9 April 2002
PROC. ENTOMOL. SOC. WASH.
104(2), 2002, pp. 376–389

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

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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

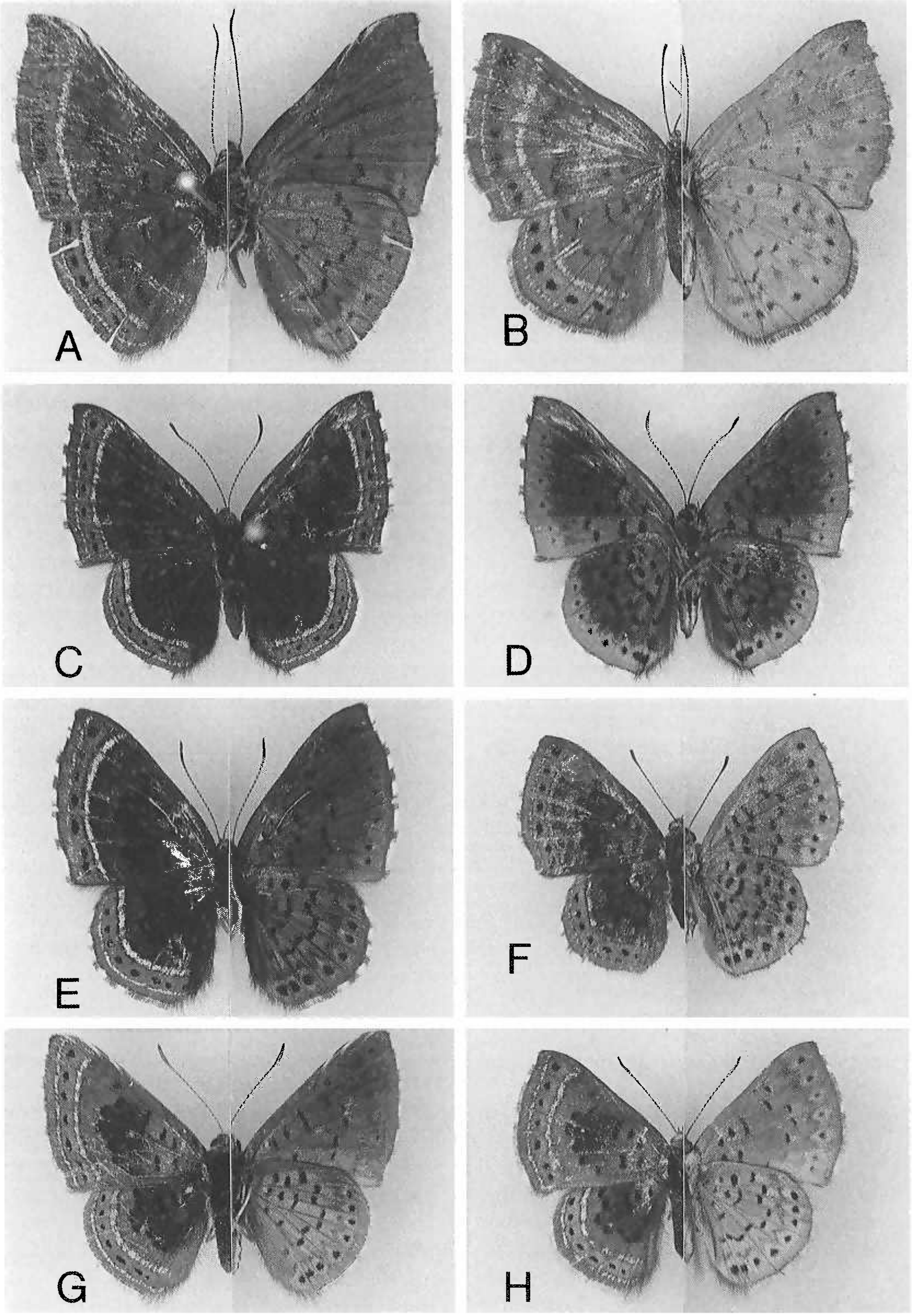
REVIEW OF *CHALODETA*

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).

include the species *theodora, lypera, panurga, chaonitis,* and *calagutis* Hewitson 1871, designating the first of these as the type species, but subsequently added *chelonis, epijessa* Prittwitz 1865, *azora* Godart [1824] (Stichel 1910b) and *speusippa* Schaus 1928 (Stichel 1930–31). The taxon *virido* Lathy 1958, was added to *Chalodeta* by Rebillard (1958) as a subspecies of *chelonis,* but subsequently raised to species rank by Callaghan (1995). In his first riodinid catalog, Bridges (1988) placed *calagutis* in *Charis,* presumably inadvertently, although *calagutis* and the remaining members of the *ocellata* group are actually generically distinct from *Charis* (Hall and Harvey, in prep.). d'Abrera (1994) confused the generic status of *Chalodeta* by combining it with *Charis* in his pictorial overview of the family, stating: "Some workers follow Stichel (1910) in separating certain species in this group into the genus *Chalodeta* Stichel, 1910. . . . This writer considers this confusing and unnecessary and will retain them all in *Charis* Hübner." However, Bridges (1994) retained *Chalodeta* distinct from *Charis.* Most recently, DeVries (1997) synonymized *speusippa* with *lypera,* Hall and Willmott (1998) described *pescada,* and Hall (2001) transferred *virido* and *azora* (with *epijessa* as a synonym) to *Dachetola.* Since two species are newly described here, I recognize eight species for *Chalodeta* in the systematic checklist below. *Chalodeta theodora* is highly variable even within populations, and as the name *stilbos* Stichel 1910 does not represent a geographically discrete phenotype, it is synonymized with *C. theodora.* A dash "—" indicates a synonym.

