

**A REVISION OF THE NEW RIODINID BUTTERFLY GENUS  
*DACHETOLA* (LEPIDOPTERA: RIODINIDAE)**

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*Abstract.*—The new riodinid genus *Dachetola*, tribe Riodinini, is described and illustrated from Central and South America. Four species are recognized: *azora* Godart, [1824], and *virido* Lathy, 1958, are transferred from *Chalodeta* Stichel to *Dachetola* (**comb. novs.**), and *caligata* Stichel, 1911, and *pione* Bates, 1868, are transferred from *Calospila* Geyer to *Dachetola* (**comb. novs.**). *Dachetola* is hypothesized to be most closely related to *Metacharis* Butler.

*Key words:* *Calospila*, *Chalodeta*, *Metacharis*, Neotropical, Nymphidiini, Riodinini.

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During systematic studies on the riodinid genera *Calospila* Geyer, 1832 (tribe Nymphidiini) and *Chalodeta* Stichel, 1910 (tribe Riodinini), it was discovered that each contained two misplaced species that were closely related to each other. A new genus is described in the tribe Riodinini to accommodate these four species and its systematic position is discussed. Taxonomic, morphological and ecological information, and distributional data and maps are given for each species.

METHODS

Dissections were made using standard techniques, abdomens being soaked in hot 10% potassium hydroxide (KOH) solution for approximately five minutes, and subsequently stored in glycerol. Specimens dissected are indicated in the material examined sections with an asterisk. The terminology for male and female genital and abdominal structures follows Klots (1956) and Eliot (1973), and nomenclature for wing venation follows Comstock and Needham (1918). The taxonomic status of names is based on the catalog of Callaghan and Lamas (2001).

The following collections, whose acronyms are used throughout the text, were examined for relevant material: BMNH: The Natural History Museum, London, England; CMNH: Carnegie Museum of Natural History, Pittsburgh, PA, U.S.A.; MNHN: Musée Nationale d'Histore Naturelle, Paris, France; SMF: Senckenberg Museum, Frankfurt, Germany; SMTD: Staatliches Museum für Tierkunde, Dresden, Germany; USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.; ZMHU: Zoologisches Museum für Naturkunde, Humboldt Universität, Berlin, Germany. The protocol for listing material examined follows Hall (1999).

