

**Fasslantonius gen. n. a monotypic genus of Neotropical eumaeine  
lycaenids (Lepidoptera: Lycaenidae, Eumaeini)**

ZS. BÁLINT<sup>1</sup> and J. A. SALAZAR-ESCOBAR<sup>2</sup>

<sup>1</sup>Department of Zoology, Hungarian Natural History Museum  
H-1088, Baross utca 13, Budapest, Hungary. E-mail: balint@zoo.zoo.nhmus.hu

<sup>2</sup>Museum de Historia Natural, Universidad de Caldas  
A. A. 275, Manizales, Caldas, Colombia. E-mail: julianadolfo@hotmail.com

**Abstract** – *Fasslantonius* gen. n. (Lepidoptera: Lycaenidae, Eumaeini) is described. The type species is the strongly sexually dimorphic *Thecla episcopalis* FASSL, 1912 (= *Thecla phacana* DRAUDT, 1920, syn. n.). Sexual dimorphism, wing and genital characters, systematic placement and monotypy are discussed. With 6 figures.

**Key words** – Lycaenidae, Eumaeini, new genus, synonym, Colombia.

## INTRODUCTION

When the genus *Jagiello* BÁLINT et WOJTUSIAK, 2000 was described from Peru, it was pointed out that BROWN (1993: 47) speculated that one of the characteristics typifying the Neotropical lycaenid fauna is the large potential number of monotypic genera (BÁLINT & WOJTUSIAK 2000: 186). A brief review was presented demonstrating that, previously, only four Neotropical lycaenid butterfly genera were considered to be monotypic. Interestingly, subsequent to BROWN's paper, JOHNSON and his coworkers described thirty-nine eumaeine lycaenid butterfly genera in 1997 and none of them were indicated as monotypic (JOHNSON, AUSTIN *et al.* 1997, JOHNSON & CONSTANTINO 1997, JOHNSON & LE CROM 1997, JOHNSON, KRUSE *et al.* 1997, JOHNSON & SALAZAR-ESCOBAR 1997, SALAZAR-ESCOBAR & JOHNSON 1997). Thus it can be supposed that most of the potentially monotypic genera referred to by BROWN remained undescribed, if BROWN's speculation was credible. In the most recent book of d'ABRERA the neotropical Eumaeini were reviewed and eight new genera were established, five of them indicated as monotypic (D'ABRERA 2001: 194–199). However, further research revealed that only two of them actually contained only one species (see Discussion).

Similarly, several "isolated" taxa amongst neotropical eumaeines placed in particular groups by DRAUDT (1919–1920) have since proved to have additional

close relatives but, needless to say, there still remained species that appear so unique as to perhaps require placement in a monotypic genus. Amongst them is *Thecla episcopalis* FASSL, 1912 ("4. Episcopalis Gruppe" in DRAUDT 1919: 747). *Th. episcopalis* is a rare butterfly, known from very few specimens and with its female also previously unknown (SALAZAR-ESCOBAR 1993: 48). Genital morphology of the species had not been studied as yet; therefore, it had been left in "Thecla (New World Eumaeini)" (BRIDGES 1994: IX.126, D'ABRERA 1995: 1109). Amongst Colombian eumaeine samples we have examined recently collected specimens of this species. We have found that the nominal taxon described as *Thecla phacana* DRAUDT, 1920 represents the female of *Th. episcopalis*. We have also found that the concept of DRAUDT, wherein he separated *Th. episcopalis* into its own group, has merit.

Therefore the present paper aims the following: (1) presents evidence that *Th. phacana* is the female of *Th. episcopalis* and, accordingly, they are subjective synonyms; (2) describes the genital morphology of *Th. episcopalis* and designates it as type species of a new monotypic genus, and (3) discusses the characters of the genus and identifies its closest relatives.

Specimens collected in the field were pinned, set, dried, labeled and deposited in the collection of the junior author. Images of the specimens were taken by a Pentax K-1000 camera and transferred electronically to the senior author. Abdomens were removed and sent for examination to the senior author by mail. The abdomens were dissected by traditional methods, placed in glycerin, and kept in plastic microvials with the specimens, studied and databased by the senior author, and then sent back to Colombia. During the examination the dissections were placed and macerated in glycerin and examined under various magnifications of an Olympus SZ60 light microscope. Measurements (cf. ROBBINS 1991: 18–21) were taken using the digital line of an Olympus GSWH1022 microscope ocular.