Chalodeta Stichel 1910
chelonis group
    chaonitis (Hewitson 1866)
    chelonis (Hewitson 1866)
    chitinosa Hall, n. sp.
    chlosine Hall, n. sp.
theodora group
    lypera (Bates 1868)
    —*speusippa* Schaus 1928
    panurga Stichel 1910
    pescada Hall and Willmott 1998
    theodora (C. and R. Felder 1862)
    —*stilbos* Stichel 1910, **n. syn.**
    —*calligramma* (Rebillard 1958)

KEY TO SPECIES OF *CHALODETA* (MALES)

No key is given for females as those of *C. chlosine, C. pescada* and *C. panurga* are not known.

1\. Dorsal submargin with one silverish colored line 2
– Dorsal submargin with two silverish colored lines 4
2(1). Ventral surface prominently iridescent blue 3
– Ventral surface brown with faint purple iridescence . . . . *lypera*
3(2). Dorsal surface with dark shades of iridescent blue . . . . *panurga*
– Dorsal surface brown . . . . *pescada*
4(1). Dorsal submarginal lines closely spaced, narrow and bluish silver 5
– Dorsal submarginal lines distantly spaced, broad and greenish silver . . . . *theodora*
5(4). Dorsal postdiscal line with no dark shading proximally 6
– Dorsal postdiscal line with dark shading proximally 7
6(5). Forewing length typically 16 mm, forewing apex strongly falcate, ventral purple iridescence strong . . . . *chelonis*
– Forewing length typically 13 mm, forewing apex weakly falcate, ventral purple iridescence weak . . . . *chlosine*
7(5). Dark shading proximal to dorsal postdiscal line narrow, distal portion of dorsal wings brown . . . . *chitinosa*
– Dark shading proximal to dorsal postdiscal line broad, distal portion of dorsal wings greenish brown . . . . *chaonitis*

Biogeography.—*Chalodeta* species are distributed throughout the Neotropics, from Mexico to west Ecuador, throughout the Amazon basin and Guianas, and extend as far as southeastern Brazil (see Fig. 5). Two species, *C. panurga* and *C. pescada* exclusively inhabit lower premontane forest (Hall and Willmott 1998), while the remainder inhabit wet lowland rainforest and may also extend into lower premontane habitats (e.g., *C. lypera, C. theodora* and *C. chelonis*). The highest number of species occurs in the five northern and central Andean countries, where all species but *C.*

chelonis, a southeastern Brazilian endemic, should occur. Only *C. lypera* and *C. chaonitis* are known to occur west of the Andes and throughout the Guianas.

Biology.—All *Chalodeta* species except *C. theodora* are uncommon to very rare. Males are rarely encountered perching in small groups on hilltops, along streamsides or shaded forest paths at a variety of heights above the ground and usually in the early morning or early to late afternoon; they make rapid sorties and rest only briefly on the tops of leaves with their wings half open (Brévignon and Gallard 1998, Hall and Willmott, unpubl. data). Males are most frequently encountered in rotting fish baited canopy and subcanopy traps (Hall and Willmott 2000), suggesting that males are infrequently seen because they perch in the canopy. Two species, *C. lypera* and *C. chaonitis* have been recorded visiting flowers (Brévignon and Gallard 1998, Hall and Willmott 2000). The early stages are known for two species, *C. lypera* (incorrectly referred to as *C. chelonis* by Kaye 1921) and *C. chaonitis,* which have been recorded feeding on young leaves and flowers of plants in the Melastomataceae, Passifloraceae and Sterculiaceae (Kaye 1921, Kirkpatrick 1954, DeVries et al. 1994). The larvae bear long tufts of lateral setae and the pupae are squat and bulbous with a broad cremaster (DeVries 1997).

REVISION OF *CHALODETA CHELONIS* GROUP

Chalodeta chelonis (Hewitson 1866)
(Figs. 1A, B; 2A; 4A; 5)

Charis chelonis Hewitson 1866: pl. 57, fig. 9. TL: Rio de Janeiro, S.E. Brazil. Syntype ♂ BMNH [examined].

Identification and taxonomy.—Typical forewing length: male 16 mm; female 15 mm. This species is readily distinguished by its large size, pointed wing shape, prominently falcate forewing apex and more uniformly pale iridescent purple ventral surface with weakly defined markings. The lack of dark shading proximal to the dorsal postdiscal bands occurs elsewhere only in *C. chlosine* (described below), which also has very similar male genitalia and appears to be its closest relative. The two species are distinguished in that species account.

Biology.—Unknown.

Distribution.—This species appears to be endemic to the northern states of southeastern Brazil.

Material examined.—BRAZIL: *Espírito Santo,* No specific locality 1 ♂, 1 ♀ BMNH; *Minas Gerais,* Campo Belo 3 ♀ ZMHU; Maromba 2 ♂ BMNH; 1 ♂ SMF; Leopoldina 1 ♂, 1 ♀ ZMHU; 1 ♂, 1 ♀ SMTD; *Rio de Janeiro,* Rio de Janeiro 1 ♂, 1 ♀ BMNH; 1 ♂ SMTD; 1 ♀ SMF; Nova Friburgo 1 ♂ BMNH; Laguna de Sacuarema 2 ♂, 1 ♀ BMNH; Petrópolis 3 ♂*, 1 ♀* USNM; Itatiaia 6 ♂, 3 ♀ SMF; No locality data 1 ♂ ZMHU. No locality data 3 ♂, 1 ♀ BMNH; 1 ♀ ZMHU; 1 ♀ SMF.