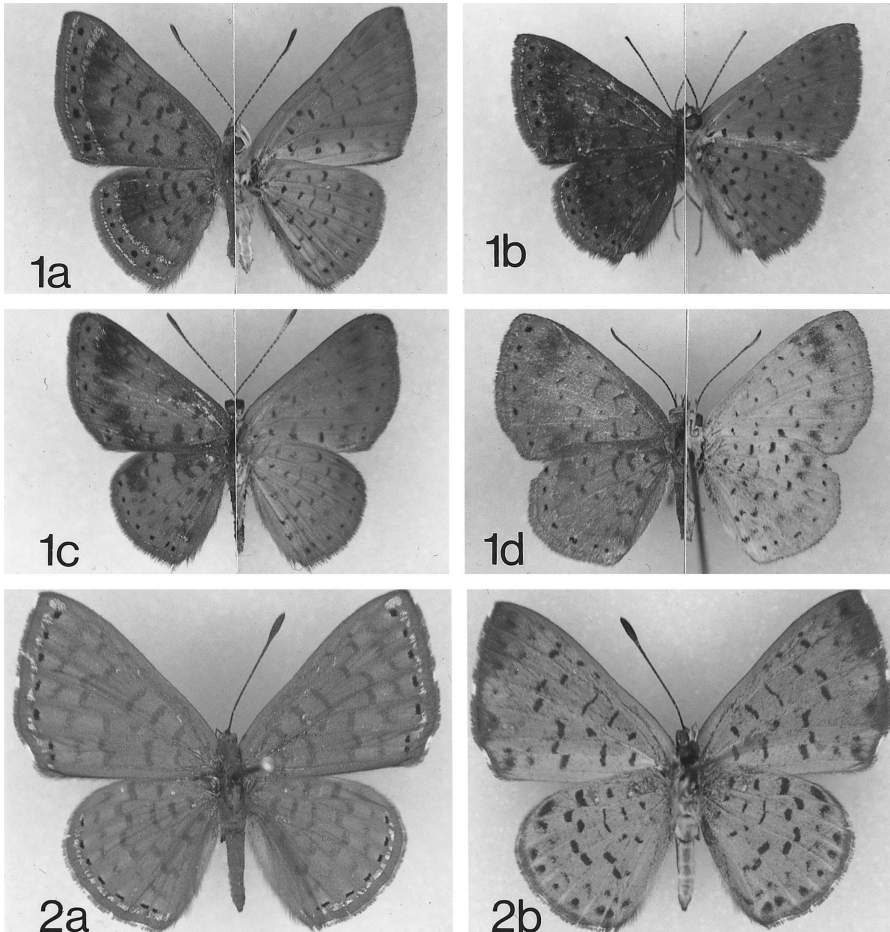
SYSTEMATICS

*Dachetola* Hall, **new genus**

Figs. 1–13

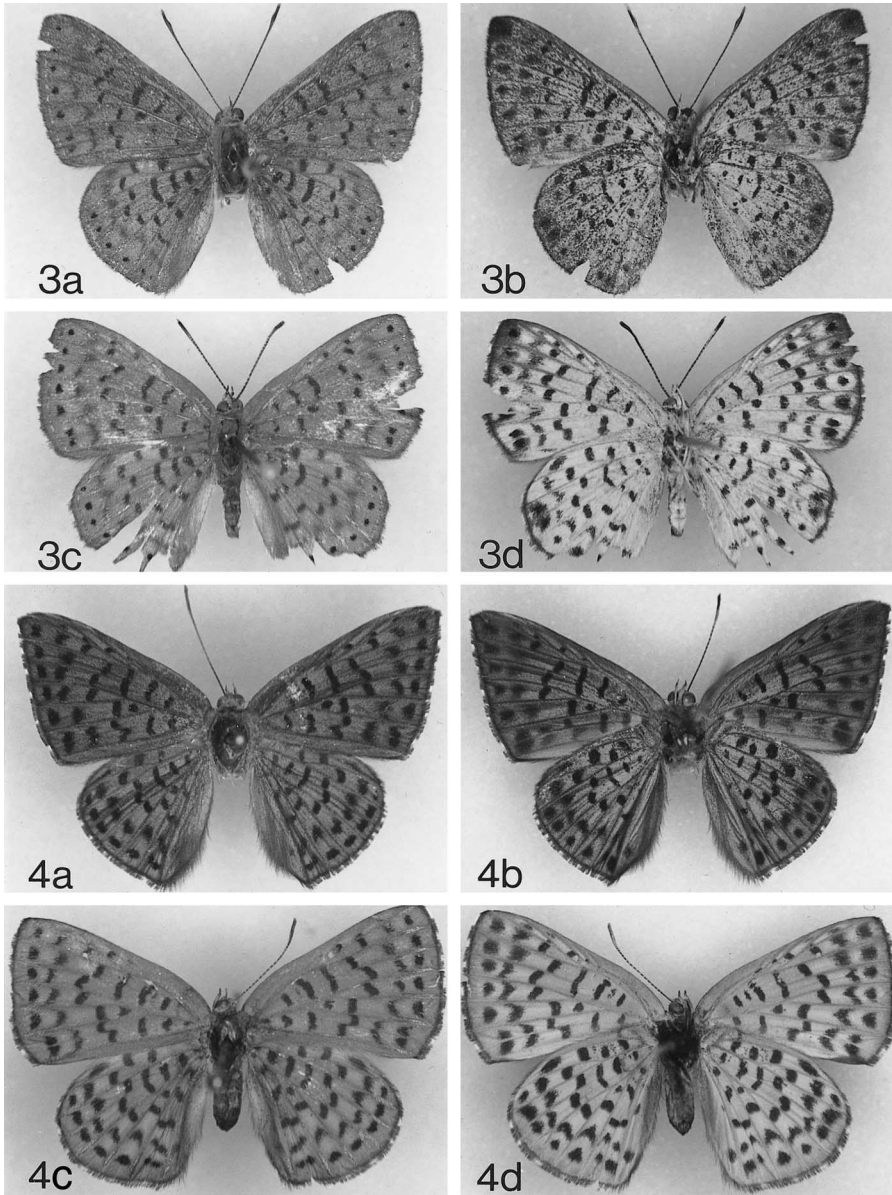
**Type species.** *Polystichtis caligata* Stichel, 1911

**Etymology.** The name is an anagram of *Chalodeta*, a riodinine genus of similar-looking species.



Figs. 1–2. Adults of *Dachtola* spp.; dorsal surface on left, ventral surface on right unless otherwise stated. 1. *Dachtola azora* (Godart), a) ♂, João Pessoa, Brazil (PB) (USNM); b) neotype ♂, Teresópolis, Brazil (RJ) (USNM); c) ♂, São Paulo, Brazil (SC) (USNM); d) ♀, Barbacena, Brazil (MG) (USNM). 2. *Dachtola virido* (Lathy) holotype ♂, Río Songo, Bolivia (MNHN), a) dorsal surface; b) ventral surface.

**Description.** *Male:* Forewing length 12–15 mm. *Wing shape.* Both wings compact; forewing costa approximately straight, distal margin slightly convex; hindwing rounded. *Venation* (Fig. 5A). Four forewing radial veins. *Dorsal surface.* Ground color of both wings shades of brown or iridescent green or blue; three evenly spaced dark brown marks in discal cell of each wing, that marking cell end extends as discal line to vein 2A on both wings and to costa on hindwing, one towards base of cell Cu2 on both wings, column of disjointed postdiscal spots on both wings consists of three sets of distally semicircular markings, one in cells Cu2 and Cu1, one in cells



Figs. 3–4. Adults of *Datchetola* spp.; a, dorsal surface of ♂, b, ventral surface of ♂; c, dorsal surface of ♀, d, ventral surface of ♀. 3. *Datchetola caligata* (Stichel), ♂, Cerro Galera, Panama (USNM); ♀, Cerro Campana, Panama (USNM). 4. *Datchetola pione* (Bates), ♂, French Guiana (BMNH); ♀, “Brazil” (BMNH).