## A NEW SYNONYM

### *Thecla episcopalis* FASSL, 1912

*Thecla phacana* DRAUDT, 1920, **syn. n.**

*Material examined* – Pico de Loro, Farallones de Cali, Valle del Cauca, 1600 m., 25.V.1986, leg. J. A. Salazar (male) (SALAZAR-ESCOBAR 1993, fig. 1); San Antonio del Chamí, Risaralda, Western Cordillera, 1700 m, 1984, leg. J. A. Salazar (female) (Figs 1–2). Genital dissections (gen. prep. BÁLINT): no. 999 (female), no. 1000 (male).

*Remarks* – *Thecla episcopalis* was described from three male syntypic specimens taken at 2000 m elevation, along the Rio Aguacatal, upper Cauca valley, Colombia by FASSL (1912a: 42) and deposited in the BRABANT collection (de Morenchies), in the COURVOISIER collection (Basel) and in the FASSL collection. FASSL was a naturalist, but also an insect dealer, whose personal collection became dispersed among the materials held privately by a number of lepidopterists (HORN *et al.* 1990: 115). According to BRIDGES (1994: VIII.160) the type material of *Th. episcopalis* was deposited in the “NMB [= Naturhistorisches Museum, Basel], Fassl collection”. This information may be based on the discovery by G. LAMAS (Lima, Peru), or a subsequent discovery known to BRIDGES, wherein many DRAUDT type specimens were located in Basel (cf. JOHNSON 1992: 15). However, this type material of *Th. episcopalis* could be well the syntype indicated by FASSL as deposited in the COURVOISIER collection, which is indeed housed in the NMB (HORN *et al.* 1990: 80). The syntype of the BRABANT collection should be in the BMNH (= The Natural History Museum, London). The collection of E. BRABANT was purchased by J. J. JOICEY in 1920, whose collection was registered as “J. J. Joicey Coll., B.M. 1929–435” in the BMNH. According to the BMNH Lycaenidae species card index *Th. episcopalis* is curated in the drawer 28A–62 of the General Collection. I did not find any individual of *Th. episcopalis* in the drawer but there was a curatorial label which indicated that a male specimen has been in loan since 1981 for ROBERT K. ROBBINS (Washington, USA). Very recently D’ABRERA (1995: 1109) figured one male “*E. episcopalis*” specimen taken at the type locality indicating “N.H.M.N., Smithsonian” as its source. Presumably this is the BMNH individual in loan, and possibly the BRABANT syntype.

The species was described by FASSL as his own discovery (FASSL 1916: 49) and subsequently figured by DRAUDT (1919, pl. 153a: “*episcopalis*” and “*episcopalis* U”, a faithful reproduction for the original figures of FASSL 1912a) and placed by DRAUDT in a monotypic group. The species was cited by Brother APO-LINAR (1928: 96) as an important discovery from Colombia. SALAZAR-ESCOBAR (1993: 52) figured the male individual collected personally by himself.

*Thecla phacana* was described on the basis of two female specimens (= syntypes) originating from Rio Negro and Rio Aguacatal, Colombia by DRAUDT (1920: 790, Plate 157.). Whereabouts of the type material is unknown (cf. BRIDGES 1994: VIII.366). BRIDGES suggested, incorrectly, that the taxon was closely related to *Th. aphaca* HEWITSON, 1867 a view based on a homoplasy of the ventral wing pattern. The taxon *aphaca* belongs in *Paiwarria* KAYE, 1904 (cf. BROWN & FREITAS 2000: 108), but has a number of supralimital characters that can make its proper phylogenetic placement confusing. BRIDGES catalogued *phacana* as a species of “*Thecla* (New World Eumaeini)” (BRIDGES 1994: IX.128) and D’ABRERA



(1995: 1260) listed it as a taxon unknown for him but previously he still mentioned under the entry of "*Thecla tityrus* Felder, 1865" on the basis of a note he found in the BMNH that "*phacana* Drdt. 1920 is probably the ? *tityrus*" (D'ABRERA 1995: 1128). The taxon *Thecla tityrus* FELDER et FELDER, 1865 has been designated as type species of the genus *Balintus* by D'ABRERA (2001: 195). We have examined both male and female genital structures of *tityrus* (HNHM (= Hungarian Natural History Museum) BÁLINT gen. prep. nos 873, 874; BMNH Rhopalocera vial numbers 5825, 5826) and they are qualitatively differ from that of *Th. episcopialis* and *Th. phacana*. Wing colouration and pattern of *B. tityrus* are identical on both of the sexes, but the male has a discal androconial cluster formed by iridescent scales. The most striking difference between the *phacana* and *tityrus* phenotypes is the absence and presence of the hindwing ventral subbasal line: *phacana* lacks this line, *tityrus* possesses.

