

REVISION OF *CHLOROSTRYMON* CLENCH AND DESCRIPTION OF TWO NEW AUSTRAL NEOTROPICAL SPECIES (LYCAENIDAE)

KURT JOHNSON

Department of Entomology, American Museum of Natural History,
Central Park West at 79th Street, New York, New York 10024

ABSTRACT. Neotropical *Chlorostrymon* Clench is revised to comprise six species, including the austral *C. patagonia*, new species (Patagonian Steppe biotic province, Argentina); *C. chileana*, new species (Central Valley biotic province, Chile); and *C. kuscheli* (Ureta), new combination (N Andean Cordillera-High Andean Plateau biotic provinces, Chile). Three additional congeners are *C. simaethis* (Drury) (*Thecla simaethis jago* Comstock & Huntington, new synonym, Antilles; *C. s. sarita* (Skinner), *C. s. rosario* Nicolay, new synonym, mainland Neotropics), *C. telea* (Hewitson) (Central and South America), and *C. maesites* (Herrich-Schaeffer) (Antilles). Differentiating characters include female genitalia. The Andes have produced three distinctive species isolated in high montane and austral regions.

Additional key words: Eumaeini, systematics, biogeography.

Chlorostrymon was erected by Clench (1961) to include three familiar and widely distributed New World hairstreaks: *C. simaethis* (Drury), *C. telea* (Hewitson), and *C. maesites* (Herrich-Schaeffer). Subsequently, Nicolay (1980) elucidated the original generic description, and Clench (1963) further distinguished the Antillean species. *Chlorostrymon* species are distinctly marked, and aside from the naming of some subspecies (Skinner 1898, Stallings & Turner 1947, Comstock & Huntington 1943, Nicolay 1980), the genus has appeared to be one of the best known and taxonomically stable in Eumaeini (Nicolay 1980).

I have assembled and studied eumaeine samples from the austral Neotropics (Johnson et al. 1986, 1988, Johnson 1987, 1989, Johnson in press). These specimens derived from unsorted and unincorporated material principally at the British Museum (Natural History) (BMNH), and Museum National d'Histoire Naturelle, Paris (MNHN). Specimens were also provided by the Central Entomological Collection, University of Chile, Santiago (CECUC), and the Museo Nacional de Historia Natural, Chile, Santiago (MNHNC).

Three distinctive austral South American members of *Chlorostrymon* are apparent: *Thecla kuscheli* Ureta (1949), hitherto not examined by northern workers, and two new species. Unique characters in these austral populations require expansion of Nicolay's (1980) redescription of the genus. I revise *Chlorostrymon* to comprise six species, including these newly discovered austral ones.

Because of peculiar intraspecific variation, there is little utility in pursuing extensive subspecific division of the three familiar *Chlorostrymon* species (Nicolay 1980). Accordingly, I synonymize some sub-

species. I reduce subspecies in *C. simaethis* to two (Antillean and mainland, consistent with the distribution of *C. maesites* and *C. telea*), and reduce subspecies in *C. maesites* to the nominate. I treat *C. maesites* and *C. telea* as species based on their traditionally cited features (Comstock & Huntington 1943, Klots 1951, Clench 1961, 1964, Riley 1975, Thorne 1975, Pyle 1981, Opler & Krizek 1986, Scott 1986) as well as a statistically significant difference in their female genitalia.

METHODS AND MATERIALS

I follow Clench (1961) in abbreviating dorsal hind- and forewing to DHW and DFW, respectively, and ventral hind- and forewing to VHW and VFW, respectively. I also use TL for type locality.

Distribution data derive from specimens at the Allyn Museum of Entomology-Florida State Museum (AME), American Museum of Natural History (AMNH), BMNH, Carnegie Museum of Natural History (CMNH), CECUC, Instituto Miguel Lillo (Tucumán, Argentina) (IML), Milwaukee Public Museum (MPM), MNHN, and MNHNC. To study consistency of morphological characters, I dissected genitalia of males and females from localities spanning distribution of each taxon, as well as more extensive series available from particular sites. Such material is listed for each taxonomic entry.

Chlorostrymon Clench (Figs. 1-6)

Chlorostrymon Clench (1961:189). Clench (1963:248; 1976:269; 1977:186), dos Passos (1970:27), Brown & Heineman (1971:4; 1972:230), Emmel & Emmel (1973:51), Ferris (1974:278), Riley (1975:100), Thorne (1975:277), Ross (1976:188), Nicolay (1980:253), Miller & Brown (1981:99; 1983:54), Pyle (1981:464), Schwartz & Jimenez (1982:8), Garth & Tilden (1986:189), Opler & Krizek (1986:88), Scott (1986:359), Llorente-Bousquets et al. (1986:25), Schwartz (1989).

Diagnosis. In wings (Figs. 1-3), DFW and DHW are variously iridescent blue to violet like many Eumaeini (though lacking DFW male androconia as in some Eumaeini), but *Chlorostrymon* is distinctive in its brilliant green (often chartreuse) ventral ground color; VHW with brilliant white to silver bands (usually across entire wing) and lavish reddish brown or gray suffusion across limbal area; and VFW post-median silver-white or blackish bands. These markings are distinctive in overall pattern regardless of occasional reduction, and can be confused only with *Cyanophrys crethona* (Kaye), as discussed later under *Chlorostrymon simaethis*. *Chlorostrymon* genitalia (Figs. 5, 6) differ from other Eumaeini by the male aedeagus having its terminus separated from the rest of the shaft by a transparent juncture, but conjoined internally by the elongate, pointed cornutus, as discussed further on.

Type species. *Papilio simaethis* Drury (1773) by original description.

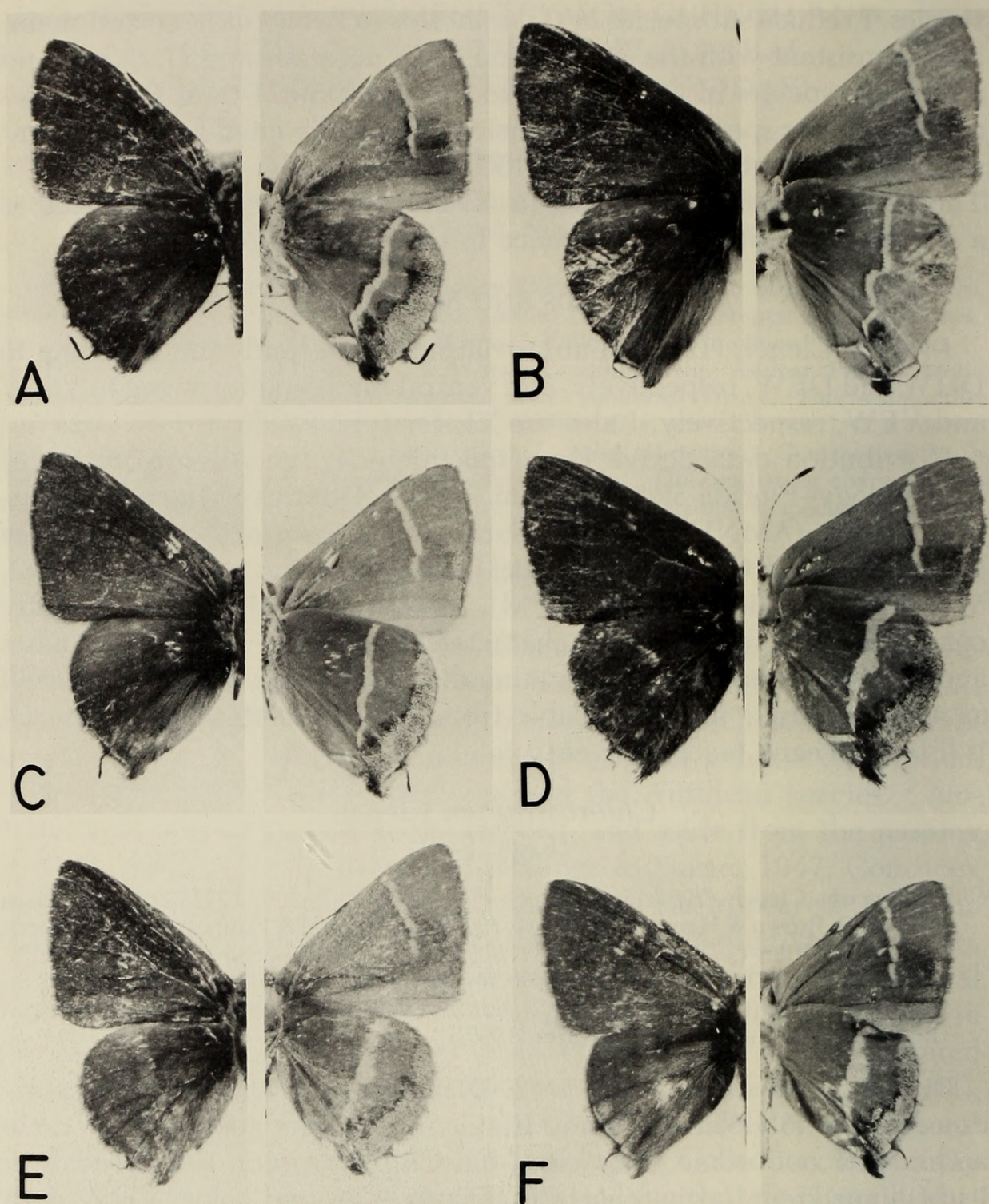


FIG. 1. Adult male *Chlorostrymon simaethis* (left, upper surface; right, under surface) (AMNH except as noted). A, *C. s. simaethis*, proximate topotype (TL given as generalized locality), Basseterre, St. Kitts. B, *Thecla s. jago*, holotype. C, *C. s. sarita*, proximate topotype, San Antonio, Texas, 29 October 1933. D, *C. s. sarita*, Caripito, Venezuela, 1 July 1913. E, *C. s. sarita*, Callao, Lima Department, Peru (BMNH). F, *C. s. sarita*, Arroyo San Pedro, Jujuy Province, Argentina, 17 July 1978.