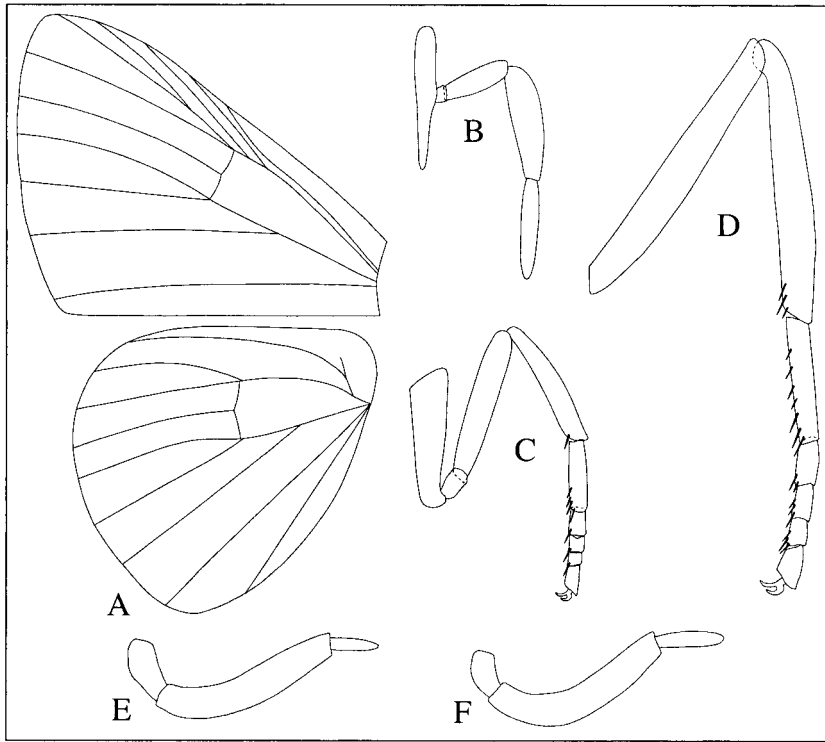
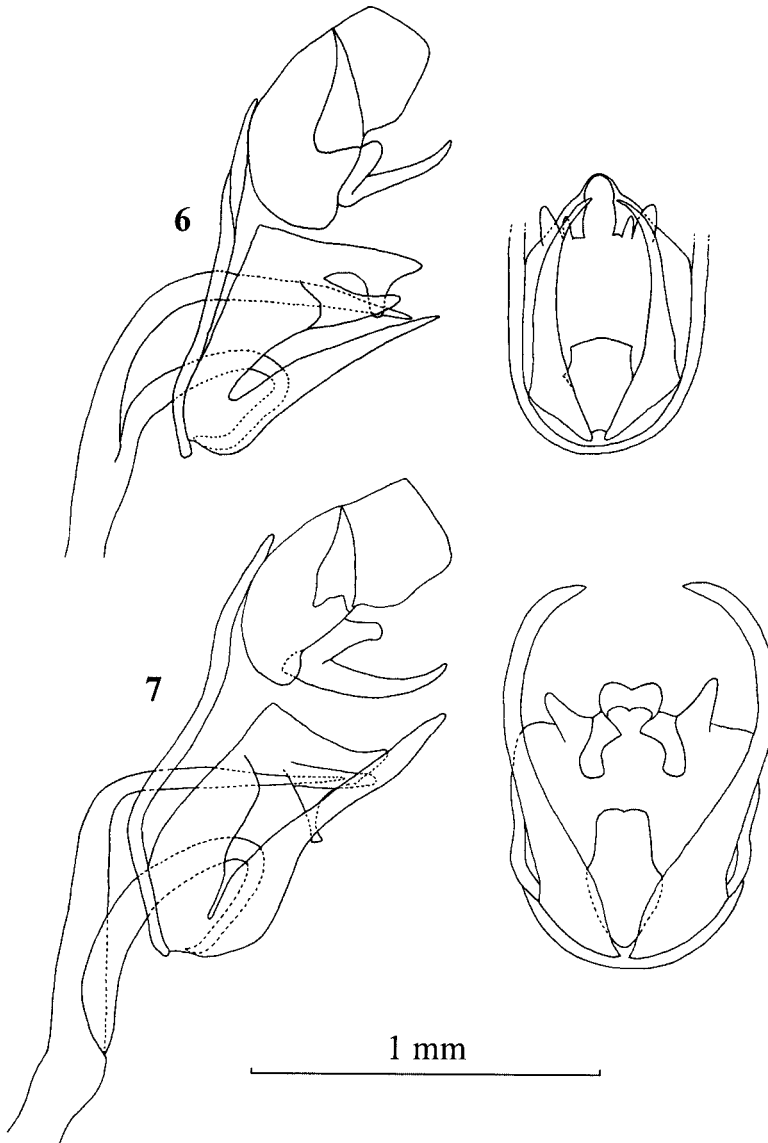
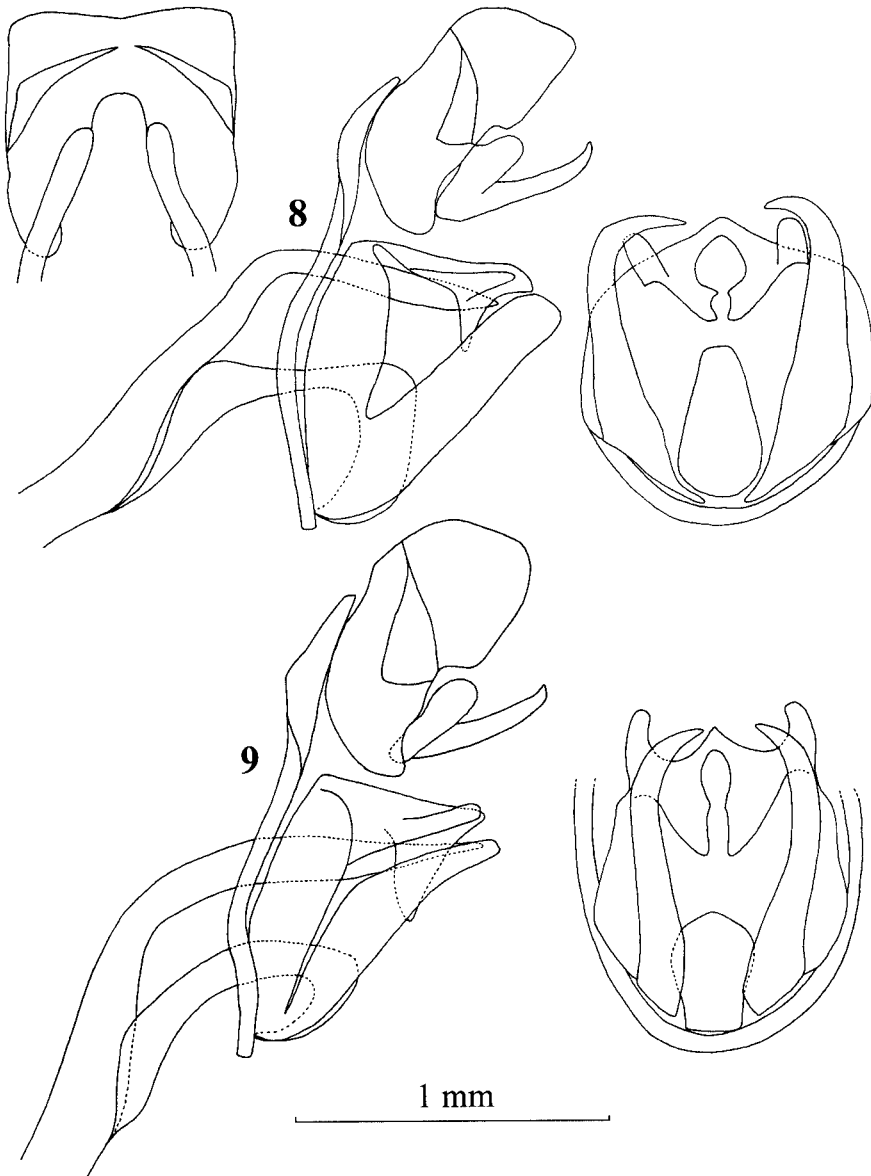