We are of the opinion that *Thecla phacana* is the female of *Th. episcopialis*. Both taxa inhabit the same region in the western Cordillera of Colombia, and their type localities are identical (we restrict here the type locality of *Th. phacana* as Rio Agaucatal, Upper Cauca Valley, Western Colombia). Both nominal taxa possess green dorsal colouration. In our view this can be indicative of a relationship because we know of other taxa with striking sexual dimorphism exhibited in their ventral patterns but with similar dorsal colouration, for examples: *Micandra platypetra* (FELDER et FELDER, 1865), *Timaeta timaeus* (FELDER et FELDER, 1865) and *Trichonis immaculata* LATHY, 1926. Therefore we have speculated that the synchronic and syntopic nominal taxa *Thecla episcopialis* and *Th. phacana* represent the same biological species. Our observation is also supported by the suggestion of ROBBINS (1991: 3), that a marked assymmetric female genitalia is usually associated with development of teeth in the male genital cornutus, which is also the case in *Th. episcopialis* and *Th. phacana* (see Discussion).

### **Fasslantonius gen. n.**

(Figs 1–6)

*Type species* – *Thecla episcopialis* DRAUDT, 1912. The genus is monotypic.

*Diagnosis* – The male represents a unique phenotype with a gleaming Tiber Green (MAERZ & PAUL 1950: Pl. 30, Fig. J11) coloured dorsum and a pattern of three vertical black stripes (basally, medially and antemarginally) on the ventrum. The female phenotype (Figs 1–2) is homoplasious, dorsally and ventrally resembling many other eumaeine taxa (e.g. *B. tityrus*, "*Thecla*" *thespia* HEWITSON, 1870). The male genitalia is typical eumaeine (cf. ELIOT 1973: 440, ROBBINS

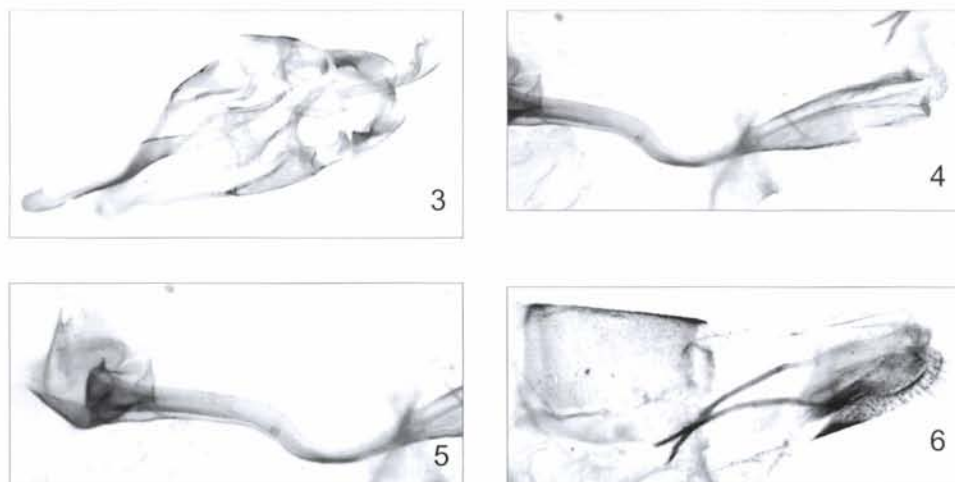


Figs 1–2. *Fasslantonius episcopalis* (FASSEL, 1912) female: 1 = dorsum, 2 = ventrum

1986: 153) but the tegumen has a rounded appendix angularis and the aedeagus a curved terminal cornutus in lateral view, conspicuously dentate distally. The female genitalia is also typical eumaeine, typifying that of larger eumaeines (cf. ROBBINS 1986: 153) with an asymmetrical structure reminiscent of *Thereus* but with the bursa copulatrix distinctively sclerotized.