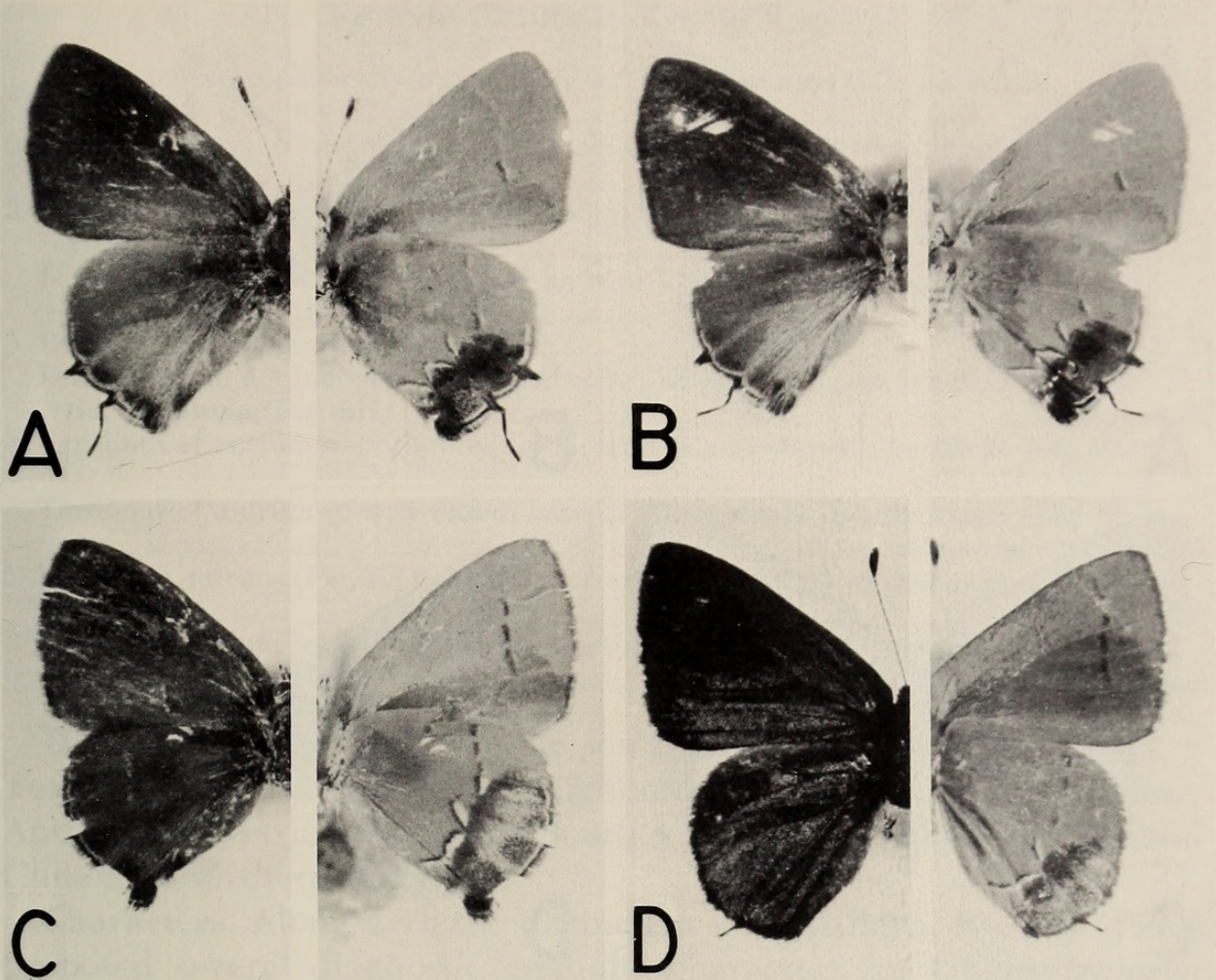


FIG. 2. Adult female *Chlorostyrimon telea* and *C. maesites* (left, upper surface; right, under surface) (AMNH except as noted). A, *C. telea*, proximate topotype, Obidos, Amazonas State, Brazil. B, *C. telea*, Villa Ana, Santa Fe Province, Argentina, 26 February 1927 (BMNH). C, *C. maesites*, proximate topotype, Guantanamo Bay, Cuba. D, *Thecla m. clenchi*, allotype.

Diversity. Previously comprising the species *simaethis*, *telea*, and *maesites*; hereafter, these species, *kuscheli*, and the two new species. All are distinguished in the following key. A key character is not considered “distinctive” if obscure.

Wing Character Key to Species

- 1 VHW postdiscal band distinctive across entire wing 2
- VHW postdiscal band distinctive only costad vein M₃ or caudad vein M₃ 3
- 2 VFW postmedian line white or silver 5
- VFW postmedian line black (without white) or faint to absent 4
- 3 VHW postdiscal band distinctive only costad vein M₃ *chileana*, new species
- VHW postdiscal band distinctive only caudad vein M₃ and with the costal fold of forewing extremely wide (≥1 mm) and rufous colored *patagonia*, new species
- 4 VHW limbal patch extending costad to M₁; postmedian line forming a distinct “W”; VFW postmedian line very faint to absent *telea*
- VHW limbal patch extending costad to M₃; postmedian line not forming a “W”; VFW postmedian line black *maesites*

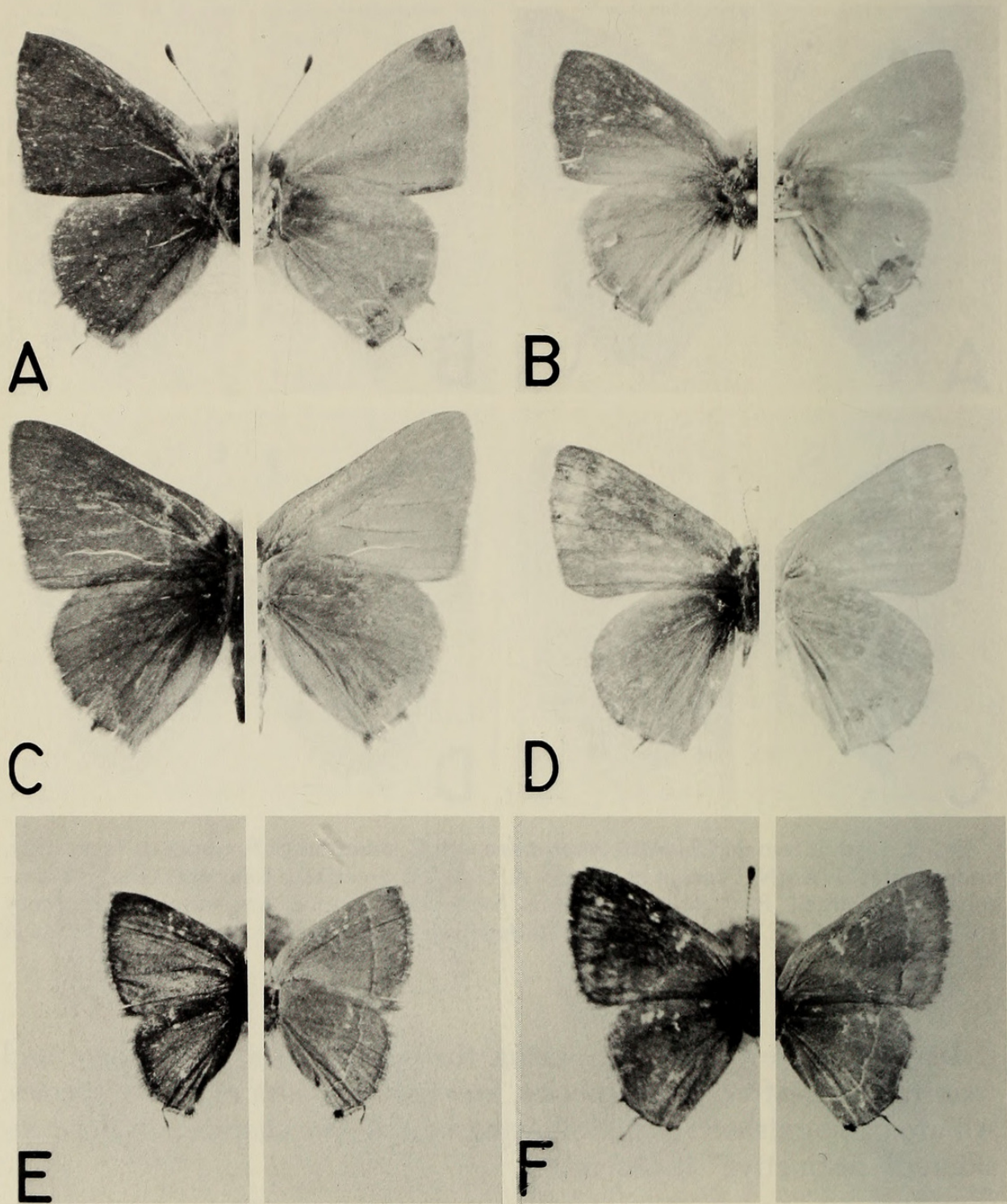


FIG. 3. Adults of austral South American *Chlorostrymon* (left, upper surface; right, under surface). A, *C. patagonia*, allotype male. B, *C. patagonia*, holotype female. C, *C. chileana*, allotype male. D, *C. chileana*, holotype female. E, *C. kuscheli*, paratype male. F, *C. kuscheli*, female, data in text.

5 VFW, VHW band wide, silver-white; DHW with uniformly colored ground *simaethis*
VFW, VHW band extremely thin, white; DHW with bright rufous limbal patch
..... *kuscheli*, new combination

Wing characters are correlated with characters of the female genitalia. Since the latter have not been previously treated, the following key uses features of the ductus bursae and cervix bursae.

Female Genitalic Key to Species

- 1 Ductus bursae cephalically inclined 60–90°; cervix bursae with two dorsal sclerotized pads (Fig. 6A–F) *simaethis*
 Ductus bursae inclined <60° or not at all; cervix bursae without sclerotized pads (Fig. 6G–O) 2
- 2 Ductus bursae with cephalic tubular ductus and caudally flared antrum (Fig. 6G–I) 3
 Ductus bursae with caudally flared antrum only, antrum connected directly to corpus bursae (Fig. 6N, O) 4
- 3 Ductus bursae inclined 30–60° 5
 Ductus bursae not inclined or inclined <20°; length of antrum less than length of ductus bursae (Fig. 6H, I) *maesites*
- 4 Terminus of antrum only slightly flared; lamella postvaginalis parabolic (Fig. 6O) *chileana*, new species
 Terminus of antrum greatly flared; lamella postvaginalis distally lobate (Fig. 6N) *patagonia*, new species
- 5 Length of antrum (Fig. 6A) equalling or exceeding length of ductus bursae (Fig. 6G) *telea*
 Length of antrum less than length of ductus bursae (Fig. 6M) *kuscheli*, new combination

Distribution (Fig. 4). Extreme southern United States (S Florida, S Texas to Baja California and neighboring areas), Greater and Lesser Antilles and Mexico, S through South America to northern and central Chile and northern Patagonia.

Characters. Along with the distinctive wing pattern, Nicolay (1980) proposed several diagnostic genitalic characters for *Chlorostrymon*. From my analysis of 121 male and 138 female genitalia, one character of male genitalia appears common to all *Chlorostrymon* taxa: separation of aedeagal terminus and shaft by a stripe of transparent sclerotization conjoined internally by the single elongate cornutus (Nicolay 1980:225) (Fig. 5). Because of great structural divergence of male genitalia in Eumaeini, other male genitalic characters of *Chlorostrymon* appear less diagnostic.

In the female genitalia, Nicolay distinguished *Chlorostrymon* from other Eumaeini by the cephalic one-quarter of the ductus bursae dorsally inclining ca. 90°, and by two sclerotized pads occurring on the dorsum of the cervix bursae (Fig. 6A–F). However, my samples indicate that only *C. simaethis*, the type species, has these characters.

Phylogenetic position. Search for the sister group of *Chlorostrymon* (Hennig 1966) appears difficult and will probably be resolved only by further study of the many undescribed Eumaeini. Considering *Chlorostrymon*'s distinctive wing characters, and the wide geographic range of its two sympatric congeners, the genus is probably very old. The distinctive *Chlorostrymon* aedeagus may occur in other as yet undescribed or unstudied Eumaeini, and be a key to recognizing the out-group. In other respects, male and female *Chlorostrymon* genitalia resemble taxa of *Electrostrymon* Clench (type species *Papilio endym-*



FIG. 4. Geographic ranges of *Chlorostyrmom* species. A, United States and northern Mexico distributions of *C. simaethis* (vertical hatches), *C. telea* (stippled), and *C. maesites* (black), from localities assembled by Scott (1986) and Opler and Krizek (1986). B, Neotropical and austral distributions (specimens in AMNH except as noted). Numbers 1-27: sympatric Neotropical localities of *C. simaethis* and *C. telea* (mainland) or *C. maesites* (Antilles). Only localities not mentioned in text are given here. 1, San Francisco, Tamaulipas State, Mexico. 4, Guatemala City, Guatemala. 5, Havana, Cuba. 6, Guantanamo, Cuba. 9, Turrialba, Costa Rica. 10, Coamo Springs, Puerto Rico. 11, St. Vincent, Lesser Antilles. 12, Port-of-Spain, Trinidad. 15, Barta District, Guyana. 17, Pernambuco, Brazil (AMNH, BMNH). 19, Espirito Santo, Brazil (MPM, BMNH). 20, Callao, Lima Department, Peru (BMNH). 22, Campo Grande, Mato Grosso State, Brazil (BMNH). 27, Óbidos, Amazonas State, Brazil. Numbers 28-30: austral species distributions and biotic provinces (BP): 28 & cross hatches, *C. chiliana*, Cental Valley BP. 29 & stippling, *C. patagonia*, Patagonian Steppe BP. 30 & vertical hatches, *C. kuscheli* (dark hatches, Northern Andean Cordillera BP; light, High Plateau BP).

ion Fabricius). However, *Electrostrymon* has not been revised and, since Clench (1961, 1963) never listed the taxa it included, the genus has been subject to various interpretations (Barcant 1970, Riley 1975, Johnson & Matusik 1988). Johnson and Matusik (1988) suggested the Barcant and Riley treatments of *Electrostrymon* were, at least, diphyletic. To complicate matters, the short, non-inclined female genitalia of *Chlorostrymon maesites* and the new austral *Chlorostrymon* species (Fig. 6H, I, M–O) resemble those of at least two groups of Eumaeini whose wing patterns differ greatly: the taxa-rich “*Thecla celmus*” and “*Thecla phrutus*” groups (Johnson 1986, Johnson & Matusik 1988), and *Parrhasius* Hübner and *Michaelus* Nicolay (Nicolay 1979). Without a designated outgroup, or a basis for describing outstate characters, phylogenetic inference concerning *Chlorostrymon* taxa is too speculative.