Fig. 5. Morphology of *Dachtetola caligata*: A, ♂ venation; B, ♂ foreleg; C, ♀ foreleg; D, ♂ hindleg; E, ♂ palpus; F, ♀ palpus.

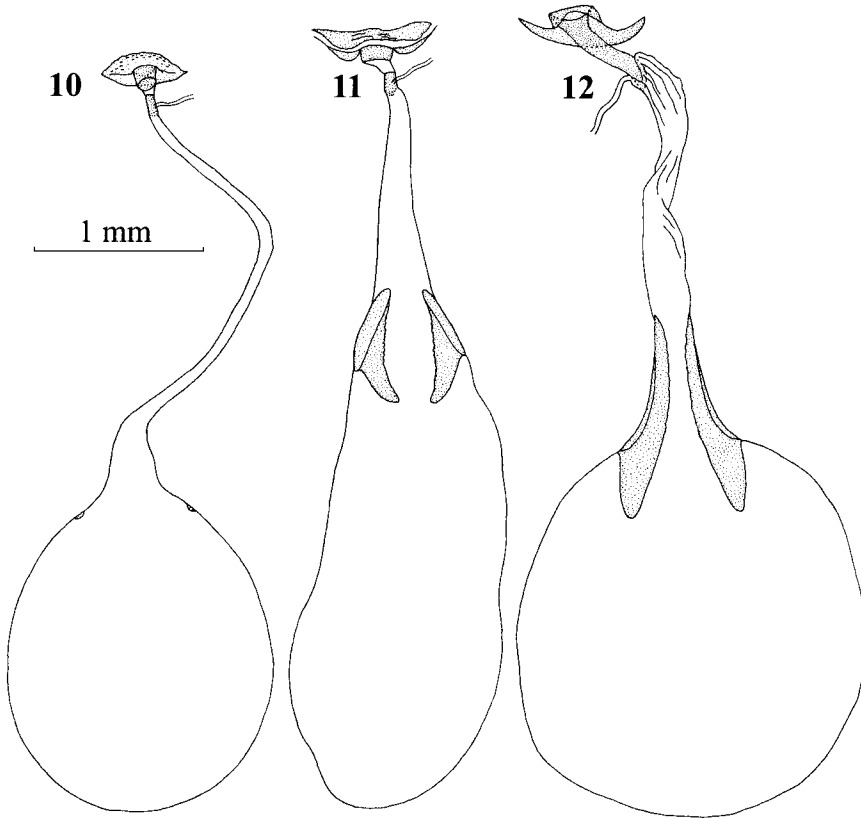
M3 to M1 and the last in cells R4+5 to R2 (Rs and Sc+R1 on hindwing); a variably prominent dark brown outer submarginal band and an inner submarginal row of black spots typically with silver along vein endings proximally and as a marginal line distally on both wings; fringe on both wings varies from entirely brown to possessing white elements in each cell. *Ventral surface*. Differs from dorsal surface in following ways: ground color of both wings brown with shades of iridescent purple or shades of iridescent blue; outer submarginal band more prominent and always formed into distinct spots; silver markings absent. *Head*. Labial palpi same color as ventral ground color, second segment elongate (Fig. 5E); eyes brown and very sparsely setose, brown scaling at margins; frons brown with paler scaling ventrally; antennal length approximately 60% of forewing length, segments brown with prominent white scaling at base, narrow disjointed nudum line along inner margin of shaft; clubs long and brown, tips often orange-brown. *Body*. Dorsal and ventral surface of thorax and abdomen similar to color of respective wing surface; tarsus of foreleg unimerous, coxa of medium length for family (Fig. 5B); all legs similar to color of ventral wings, midleg and hindleg with a tibial spur and a group of spines at inner distal tip of tibia and all tarsal segments, several further spines along inner distal margin