*Description* – Moderate in size for lycaenids with typical forewing length (from base of radial vein to terminus of vein R3) more than 15 mm; sexual dimorphism striking.

Male. Wing shape: forewing costa convex, apex pointed, distal margin convex, anal margin straight; hindwing costa convex, apex rounded, distal margin highly convex with anal lobe and filamental tail terminad at veins CuA2 and 1A+2A. Venation: four forewing radial veins. Dorsal sur-



Figs 3–6. *Fasslantonius episcopalis* (FASSEL, 1912) genital organ: 3 = male, in ventral view (brush organ removed), 4–6 = female: 4 = anterior ductus bursae in lateral view, 5 = anterior ductus bursae and complex posterior pouch of ductus bursae in ventral view, 6 = papillae anales in lateral view

face: No androconial cluster, discal line present, forewing ground colour green with black submarginal band, distal fringe white; hindwing coloured similarly to forewing but with very narrow black outer margin, vein termini black, cell 3A grey and pubescent. Ventral surface: forewing ground colour green with submarginal band, vein termini black; hindwing ground colour goldish green with wide basal, median and postmedian bands converging to tornus, veins black, especially 1A+2A and 3A, margin black, tails black. Genitalia (Fig. 3): uncus heavily sclerotized and broad, gnathos long and pointed, tegumen strong, vinculum sclerotized with membranous posterior process of brush organ, brush organ present, vincular saccus as long as subbasal aedeagus; aedeagus with suprazonal three-times longer than subbasal element, vesica with dentate cornutus. Male measurements ( $n = 1$ ): forewing length from base of radial vein to terminus of vein R3: 13 mm; genital valval length in ventral aspect: 1.1 mm; genital saccus length in ventral aspect: 0.3 mm; length of internal penis in lateral aspect: 0.9 mm; length of external penis in lateral aspect: 2.3 mm; length of dorsal capsule in dorsal aspect: 0.35 mm.

Female (Figs 1–2). Wing shape: similar to male. Dorsal surface: similar to male, but ground colour somewhat darker, hindwing with black submarginal band. Ventral surface: ground colour dove grey, forewing with vertical white postmedian and submarginal lines, submarginal area lighter; hindwing as forewing, but with an additional white medial line “w”-shaped in tornal area, tornus red with black ocula in cell CuA2, vein 3A white, margin and filamental tails black, distal fringe white. Genitalia (Figs 4–6): asymmetrical and complex, lamella postvaginalis latero-terminally pointed, ductus bursae vertically and dextrally bent, ductus seminalis ventrally sclerotized, bursa copulatrix with sclerotized stripe. Female measurements ( $n = 1$ ): forewing length from base of radial vein to terminus of vein R3: 15 mm; length of posterior ductus bursae: 0.9 mm; length of anterior ductus bursae with lateral rotation in ventral aspect: 1.1 mm.

*Species identification* – The male is unique; thus, no similar species. Identification of the female can be problematic. Superficially similar *B. tityrus* is larger and exhibits a basal line on the hindwing ventrum (absent in *F. episcopalis*); the female of *Th. thespia* has a salient white antemarginal line on the forewing’s ventrum (absent on *F. episcopalis*); the female of *Thecla bosora* HEWITSON, 1870 is smaller and the hindwing ventral median line is jagged (lineal in *F. episcopalis*).

*Systematic placement* – *Fasslantonius* gen. n. belongs to Eumaeini (Lycaenidae) as characterized by ROBBINS & VENABLES (1991: 12). The sister group of *Fasslantonius* is unknown, however we discuss traits under Discussion.

*Biology* – FASSL (1912b: 17–18) reported the syntopic and synchronic occurrence of the following lycaenid species (listed in alphabetical order): *Bussa undulata* (HEWITSON, 1867), *Micandra platyptera* (FELDER et FELDER, 1865), *Lucilda hisbon* (GODMAN et SALVIN, 1887) and *Timaeta timaeus* (FELDER et FELDER, 1865). All these eumaeine lycaenids typify the montane cloud forest ecotones of the Andes, which show extremely high endemism.