Conspecificity of *Chlorostrymon telea* and *C. maesites*. This has been much debated (Riley 1975, Clench 1961, Opler & Krizek 1986, Scott 1986). Some early workers, and recently Scott (1986), proposed the synonymy of the two taxa. Genitalic study indicates that, along with traditionally cited pattern differences, female genitalia of the two taxa differ consistently and distinctly (Female Genitalic Key, Fig. 6, and discussion under *C. telea*). Accordingly, these taxa are treated as distinct species here.

Temporal and spatial distribution. Rarity of *Chlorostrymon* taxa, compared to many other hairstreak butterflies (Opler & Krizek 1986), is reflected in museum samples. There is a correlation between *Chlorostrymon* occurrence (particularly sympatry of *C. simaethis* with *C. telea* or *C. maesites*) and location of major collectors. Study of such samples indicates *Chlorostrymon* taxa are local, but sometimes locally common. Major historical sources of *Chlorostrymon* specimens warrant mention because they explain the origin of most data on the genus, and have allowed study of *C. simaethis* and *C. telea* or *C. maesites* from numerous areas of sympatry (Fig. 4). Such collectors, common collecting localities, and depositories are listed with Fig. 4 locality numbers as follows:

(2, 3) Mexico: Presidio, Cordoba, Vera Cruz State, Colima, Colima State; N. Hoffman (AMNH). (7) Jamaica: B. Heineman (AMNH). (8) Hispaniola: A. Schwartz (private, AME), D. Matusik (private, FMNH, AMNH, CMNH), K. Johnson (AMNH, AME). (12) Trinidad-Tobago: R. Rozycki (AMNH). (13) Panama: collections of AMNH Research Station (AMNH). (15) Venezuela: Caripito; collections of New York Zoological Society (AMNH). (16) French Guiana: northern localities; expedition collections of MNHN (MNHN). (18) Brazil: Minas Gerais; collections of J. F. & W. Zikán (Instituto Oswaldo Cruz, Guanabara). (21) Bolivia: eastern localities; J. Steinbach (CMNH, BMNH). (23) Paraguay: Santissia-Trinidad; B. Podtiaguin (AMNH). (24) Brazil: Rio de Janeiro vicinity; P. Gagarin (MPM). (25, 26) Brazil: Curitiba, Paraná State, Pelotas, Rio Grande del Sol State; C. Biezanko (BMNH, AMNH). (29) Argentina: northwestern localities; R. Eisele (AME, AMNH), B. MacPherson (AMNH), K. Hayward and N. Giacomelli (BMNH, IML). Austral South America: Pata-

gonia; C. Larsen (MNHN). (28) Chile (Valparaíso, Santiago); R. Martin (MNHN). General collections of CECUC, MNHNC.

Chlorostrymon simaethis (Drury)

(Figs. 1, 5A–D, 6A–F)

Papilio simaethis Drury (1773:3; 1770:pl. 1, fig. 3) (name given in index published in 1773).

Mitoura simaethis: Dyar (1903:38).

Tmolus simaethis: Kaye (1914:567).

Chalybs simaethis: Kaye (1921:103), Barcant (1970:251).

Thecla simaethis: Kirby (1871:398), Dewitz (1877:233, pl. 1), Godman & Salvin (1879–1901:720, pl. 81), Moeschler (1889:301), Ståhl (1882:93), Gundlach (1887:622), Draudt (1919:798, pl. 158,f), Barnes & Benjamin (1923:17), Hall (1925:188; 1936:276), Kaye (1926:462), Holland (1931:232), Wolcott (1936:403), Hoffman (1941:716), Schweizer & Webster Kay (1941:19), Comstock & Huntington (1943:58, 73; 1961:54; 1963:190), Beatty (1944:157), Comstock (1944:488), Avinoff & Shoumatoff (1946:284), Zikán & Zikán (1968:57), Hayward (1973:157).

Thecla lycus Skinner (1898:48) (takes authorship of “*lycus* Hübner” Skinner 1898:48) (misspelling, misattribution of author, not *licus* Hübner 1807:pl. 150, not *lydus* Hübner 1818:75, no. 753), Dyar (1903:36), Draudt (1931:798), Barnes & McDunnough (1917:13) (all follow Skinner, in error), Barnes & Benjamin (1923:17), Comstock & Huntington (1958–64 [1963]:190) (both cite Skinner 1898 as an error).

Thecla sarita Skinner (1895:112; 1898:48), Barnes & McDunnough (1917:3), Barnes & Benjamin (1923:17), McDunnough (1938:24), Stallings & Turner (1947:40) (the last make *sarita* a subspecies of *simaethis*).

Strymon simaethis: Barnes & McDunnough (1917:13), Bates (1935:194), McDunnough (1938:24), Stallings & Turner (1947:40), Klots (1951:139), Ziegler 1961:22 (as “*Strymon*”), Lipes (1961:56), dos Passos (1964:56), Lewis (1974:67).

Chlorostrymon simaethis: Clench (1961:189; 1964:248; 1976:269; 1977:192), dos Passos (1970:27), Brown & Heineman (1971:230), Emmel & Emmel (1973:51), Riley (1975:100), Thorne (1975:277), Ross (1976:188), Nicolay (1980:253), Miller & Brown (1981:99; 1983:54), Pyle (1981:465), Schwartz & Jimenez (1982:8), Garth & Tilden (1986:189), Opler & Krizek (1986:89), Scott (1986:359), Llorente-Bousquets et al. (1986:25), Schwartz (1989).

Diagnosis. DFW, DHW brown, strongly suffused with iridescent purple (much duller on females); VFW, VHW ground chartreuse, VHW postdiscal band white to pearly white, distinctive across entire wing; VFW postmedian line, thick, white or pearly white (Fig. 1). Male genitalia with vincular arc, valvae, saccus and aedeagus all more elongate than congeners (and aedeagus not ventroterminally declined) (Fig. 5A–D); brush organs moderately dense, articulated to small basal membrane along each ventrocephalic edge of vincular arc (Fig. 5J); female genitalia with ductus bursae cephalically inclined 90°, cervix bursae with two dorsal sclerotized pads, papillae anales terminally lobate, apophyses of papillae anales short (not extending entire length of ductus bursae) (Fig. 6A–F).

Types. *Papilio simaethis* type reported lost (Miller & Brown 1981); TL “St. Christopher’s” (=St. Kitts, Riley 1975). *Chlorostrymon simaethis* is unambiguous in facies; there is no need for a neotype. *Thecla lycus* type and TL unknown (Comstock & Huntington 1961).

Distribution. In United States, extreme S California, Arizona, Texas, and Florida; Baja California, throughout Mexico and Central America, most of Greater and Lesser Antilles; in South America, SW to central Peru, E over entire continent except Amazon basin, SE along Brazilian coast, and W from SE Brazil to Paraguay and E Bolivia, S to NW Argentina (Fig. 4). Scott (1986) portrays the Baja California distribution as transient. However, since Opler and Krizek (1986) document recent establishment of the species in Florida, the large series of specimens from numerous Baja California locales (AMNH, CMNH) may also represent resident populations. John Brown (San Diego Museum, pers. comm.) suspects that marked genitalic variation between Baja California populations may reflect a flux of resident and transient populations.

Superficially similar noncongeners. As noted in Diagnosis, *Cyanophrys crethona* (Kaye) somewhat resembles *C. simaethis* because both have lavish VHW limbal suffusion. The former is much larger (forewing base to apex in the male 15 mm, in the female 17 mm, compared with 12 and 14 mm for *simaethis*; Riley 1975); its DFW and DHW are deep iridescent blue with wide black borders; and its VHW and VFW are deep lime green, with VHW postdiscal band continuous basad discal cell, disjunct costad.

Variability. Klots (1951) and Nicolay (1980) noted that wing pattern variability in *Chlorostrymon simaethis* caused most of its subspecies to be ill-defined geographically. Except for two major allopatric segregations, subspecies are dropped here by placement in appropriate synonymies. Below, I summarize these synonymies and the character variation on which they are based.

1. Nominate *C. s. simaethis* (Fig. 1A) and Jamaican *C. s. jago* (*Thecla s. jago* Comstock & Huntington, 1943:74, pl. 1, fig. 7; holotype male, Fig. 1B, allotype female, both AMNH, TL Dunrobin District, Mandeville, Manchester, Jamaica), **NEW SYNONYMY.**

By virtue of its type locality, nominate *Chlorostrymon s. simaethis* has historically been considered restricted to the Antilles. However, while *C. simaethis* was still poorly known from the Antilles, Comstock and Huntington (1943) described subspecies *jago* from Jamaica. Later, Riley (1975) noted that wing characters of *jago* duplicated those of *C. simaethis* occurring on Hispaniola.

Compared to mainland populations, Antillean *C. simaethis* display some homogenous wing characters (Fig. 7A), but Jamaican specimens are no more distinct than other Antillean populations. Female genitalia of Jamaican specimens have a widely flared, elongate antrum (Fig. 6A). However, equally distinctive innovations appear in other Antillean *C. simaethis*: Virgin Islands specimens show a distinctively narrow and elongate ductus and antrum; Hispaniola specimens have a markedly constricted genital plate. Male genitalia also have numerous localized innovations, including a cephalically elongated vinculum in Jamaica (Fig. 5A), an elongate, narrow, valve in Puerto Rico, and a wide, blunt-ended valve in Hispaniola. Genitalia of Hispaniolan females most resemble Cuban females; genitalia of Hispaniolan males most resemble St. Vincent males. Such genitalic variation in Antillean *C. simaethis* makes *jago* appear no more distinct than other Antillean populations. Further, there is no distinctive character correlation between *C. simaethis* of Jamaica and that of southern Hispaniola, which, if present, would have biogeographic significance (Schwartz 1989, Schwartz et al. 1984, 1986a, 1986b, Johnson