Chalodeta chlosine **Hall, new species**
(Figs. 1C, D; 2B; 5)

Description.—Male: Forewing length 13 mm. Forewing costal margin approximately straight, distal margin slightly convex; hindwing rounded. *Dorsal surface:* Forewing ground color brown with subtle greenish iridescence at oblique angle; three black marks in discal cell, one at base of cell Cu1, two towards base of cell Cu2; a disjointed black postdiscal band extends from vein 2A to costa and is proximally kinked in cell Cu1 and distally kinked in cell R4+5; two parallel submarginal silver lines encompass area of dark orange-brown scaling containing a single black spot in each of cells Cu1 to R4+5 and two in cell Cu2, dark orange-brown at distal margin; fringe brown with white scaling at distal tips of veins Cu2 to R4+5. Hindwing same as forewing except postdiscal band proximally kinked in cells Cu1 and M3, and fringe entirely white. *Ventral surface:* Differs from dorsal surface in following ways: Ground color pale gray brown overlaid with purple iridescence, distal margins gray without iridescence and

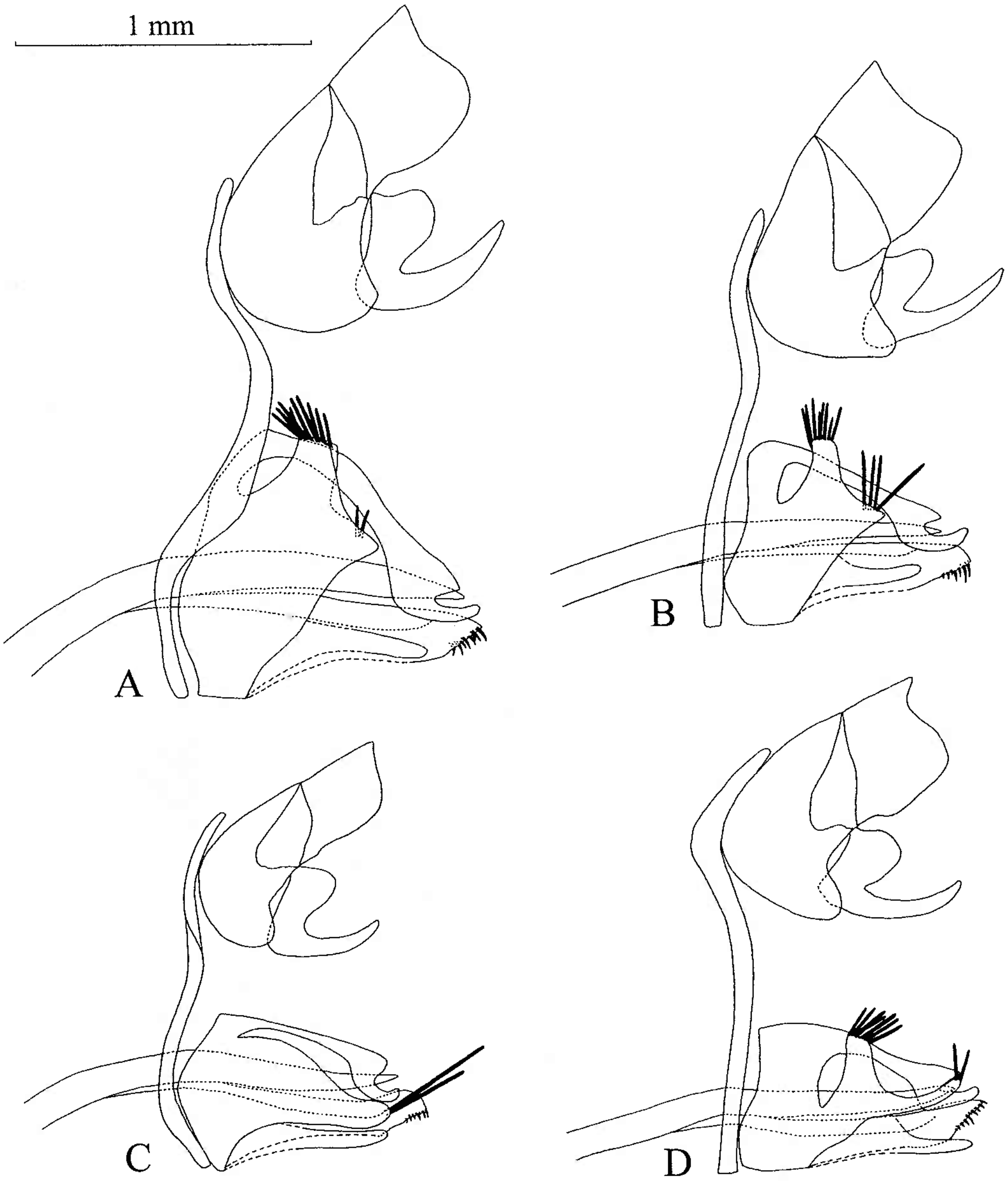

Fig. 2. Male genitalia in lateral view. A, *Chalodeta chelonis.* B, *C. chlosine.* C, *C. chitinosa.* D, *C. chaonitis.*

with undulating proximal margin, silver submarginal lines absent.

Head: Labial palpus brown. Eye brown and densely setose with brown scaling at margins. Frons brown. Antennal segments black with white scaling at base; club black, tip orange brown.

Body: Dorsal surface of thorax and abdomen dark brown, ventral surface pale brown; tegula brown. Legs brown with some iridescent purple setae.