*Etymology* – The genus is dedicated to the memory of ANTON HERMANN FASSL (1876–1922), pioneer on the research of Colombian butterflies and moths.



## DISCUSSION

*Sexual dimorphism* – We know several eumaeine species with striking sexual dimorphism, in which males and females of the same biological species possess qualitatively different dorsal and ventral colouration and pattern. Examples include: *Denivia hemon* (CRAMER, 1775), *Margaritheclus danaus* (FELDER et FELDER, 1865), *Micandra platyptera* (FELDER et FELDER, 1865), *Theorema sapho* STAUDINGER, 1888, *Trichonis hyacinthus* (CRAMER, 1775), *T. immaculata* LATHY, 1926. However, this striking character is a result of convergence, and does not indicate any close phylogenetic relationship (concordant characters of the wing shapes, pattern and genital morphology of such taxa not supporting monophyly of the species listed).

*Wings* – The wing venation of *Fasslantonius* is typical eumaeine (ELIOT 1973: 439). Somewhat rounded and narrow forewing shape – with costal and anal edge almost equal in lengths – occurs in many Eumaeini species, a few striking examples including: *Arawacus leucogyna* (FELDER et FELDER, 1865), *Arcas cypria* (GEYER, 1832), *Denivia chaluma* (SCHAUS, 1902), *Jantechla flosculus* (DRUCE, 1907), *Micandra platyptera* (FELDER et FELDER, 1865), *Trichonus immaculata* LATHY, 1926, *Trochusinus trochus* (DRUCE, 1907), *Variegatta elongata* (HEWITSON, 1870), etc. These species do not create monophyly as they have, again, distinctive wing patterns and genitalia (and sometimes also venation). Therefore, wing shapes in these cases are also not informative from a phylogenetic point of view. There are numerous eumaeine species with green dorsa, for examples: *Laothus viridicans* (FELDER et FELDER, 1865) and some of its relatives, *Podanotum clarissimum* TORRES, JOHNSON et WILLMOTT, 1996 and some of its relatives, *Rhamma hybla* (DRUCE, 1907) and some of its relatives, *Theritas mavors* (HÜBNER, 1818) and some of its relatives and *Trochusinus trochus*. Similarly, such taxa all together also do not represent monophyly. Their male and the female ventral patterns are not indicative of a close phylogenetic relationship since, qualitatively, the same pattern occurs in species belonging to diverse genera of the Eumaeini, for examples in males: *Arawacus* KAYE, 1904, *Cynus* HÜBNER, 1819, *Laothus* JOHNSON, KRUSE et KROENLEIN, 1997, *Thaëides* JOHNSON, KRUSE et KROENLEIN, 1997; in females: *Paiwarria* KAYE, 1904, *Salazaria* D'ABRERA et BÁLINT, 2001, *Strymon* HÜBNER, 1818.

*Genitalia* – Regarding phylogenetic affinities, genital configurations are more informative. The male genitalia of *Fasslantonius episcopalis* is strikingly similar to the genitalia of *Contrafacia* JOHNSON, 1989, *Noreena* JOHNSON, MACPHERSON et INGRAHAM, 1986, *Rekoa* KAYE, 1904, and *Thereus* HÜBNER, 1819, however the vincular anterior process characterizing the *Thereus* section (ROBBINS

1991: 2) is absent. A conspicuous character is the ventral cornutus of the aedeagus, laterally dentate, which suggests that this trait is homoplasious for *Fasslantonius*, as it was stated that this trait exclusively typifies *Rekoa* in the *Thereus* section (ROBBINS 1991: 20). This dentate vesical cornutus should corroborate the marked asymmetry of the female bursa copulatrix (cf. ROBBINS 1991), which is the case as explained below.