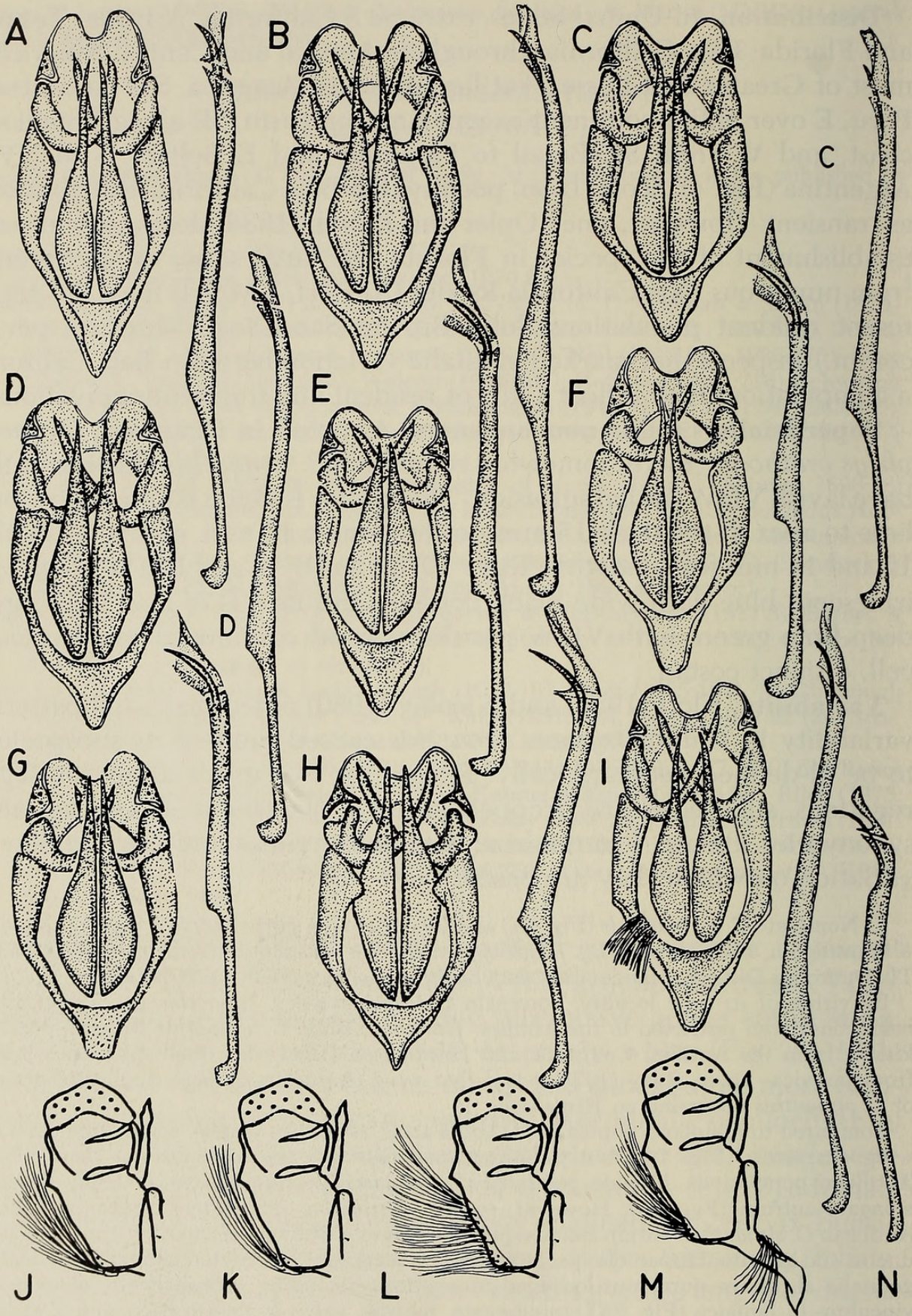


FIG. 5. Male genitalia (A-I, N) and brush organs (J-M) of *Chlorostrymon*. Genitalia shown in ventral view at left without aedeagus, aedeagus in lateral view at right (specimens in AMNH unless otherwise noted here or in text). A, *Thecla simaethis jago*, holotype. B, C, *simaethis sarita*, proximate topotype, San Antonio, Texas, 29 October 1933. C, C. s. *simaethis*, proximate topotype, Basseterre, St. Kitts. D, C. s. *sarita*, Caripito, Venezuela.

& Matusik 1988). Description of subspecies from Antillean populations would invite an inflated trinomial nomenclature on the mainland. **Dissections examined** (all AMNH). *C. s. simaethis*: CUBA: Santiago (♀), Havana (♂), Guantanamo Bay (♂, ♀). DOMINICAN REPUBLIC: El Numero, Barahona Province, 3 July 1986 (3 ♂, 2 ♀). HAITI: Petionville, 9 May 1930 (♀), 24–29 January 1922 (♂). LESSER ANTILLES: St. Vincent (♂, ♀); Dominica, Canefields, 1–8 December 1933 (4 ♂, 16 ♀), October 1919 (♀); St. Kitts, Basseterre (♂, ♀). UNITED STATES: Puerto Rico, Cuamo Springs, 26 December 1914 (♂); Virgin Islands, St. Croix, 14 March 1951 (5 ♂, 6 ♀). *C. s. jago*: JAMAICA: primary types, paratypes with same data except 23 December 1919 (♂), 28 January 1919 (♀), 4, 22, 28 December 1919 (3 ♀), 4 November 1919 (♀), Mt. Diablo, 5 March 1951 (♂), Constant Springs, 4 January 1924 (3 ♀).

2. *C. s. sarita* (Skinner 1895:112; holotype male, CMNH, TL Comal Co., Texas) (Figs. 1C, 5B, 6B) and *C. s. rosario* (Nicolay 1980:254; holotype male and 10 paratypes in AME, TL La Kenedy, Pichincha, Ecuador; 1 paratype, S. Nicolay Collection, same locality; allotype female, San Bartolo, Ecuador, AME), **NEW SYNONYMY**.

Subspecies *sarita* has usually been characterized by generally straight VHW band (poised perpendicular or slightly slanted costad FW inner margin), and with discal area of band sometimes distally produced (Fig. 1). Stallings and Turner (1947) presented data recommending use of *C. s. sarita* for populations extending from the SW United States into Mexico. Subsequently, *C. s. sarita* was applied southward into Central America (Llorente-Bousquets et al. 1986) and South America (Nicolay 1980). Nicolay (1980) also described a new subspecies (*C. s. rosario*) from then unique Ecuadorian specimens. Subsequently, however, numerous variable series of *C. simaethis* have been accumulated from Ecuador (Banós: AMNH, CMNH; Aguarico, Duran, Latas, Mishahualli: AMNH) and the species taken southward in Peru (AMNH, BMNH).

Mainland *C. simaethis* are generally distinct from Antillean populations (Fig. 7A), and notably high frequencies of wing characters occur in some regional mainland populations (Fig. 7A). Though northern populations usually have a more uniform hindwing band, a few (notably S Texas and insular montane Vera Cruz and Guerrero in Mexico) show extreme swelling of the discal area of the VHW band. This trait becomes much more common in South America (Figs. 1D–F, 7A) but the distinction is obviated by blending in the Panamanian isthmus region.

In contrast to haphazard local genitalic variation in Antillean *C. simaethis*, genitalic characteristics in both sexes of mainland *C. s. sarita* are often regional. Homogeneity is most common in contiguous lowland regions and appears more varied in disjunct or high montane areas. Male and female genitalia are most uniform from S Texas S across Mexico (Figs. 5B, 6B) with variation increasing in specimens from S California-Baja California, and Guatemala S through Panama. Males from S California-Baja California exhibit an elongate vinculum, and females an unusually wide ductus (width $\frac{1}{2}$ that of lamella; normally about $\frac{1}{3}$). From Guatemala S through Panama, females are more locally variable in antrimal width and ductus length, and males more variable in valval width, terminal recurvature and saccus length. In South America, males have more distally shouldered valvae which are less terminally elongate or recurved. The last trait is strongest in populations from Colombia E across the Guyana shield (Fig. 5D). Populations S of the Amazon basin, SE Brazil to NW Argentina, show more elongation in the valve but not increased recurvature. In South American females the antrum is usually outstanding and greatly flared (most often from about half the distance between the lamellar termini and the

←
E, *Thecla telea*, holotype. F, *C. maesites*, Nicoll's Town, North Andros Island, Bahamas. G, *Thecla maesites clenchi*, holotype. H, *C. patagonia*, allotype (MNHN). I, *P. chileana*, allotype (MNHN), with saccal brush organ. Brush organs shown in diagrammatic lateral view from vinculum to labides including abutment of anchoring membrane. J, *C. simaethis*. K, *C. telea* and *C. maesites*. L, *C. patagonia*. M, *C. chileana* (including saccus and saccal brush organ). N, Aedeagus of *C. kuscheli* paratype male (CECUC).

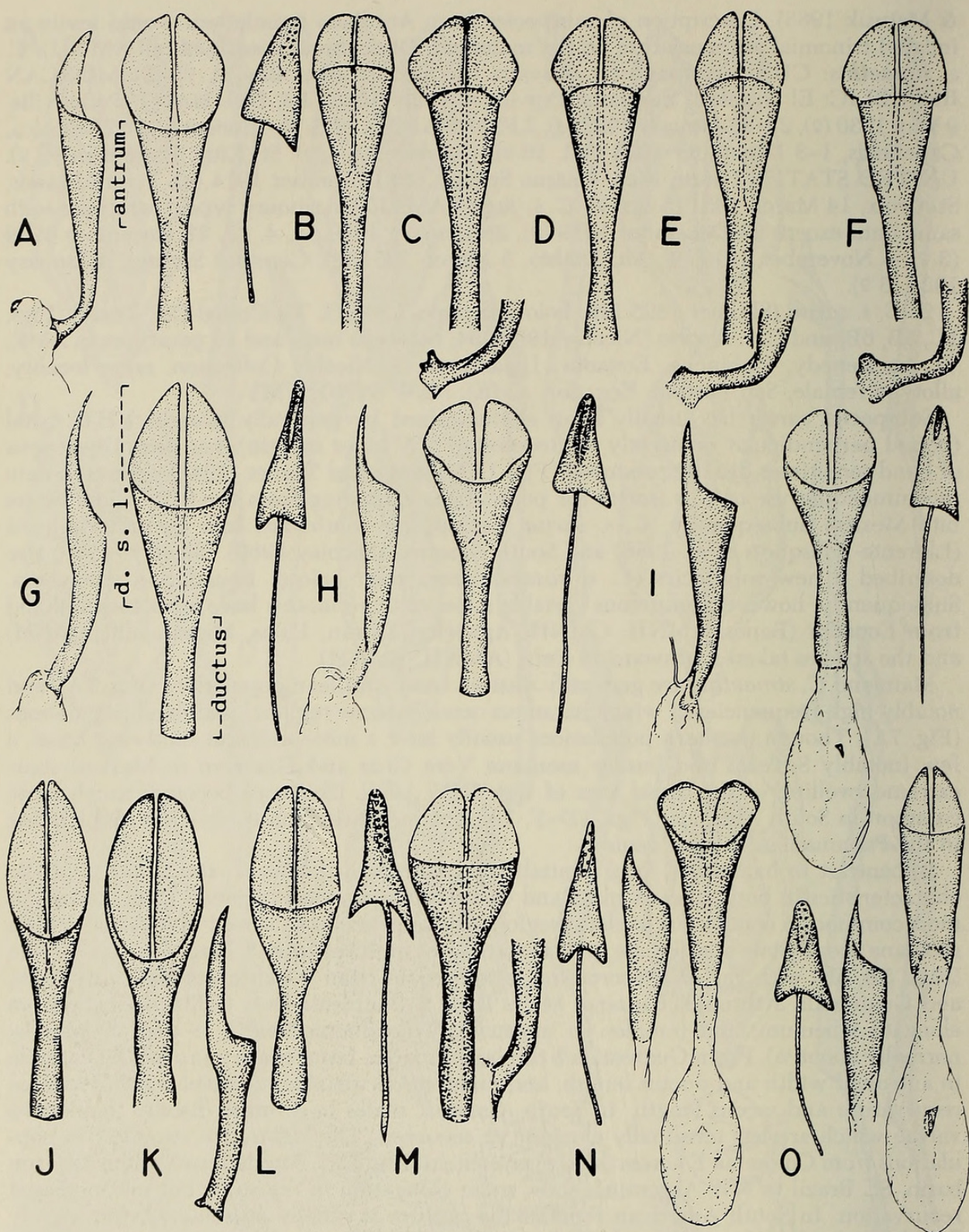


FIG. 6. Female genitalia of *Chlorostrymon*. Unless otherwise indicated, lateral view at left; ventral view at center (antrum indicated in A; dorsal suture line, d.s.l., and ductus indicated in G); lateral view of papillae anales and their apophyses at right (specimens in AMNH unless indicated otherwise here or in text). A, *Thecla simaethis jago*, allotype. B-F, *Chlorostrymon simaethis sarita*, proximate topotype, San Antonio, Texas, 29 October 1933 (ventral only, with lateral view of cephalic inclination in C, E, F). C, *C. s. simaethis*, proximate topotype, Basseterre, St. Kitts. D, *C. s. sarita*, Caripito, Venezuela. E, *C. s. sarita*, Balsapuerto, Huanuco Department, Peru. F, *C. s. sarita*, La Rioja, La Rioja Province, Argentina. G, *C. telea*, proximate topotype, Obidos, Amazonas State, Brazil. H, *C. maesites*, proximate topotype, Guantanamo, Cuba. I, *Thecla maesites clenchi*, allotype.

cephalic area where the ductus is dorsally inclined) (Fig. 6D-F). Variation from this ground plan is usually limited to difference in ductal length before and after the dorsal inclination. Most notably, isolated montane Peruvian populations have the ductus more elongate on both sides of the dorsal inclination (Fig. 6E), and Colombian specimens have a decreased dorsal inclination. The numerous high montane populations in Ecuador show extreme local variation.

