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A REVIEW OF *CHALODETA* STICHEL WITH A REVISION OF THE *CHELONIS* GROUP (LEPIDOPTERA: RIODINIDAE)

JASON P. W. HALL

Department of Systematic Biology, Entomology Section, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127, U.S.A. (e-mail: jpwhall@hotmail.com)

Abstract.—An overview of the Neotropical riodinid genus *Chalodeta* Stichel is presented which defines the taxon, delineates its member species, and discusses its systematic position within the tribe Riodinini. A revision of the *Chalodeta chelonis* group includes notes on the taxonomy and biology of its species, and illustrations of the adults and male and female genitalia (where known) of all taxa. Four species are recognized, including two that are previously described, *C. chelonis* (Hewitson 1866) and *C. chaonitis* (Hewitson 1866), and two that are described here, ***C. chitinosa,* n. sp.**, and ***C. chlosine,* n. sp.** The taxon *stilbos* Stichel 1910, is synonymized with *C. theodora* (C. and R. Felder 1862) (**n. syn.**).

Key Words: *Chalodeta, Charis,* Neotropics, Riodinini, taxonomy

The monophyly of most genera in the Riodinidae has never been critically assessed, but to do so is vitally important if the family's classification is to become a predictive tool in broader evolutionary studies. The purpose of this paper is twofold. The first is to provide an overview and diagnosis for the small riodinid genus *Chalodeta* Stichel 1910, which has historically often been confused with other genera in the tribe Riodinini (*sensu* Harvey 1987), particularly *Charis* Hübner [1819], delineate its constituent species, and discuss its systematic position, biogeography, and biology. *Chalodeta* is hypothesized here to consist of two monophyletic groups, and the second purpose of this paper is to present a revision of one of these, the *chelonis* group, whose true species diversity has previously gone undetected. It consists of two named species, *C. chelonis* (Hewitson 1866) and *C. chaonitis* (Hewitson 1866), and two additional species, widely sympatric with *C. chaonitis,* that are described here. All four *chelonis* group species are illustrated here, while adequate color figures of all *theodora* group species may be found in d'Abrera (1994) (*C. theodora* (C. and R. Felder 1862) and *C. lypera* (Bates 1868)) and Hall and Willmott (1998) (*C. pescada* Hall and Willmott 1998 and *C. panurga* Stichel 1910).

METHODS

Dissections were made using standard techniques, abdomens being soaked in hot 10% potassium hydroxide solution for approximately five minutes, and subsequently stored in glycerol. Specimens dissected are indicated in the material examined sections with an asterisk. Morphological terms for genitalia follow Klots (1956) and Eliot (1973), and the terminology for wing venation follows Comstock and Needham (1918). The protocol for listing material examined follows Hall (1999).

Chalodeta chelonis group specimens have been examined and their locality data recorded in the following collections, whose acronyms are used throughout the text. Only locality data are given in the species accounts of described taxa, but full label data are given for new species.

AME	Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota, FL, U.S.A.
BD	Collection of Boyce Drummond, Florissant, CO, U.S.A.
BMNH	The Natural History Museum, London, U.K.
JHKW	Collection of Jason Hall and Keith Willmott, Washington, DC, U.S.A.
MUSM	Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru
RPM	Reading Public Museum, Reading, PA, U.S.A.
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	Zoologische Museum für Naturkunde, Humboldt Universität, Berlin, Germany
ZSM	Zoologische Staatssammlung, Munich, Germany