The female genitalia show more distinctive traits. First of all, the female papillae anales (in ventral aspect) show the notched tip typifying *Rekoa* species (ROBBINS 2000: 165, Figs 7–9) (cf. Fig. 6, presented here). The genitalia is complex and assymmetrical (see Figs 4–5). Complexity and assymetry is not rare in eumaeine female structures, for examples in *Arcas* or *Denivia*. The ductus bursae is a three dimensional tube tapering from the anterior and terminating in a lamella postvaginalis divided into “left” and “right” plates by a central membranous area which also tapers anteriorly. The plates are symmetrical and terminally sclerotized with small posteriorly directed spines. There is no membranous area between the posterior and anterior elements of the ductus bursae, the entire tube being sclerotized, with rims, and twisted vertically at the center of the entire ductus some 90 degrees with the anterior part rotated 90 degrees dextrally and joining the corpus bursae. ROBBINS (1991: 3, 21) stated that this “extreme assymetry” occurs in all *Rekoa* species and in some *Thereus* species (and see JOHNSON 1989: 23, Fig. 6, b–c, e–f). This is suggested as a derived state characterizing *Rekoa* and its relatives. Superficially similar twisted ductus bursae occur in certain *Strymon* species groups (JOHNSON 1989: 24, Fig. 7N; LE CROM & JOHNSON 1997: 12, Fig. 11; ROBBINS & NICOLAY 2001: 90, 26) but all these species have the bursa copulatrix with distinctive signa. The sclerotized anterior ductus bursae joins the posterior part of the ductus bursae forming there a sclerotized pouch surrounded dorsally and ventrally also by sclerotized ductal processess. The ventral processes are spined, connected with a sclerotized rim of small processes, where the ductus enters the bursa. The ductus seminalis arises from the posterior end of the pouch, which is laterally sclerotized and pointed, running parallel with the anterior end of the ductus bursae. ROBBINS mentioned that this part of the female genitalia in *Arawacus*, *Rekoa* and *Thereus* has sclerotized patches, which in the case of certain *Rekoa* species have been lost (ROBBINS 1991: 27). The ductus bursae is distinctive: between the two signa in the center there is a sclerotized line slightly tapering anteriorly; the interior signa are slit-shaped, double spined, and pointing anteriorly into the ductus bursae.

*Systematic placement* – We should place *Fasslantonius* close to the *Thereus* genus-group on the basis of male dentated vesical cornutus plus female assymetric genitalia with twisted ductus bursae morphology and notched papillae anales. The exact position of *Fasslantonius* to the *Thereus* cluster is still undetermined as



certain characters suggest the genus is a closer relative of *Rekoa* (notched papillae anales, dentated cornutus) while certain other traits suggest other relations (e.g. complex bursa copulatrix). We point out the important character hitherto unrecorded in eumaeines: the anteriorly pointed, sclerotized, ventral element of the bursal pouch (Fig. 5). According to the argument of ELIOT (1973: 455), this character might be regarded as derived, since it suggests specialized traits; however, we consider this character relatively plesiomorphic which has been lost by certain genera belonging to *Thereus* genus-group. Our consideration is compatible with the observation that the sclerotized pouch is more phylogenetically basal than the membranous pouch (ROBBINS 1991: 27). Therefore, we suspect that *Fasslantonius* is most probably plesiotypic taxon situated basally to the *Thereus* lineage.

*Monotypy* – It is still an open question how many monotypic lycaenid genera exist in the New World fauna. Amongst the five genera originally considered monotypic, *Lucilda* D'ABRERA et BÁLINT, 2001 and *Balintus* D'ABRERA, 2001 turned out to be more diverse (BÁLINT, in prep.). The type species of *Pedusa* D'ABRERA, 2001, *Thecla pedusa* HEWITSON, 1867, was placed in *Thereus* by ROBBINS (1991: 3); however, *pedusa* is a supralimital species placed amongst "Arawacus" species by DRAUDT (1919: 757) and, obviously, all these placements warrant review. Two genera, *Riojana* D'ABRERA et BÁLINT, 2001 (type species: *Thecla thargelia* BURMEISTER, 1878) and *Gullicaena* BÁLINT, 2002 (type species: *Thecla gigantea* HEWITSON, 1867) seem, as yet, to show true monotypy. Therefore, at the present stage of our knowledge monotypic genera do not appear to occur in a higher percentage in the Neotropical Lycaenidae fauna than in the other faunal regions.