In conclusion, some mainland regions evidence certain distinctive characters, but overall contiguity suggests validity of a single name: *C. s. sarita*. Unless numerous subspecies are recognized in South America, *C. s. rosario* is best considered a synonym of *C. s. sarita*. **Dissections examined** (all AMNH). *C. s. sarita*: ARGENTINA: La Rioja Province, La Rioja (2 ♂, 1 ♀); Salta Province, Yariquarenda (1 ♂, 2 ♀), Agua Blanca (2 ♂, 1 ♀), Mosconi (2 ♂, 2 ♀), Tartagal (1 ♂, 1 ♀), La Merced (1 ♂, 1 ♀); Jujuy Province, San Pedro (2 ♂, 2 ♀), Rio Lazares (1 ♂, 1 ♀). BOLIVIA: Rio Surutu, 350 m, E Bolivia (1 ♂, 1 ♀). BRAZIL: highlands nr. Massaranduba Blumenau (♂); Annaburg, St. Catarina (♂). COLOMBIA: Cauca Valley, 3200 ft (975 m), 25 January 1935 (3 ♀). COSTA RICA: Turrialba, 29 May 1946 (♂, ♀). ECUADOR: Banós, February 1939 (6 ♂, 2 ♀); Duran, 400 ft (122 m), 24 June 1914 (1 ♂, 1 ♀); Aguarico, November 1979 (8 ♂, 6 ♀), Mishahualli (♂); Latas, Oriente (♀). GUATEMALA: Guatemala City (♂, ♀). GUYANA: "British Guiana" (♂); Bartica District, Bartica (♂). MEXICO: Baja California, Arroyo del Refugio, 5 May 1935 (2 ♂, 3 ♀); Arroyo del Rosario, 21 March 1935 (3 ♀); Cape San Lucas, 24, 26 December 1938, 13 November 1938 (3 ♀); North End, San Jose Island, 12 December 1938 (2 ♂, 2 ♀); Vera Cruz State, Presidio (♂, ♀), Jalapa (4 ♂, 2 ♀); Colima State, Colima, April 1918 (1 ♂, 3 ♀); Tamaulipas State, San Francisco, August 1964 (♂, ♀). PANAMA: La Boca, Canal Zone, 25 January 1908 (♂, ♀). PARAGUAY: Santissima Trinidad, Cordillera Province, June-July (2 ♂, 2 ♀). PERU: Balsapuerto, Paranapura River, Loreto, June 1933 (♂); Callao (BMNH) (♂, ♀); Chanchamayo, Huanuco (BMNH) (♂); Chosica, 850 m, January 1900 (BMNH) (♀). TRINIDAD-TOBAGO: Port-of-Spain, 1-9 April 1929 (2 ♂). UNITED STATES: Texas, Brownsville, 30 October 1965 (4 ♂, 5 ♀), Pharr (4 ♀), San Antonio (Comal Co.; TL), 29 October 1933 (♂, ♀); Arizona, Portal, 10 June 1958 (♂); California, San Diego Co., 193- [sic] (2 ♂, 4 ♀). VENEZUELA: Caripito (3 ♂, 3 ♀); San Felipe Venezuela, 6 May 1938 (♂). *C. s. rosario*: I saw *C. s. rosario* type series but did not dissect specimens; I rely on illustrations of Nicolay (1980) and specimens variously identified as *rosario* listed above under EC-UADOR (AMNH).

Chlorostrymon telea (Hewitson) (Figs. 2A, B, 5E, K, 6G, J-L)

Thecla telea Hewitson (1868:4) (cited by Comstock & Huntington 1958-64 [1964]:123, as "1868, Specimen of a Catalogue of Lycaenidae in the British Museum, p. 4", probably referring to text later published by Classey with preface by L. Higgins; see Higgins 1972). Kirby (1871:398), Hewitson (1862-78 [1873, February], vol. 1:143, vol. 2:pl. 57, figs. 350, 351), Dewitz (1877:233, pl. 1), Godman & Salvin (1879-1901:720), Moeschler (1889:301), Ståhl (1882:93), Gundlach (1887:622), Draudt (1919:798, pl. 158,f), Kaye (1926:462), Barnes & Benjamin (1923:17), Holland (1931:232), Bates (1935:190), Wolcott (1936:402), Hoffman (1941:462), Beatty (1944:157), Comstock (1944:488), Comstock & Huntington (1943:73; 1958-64 [1964]:123) (last two citations place *telea* as subspecies of *maesites*; Comstock 1944, however, makes *telea* a species), Avinoff & Shoumatoff (1946:284), Hayward (1973:158).

←

(including entire corpus bursae). J-L, *Chlorostrymon telea* (ventral only, with lateral view of cephalic inclination in L); J, Port-of-Spain, Trinidad; K, Villa Ana, Santa Fe Province, Argentina (BMNH); L, Callao, Lima Department, Peru (BMNH). M, *C. kus-cheli*, data in text (ventral view, cephalic inclination). N, *C. patagonia*, holotype (including entire corpus bursae). O, *C. chiliana*, holotype (including entire corpus bursae).

- Thecla maesites telea*: Comstock & Huntington (1943:73; 1958-64 [1964]:123), Zikán & Zikán (1968:57).
Eupsyche telea: Dyar (1902:36), Wolcott (1936:402), Grossbeck (1917:23).
Chalybs telea: Kaye (1921:103), Barcant (1970:85).
Strymon telea: Barnes & McDunnough (1917:13), McDunnough (1938:24), Rindge (1952:11), Ziegler (1960:22) (as "*Strymon*"), Lipes (1961:56), dos Passos (1964:55).
Strymon maesites telea: Young (1937:47), Klots (1951:139), Kimball (1965:47).
Chlorostrymon telea: Clench (1961:190; 1976:269; 1977:186), dos Passos (1970:27), Riley (1975:100), Thorne (1975:278), Ross (1975:189), Miller & Brown (1981:99; 1983:54), Pyle (1981:464), Opler & Krizek (1986:89).
Chlorostrymon maesites telea: Brown & Heineman (1972:229) (Brown, in Miller & Brown 1981, 1983 considers *telea* a species), Scott (1986:360).

Diagnosis. DFW, DHW brilliant iridescent azure blue; VFW post-median line black (with only faint white borders, if any); VHW limbal suffusion extending costad to M_1 ; postdiscal band thin ("line"), often broken costad discal cell; line forming distinct "W" basad limbal area (Fig. 2A, B). Male genitalia with vincular arc, valvae, saccus, and aedeagus less elongate than *C. simaethis* (Fig. 5E), brush organs attached as in *C. simaethis* but less dense (Fig. 5K). Female genitalia less elongate and not cephalically inclined as in *C. simaethis*, papillae anales terminally constricted, papillae anales apophyses long (usually extending entire length of ductus bursae) (Fig. 6G, J-L). For genitalic comparison to *C. maesites*, see below.

Types. Holotype male in BMNH (Fig. 5E); TL "Amazon".

Distribution (Fig. 4). From S Texas S across Mexico and Central America; in South America from SW Colombia SE (except for Amazon basin) along SE coast of Brazil, W across Uruguay and Paraguay to E Bolivia and E Argentina. W from SW Colombia but only a few specimens from coastal Peru, none from Ecuador. Reports of *C. telea* from Florida are usually considered to be *C. maesites* (Klots 1951, Opler & Krizek 1986, Scott 1986, and as discussed below).

Conspecificity of *C. telea* and *C. maesites*. Possible conspecificity of *C. telea* and *C. maesites* has been often discussed, and favored by several early authors, more recently by Scott (1986). The taxa have well defined morphological characters (Figs. 5-7) which are homogeneous in their respective ranges. For this reason I retain them as species.

The major difference occurs in female genitalia: *C. maesites* (Fig. 6H, I) has a much smaller antrum and lamellar configuration than *C. telea* (Fig. 6G, J-L). As Nicolay (1980) noted, the lamellar area of *Chlorostrymon* has a membranous ventral covering. This occurs in various Eumaeini (Brown 1982), but is artifactual since the covering strips away easily to expose underlying structures (Johnson 1976, 1978). In *Chlorostrymon*, when this membrane is stripped away, the lamella antevaginalis may be damaged. Thus, the best measure of visual difference between *C. telea* and *C. maesites* is the ratio of the "dorsal

suture line" (Fig. 6G, extending from terminus of lamellae to base of "antrum", Fig. 6A) to the remaining length of ductus bursae. Samples of *C. telea* and *C. maesites* (each spanning distributions characterized in respective Dissections Examined sections) produced frequency distributions (Fig. 7B), whose means differ by *t*-test ($P < 0.05$). To be sure that extreme morphology in *C. m. clenchi* (Fig. 7B, intervals 1.2–1.4) did not prejudice the distribution of *C. maesites*, *t* was recomputed without these specimens, and also proved significant ($P < 0.05$). Conversion of the data to "meaningful pairs" lacking intracorrelation reduced *t*-values, but they are still significant ($P < 0.05$). This difference in female genitalia along with the long cited differences in characters of the wing make these allopatric taxa distinctive. As discussed under *C. maesites*, lesser differences are apparent in male genitalia. *Chlorostrymon simaethis* shows no comparable major difference between mainland and Antillean populations.

As with my treatment of *C. simaethis*, I did not subdivide *C. telea* into subspecies.

Dissections examined (AMNH except as indicated). VENEZUELA: Caripito (♂, ♀). TRINIDAD-TOBAGO: Port-of-Spain (♀). BRAZIL: Paraná State, Caviuna (♀); Santa Catarina State, highlands above Massaranduba, Blumenau (♂); Amazonas State, Óbidos, January 1936 (♀). COLOMBIA: Caldas, 14 May 1914 (♂, ♀). MEXICO: Vera Cruz State, Presidio (♂, ♀); Colima State, Colima (♂, ♀); Tamaulipas State, San Francisco (♂, ♀). UNITED STATES: Texas, Loredo (♀). COSTA RICA: Turrialba (2 ♂, ♀). GUATEMALA: Guatemala City (♀) (BMNH). PANAMA: La Boca, Canal Zone (♂, ♀).

Chlorostrymon maesites (Herrich-Schaeffer)

(Figs. 2C, D, 5F, G, 6H, I)

Thecla maesites Herrich-Schaeffer 1864:165. Dewitz (1877:233, pl. 1), Moeschler (1889:301), Ståhl (1882:93), Gundlach (1887:623), Wolcott (1936:402), Comstock & Huntington (1943:72; 1958–64 [1961]:158), Comstock (1944:487), Zikán & Zikán (1968:57).

