 3(1867):379-536.

FREEMAN, H. A. 1990. A new species of *Piruna* from Mexico (Hesperiidae). J. Lepid. Soc. 45:42-45.

_____. 1991a. A new species of *Piruna* from Oaxaca, Mexico (Hesperiidae). J. Lepid. Soc. 45:42-45.

_____. 1991b. A new species of *Dalla* from Mexico (Lepidoptera: Hesperiidae). Trop. Lepid. 2:65-67.

GODMAN, F. D. & O. SALVIN. 1879-1901. Biologia Centrali Americana. Zoology: Insecta: Lepidoptera: Rhopalocera. London, Dulau. Vols. II & III. 782 pp.

HEMMING, F. 1967. The generic names of the butterflies and their type species (Lepidoptera: Rhopalocera). Bull. British Mus. (Nat. Hist.). Ent. Suppl. 9:1-509.

HEPPNER, J. B. 1998. Classification of the Lepidoptera. Part 1. Introduction. Holarctic Lepid. 5(suppl. 1):1-148.

HIGGINS, L. G. 1975. The classification of European butterflies. London, Collins. 320 pp.

HUBNER, J. 1816-1826. Verzeichniss bekannter Schmetterlinge. Augsburg, published by author. [1819]:17-176.

KIRBY, W. 1871. A synonymic catalogue of the diurnal Lepidoptera. London, Van Voorst. iiii-vii + 690 pp.

LEDERER, J. 1852. Versuch, die europäischen Lepidopteren in möglichst natürliche Reihenfolge zu stellen. Verh. Zool. -bot. Ges. Wein. 2:14-54, 65-126.

MABILLE, P. 1903 - 1904. Lepidoptera Rhopalocera. Family Hesperiidae. Pp. 1-210, In P. Wytsman (ed.), Genera Insectorum. Vol 17. Bruxelles, V. Vertenuil & L. Desmet.

MILLER, L. D. & F. M. BROWN. 1981. A catalogue/checklist of the butterflies of America north of Mexico. Mem. Lepid. Soc. 2:1-280.

SPEYER, A. 1879. Die Hesperiden-Gattungen des europäischen Faunengebiets II. Nachträge. Das Flügeleäder. Ent. Zeit. 40:477-500.

STEINHAUSER, S. R. 1991a. Taxonomic notes and descriptions of new taxa in the neotropical Hesperiidae. Part II, Heteropterinae and Hesperiinae, *vinius* group. Bull. Allyn Mus. No. 132:1-79.

_____. 1991b. Six new species of skippers from Mexico (Lepidoptera: Hesperiidae: Pyrginae and Heteropterinae). Insecta Mundi. 5:25-43.

STEINHAUSER, S. R., L. D. MILLER, J. Y. MILLER & C. A. BRIDGES. 1990. Case 2720- *Dalla* Mabille, 1904 (Insecta, Lepidoptera): proposed conserva tion. Bull. Zool. Nomen. 47:184-186.

TUTT, J. W. 1896. The classification of the British butterflies. Ent. Rec. 7:300-301.

_____. 1906. Catalogue of the Palaearctic Urbicolides. Ent. Rec. 18:195-198.

WARREN, A. D. 1997. A new species of *Dalla* from Guatemala (Lepidoptera: Hesperiidae). Trop. Lepid. 8:35-37.

_____. 2000. Hesperioidea (Lepidoptera). Pp. 535-580, In: Llorente-B., J, E. González-S. & N. Papavero (Eds.), Biodiversidad, taxonomía y biogeografía de artrópodos de México: Hacia una síntesis de su conocimiento. Volumen II. México City, Universidad Nacional Autónoma de México. 676pp.

WARREN, A. D. & L. GONZALEZ-C. 1996. Rediscovery of *Dalla bubobon* in Michoacán, Mexico (Lepdioptera: Hesperiidae: Heteropterinae). Trop. Lepid. 7:68-70.

_____. 1998. Notes on the genus *Piruna* in western Mexico, with description of a new species (Lepidoptera: Hesperiidae). Trop. Lepid. 9(suppl. 2):1-7.

WARREN, B. C. S. 1926. Monograph on the tribe Hesperiidi (European species) with revised classification of the subfamily Hesperiinae (Palaearctic spe cies), based on the genital armature of the males. Trans. Ent. Soc. Lond. 74:1-170.

WATSON, E. Y. 1893. A proposed classification of the Hesperiidae, with a revision of the genera. Proc. Zool. Soc. Lond. 1893:3-132.

EXPLANATION OF FIGURES

Figs. 1-2. Holotype male of *Freemania rawlinsi* in **A**) dorsal and **B**) ventral views.

Fig. 3. Antennal club and apiculus, with nudum segments stippled, of **A**) holotype of *Freemania rawlinsi* with a "slightly tapered" apiculus, and **B**) male of *Dalla faula* with "very tapered" apiculus, from México: Michoacán: Mpio. Arteaga: Rancho "El Zorrillo," 764 m., 21 July 1996, A. D. Warren.