Figs. 6–7. Male genitalia in lateral (left) and ventral view (right). 6. *Datchetola azora*. 7. *D. virido*.



Figs. 8-9. Male genitalia in lateral (left) and ventral view (right). 8. *D. caligata*, also dorsal view of uncus and tegumen at far left. 9. *D. pione*.



Figs. 10–12. Female genitalia in dorsal view. 10. *Dactylopsycha azora*. 11. *D. caligata*. 12. *D. pione*.

of first tarsal segment (Fig. 5D). *Genitalia* (Figs. 6–9). Uncus rectangular with rounded ventral posterior corner, falces of average size and shape for family, tegumen with deep medial notch at anterior margin; vinculum narrow and somewhat sinuate; aedeagus narrow and sigmoidal in shape with pointed tip opening broadly to right, no cornuti present; pedicel somewhat elongate, distal portion broad, strap-like and typically not connected to valvae; valvae consist of an elongate upwardly and inwardly curving lower process connected by a broad sclerotized band paralleling vinculum to a posteriorly elongate transtilla, short upper valve process originates from anterior base of transtilla, transtilla with pair of elongate subterminal ventral projections encircling groove to accommodate tip of aedeagus.

*Female*: Differs externally from male in following ways: Both wings more rounded; color of both dorsal wings brown, ventral wings paler. *Head*. Third palpal segment slightly more elongate (Fig. 5F). *Body*. Foreleg with spines at inner distal tip of tibia and tarsal segments one to four (Fig. 5C). *Genitalia* (Figs. 10–12). Corpus bursae ovoid, signa small spine-like invaginations or shallow indentations at posterior

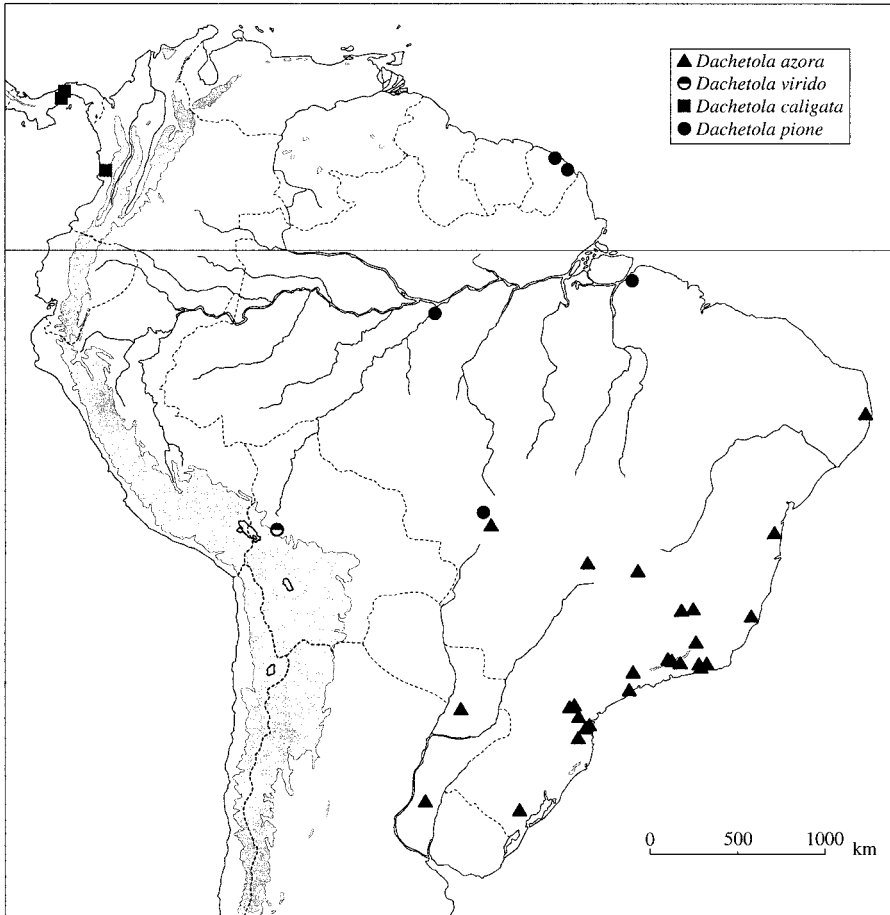


Fig. 13. A map of South America illustrating the distribution of *Dactetola* species.

end of corpus, ductus bursae membranous except for small ventral sclerotized section at posterior tip, ductus seminalis exits ductus bursae immediately anterior to sclerotization, ostium bursae a simple sclerotized tube, eighth abdominal sternite weakly sclerotized.