## REFERENCES

- APOLINAR, BR. (1928): Actividades de un naturalista en Colombia. – *Boletín de la Sociedad colombiana de Ciencias naturales* 17: 90–96.
- BÁLINT, ZS. & WOJTUSIAK, J. (2000): Jagiello molinopampa gen. et. sp. n. from Peru (Lepidoptera: Lycaenidae). – *Annales historico-naturales Musei nationalis Hungarici* 92: 183–191.
- BRIDGES, CH. A. (1994): *Catalogue of the Family-group, Genus-group and Species-group Names of the Riodinidae & Lycaenidae (Lepidoptera) of the World. Introduction + Parts I–XIII, Appendices I–III*. Published by the author, Urbana, Illinois, [i–xiii], ii+3, ii+1, ii+2, ii+48, ii+12, ii+26, ii+7, ii+502, ii+135, ii+172, ii+134, ii+50, ii+16, ii+1, ii+5, ii+1 pp.
- BROWN, K. S. (1993): Neotropical Lycaenidae: an overview. – In: NEW, T. R. (ed.): *Conservation Biology of Lycaenidae (Butterflies)*. International Union for Conservation of Nature and Natural Resources, Gland, pp. 45–61.
- BROWN, K. S. & FREITAS, A. V. L. (2000): Diversidade de Lepidoptera em Santa Teresa, Espírito Santo. – *Boletim do Museu Biologia Mello Leitao (n. sér.)* 11–12: 71–118.

- D'ABRERA, B. (1995): *Butterflies of the Neotropical region. Part VII. Lycaenidae*. – Victoria, Black Rock, Hill House, i–ix, 1098–1270 pp.
- D'ABRERA, B. (2001): *The concise Atlas of the Butterflies of the World*. – Hill House Publishers, Melbourne-London, 353 pp.
- DRAUDT, M. (1919–1920): 4. Gattung: Thecla F. – In: SEITZ, A. (ed.): *Die Gross-Schmetterlinge der Erde, Band 5*. Alfred Kernen Verlag, Stuttgart, pp. 745–768 (1919), 769–811 (1920).
- ELIOT, J. N. (1973): The higher classification of the Lycaenidae (Lepidoptera): a tentative arrangement. – *Bulletin of the British Museum (Natural History), Entomology* **28**: 371–505.
- FASSL, A. W. (1912a): Thecla episcopalis nov. spec. – *Revue mensuelle de la Société entomologique namuroise* **12**: 42–43.
- FASSL, A. W. (1912b): *Das obere Caucatal und die Westcordillere*. Separat-Abdruck der Entomologischen Rundschau 31, Alfred Kernen, Stuttgart, 28 pp.
- FASSL, A. W. (1916): Verzeichnis neu beschriebener Schmetterlingsformen und Jugendzustände tropischer Lepidopteren von meiner Columbien-Reise (1908–12). – *Entomologische Rundschau* **33** (8): 40.
- HORN, W., KAHLE, I. & GAEDIKE, R. (1990): *Collections entomologicae. Teil I: A bis K*. Akademie der Landwirtschaftswissenschaften der Deutschen Demokratischen Republik, Berlin, 220 pp.
- JOHNSON, K. (1989): A revisionary study of the Neotropical hairstreak butterfly genus Noreena and its new sister genus Contrafacia (Lepidoptera: Lycaenidae). – *Journal of the New York Entomological Society* **97**: 11–46.
- JOHNSON, K. (1992): Genera and Species of the Neotropical “Elfin”-like hairstreak Butterflies (Lepidoptera, Lycaenidae, Theclinae). – *Reports of the Museum of Natural History, University of Wisconsin, Stevens Point* **22** (1): 1–135, (2): 136–272.
- JOHNSON, K., AUSTIN, K. G., LE CROM, J. F. & SALAZAR-ESCOBAR, J. A. (1997): The Strephonina, a new infratribe of the Eumaeini with description of fourteen new genera (Lycaenidae). – *Revista de Theclinae colombianos* **1** (1): 1–57.
- JOHNSON, K. & CONSTANTINO, L. M. (1997): Paraspiculatus, a new genus of the Eumaeini. – *Revista de Theclinae colombianos* **2** (10): 1–7.
- JOHNSON, K. & LE CROM, J. F. (1997): Asymbiopsis, a new genus of the tribe Eumaeini (Lycaenidae) with the descriptions of new species of Asymbiopsis and Symbiopsis Nicolay. – *Revista de Theclinae colombianos* **2** (9): 1–23.
- JOHNSON, K., KRUSE, J. J. & KROENLEIN, K. R. (1997): The Macusiina, a new infratribe of the Eumaeini with description of ten new genera. – *Revista de Theclinae colombianos* **2** (13): 1–37.
- JOHNSON, K. & SALAZAR-ESCOBAR, J. A. (1997): New species of Micandra Staudinger from Colombia with distinction of Trochusinus, a new genus of the Eumaeini. – *Revista de Theclinae colombianos* **2** (15): 1–15.
- LE CROM, J. F. & JOHNSON, K. (1997): Additions to the Strymon fauna of Colombia (Lycaenidae). – *Revista de Theclinae colombianos* **2** (16): 1–45.
- ROBBINS, R. K. (1986): Evolution and identification of the New World hairstreak butterflies (Lycaenidae: Eumaeini): Eliot's Trichonis Section and Trichonis Hewitson. – *Journal of the Lepidopterists' Society* **40**: 138–157.
- ROBBINS, R. K. (1991): Evolution, Comparative Morphology, and Identification of Eumaeine Butterfly Genus Rekoa Kaye (Lycaenidae: Theclinae). – *Smithsonian Contribution to Zoology* **498**: i–iii, 1–64.
- ROBBINS, R. K. (2000): The new world hairstreak genus Arawacus Kaye (Lepidoptera: Lycaenidae: Theclinae: Eumaeini). – *Proceedings of the Entomological Society of Washington D.C.* **102**: 162–169.