Thecla maesites clenchi Comstock & Huntington (1943:72) (holotype male, allotype female [Fig. 2D], AMNH, Roseau Valley, Dominica, British West Indies, April). **NEW STATUS.**

Thecla moesites [sic]: Kirby (1871:398), Draudt (1919:798) (misspelling; Comstock & Huntington 1958–64 [1961]:158 incorrectly attribute error to Draudt).

Thecla moesites Draudt (1919:798). Comstock & Huntington (1958–64 [1961]:158, 171) (incorrect *nomen nudum* attributed to Draudt).

Strymon maesites: Barnes & McDunnough (1917:13), Bates (1935:194), Young (1937:47), McDunnough (1938:24), Klots (1951:140), Kimball (1965:47), Rindge (1952:11), Ziegler (1960:22) (as "*Strymon*"), dos Passos (1964:55).

Chlorostrymon maesites: Clench (1961:189; 1963:248; 1976:269; 1977:186), dos Passos (1970:27), Riley (1975:100), Thorne (1975:277), Miller & Brown (1981:99; 1983:54), Pyle (1981:464), Opler & Krizek (1986:88), Scott (1986:360), Schwartz (1988).

Diagnosis. DFW, DHW brilliant iridescent azure blue; VHW terminal patch extending costad to M_3 , postmedian line not making a "W"; VFW postmedian line black (Fig. 2C, D). Genitalia differing

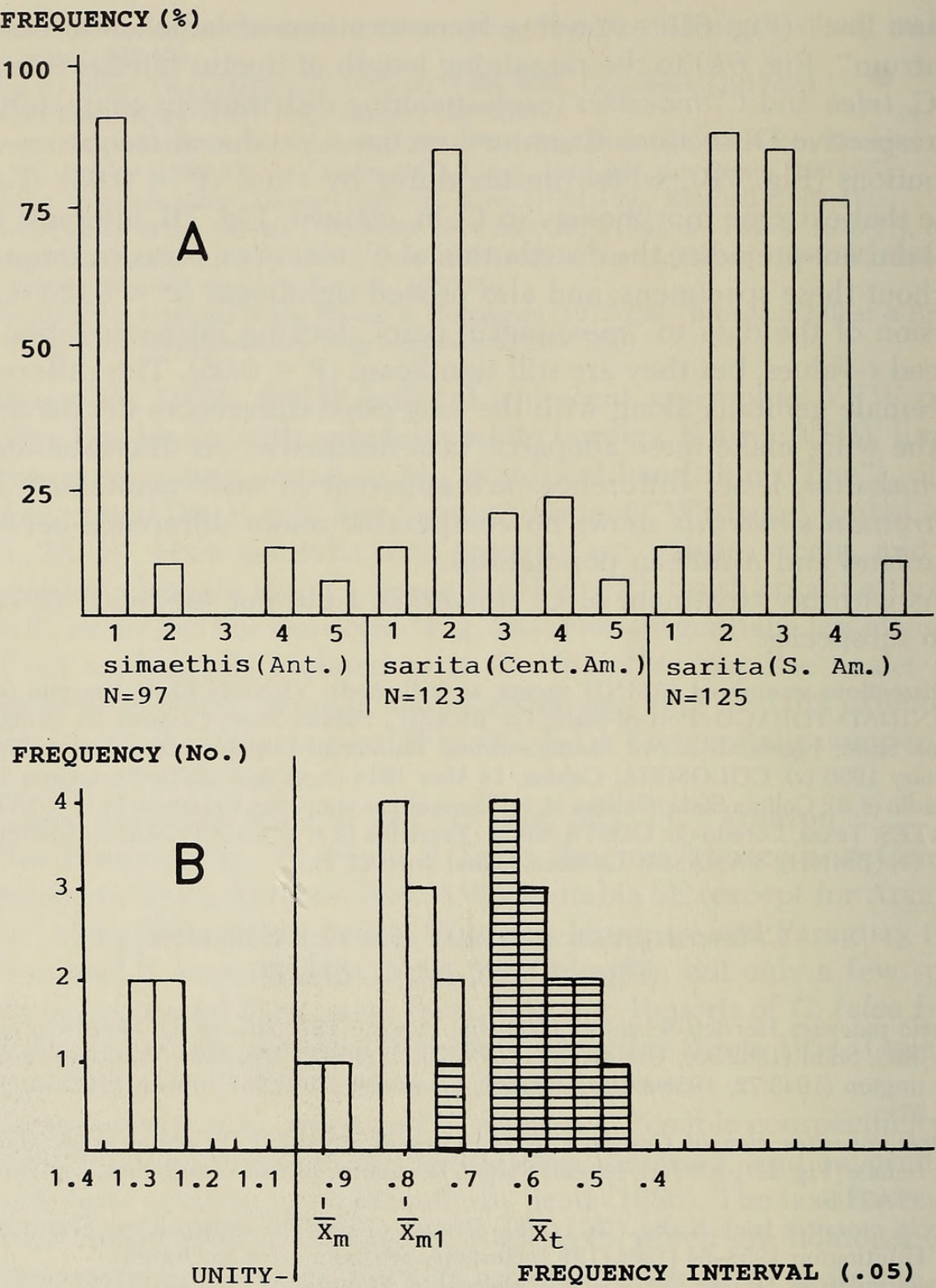


FIG. 7. Frequencies of characters in certain *Chlorostyrymon* populations. A, Wing characters in *C. simaethis simaethis* (Antilles) and *C. s. sarita* (Central America, South America). Characters: 1, VHW postdiscal band undulate (angles of band, along inner surface at consecutive veins, changing at least 6 times costad of vein 2A). 2, band generally straight (not as in 1, and in at least 3 of 5 cells costad of vein 2A, generally in same plane). 3, band swollen distad in area adjacent to discal cell. 4, VFW with marginal and submarginal areas, cells CuA₁ and M₃, suffused red-brown and gray. 5, FW with basal area of costa folded and colored orange. B, Female genitalic shape in *C. telea* (hatched) and *C. maesites* (white). Shape expressed as ratio of length of dorsal suture line (d.s.l.) to length of ductus (d) (d.s.l./d). $\bar{x}_m$ is mean of *C. maesites* sample including *C. m. clenchi* (0.95, N = 14); $\bar{x}_{m1}$ is mean of *C. maesites* excluding *C. m. clenchi* (0.81, N = 10); $\bar{x}_t$ is mean of *C. telea* sample (0.58, N = 14).

from *C. simaethis* as in *C. telea*. For genitalic comparison to *C. telea* see *C. telea* and below.

Types. Location of *T. maesites* type not known (cited as possibly Havana, Cuba, by Miller & Brown 1981:note 357); TL Cuba. Comstock & Huntington (1958–64 [1961]:171) cite a “species” “*moesites* Draudt”, taking Draudt’s (1919) treatment of this name as a description. They cite no type or type locality as Draudt gave none. Draudt’s treatment of “*moesites*” was an incorrect repetition of an earlier misspelling by Kirby (1871:398). Clearly, Kirby, and consequently Draudt, were treating *T. maesites*.

Distribution (Fig. 4). S Florida, Bahamas, Greater and Lesser Antilles S to St. Vincent.

Specificity of *C. maesites* and *C. telea*. Considering *C. telea* and *C. maesites* separate species, Clench (1961) stated, without elaboration, “the two . . . are different in many traits”. Such observations probably resulted from Clench’s experience with *Chlorostrymon* species in the field (Clench 1976, 1977).

Variability of *C. maesites*. As noted under *C. telea*, male genitalia of *C. telea* and *C. maesites* are similar (Fig. 5E–G). They differ from *C. simaethis* (Fig. 5A–D) by a generally reduced vincular arc, shorter valval configuration, and aedeagus (a) short, its length usually not exceeding $3\times$ maximum width of vincular arc (in *C. simaethis*, $3.5\text{--}4.0\times$), and (b) with terminal $\frac{1}{4}$ greatly flared and ventrally inclined about 60° . Female genitalia of *C. telea* (Fig. 6G, J–L) and *C. maesites* (Fig. 6H, I) differ consistently in structure of ductus and antrum (Fig. 7B). In addition, papillae anales of *C. maesites* are not as terminally constricted as in *C. telea* (Fig. 6G–I). In Antillean *C. maesites*, as with Antillean *C. simaethis*, infraspecific variation is more extreme than in mainland populations. For example, male genitalia from the Bahamas and Puerto Rico show notable cephalic sculpturing along outer valval margins. These do not occur in any other *Chlorostrymon* and are probably a parallelism. Female genitalia vary most in ratio of lengths of antrum and ductus bursae (Fig. 7B), and in degree of dorsal inclination, if any, at the cephalic terminus of ductus bursae (Fig. 6G–L). Dominican endemic *C. m. clenchi* (Fig. 6I) and some specimens from Jamaica have a somewhat reduced cephalic terminus on the ductus bursae. In the two new austral species described here, this tendency is so extreme that only the area of the antrum remains.

Subspecies of *C. maesites*. Comstock and Huntington (1943) noted that *C. m. clenchi* lacked a tail at vein CuA_1 , and that both sexes had a dull DFW, DHW ground color, and pronounced black apical borders (noticeable in male; emphatic in female, obscuring almost any DFW blue). The wing pattern in *C. m. clenchi* is distinctive, more so than degree of local differentiation in other Antillean *C. m. maesites*. However, certain genitalic features of *C. m. clenchi* are duplicated in other Antillean *C. maesites* (female discussed

under species treatment; in male, elongation of valval terminus in *C. m. clenchi* [Fig. 5G] duplicated in males from Puerto Rico and the Bahamas). As in *C. simaethis*, there appear to be Antillean populations of *C. maesites* that might equally be considered worthy of subspecific status. Nevertheless, I recommend that no further subspecies of *C. maesites* be recognized, although the name *clenchi* might still be useful historically to note the pattern morph typifying Dominica.

Dissections examined (all AMNH). *C. m. maesites*: BAHAMAS: Nicoll's Town, Andros Island (♂, ♀), North Caicos, 17–18 May 1983 (2 ♂, 1 ♀). CUBA: Guantanamo Bay. JAMAICA: Port Antonio, 10 March 1954 (♂), Baron Hill, Trelawny, 16 February 1931 (♂), Montego Bay, 3 January 1965 (♂), Reading, St. James, 27 March 1939 (♀), Sandy Gully, St. Andrews, 20 June 1951, 3 December 1951 (2 ♂), 8 July 1951 (♀). UNITED STATES: Miami, Florida, various dates (7 ♂, 7 ♀), Brickell Hammock, Florida, 6 August 1914 (♂, ♀), Coamo Springs, Puerto Rico, 26–29 December 1914 (2 ♂, ♀). *C. m. clenchi*: types. DOMINICA: Roseau, 11 April 1929 (2 ♂, 3 ♀).

***Chlorostrymon kuscheli* (Ureta), new combination**
(Figs. 3E, F, 5N, 6M)

Thecla kuscheli Ureta (1949:98, pl. 1, fig. 4), Comstock & Huntington (1958–64 [1961]: 58), Rojas (1964:103).

Diagnosis. FW small, base to apex 8.0–9.5 mm (N = 2); DFW, DHW iridescent lavender in male, dull brown in female, and DHW of both sexes with bright rufous suffusion across limbal area. VFW, VHW with white bands limited to thin lines, VHW limbal suffusion only barely perceptible as silverish streaks. Female genitalia with cephalic end of ductus dorsally inclined as in *C. telea*, but with ductus length far exceeding that of lamellae, as in *C. maesites*; papillae anales with apophyses elongate, extending entire length of ductus bursae.