**Diagnosis and systematic position.** During the course of an ongoing generic reclassification and species-level revision of the tribe Nymphidiini (Hall, in prep.), it became apparent, upon examination of their genitalia, that two species currently treated in *Calospila* (Bridges, 1994; Callaghan and Lamas, 2001), *caligata* and *pione*, actually belonged in the tribe Riodinini, as defined by Harvey (1987). The sister relationship of these two taxa has never been previously recognized, and Stichel (1911, 1930–31) placed them in different species groups. Subsequently, while working on a review and characterization of the riodinine genus *Chalodeta* (Hall, in



press), I found that the species *azora* and *virido* were misplaced. Both shared very similar external facies and genital morphology to the two aforementioned species of “*Calospila*.”

Although *Dachetola* species externally somewhat resemble those of *Chalodeta*, their genital morphology is quite distinct. The latter possess male genitalia with a narrow posteriorly elongate pedicel with a bulbous (and often ventrally spiny) tip instead of a simple strap-like one, a straight instead of strongly sigmoidal aedeagus and two distinct valve types, neither of which approximates those of *Dachetola* species. The female genitalia of *Chalodeta* species are believed to be unique within the Riodinini in possessing the small ventral sclerotized plate of the ductus bursae positioned at the opening of the corpus bursae instead of immediately before the ostium (creating an elongate ductus seminalis parallel to the ductus bursae) (Hall, in press). The genital morphology of *Dachetola* species appears to be closest to that of *Metacharis* species, and I tentatively suggest that these two genera may form a monophyletic group. The four species treated here are placed in the new genus *Dachetola* instead of *Metacharis* for the following morphological and ecological reasons.

As conceived by Stichel (1910, 1930–31), d’Abrera (1994) and Bridges (1994), *Metacharis* was polyphyletic, but as currently conceived (Callaghan and Lamas, 2001) it is a readily definable monophyletic group. Externally, the wing shape is elongate, both wing surfaces are typically orange-brown or iridescent blue with silver marking the vein endings dorsally, reduced submarginal markings in all but the putatively most basal species (Hall, unpubl. data) and four spots in the discal cells, and the abdomen is narrow and elongate. *Dachetola* species have compact wing shapes with an additional dorsal outer submarginal silver line, three spots in the discal cells (as in *Chalodeta*), and short, stout thoraces and abdomens. The male genitalia of *Metacharis* species possess a pedicel that is modified into a broad posteriorly elongate “rod” which connects basally to the lower valve processes, and the upper valve processes possess elongate spines at their tip. *Dachetola* species have a simple strap-like pedicel that does not connect to the valve complex and no spines on the valvae. *Metacharis* species are typically encountered in wet marshy areas and along streamsides, are not known to hilltop, and have a relatively weak flight, while *Dachetola* species hilltop and, judging by their robust thoraces, probably fly rapidly.

**Biology.** *Dachetola* species are uncommon (*azora*) to very rare (*virido*, *caligata* and *pione*) inhabitants of wet lowland and premontane forest from sea-level up to approximately 1,500 m, and very little is therefore known about their biology. The males of two species, *D. azora* and *D. caligata*, are known to perch in hilltop light-gaps in the early afternoon (R. Robbins, pers. comm.), and the male of another, *D. pione*, has been recorded nectaring on *Cordia* flowers (Brévignon and Gallard, 1999).

**Distribution.** *Dachetola* is a pan-Neotropical genus whose species appear to be distributed essentially allopatrically in eastern Central America and the Chocó, the Guianas and mid to lower Amazon, south-eastern South America, and Bolivia (possibly along the base of the southern Andes), respectively.

*Dachetola azora* (Godart, [1824]) **comb. n.**

Figs. 1A–D, 6A, B, 10, 13

*Erycina azora* Godart, [1824]. *Ency. Méth.* 9(Ins.)(2): 572. Type locality: Teresópolis, S.E. Brazil. Neotype ♂ USNM [Designated].

- = *Nymphidium jessa* Boisduval, 1836. *Spec. Gén. Lépid.* 1: pl. 6, fig. 10. Type locality: Brazil. Syntype ♂ BMNH [Examined].
- = *Charis epijessa* Prittwitz, 1865. *Spec. Gén. Lépid.* 1: pl. 6, fig. 10. Type locality: Rio de Janeiro, S.E. Brazil. Syntype ♂ ZMHU [Examined].
- = *Charis calicene* Hewitson, 1866. *Ill. Exot. Butts.* 3: pl. 57, figs. 4, 5. Type locality: Rio de Janeiro, S.E. Brazil. Syntype ♀ BMNH [Examined]. **syn. n.**
- = *Lemonias charis* Hewitson, 1874. *Ill. Exot. Butts.* 5: pl. 41, figs. 52, 53. Type locality: Espírito Santo, S.E. Brazil. Syntype ♂ BMNH [Examined].