- ROBBINS, R. K. & NICOLAY, S. S. (2001): An overview of Strymon Hübner (Lycaenidae: Theclinae: Eumaeini). – *Journal of the Lepidopterists' Society* **55**: 85–100.
- ROBBINS, R. K. & VENABLES, B. A. B. (1991): Synopsis of a new Neotropical hairstreak genus, *Janthecla*, and description of a new species (Lycaenidae). – *Journal of the Lepidopterists' Society* **45**: 11–33.
- SALAZAR-ESCOBAR, J. A. (1993): Noticias sobre seis raras especies de licénidos colombianos. Descripción de una nueva especie de Riodinidae para Colombia (Lepidoptera: Lycaenidae). – *Shilap Revista de Lepidopterología* **21** (81): 47–53.
- SALAZAR-ESCOBAR, J. A. & JOHNSON, K. (1997): A new genus of Neotropical hairstreaks utilizing bird excrement as their protective color substrate (Eumaeini; Macusiina). – *Revista de Theclinae colombianos* **2** (14): 1–10.



# *Contributions to a Manual of Palaearctic Diptera*

Edited by L. Papp and B. Darvas

## *Volumes 1–3, Appendix*

The excellently illustrated volumes of the "Contributions to a Manual of Palaearctic Diptera" morphological, physiological, genetical, ecological and economic up-to-date knowledge of dipterous species (midges and flies), which have significant importance in genetics as model organisms, in plant cultivation as pests or beneficial parasitoids, in animal husbandry and human health as vectors of serious illnesses and which are important for ecosystem function, are treated. Morphological keys to generic level for adults and larvae are provided, which help readers with identification of dipterous pests and parasitoids, while readers in the field of applied dipterology will find suitable environmentally friendly methods against pests or biological control methods.

Volume 1 (published in 2000): 24 chapters of general and applied dipterology, by 31 specialists, on 978 pages with 956 figures on 176 plates. Volume 2 (published in 1997): 38 dipterous family chapters, by 23 specialists, on 592 pages with 1895 figures on 258 plates. Volume 3 (published in 1998): 56 dipterous family chapters, by 32 specialists, on 880 pages with 1773 figures on 294 plates. Appendix (published in 2000): 16 dipterous family chapters, by 19 specialists, on 604 pages with 2134 figures on 207 plates.

ISBN 963 04 8836 1 (Series)

ISBN 963 04 8839 6 (Volume 1)

ISBN 963 04 8837 X (Volume 2)

ISBN 963 04 8838 8 (Volume 3)

ISBN 963 04 8840 X (Appendix)

Foundation for the Publicity of the Hungarian Science  
Publisher: Science Herald, Budapest

### **Order should be sent to**

E. W. Classey Ltd.

Natural History Publisher & Bookseller  
Oxford House, 6 Marlborough Street, Faringdon  
Oxon SN7 7JP, UK, Facsimile: (44) 1367 244800  
E-mail: [bugbooks@classey.demon.co.uk](mailto:bugbooks@classey.demon.co.uk)