Genitalia (Fig. 2B): Uncus rectangular, posterior dorsal margin produced into two small points medially; falces of average size and shape for family, small, deep semicircular notch in anterior margin of tegumen; vinculum narrow and ribbon-like, extends dorsally over anterior portion of tegumen;

aedeagus relatively short, narrow and straight with pointed tip; pedicel extends from a point on aedeagus one-third distance from base to tip as narrow weakly sclerotized tube to form short posterior projection tipped with a heavily sclerotized oval plate with short spines around ventral perimeter, ventrally unsclerotized except at tip; valvae consist of a short, rounded lower process that is unsclerotized at its base and an upper process with dense patches of long spines apically and on a small posteriorly projecting section medially, posteriorly elongate transtilla connected to dorsal anterior portion of upper valvae process and forms two small, upwardly curving rounded posterior projections at tip.

Female: Unknown.

Type material.—Holotype: ♂*, PERU: *Madre de Dios,* Parque Nacional Pakitza, 11°55′48″S 71°15′18″W, 340 m, 30 Sept 1991 (O. Mielke) (USNM).

Paratypes: COLOMBIA: *Putumayo,* 1 ♂: Río Mulato, Mocoa, 29 Mar 1929 (ZMHU). *Amazonas,* 1 ♂: Florida, Sept 1931 (G. Klug) (BMNH). ECUADOR: *Napo,* 1 ♂*: Tena, 1°01′S 77°49′W, 550 m, 6–10 Nov 1988 (R. Robbins) (USNM). 1 ♂*: Apuya, km 20 Tena-Puyo rd., 600 m, 6 Dec 1996 (K. Willmott) (JHKW). PERU: *Loreto,* 1 ♂: Río Pacaya, Lower Río Ucayali, Aug 1912 (BMNH). *Junín,* 1 ♂: Chanchamayo (ZSM). *Madre de Dios,* Parque Nacional Pakitza, 11°55′48″S 71°15′18″W, 340 m (USNM), 1 ♂: 14 Oct 1991 (R. Robbins), 1 ♂: 15 Oct 1991 (G. Lamas), 1 ♂*: 20 Oct 1991 (M. Casagrande). 1 ♂: Boca Río La Torre, 20 Oct 1983 (G. Lamas) (MUSM). *Puno,* 2 ♂: Yahuarmayo, 1,200 ft, Feb/Mar 1912 (H. & C. Watkins) (BMNH). BOLIVIA: *La Paz,* 1 ♂: Mapiri (SMTD). BRAZIL: *Mato Grosso,* 1 ♂*: Diamantino, Alto Rio Arinos, 14°13′S 56°12′W, 24 Sept 1989 (E. Furtado) (USNM). 3 ♂: Cuiabá (BMNH). 1 ♂: "Mato Grosso" (Zobrys & Wolter) (BMNH).

Etymology.—The species name is a euphonious anagram of "chelonis," the name of its most closely related species.

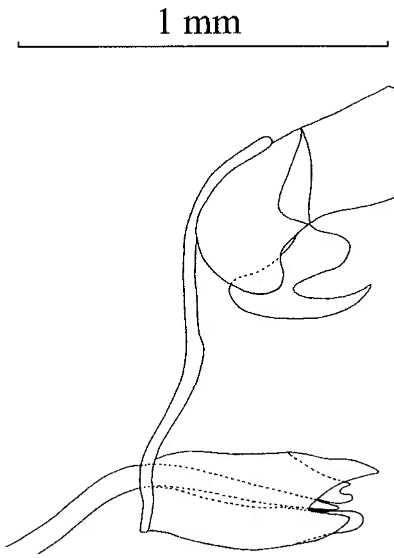

Fig. 3. Male genitalia in lateral view of *Chalodeta theodora.*

Diagnosis.—*Chalodeta chlosine* is superficially most similar to *C. chaontits* and *C. chitinosa* (described below), but lacks dark shading proximal to the dorsal postdiscal bands and has different genitalia (see those species accounts for further details). It appears to be most closely related to the southeastern Brazilian endemic *C. chelonis,* but is smaller, has a more rounded wing shape, a less falcate forewing apex, and more prominent ventral markings. The male genitalia do not differ consistently.

Biology.—*Chalodeta chlosine* is the rarest of the Amazonian *chelonis* group species. The ratio of *chlosine, chitinosa,* and *chaonitis* specimens examined in collections, respectively, is 2:7:10. An Ecuadorian male was attracted to a canopy trap baited with rotting fish.

Distribution.—This species is currently known only from the western Amazon, from Ecuador to Bolivia and into southwestern Brazil.

Chalodeta chitinosa Hall, new species

(Figs. 1E, F; 2C; 4B; 5)