**Identification and taxonomy.** Typical FW length: both sexes 13 mm. Godart ([1824]) did not illustrate his newly described taxon *azora* nor indicate a precise type locality for it (only “Brazil”). Since the type is unknown, the identity of this species has been subsequently somewhat uncertain, especially with respect to *epijessa* and *jessa*, which were regarded as distinct species until recently (Callaghan & Lamas, 2001). In the interests of nomenclatural stability, I designate a neotype for *azora*. The most common depository for the types of species described by Godart is the Muséum Nationale d’Histoire Naturelle, Paris, France (MNHN). However, despite thorough searching, neither myself, G. Lamas (pers. comm.), nor Callaghan (1995) have been able to locate a potential syntype specimen of *azora* there or in any other collection. Since the material described by Godart is believed to have been obtained by collectors in the vicinity of Rio de Janeiro in south-east Brazil (G. Lamas, pers. comm.), I designate a male neotype in the USNM with the following label data: “Brazil, RJ, Teresopolis/22°27’S, 42°59’W/17 Feb 1995, 1000 m/Leg. Robbins & Caldas,” “Territorial/Behavior/Time: 1336,” “Genitalia vial/Dachetola/azora/USNM 136/J. P. W. Hall,” and “Neotype male/Dachetola azora/det. J. P. W. Hall”.

*Dachetola azora* is readily distinguished by its small size, more prominent inner silver submarginal line on both dorsal wings, relatively ill-defined and more proximally positioned outer submarginal band, and orange-brown ventral ground color. The male genitalia are most readily recognized by the gradually tapering and pointed lower valve process, broad upper valve process, and relatively short and angular ventral transtilla projections. *D. azora* exhibits significant wing pattern variation even within populations. The dorsal surface ranges from nearly uniform gray-brown (Fig. 1A) or dark brown (Fig. 1B) to orange-brown mixed with darker brown submarginal and basal areas (Fig. 1C), the dorsal inner silver submarginal line is variably present, and the ventral surface exhibits varying degrees of subtle purple iridescence with some specimens exhibiting white scaling in the basal half of the hindwing. Since I can discern no significant discrete geographic variation, no subspecies are recognized, and the names *jessa*, *epijessa*, *calicene* and *charis* are all treated as synonyms of *azora*.

**Biology.** *Dachetola azora* is the most common *Dachetola* species in collections and appears to occur from sea-level to about 1,500 m. Label data from several specimens indicate that males perch on hilltops between 1215 and 1400 hr. R. Robbins (pers. comm.) reports encountering solitary males perching in an open lightgap atop a prominent hilltop in Teresópolis.

**Distribution.** This species is widespread throughout south-eastern South America, and is currently known from eastern Argentina, Paraguay and between the southern

Brazilian states of Mato Grosso, Paraíba and Rio Grande do Sul (see Fig. 13). It may be sympatric with *D. pione* in Mato Grosso. The following additional localities are listed by Brown (1992) (as *Chalodeta jessa*) for BRAZIL: **São Paulo**, Serra do Japi; and by Biezanko et al. ([1979]) (as *Charis epijessa*) for BRAZIL: **Rio Grande do Sul**, Laranjal.

**Specimens examined.** 89♂, 40♀. ARGENTINA: **Entre Ríos**, 1♀, No specific locality (BMNH). BRAZIL: **Mato Grosso**, 1♀, Cuiabá (BMNH); 1♂, No specific locality (BMNH); **Paraíba**, 1♂\*, João Pessoa (USNM); **Bahia**, 2♂, Cachimbo (BMNH); **Espírito Santo**, 9♂, 1♀, No specific locality (BMNH); 1♂ (SMF); **Góias**, 1♂, Campinas (SMF); **Minas Gerais**, 1♂\*, Paracatu (USNM); 1♀, Paraopeba (USNM); 1♀, Barbacena (USNM); 1♀\*, 15 km S.E. of Itamonte (USNM); 1♀\*, Serra do Cipo (USNM); 1♂, 1♀, Passa Quatro (ZMHU); 2♀, No specific locality (BMNH); **Rio de Janeiro**, 7♂, 4♀, Rio de Janeiro (BMNH); 1♂ (USNM); 1♂, 1♀ (ZMHU); 1♂, Gávea (BMNH); 1♂, 1♀, Laguna de Sacuarema (BMNH); 2♂, 2♀, Nova Friburgo (BMNH); 2♂, 3♀ (ZMHU); 2♂, 2♀, Petrópolis (BMNH); 3♂, 1♀ (USNM); 1♂ (ZMHU); 1♂, Niterói (ZMHU); 7♂\*, Teresópolis (USNM); 1♂, Itatiaia (SMF); *São Paulo*, 1♂, Itanhaem (BMNH); 2♂, Alto da Serra, Santos (BMNH); 1♂ (SMF); 2♂, 1♀, No specific locality (BMNH); 2♂, 1♀ (ZMHU); 1♂ (SMF); **Paraná**, 3♂, Castro (BMNH); 1♂ (USNM); 1♂, 30 km. N.W. of Ponta Grossa (USNM); 1♂, 1♀, Lapa, Rio de Várzea (SMF); **Santa Catarina**, 9♂, 1♀, São Paulo (USNM); 1♂, Jaraguá do Sul (ZMHU); 1♂, Joinville (SMF); 1♂, Nova Brémen (SMF); 1♂, No specific locality (ZMHU); 1♂ (SMF); 2♂, No locality data (BMNH); 1♂ (ZMHU). PARAGUAY: **Paraguarí**, 1♂\*, Sapucay (USNM). 7♂, 6♀, No locality data (BMNH); 1♂ (USNM); 6♂, 4♀ (ZMHU); 1♂ (SMTD). Mislabeled: 3♀, Venezuela (BMNH).