Description. Male. DFW, DHW iridescent lavender. VFW, VHW ground dull chartreuse; each wing with complete postmedial band, but constricted as thin white lines. VFW with red-brown suffused discal slash; VHW with limbal area vaguely suffused silverish. Length of forewing: 8.0 mm (N = 1). **Female.** Similar to male but slightly larger, with DFW, DHW duller brown. Length of forewing: 9.5 mm (N = 1). **Male genitalia** (Fig. 5N). Only aedeagus remains of paratype genitalic preparation; aedeagus typical of genus but angled at junction of shaft and caecum, latter rather elongate for genus. **Female genitalia** (Fig. 6M). Cephalic ductal terminus inclined dorsally about 45°, ductus elongate compared to length of dorsal suture line (ratio 0.99). Papillae anales with apophyses extremely elongate, extending entire length of ductus.

Types. Holotype male, MNHNC, Larancagua, Tarapaca, Chile, 2800 m, 9 December 1946. Allotype female, MNHNC, same data except 25 February 1948. Paratype (Fig. 3E), CECUC, labelled "*Thecla kuscheli*; Larancagua, 2700 m, Kuschel, 8 xii 1946; Paratypus; donada par E. Ureta."

Distribution (Fig. 4). Tarapaca State, Chile, near border with Bolivia and Argentina.

Remarks. Ureta's description, in Spanish, was not widely distributed, and specimens of *C. kuscheli* have only recently been available to northern workers. Though uniquely marked, the species clearly belongs in *Chlorostrymon* by wing, male aedeagal, and female genitalic characters. The DHW rufous coloration is unique for the genus; reduced VFW, VHW bands, and limbal suffusions are common to all austral *Chlorostrymon* (but differ in each species). Female genitalia do not show marked reduction of ductus bursae as in the new austral species described further on. Though wing pattern in *C. kuscheli* is extreme, and somewhat reminiscent of *C. simaethis*, genitalia are more like *C. maesites* and *C. telea*.

Biogeography. The species is apparently a high montane (2700–3650 m) isolate of the genus. Specimens are known only from the cusp of the Northern Andean Cordillera and Andean High Plateau biotic provinces (Irwin & Schlinger 1986, Davis 1986) in northern Chile, but may also occur in adjacent high montane Bolivia and Argentina.

Dissections examined (all CECUC). Paratype ♂. CHILE: Putre, Arica region, 3650 m, 25 February 1940, leg. Ureta (♀).

***Chlorostrymon patagonia*, new species**
(Figs. 3A, B, 5H, 6N)

Diagnosis. Male DFW, DHW iridescent red-violet; fuscous, basally overlaid with dull blue-gray in female. Both sexes with FW costa basally folded, colored bright rufous; VFW, VHW without bands, patterned as short silver cellular streaks across VHW discal cell and cells CuA₂ to caudal M₃ (limbal suffusion, dull rusty-red to grayish, generally restricted to latter cells). Larger than *C. telea* and *C. maesites*: forewing base to apex averaging 12.2 mm, range 10.0–13.0 mm (N = 8); in *C. telea* 8.8 mm, range 7.5–10.0 mm (N = 19); in *C. maesites* 8.6 mm, range 6.0–11.0 mm (N = 18). Female genitalia sclerotized only in the terminal antrum configuration (as only in *C. chileana*), corpus bursae uniquely lacking signa (Fig. 6N); male resembling *C. telea* and *C. maesites* except bilobed valval configuration wider, more shouldered, saccus reduced to small terminal point, aedeagus with unique cephalic inclination and marked terminal declination, and brush organs attached to long membrane spanning ventral surface of vincular arc (Fig. 5H, L).

Description. Male. DFW, DHW bright iridescent red-violet, basal area of costa widely folded and colored bright rufous. VFW chartreuse, patterned only with occasional, hardly visible, light streaks in various cells from costa to cell M₃; VHW chartreuse, patterned only by light slash through discal cell, and silvery zig-zag markings, basad dull rusty-

red to slightly gray suffusion from cells CuA_2 to caudal M_3 . Stubby tail, terminus of vein CuA_2 . FW length 12.0 mm (allotype). **Female**. Similar to male, but DFW, DHW fuscous and suffused dull blue-gray on base of FW and basal half of HW. FW length 12.0 mm (holotype). **Male genitalia** (Fig. 5H). Similar to *C. telea* and *C. maesites* but differing by wider, more shouldered bilobed valval configuration; reduced, funnel-shaped saccus; aedeagus markedly inclined at caecum, declined at terminus; and brush organs attached along entire ventral surface of vincular arc. **Female genitalia** (Fig. 6N). Resembling only *C. chileana*, with sclerotized components including only the antrunal structure. Lamellae distally lobated as in *C. telea* and *C. maesites*; corpus bursae lacking signa; papillae anales constricted terminad as in *C. telea*, but apophyses of papillae anales short (about equal to length of antrunal sclerotization).

Types. Holotype female, allotype male, Nahuel Huapí, Mendoza Province, Argentina, 15 March 1911 (♀), 3 December 1908 (♂) (C. S. Larsen Collection in MNHN). Paratypes: MNHN—same data as allotype (♂), Mendoza, Argentina, 8 April 1907 (♂), 14 March 1907 (♂), 13 December 1906 (♂), all C. S. Larsen Collection; AMNH—same data as allotype (♂); MPM—Patagonia, August 1939, P. Gagarin Collection (♀).

Distribution (Fig. 4). Known only from N to central Patagonian Steppe biotic province (Davis 1986) of Argentina.

Remarks. In facies, *C. patagonia* might be considered a *C. telea* population of extremely reduced wing pattern if it were not for its larger size, unique wing characters, and female genitalia resembling only *C. chileana*. The southernmost record of *C. telea* is Villa Ana, Santa Fe Province, Argentina (BMNH); the southwesternmost, Callao, Peru (BMNH) (Fig. 4). These specimens are females and typical of *C. telea* (Figs. 2B, 6L, M).

It should be noted that Clench (1961) called the upper surface iridescent color of *C. telea* "red-violet". This is unfortunate since this surface in *C. patagonia* is truly red-violet and distinctive from *C. telea*, generally characterized by other authors as brilliant blue. The widely folded, rufous colored DFW costal fold is also obvious on all specimens of *C. patagonia*. A survey of 38 *C. telea* from across its range shows no such costal character. An orangish costal fold occurs in occasional specimens of *C. simaethis* (Fig. 7A). In genitalia, the sclerotized structures in female *C. patagonia* (and *C. chileana*) duplicate only the antrunal structure of other *Chlorostyrmon* species. The ductal area of *C. patagonia* (and *C. chileana*) is wholly membranous. Male genitalia of *C. patagonia* resemble those of *C. telea* and *C. maesites* most, but differ as summarized in Diagnosis.

I speculate that such unusual characters in *C. patagonia* and *C. chilleana* are autapomorphic, as discussed under *C. chilleana*.

Biogeography. *Chlorostrymon patagonia* is found within the Patagonian Steppe biotic province of Davis (1986). From 30°S latitude, this province extends S in a thin strip E of the Andean Cordillera to encompass all of Patagonia S and E of 44°S latitude. Vegetation is xeric grassland, compatible with known habitats of *Chlorostrymon* taxa. Several other butterfly species have insular distributions like *C. patagonia*. One is the distinctly marked *Thecla thargelia* Burmeister, found only occasionally northward to Tucumán (IML, MNHN). Five others are *T. larseni* Lathy, *T. restricta* Lathy (both described from MNHN C. S. Larsen material), and three species of *Eiseliaria* Ajmat de Toledo located recently in Patagonian material at AMNH, BMNH, and MNHN.

***Chlorostrymon chilleana*, new species**

(Figs. 3C, D, 5I, 6O)

Diagnosis. DFW, DHW of both sexes, dull brown, male slightly suffused purplish. VFW, VHW lacking bands, VHW patterned only with vague postdiscal line from discal cell costad to margin. Limbal area suffused only vaguely gray-brown and dusted basad with silver from cells CuA₁ and CuA₂. Female genitalia sclerotized only in terminal antrimal configuration (as in *C. patagonia*); male genitalia resembling *C. simaethis* most but with an enlarged, broad saccus, and an additional brush organ occurring distally at each juncture of saccus and vinculum.

Description. Male. DFW, DHW dull fuscous slightly hued with purplish blue. VFW, VHW ground dull chartreuse, VFW without pattern, VHW with obsolescent postdiscal line, discal cell costad to costal margin; limbal area, cells CuA₁ and CuA₂ slightly suffused reddish to grey distad, silver basad; stubby tail at terminus of HW vein CuA₂. FW length 11.5 mm (allotype). **Female.** Similar to male except DFW, DHW dull brown. FW length 11.0 mm (holotype). **Male genitalia** (Fig. 5I). Similar to *C. simaethis* but with saccus enlarged and broad (length & width nearly equal and each equally about $\frac{2}{3}$ length of vincular arc), a second brush organ distally at juncture of saccus and vinculum, aedeagus short, its shaft only slightly exceeding length of entire genitalia, and with caecum somewhat laterally displaced. **Female genitalia** (Fig. 6O). Resembling *C. patagonia*, with sclerotization limited to antrum; lamellae parabolic as in *C. simaethis*; signa reduced as small blunt spines; papillae anales lobate; apophyses of papillae anales short (length barely exceeding that of antrimal sclerotization).

Types. Holotype male, allotype female, Santiago, Chile, R. Martin, deposited in MNHN. Paratypes: MNHN—same data as primary types

(4 ♂, 1 ♀); BMNH—"Chili", Walker, J. J. Joicey Collection, "*Thecla* sp. not in collection, S.G" (♂); AMNH—same data as primary types (♂).

Distribution (Fig. 4). Known only from TL and "Chili".

Remarks. *Chlorostrymon chileana* differs greatly from *C. simaethis* in its nearly immaculate undersurface and unusual male and female genitalia. Female genitalia superficially resemble *C. patagonia* while male genitalia have a number of unique characters as summarized in *C. patagonia* and *C. chileana* Diagnosis sections.

Biogeography. MNHN has substantial series of butterflies bearing the labels "Santiago, Chile, R. Martin" and "Valpariso, Chile, R. Martin". *Chlorostrymon chileana* occurs only in the Santiago samples. This locality, if taken literally, is within the Central Valley biotic province (Davis 1986, Irwin & Schlinger 1986)—relatively xeric, former thorn forest now extensively replaced by cultivation. This province is quite small, extending inland from the Central Coastal Cordillera from about 32–38°S latitude. Its ecology is typical of that associated with *Chlorostrymon* taxa. These circumstances, along with unusual characters, suggest that *C. chileana* is an insular species. Its present-day occurrence may be severely restricted by land use, as noted for several central Argentinean plains butterflies (Johnson et al. 1988). The Central Valley biotic province lies directly opposite the distribution of *C. patagonia* on E slopes of the Andes in Argentina. MNHN "R. Martin" samples include a number of butterflies previously unrecorded for Chile which have congeners occurring directly eastward in Argentina's Coquena biotic province (Davis 1986). Examples include *Calycopis* Scudder (Johnson et al. 1988), *Femniterga* Johnson (1987), the little known hairstreaks *Thecla americensis* Blanchard and *T. wagenknechti* Ureta, and others. From such diversity, and comparison with information from more recent Chilean collections (such as J. Herrera's, on loan to AME), I suspect that MNHN "Santiago" and "Valpariso" labels include diverse Chilean habitats.

ACKNOWLEDGMENTS

I am grateful to the following curators: P. Ackery (BMNH), D. Ajmat de Toledo (IML), G. Bernardi and J. Pierre (MNHN), L. D. & J. Y. Miller (AME), J. E. Rawlins (CMNH), F. H. Rindge (AMNH), A. Young, S. Borkin (MPM), and J. Herrera (CECUC, MNHNC). Lee D. & J. Y. Miller, D. Matusik (FMNH), and E. Quinter (AMNH) assisted in obtaining literature, and L. D. & J. Y. Miller in obtaining Chilean specimens. For help with statistical analyses I thank R. F. Rockwell (City College, New York) and Paula Martin.