Description.—Male: Forewing length 14 mm. Forewing costal margin approximately

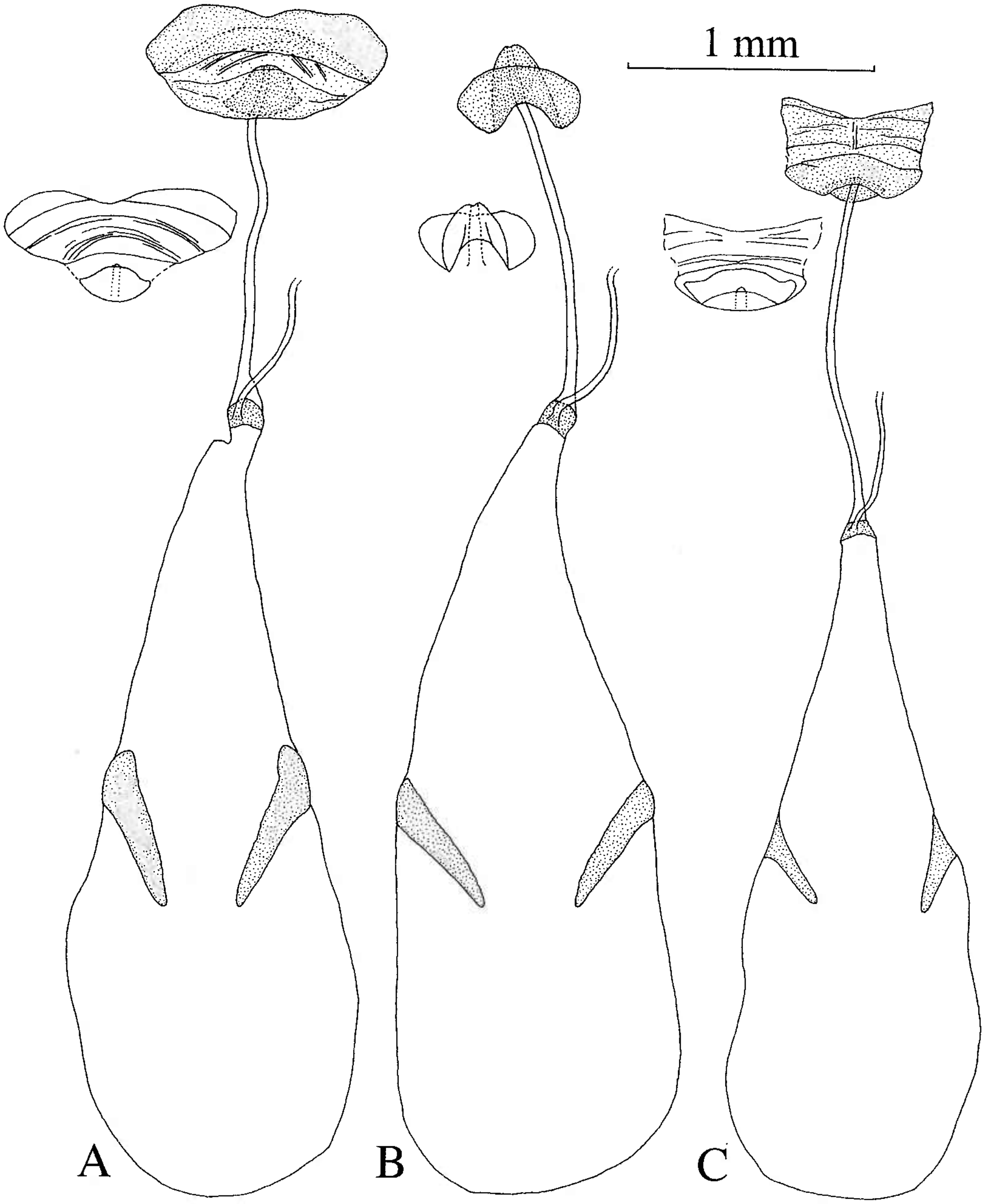

Fig. 4. Female genitalia. A, *Chalodeta chelonis*. B, *C. chitinosa*. C, *C. chaonitis*.

straight, distal margin slightly convex, hindwing rounded. *Dorsal surface:* Forewing ground color brown with subtle greenish iridescence at oblique angle; three black marks in discal cell, one at base of cell Cu1, two towards base of cell Cu2; a disjointed black postdiscal band extends from vein 2A to costa and is proximally kinked in cells Cu1 and M3, black scaling extends proximally; two parallel submarginal silver lines encompass area of dark orange brown scaling containing a single black spot in each of cells Cu1 to R4+5 and two in cell Cu2, dark orange brown at distal margin, fringe brown with white scaling at distal tips of veins Cu2 to R4+5. Hindwing same as forewing except black scaling proximal to postdiscal band considerably less prominent. *Ventral surface:* differs from dorsal surface as follows: ground color pale gray brown overlaid with purple iridescence, distal margins gray without iridescence (especially hindwing) and with undulating proximal margin, silver submarginal lines absent.

Head: Labial palpus brown. Eye brown and densely setose with brown scaling at margins. Frons brown. Antennal segments black with white scaling at base; club black, tip orange brown.

Body: Dorsal surface of thorax and abdomen dark brown, ventral surface pale brown; tegula brown. Legs brown with some iridescent purple setae.

Genitalia (Fig. 2C): Uncus rectangular, posterior dorsal margin approximately straight; falces of average size and shape for family, small, deep semicircular notch in anterior margin of tegumen; vinculum narrow and ribbon-like, extends dorsally over anterior portion of tegumen; aedeagus relatively short, narrow and straight with pointed tip; pedicel extends from a point on aedeagus one-third distance from base to tip as narrow weakly sclerotized tube to form short posterior projection tipped with a heavily sclerotized oval plate with short spines around ventral perimeter, ventrally unsclerotized except at tip; valvae consist of a short, rounded lower process that is unsclerotized at its base and a tapering, rounded posteriorly projecting upper process with two long stout spines at tip, posteriorly elongate transtilla connected to dorsal anterior portion of upper valvae process and forms two small, upwardly curving rounded posterior projections at tip.

Female: Differs from male as follows: Distal margin of forewing more convex. *Dorsal surface:* Ground color paler. *Ventral surface:* Ground color brown with no purple iridescence, distal margins and wing bases pale orange brown.

Genitalia (Fig. 4B): Corpus bursae elongate, signa medium-sized spine-like invaginations; ductus bursae narrow and membranous with small sclerotized ventral plate at anterior end, ductus seminalis connects to this sclerotized plate; eighth abdominal sternite a small sclerotized plate with medially and ventrally positioned ostium bursae forming a rounded posteriorly elongate projection, small round opening for ductus bursae at dorsal tip.