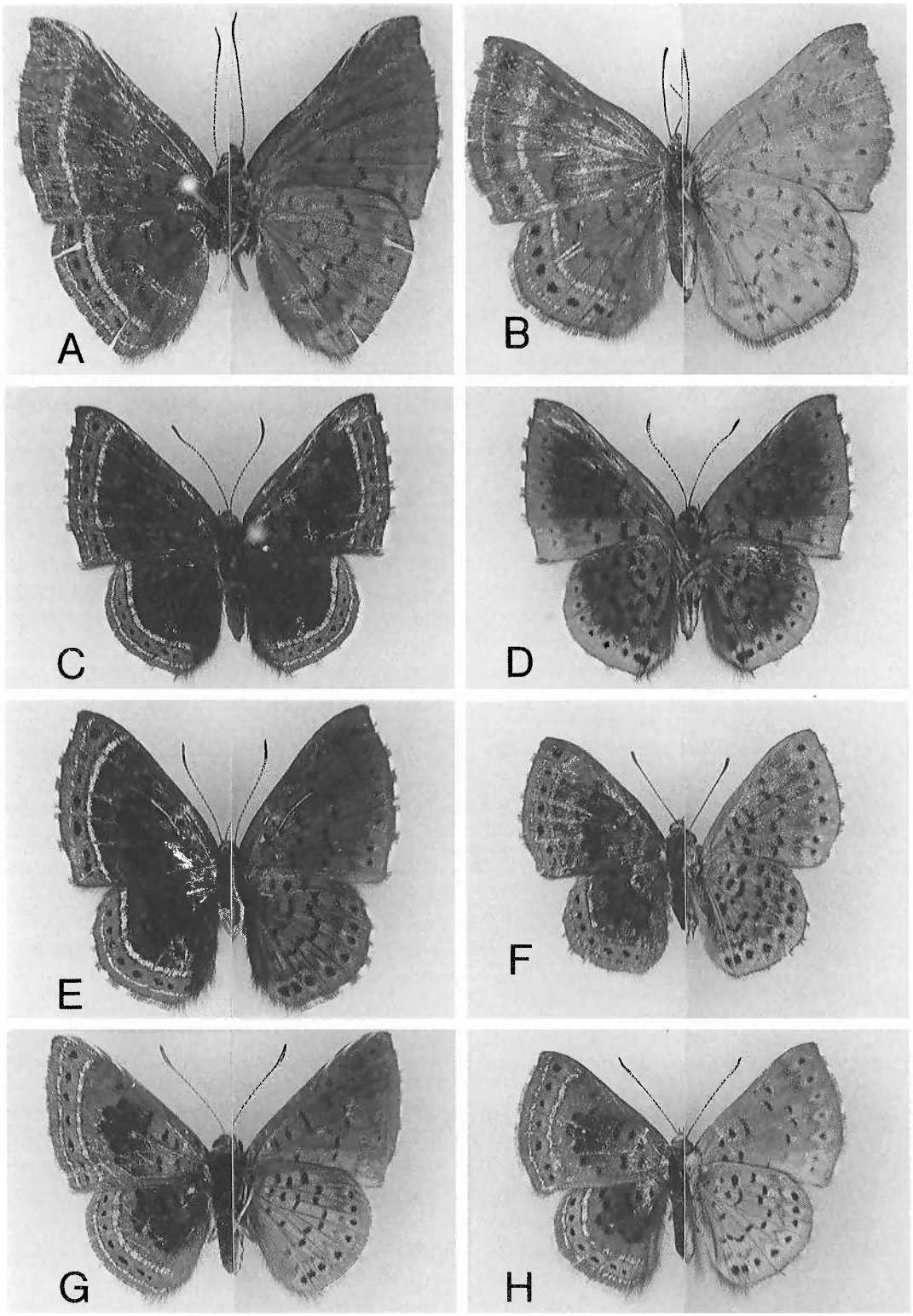
Review of *Chalodeta*

Chalodeta Stichel 1910

Chalodeta Stichel 1910b: 15. Type species by original designation: *Charis theodora* C. and R. Felder 1862: 72.

Diagnosis and systematic position.—*Chalodeta* species are small to medium-sized riodinids (forewing length 10 mm [*theodora*] to 16 mm [*chelonis*]) with compact wing shapes, often slightly falcate forewing apices, and rounded hindwings. The dorsal surface is typically brown with one (all *theodora* group species except *theodora*) or two (all *chelonis* group species and *theodora*) submarginal blue or greenish silver lines, three dark brown markings in the discal cell, and discal, postdiscal and submarginal bands of dark brown spots. The ventral surface is typically iridescent blue or purple in males and brown in females and has similar markings to the dorsal surface except no silver submarginal lines are present (see Figs. 1A–H). The fringe of both wings is often entirely white. All members of the often confused genus *Charis* except the misplaced *ocellata* group (Hall and Harvey, in prep.) have two dorsal submarginal silver lines, and all except one have some ventral submarginal silver markings. The exception is a recently described member of the *Charis gynaea* group (Hall and Harvey 2001), which was figured by DeVries (1997) as "*Chalodeta candiope*" and presumably placed by him in *Chalodeta* because of its lacks of ventral silver markings.