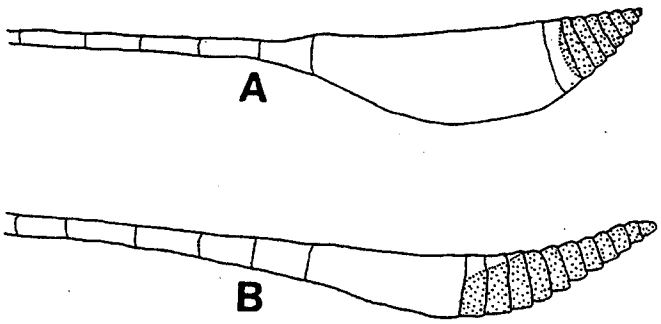
Fig. 4. Male genitalia of *Freemania rawlinsi* paratype. Genitalia vial # H-1787, H. A. Freeman. **A**) Uncas, gnathos, tegumen and saccus in left lateral view. **B**) Saccus in ventral view. **C**) Left valve in left lateral view and **D**) dorsal view (with hairs not shown). **E**) Uncus and tegumen in dorsal view (dorsal hairs not shown). **F**) Uncus, gnathos, and tegumen in ventral view. **G**) Juxta and penis in left lateral view. **H**) Juxta in dorsal and **I**) ventral views.

Table 1. Distribution of important characters among American genera of Cyclopidinae. Character states in bold are especially diagnostic for listed genera. VHW = ventral hindwing; FW = forewing; pr. = pair(s).

1

2

3



4

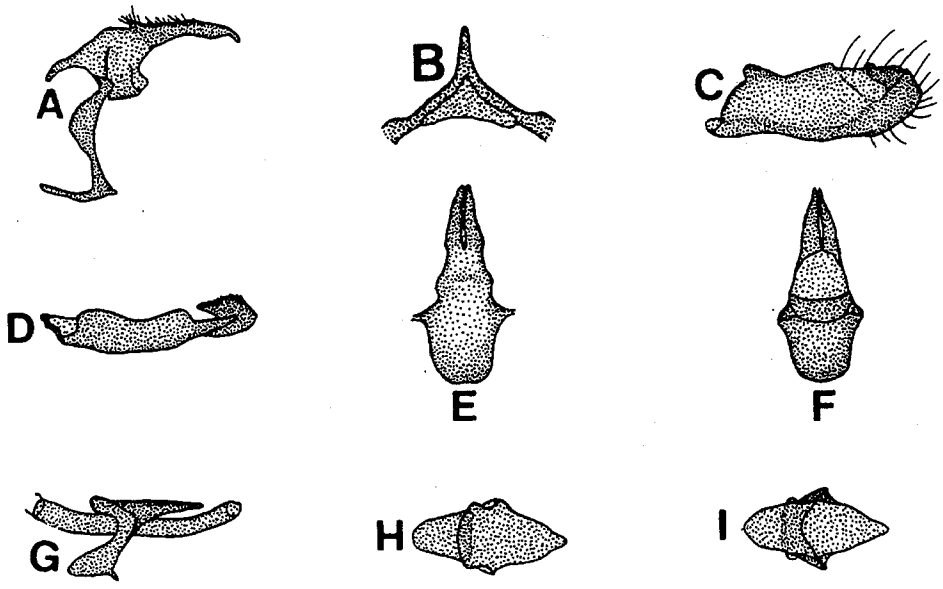


Table 1

Species:	*Carterocephalus*	*Piruna*	*Dardarina*	*Butleria*	*Argopteron*	*Dalla*	*Freemania*
Characters:							
VHW	spotted	spotted or bare	spotted	spotted	unmarked, bright gold	spotted or unmarked	unmarked
FW spots in spaces M1-M2 and / or M2-M3	yes	no	yes	yes	yes	yes / no	no
antennal club	stout	stout	stout	stout	stout, with ventral groove	stout to swollen	very swollen
apiculus	slightly tapered	slightly tapered	very tapered	slightly to very tapered	flattened	very tapered	slightly tapered
nudum #	6 --> 10	7 --> 10	11 --> 12	10 --> 17	8 --> 9	11 --> 14	7 --> 8
antennal length in proportion to FW costa	less than half	less than or = half	about half	greater than or = half	about half	about half	about 3/4
length of palpi in proportion to length of head	longer	longer	about =	longer	longer	longer or =	longer
Prothoracic tibial epiphysis	short and slender	short and stout	short and stout	long and slender	long and slender	short or long and stout	minute, stout
Metathoracic tibial armature	1 pr spurs + spines	2 pr. Spurs + spines on female	1 pr. Spurs + spines	2 pr spurs + spines	2 pairs of spurs + few spines (many on female)	1-2 pairs of spurs + spines (usually)	1 pr spurs + spines
uncus	narrow	broad	narrow or broad	narrow	narrow	narrow or broad	narrow
gnathos	prominent, long	prominent, long	prominent, long or short	prominent, long	prominent, short	prominent, may be short	vestigial
ampulla	broad	broad, rounded	broad or narrow	broad or narrow	broad	broad or narrow or irregular	narrow
hapre	broad or narrow	narrow	narrow	swollen, irregular	broad to narrow	broad or narrow or irregular	broad