Type material.—Holotype: ♂*, PERU: *Huánuco,* Tingo Maria, 800 m, 24 June 1982 (S. Nicolay) (USNM).

Allotype: ♀, PERU: *Madre de Dios,* Parque Nacional Pakitza, 11°55′48″S 71°15′18″W, 340 m, 16 Sept 1989 (R. Robbins) (USNM).

Paratypes: VENEZUELA: *Amazonas,* 1 ♀: Yavita (Lichy) (AME). COLOMBIA: 1 ♂: "Caquetá," 11 Feb (ZMHU). ECUADOR: *Sucumbíos,* Limoncocha (B. Drummond) (BD), 1 ♂*: 25 Apr 1974, 1 ♀: 8 Oct 1974. PERU: *Loreto,* 1 ♀: Castaña, 0°48′22″S 75°14′40″W, 150 m, 17 Oct 1991 (G. Lamas) (USNM). 1 ♂: Puerto Almendra, Río Nanay, 03°50′S 73°23′W, 120 m, 3 Sept 1995 (R. Robbins) (USNM). Iquitos, 1 ♂: (H. Whitely) (BMNH), 1 ♂: (Hahnel) (ZMHU). 1 ♂: Pebas (Hahnel) (ZMHU). *San Martín,* Yurimaguas, 1898 (Michael) (ZMHU). 1 ♂: Juanjui (RPM). *Pasco,* 1 ♀: Monte Alegro, Río Pachitea (G. Tessman) (ZMHU). 1 ♂: Pachitea (SMTD). *Madre de Dios,* Parque Nacional Pakitza, 11°55′48″S 71°15′18″W, 340 m (USNM), 2 ♂: 23 Sept 1989 (D. Harvey), 1 ♂: 27 Sept 1991 (O. Mielke), 2 ♀: 2 Oct 1991 (G. Lamas), 1 ♂: 6 Oct 1990 (R. Robbins), 1 ♂, 1 ♀*: 6 Oct 1991 (R. Robbins), 1 ♂: 10 Oct 1991 (O. Mielke), 1 ♂: 11 Oct 1991 (R. Robbins), 1 ♂: 12 Oct 1991 (O. Mielke), 2 ♂: 15 Oct 1991 (O Mielke), 1 ♂*: 17 Oct 1991 (O. Mielke), 1 ♂: 20 Oct 1991 (O. Mielke). 1 ♂: 30 km S.W. of Puerto Maldonado, 300 m, 22 Oct 1983 (S. Nicolay) (USNM). 1 ♂: "Peru" (SMF). *Puno,* 1F: La Union, Río Huacamayo & Río Carabaya, 2,000 ft, Nov 1904 (Ockenden) (BMNH). BOLIVIA: *La*

Paz, 2 ♂: Mapiri (BMNH). 1 ♂, 1 ♀: Yungas (ZMHU). 1 ♂*: "Peru" [= Bolivia] (coll. W. Schaus) (USNM). 2 ♂: "Bolivia" (SMF). BRAZIL: *Amazonas,* São Paulo de Olivença, 6 ♂: Jan 1933 (S. Waehner) (BMNH), 1 ♀: (M. Moss) (BMNH), 1 ♀: (H. Bates) (BMNH), 2 ♂: Nov 1930 (S. Wucherpfennig) (SMF), 1 ♂: (Hahnel) (ZMHU), 3 ♂: (SMTD). 1 ♂: Tonantins (H. Bates) (BMNH). Manicoré, 1 ♂: 1887 (Hahnel) (ZMHU), 1 ♂: (SMTD). 1 ♀: Manaus, 1886 (Hahnel) (ZMHU). *Rondônia,* vicinity of Cacaulândia, 10°32′S 62°48′W, 160–350 m (J. Kemner) (USNM), 1 ♂*: 23 Oct 1991, 1 ♀: 29 Oct 1991. *Pará,* 1 ♀: km 1,666 Cuiabá-Santarém highway (C. Callaghan) (AME). 1 ♀: Itaituba, Rio Tapajós, 1890 (Michael) (ZMHU). Belém, 2 ♀: (H. Bates) (BMNH), 1 ♂: (ZMHU), 1 ♀ (ZSM). "Amazon", 1 ♂: (H. Bates) (BMNH), 1 ♂, 1 ♀: (ZSM). GUYANA: 1 ♀: "Guyana" (Parish) (BMNH).

Etymology.—The species name is a euphonious anagram of "chaonitis," the name of a closely related species.

Diagnosis.—*Chalodeta chitinosa* has long been confused with and is most similar to *C. chaonitis* and *C. chlosine.* It has some dark shading proximal to the dorsal postdiscal bands, unlike *C. chlosine,* although this is less extensive than in *C. chaonitis,* lacks the greenish-brown distal coloration of *C. chaonitis* and typically has prominent alternating white and brown hindwing fringe elements. In *C. chlosine,* the hindwing fringe is always entirely white and in *C. chaonitis* it is pale brown with only faint dirty white fringe elements. Each of these three species has a slightly different configuration to the postdiscal forewing band. In *C. chitinosa* and *C. chlosine,* the postdiscal markings in cells Cu1 and Cu2 form an outwardly directed semicircle while in *C. chaonitis* they form a stepped outwardly directed line. The postdiscal forewing spot in cell R4+5 is also more distally positioned in *C. chlosine* than it is in *C. chaonitis* and *C. chitinosa.*

The genitalia of *C. chitinosa* are the most distinctive of all species in the group. The male genitalia have a straight instead of bifid posterior dorsal margin to the uncus, a broad posteriorly tapering upper valve process that has only two long spines at the tip and lacks a second spine-tipped dorsally elongate anterior process. The female genitalia have a smaller eighth abdominal sternite that forms a single smoother sclerotized plate with a more posteriorly elongate ostium bursae.