The male genitalia of all *Chalodeta* species (see Figs. 2A–D, 3) possess the deep notch in the anterior margin of the tegumen characteristic of the tribe Riodinini. The uncus is rectangular and in *chelonis* group species typically forms a small bifurcate posterior projection medially along the dorsal margin. The falces and tegumen are of average size and shape for the tribe, and the vinculum is evenly narrow and somewhat arched medially. The aedeagus is characteristically short, narrow and straight, unlike that of *Charis* and most other riodinine species, in which it is long and variably asymmetrically curved; no cornuti are present. The structure of the posteriorly elongate pedicel is unique. It is tightly appressed to the aedeagus, its tip forms a ventrally directed plate, and its basal ventral margin is unsclerotized. The ventral tip contains elongate spines around its perimeter in *chelonis* group species, but only very small spines (*lypera* only) or no spines in *theodora* group species. The valvae of the two *Chalodeta* species groups are very distinct.


A
B
C
D
E
F
G
H

Those of the *chelonis* group (Fig. 2) have a small narrow lower process that is unsclerotized at its base and a posteriorly elongate upper process that typically has a medial dorsal projection and long broad spines at the tip of both upper projections (only *chitinosa* lacks a dorsal upper process). The transtilla is connected to the upper valve process only at its base and is narrow and very posteriorly elongate with two upwardly curving brachia at its tip. Valvae of the *theodora* group (Fig. 3; see also male genital illustration of *C. pescada* in Hall and Willmott 1998) have an entirely sclerotized lower process and an upward and slightly outwardly directed upper process with no spines. The transtilla is connected to the upper valve process along its entire length, creating a broad concave dorsal plate that narrows to a small bifurcate and grooved tip within which the tip of the aedeagus is confined.

The female genitalia (see Figs. 4A–C) differ slightly between the two species groups. Those of the *chelonis* group have an elongate corpus bursae with elongate invaginated spine-like signa and a large area of sclerotization on the eighth abdominal sternite that is often medially desclerotized. The known females of the *theodora* group have a rounded corpus bursae with the signa either forming rectangular invaginations with an elongate base at the wall of the corpus (*theodora*) or two sclerotized bands at the wall of the corpus (*lypera*), and a small area of sclerotization on the eighth abdominal sternite. In all species, the ductus bursae is relatively short and unusual in extending to the dorsal tip of a posteriorly elongate ostium bursae. The position in all *Chalodeta* species of the small ventral sclerotized plate in the ductus bursae at the opening of the corpus bursae instead of immediately before the ostium (creating an elongate ductus seminalis parallel to the ductus bursae) is not known elsewhere in the tribe.

As indicated above, despite a superficial external similarity (including the possession of hairy eyes), the genital morphology does not suggest a particularly close relationship between *Chalodeta* and *Charis* within the Riodinini, although the presence of most wing pattern elements in the species of these genera suggests they are both relatively basal within the tribe. Currently very little is known about relationships between genera in the Riodinini and what makes the pursuit of this knowledge all the more difficult is the relative lack of conservative characters. While the tremendous interspecific variation in genitalia provides good diagnostic characters at the species and species-group levels, it acts to confound the elucidation of relationships at the generic level and above. The other putatively basal riodinine genera which still possess most wing pattern elements are *Metacharis* Butler 1867, *Dachetola* Hall 2001, *Calephelis* Grote and Robinson 1869, *Caria* Hübner 1823, *Amphiselenis* Staudinger 1887, *Lasaia* Bates 1868, and *Exoplisia* Godman and Salvin 1886. However, the male genitalia of all but the first two of these genera possess pedicels tipped with the typical riodinine scobinate patch. *Chalodeta* may be most closely related to *Metacharis* and *Dachetola,* which possess a somewhat similar wing pattern devoid of ventral silver, and a posteriorly elongate "rod"-like pedicel and a simple strap-like pedicel respectively.

History of classification.—Stichel (1910a) described the genus *Chalodeta* to

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Fig. 1. *Chalodeta* adults (dorsal surface on left, ventral surface on right, unless otherwise stated). A, ♂ *C. chelonis,* Petrópolis, S.E. Brazil (USNM). B, ♀ *C. chelonis,* Petrópolis, S.E. Brazil (USNM). C, Holotype ♂ *C. chlosine,* dorsal surface, Pakitza, Peru (USNM). D, Holotype ♂ *C. chlosine,* ventral surface. E, Holotype ♂ *C. chitinosa,* Tingo Maria, Peru (USNM). F, Allotype ♀ *C. chitinosa,* Pakitza, Peru (USNM). G, ♂ *C. chaonitis,* Parque do Gama, S.E. Brazil (USNM). H, ♀ *C. chaonitis,* Parque do Gama, S.E. Brazil (USNM).