*Dachetola virido* (Lathy, 1958) **comb. n.**

Figs. 2A, B, 7A, B, 13

*Charis chelonis virido* Lathy, 1958. In: Rebillard, P., *Mém. Mus. Nat. Hist. Nat. (A)* 15: 190, pl. 3, fig. 11. Type locality: Río Songo, Bolivia. Holotype ♂ MNHN [Examined].

**Identification and taxonomy.** FW length of male holotype: 14 mm (not 15 mm as in Rebillard, 1958). This taxon was described as a subspecies of *Chalodeta chelonis* Hewitson, 1866, but was correctly raised to the rank of species by Callaghan (1985). His designation of a lectotype for *D. virido*, however, was invalid as the species was clearly stated to have been described from a unique holotype (Rebillard, 1958).

*D. virido* exhibits wing pattern characteristics in between those of *D. azora* and *D. caligata* and *D. pione*. It is brown above, as in *azora*, but has more distinct and closely positioned inner and outer submarginal lines on the ventral surface with a prominent uniform ventral iridescence, as in the latter two species. It also more closely approximates the latter two species in size. The lower male genital valve process of *D. virido* is longer than that of all other species, extending dorsally beyond the transtilla, and the transtilla tip is up-turned and very slightly bifurcate.

**Biology.** Unknown.

**Distribution.** This species is currently only known from the type locality at the base of the north Bolivian Andes at 750 m (see Fig. 13).

**Specimens examined.** 1♂. BOLIVIA: **La Paz**, 1♂\*, Río Songo (May) (MNHN).

*Dachetola caligata* (Stichel, 1911) **comb. n.**

Figs. 3A–D, 8A, B, 11, 13

*Polystichtis caligata* Stichel, 1911. In: Wytzman, P., *Gen. Insectorum* 112B: 325.

Type locality: Río San Juan, W. Colombia. Holotype ♂ ZMHU [Examined].

**Identification and taxonomy.** Typical FW length: both sexes 14 mm. *Dachetola caligata* is similar only to *D. pione*, but has a more rounded wing shape, an iridescent green instead of blue dorsal surface with smaller outer submarginal spots and a complete submarginal silver line, and a considerably paler and brighter blue ventral surface. The male genitalia are very similar, but *D. caligata* has straighter and broader lower valve processes in lateral view, a slightly shorter upper valve process with a broader base, a slightly more posteriorly elongate transtilla with a broader ventral groove for the aedeagus, a more sinuate aedeagus, and a more elongate posterior portion to the pedicel in ventral view. The female genitalia of *D. caligata* have only a short segment of sclerotization at the distal tip of the ductus bursae and considerably smaller signa than in *D. pione* that curve inwards.

**Biology.** Very little is known about the biology of this species, which appears to be confined to wet lowland rainforest. The label data of one male specimen indicate it was captured hilltopping at 1245 hr.

**Distribution.** This species is currently known only from Panama and west Colombia, but it is sure to also occur in north-west Ecuador, and may also occur in eastern Costa Rica (see Fig. 13).

**Specimens examined.** 3♂, 1♀. PANAMA: **Panamá**, 1♀\*, Cerro Campana (Feb) (USNM); **Canal Zone**, 1♂\*, Cerro Galera (May) (USNM); 1♂, Gamboa (Jan) (USNM). COLOMBIA: **Chocó**, 1♂, Río San Juan (ZMHU).

*Dachetola pione* (Bates, 1868) **comb. n.**

Figs. 4A–D, 9A, B, 12, 13

*Lemonias pione* Bates, 1868. *J. Linn. Soc. Lond. Zool.* 9: 398. Type locality: Pará, E. Brazil. Syntype ♂ BMNH [Examined].

**Identification and taxonomy.** Typical FW length: both sexes 15 mm. *D. pione* is similar only to *D. caligata*, from which it is distinguished in that species account. The female from Mato Grosso has paler wings, less prominent black spotting and outwardly curved instead of straight postdiscal markings compared to lower Amazon females.

**Biology.** The statement by Brévignon and Gallard (1999) that a single male was captured on *Cordia* flowers in French Guiana represents our total knowledge of the biology of this species.

**Distribution.** *D. pione* is known from the Guianas and the middle to lower Brazilian Amazon (see Fig. 13). The following additional locality is listed by Brévignon and Gallard (1999) (as *Calospila pione*) for FRENCH GUIANA: **Cayenne**, Sinnamary.

**Specimens examined.** 5♂, 3♀. BRAZIL: **Amazonas**, 1♂, Nova Olinda, Rio Madeira (CMNH); **Mato Grosso**, 1♀\*, No specific locality (BMNH); **Pará**, 1♂\*, Pará (BMNH); 1♀, No locality data (BMNH). FRENCH GUIANA: 1♂, 1♀\*, No locality data (BMNH). 2♂, No locality data (BMNH).

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