Biology.—Unknown.

Distribution.—*Chalodeta chitinosa* occurs from Venezuela to Bolivia and throughout Amazonian Brazil. It is unclear how widely it may be distributed in the Guianas, and only a single female in the BMNH is labeled from Guyana.

Chalodeta chaonitis (Hewitson 1866)
(Figs. 1G, H; 2D; 4C; 5)

Charis chaonitis Hewitson 1866: pl. 57, figs. 7, 8. TL: "Amazon." Lectotype male BMNH [designated].

Identification and taxonomy.—Typical forewing length: both sexes 13 mm. *Chalodeta chaonitis* appears to have been described from two males and one female, all of which reside in the BMNH and bear Hewitson "Amazon" labels. However, although the two male syntypes represent *C. chaonitis* as treated here, the female syntype represents *C. chitinosa* described above. Thus, the only labeled syntype male of *C. chaonitis* in the BMNH is designated as a lectotype. It bears the following labels: "Hewitson Coll./79-69./Charis/chaonitis. 1/ Amazon." and "Type." This lectotype is designated to fix and stabilize the identity of this species.

Chalodeta chaonitis differs from *C. chitinosa* and *C. chlosine,* which have previously been confused with it, by possessing distal greenish-brown dorsal coloration, extensive dark shading proximal to the dorsal postdiscal bands, an outwardly diagonal instead of semicircular portion to the forewing postdiscal band in cells Cu1 and Cu2,

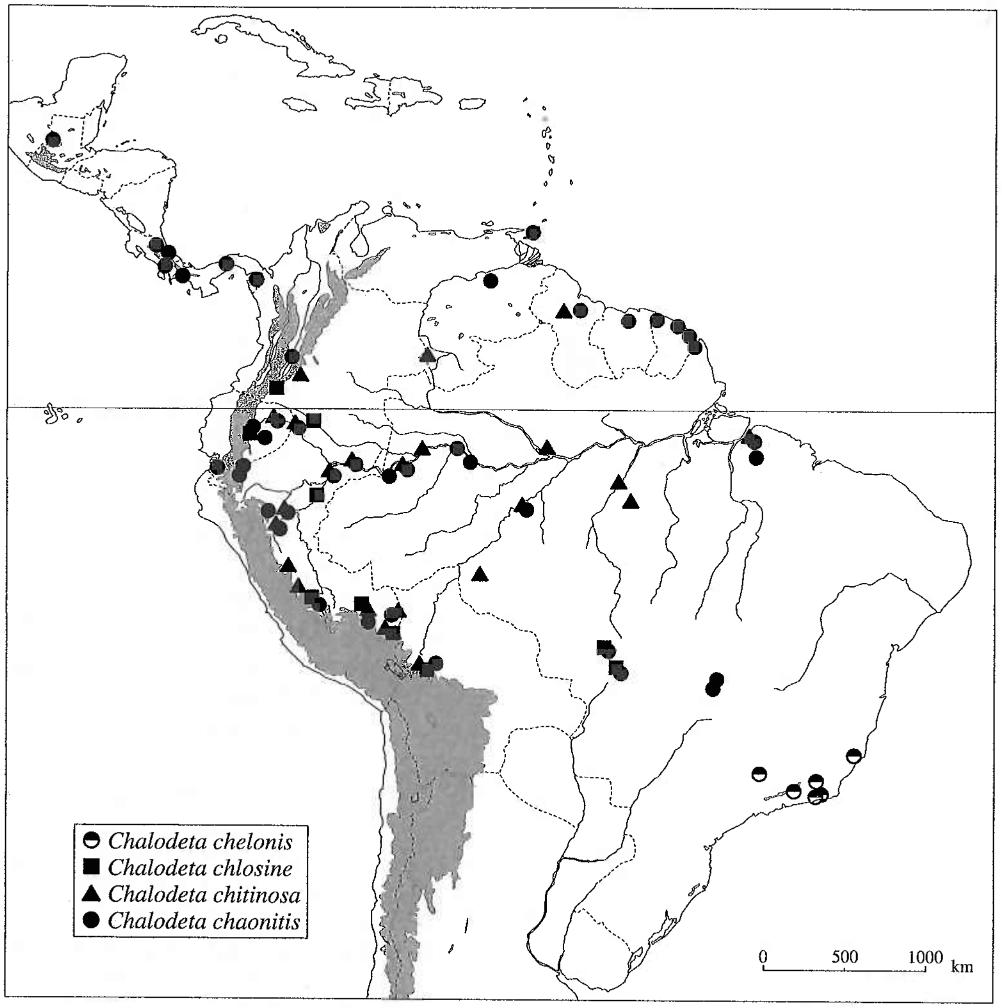

Fig. 5. Distributions of *Chalodeta chelonis* group species.

and a pale brown hindwing fringe with only weak dirty white elements. The upper valve process of the male genitalia possesses an elongate and upwardly curving posterior portion tipped with spines, and the eighth abdominal sternite of the female genitalia is divided into a heavily ribbed upper portion with the ostium bursae forming a separated ventral portion (unlike in *C. chitinosa*).

Biology.—DeVries (1997) reported finding aggregations of males perching in Ecuador along forest edges and in forest light gaps from 0.5 to 1 m above the ground between 1500 and 1530 hrs, however, these individuals may also be referrable to *C. chlosine* and *C. chitinosa. Bona fide* Ecuadorian males of *C. chaonitis* have been encountered feeding on low weedy Asteraceous flowers in secondary growth and attracted to canopy traps baited with rotting carrion in primary forest during the late afternoon (Hall and Willmott 2000). DeVries (1997) illustrated a mature larva and pupa of *C. chaonitis* reared from La Selva, Costa Rica. The larvae feed on flowers of *Miconia longifolia* (Melastomataceae) (DeVries et al. 1994).

Distribution.—This is the most widespread *chelonis* group species and ranges from Mexico to western Ecuador, the

Guianas, Amazon basin and Trinidad, and as far south as southern Brazil. The following additional localities are listed by de la Maza and de la Maza (1993) for MEXICO: *Chiapas,* No specific locality; by DeVries (1997) for COSTA RICA: *Heredia,* La Selva; *Puntarenas,* Palmar Norte; and by Barcant (1970) for TRINIDAD: Fondes Amandes. Since the report of this species in southern Mexico by de la Maza and de la Maza (1993) is not accompanied by an illustration, this record requires confirmation.

Material examined.—COSTA RICA: *Limón,* Guapiles 2 ♂ USNM. PANAMA: *Chiriquí,* No specific locality 1 ♀ BMNH; 1 ♀ ZMHU; *Canal Zone,* Cocoli 2 ♂, 1 ♀* USNM; *Darién,* Caña 2 ♂* USNM. VENEZUELA: *Bolívar,* La Vuelta, Río Caura 1 ♀ BMNH. COLOMBIA: *Huila,* Neiva 1 ♀ RPM (possibly mislabelled). ECUADOR: *El Oro,* nr. Pasaje 1 ♂ JHKW; *Sucumbíos,* Limoncocha 1 ♂ BD; *Napo,* Pano 1 ♂* JHKW; *Pastaza,* Sarayacu 1 ♂ ZMHU; *Morona-Santiago,* Bomboiza 1 ♂ JHKW; *Zamora-Chinchipe,* "Loja" 1 ♂ RPM; No locality data 1 ♂ BMNH. PERU: *Loreto,* Arcadia 2 ♂ USNM; Iquitos 1 ♂ BMNH; 1 ♂ SMTD; Pebas 1 ♂ ZMHU; *San Martín,* Río Chambirayacu, nr. Yurimaguas 1 ♂ BMNH; Juanjui 4 ♂ SMF; 1 ♂ RPM; Jepelacio 1 ♂ RPM; *Junín,* La Merced 1 ♂ BMNH; *Madre de Dios,* 10 km N. of Puerto Maldonado 1 ♂ USNM; 30 km S.W. of Puerto Maldonado 2 ♂ USNM; *Cuzco,* No specific locality 1 ♂ ZMHU. BOLIVIA: *La Paz,* Río Songo 3 ♂ BMNH; 3 ♂ ZMHU; 1 ♂ SMTD; Río Suapi 1 ♂ BMNH; Farinas 1 ♂ BMNH; Mapiri 1 ♂ ZSM; Yungas 3 ♂ BMNH; No specific locality 2 ♂ BMNH; No locality data 1 ♂ BMNH; 1 ♂ ZMHU; 1 ♂ ZSM; 1 ♂ SMF. BRAZIL: *Amazonas,* São Paulo de Olivença 5 ♂ BMNH; 1 ♂ ZMHU; 1 ♂ SMTD; 8 ♂ SMF; Río Tacana 1 ♂ SMTD; Fonteboa 1 ♂ BMNH; Tefé 3 ♂ BMNH; Manicoré 1 ♂ SMF; Parintins 1 ♂ BMNH; Upper Amazon 1 ♂ ZMHU; 3 ♂ BMNH; 1 ♂ SMTD; *Pará,* Belém 1 ♂ ZMHU; *Mato Grosso,* Cuiabá 4 ♂ BMNH; Melguira, 10 km S. of Diamantino 1 ♂ BMNH; No specific locality 1 ♂ ZMHU; *Distrito Federal,* Planaltina 1 ♂ USNM; Parque do Gama 1 ♂*, 1F USNM; *Goiás,* Vianópolis 1 ♂ SMF. GUYANA: No locality data 1 ♀ BMNH. SURINAM: No locality data 1 ♂ ZMHU. FRENCH GUIANA: *Saint Laurent du Maroni,* Saint Laurent du Maroni 1 ♂ BMNH; *Cayenne,* Cayenne 2 ♂ BMNH; 1 ♂ RPM; Sinnamary 1 ♂* USNM; Saint Georges 2 ♂ BMNH; No locality data 3 ♂, 1 ♀ BMNH. TRINIDAD: St. Annes 1 ♀ BMNH. No locality data 1 ♂ BMNH.

ACKNOWLEDGMENTS

I thank the following for giving me access to the riodinid collections in their care: P. Ackery (BMNH), B. Drummond (Florissant), M. Feyers (RPM), A. Hausmann (ZSM), W. Mey (ZMHU), L. and J. Miller (AME), W. Nässig (SMF), M. Nuss (SMTD), and R. Robbins (USNM). I thank the following for the financial assistance of field and museum research: Oxford University (Poulton Fund), Cambridge University (Christ's College), The Royal Entomological Society, Sigma Xi, Equafor, The National Geographic Society (Research and Exploration Grant #5751-96), the Smithsonian Institution (two Postdoctoral Fellowships), and The National Science Foundation (Biotic Surveys and Inventories Grant). I thank the Pontificia Universidad Católica, the Museo Nacional de Ciencias Naturales and INEFAN, in Quito, for arranging the necessary permits for research in Ecuador.

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