LITERATURE CITED

- AVINOFF, A. & N. SHOUMATOFF. 1946. An annotated list of the butterflies of Jamaica. Ann. Carnegie Mus. 30:263–295.
BARCANT, M. 1970. The butterflies of Trinidad and Tobago. Collins, London. 314 pp.

- BARNES, W. & F. H. BENJAMIN. 1923. Checklist of the diurnal Lepidoptera of boreal America. *Bull. So. Calif. Acad. Sci.* 25:1-17.
- BARNES, W. & J. H. MCDUNNOUGH. 1917. Checklist of the Lepidoptera of North America. Herald Press, Decatur, Illinois. 392 pp.
- BATES, M. 1935. The butterflies of Cuba. *Bull. Mus. Comp. Zool.* 78:63-258.
- BEATTY, H. A. 1944. Fauna of St. Croix, V.I. The insects of St. Croix, V.I., Lepidoptera. *J. Agric. Univ. Puerto Rico* 28:156-158.
- BROWN, F. M. & B. HEINEMAN. 1971. A checklist of butterflies of Jamaica. *Mid-Cont. Lepid. Ser.* 2:1-9.
- . 1972. Jamaica and its butterflies. E. W. Classey, London. 478 pp.
- CLENCH, H. K. 1961. "Lycaenidae." In Ehrlich, P. R. and A. H. Ehrlich (eds.), *How to know the butterflies*. W. C. Brown, Dubuque, Iowa. 262 pp.
- . 1963 (1965). A synopsis of the West Indian Lycaenidae with remarks on their zoogeography. *J. Res. Lepid.* 2:247-270.
- . 1976. Butterflies of the Carnegie Museum Bahamas expedition, 1976. *Ann. Carnegie Mus.* 46(16):265-283.
- . 1977. A list of the butterflies of Andros, Bahamas. *Ann. Carnegie Mus.* 46(12):173-194.
- COMSTOCK, W. P. 1944. The insects of Porto Rico and the Virgin Islands. Rhopalocera or butterflies. *Scientific Survey of Puerto Rico and the Virgin Islands (New York Academy of Sciences)* 12(1):421-622.
- COMSTOCK, W. P. & E. I. HUNTINGTON. 1943. Lycaenidae of the Antilles (Lepidoptera: Rhopalocera). *Ann. New York Acad. Sci.* 45:119-130.
- . 1958-64. An annotated list of the Lycaenidae (Lepidoptera, Rhopalocera) of the western hemisphere. *J. New York Entomol. Soc.* 66[1958]:103-118; 67[1959]:59-95, 163-212; 68[1960]:49-62, 105-122, 176-186, 232-240; 69[1961]:54-58, 105-118, 157-176, 191-200; 70[1962]:39-49, 100-118, 177-179; 71[1963]:45-57, 115-119, 189-197, 262-264; 72[1964]:62-64, 120-130.
- DAVIS, D. R. 1986. A new family of Monotrysian moths from austral South America (Lepidoptera: Palaephathidae), with a phylogenetic review of the Monotrysiina. *Smiths. Contr. Zool.* 434:1-202.
- DEWITZ, H. 1877. Tagschmetterlinge von Portorico. *Stett. Entomol. Zeit.* 38:233-245.
- DOS PASSOS, C. F. 1964. A synonymic list of the Nearctic Rhopalocera. *Lepid. Soc. Mem.* 1, 145 pp.
- . 1970. A revised synonymic catalogue with taxonomic notes on some Nearctic Lycaenidae. *J. Lepid. Soc.* 24:23-28.
- DRAUDT, M. 1919. *Thecla*, pp. 794-811. In Seitz, A. (ed.), *Macrolepidoptera of the world*. Alfred Kernen Verlag, Stuttgart. Vol. 5 ("Vol. II"), pp. 593-1139, Vol. 5 plates ("Vol. II Plates"), 194 pls.
- DRURY, D. 1770-82 [1773]. *Illustrations of natural history*. Vol. 1 and index. White, London. Vol. I [1770], 130 pp., 50 pls., index [1773].
- DYAR, H. G. 1902 (1903). List of North American Lepidoptera. *Bull. U.S. Natl. Mus.* 52, 722 pp.
- EMMEL, T. C. & J. F. EMMEL. 1973. The butterflies of southern California. *Nat. Hist. Mus. Los Angeles Co., Sci. Ser.*, 26, 148 pp.
- FERRIS, C. F. 1974. Review: Butterflies of the world by H. L. Lewis. *J. Res. Lepid.* 3:278-280.
- GARTH, J. S. & J. W. TILDEN. 1986. California butterflies. Univ. California Press, Berkeley. 246 pp.
- GODMAN, F. D. & O. SALVIN. 1879-1901. *Biologia Centrali-Americana*. Rhopalocera. Privately printed, London. Vol. I, xiv + 487 pp. (1879-86); Vol. 2, 782 pp. (1887-1901); Vol. 3 (pls.), 112 pls. (1879-1901).
- GROSSBECK, J. A. 1917. Insects of Florida, IV. Lepidoptera. *Bull. Am. Mus. Nat. Hist.* 37:1-147.
- GUNDLACH, J. 1887. Fauna Puerto-Riquena. *Ann. Soc. Espanola Hist. Nat.* 16:347-658.
- HALL, A. 1925. List of the butterflies of Hispaniola. *Entomologist (London)* 59:186-190.
- . 1936. The butterflies of St. Kitts. *Entomologist (London)* 69:274-278.

- HAYWARD, K. J. 1973. Catalogo de los Ropaloceros Argentinos. Opera Lilloana 23:1-318.
- HENNIG, W. 1966. Phylogenetic systematics. Univ. Illinois Press, Urbana. 263 pp.
- HERRICH-SCHAEFFER, G. A. W. 1864. Die Schmetterlings-fauna der Insel Cuba. Correspondenzblatt des zoologischer-mineralogische Verein in Regensburg 18:159-172, 19:52-60.
- HEWITSON, W. C. 1862-78 [1873]. Illustrations of diurnal Lepidoptera, Lycaenidae. John van Voorst, London. Vol. I, 228 pp., suppl., 48 pp.; Vol. II (pls.), 92 pls., suppl., 8 pls.
- 1868. Descriptions of some new species of Lycaenidae. John van Voorst, London. 36 pp.
- HIGGINS, L. G. 1972. Hewitson on butterflies 1867-77. Hampton, E. W. Classey, London. 210 pp.
- HOFFMAN, C. C. 1941. Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos. Sobret. Ann. Inst. Biol., Mexico, D.F. I: Papilionoidea, pp. 640-739.
- HOLLAND, W. J. 1931. The butterfly book. Doubleday, New York. 382 pp.
- HÜBNER, J. 1806-38 [1807]. Sammlung exotische [sic] Schmetterlinge 1. Privately printed, Augsburg. 36 pp., 213 pls.
- 1816-26 [1818]. Verzeichniss bekannter Schmettlinge [sic]. Privately printed, Augsburg. 431 pp. + 72 pp. index.
- IRWIN, M. E. & E. I. SCHLINGER. 1986. A gazetteer for the 1966-1967 University of California—Universidad de Chile Arthropod Expedition to Chile and parts of Argentina. Occ. Pap. California Acad. Sci. 144:1-11.
- JOHNSON, K. 1976. Three new Nearctic species of *Callophrys* (*Mitoura*), with a diagnostic [sic] of all Nearctic consubgenera (Lepidoptera: Lycaenidae). Bull. Allyn Mus. 38, 30 pp.
- 1978. Specificity, geographic distribution, and foodplant diversity in four *Callophrys* (*Mitoura*) (Lycaenidae). J. Lepid. Soc. 32:3-19.
- 1986. A new species of *Tmolus* (Lycaenidae) with notes on the *Euptychia westwoodi* (Satyridae) mimicry complex. Bull. Allyn Mus. 106, 11 pp.
- 1987. *Tergissima* and *Femniterga*, new sister genera of *Calycopis* Scudder and *Calystryma* Field from the south-central Andes. Insecta Mundi 2(1):28-42.
- 1989. A revisionary study of the Neotropical hairstreak butterfly genus *Noreena* and its new sister genus *Contrafacia*. J. New York Entomol. Soc. 97:11-46.
- In press. *Penaincisalia*, a new genus of "Elfin"-like butterflies from the high Andes (Lepidoptera: Lycaenidae). Pan-Pacific Entomol.
- JOHNSON, K., R. E. EISELE & B. MACPHERSON. 1988. The "Hairstreak butterflies" (Lycaenidae: Theclinae) of northwestern Argentina. I. *Calycopis*, *Calystryma*, *Tergissima* and *Femniterga*. Bull. Allyn Mus. 123:1-49.
- JOHNSON, K., B. MACPHERSON & J. INGRAHAM. 1986. A new genus and species of Eumaeini (Theclinae) from western Argentina (Lepidoptera: Lycaenidae). Bull. Allyn Mus. 102, 7 pp.
- JOHNSON, K. & D. MATUSIK. 1988. Five new species and one new subspecies of butterflies from the Sierra de Baoruco of Hispaniola. Ann. Carnegie Mus. 57:221-254.
- KAYE, W. J. 1914. Additions and corrections to my catalogue of Lepidoptera Rhopalocera of Trinidad (1904). Trans. Entomol. Soc. London 1914:545-585.
- 1921. A catalogue of the Trinidad Lepidoptera Rhopalocera (butterflies). Mem. Dept. Agric. Trinidad and Tobago 2, 163 pp.
- 1926. The butterflies of Jamaica. Trans. Entomol. Soc. London 1924:413-428.
- KIMBALL, C. P. 1965. The Lepidoptera of Florida, an annotated checklist. Vol. 1. Arthropods of Florida and neighboring land areas. Florida Dept. Agric., Gainesville. 363 pp.
- KIRBY, W. F. 1871. A synonymic catalogue of diurnal Lepidoptera. John van Voorst, London. 192 pp.
- KLOTS, A. B. 1951. A field guide to the butterflies of North America, east of the Great Plains. Houghton Mifflin, Boston. 349 pp.
- LEWIS, H. L. 1974. Butterflies of the world. Follett, Chicago. 312 pp.

- LIPES, J. E. 1961. Butterfly records from Brownsville, Texas. *J. Lepid. Soc.* 15:56.
- LLORENTE-BOUSQUETS, J., A. GARCÉS MEDINA & A. L. MARTINEZ. 1986. Las Mariposas de Jalapa-Teocelo, Veracruz. *Revista Teocelo* 4:14-37.
- MCDUNNOUGH, J. 1938. Checklist of the Lepidoptera of Canada and the United States of America, part I: Macrolepidoptera. *Mem. So. California Acad. Sci.* 1, 175 pp.
- MILLER, L. D. & F. M. BROWN. 1981. A catalogue/checklist of the butterflies of America north of Mexico. *Lepid. Soc. Mem.* 2, 280 pp.
- 1983. Papilionoidea, pp. 49-65. *In* Hodges, R. W. (ed.), Check list of the Lepidoptera of America north of Mexico. E. W. Classey and Wedge Entomol. Res. Found., London. 284 pp.
- MOESCHLER, H. B. 1889. Die Lepidopteran fauna von Porto Rico. *Abhandlungen der Seckenbergischen naturforschenden Gesellschaft* [1889]:69-360.
- NICOLAY, S. S. 1979. Studies in the genera of American hairstreaks. 5. A review of the Hübnerian genus *Parrhasius* and description of a new genus *Michaelus* (Lycaenidae: Eumaeini). *Bull. Allyn Mus.* 56, 52 pp.
- 1980. The genus *Chlorostrymon* and a new subspecies of *C. simaethis*. *J. Lepid. Soc.* 34:253-256.
- OPLER, P. R. & G. O. KRIZEK. 1986. Butterflies east of the Great Plains, an illustrated natural history. Johns Hopkins Univ. Press, Baltimore. 294 pp.
- PYLE, W. M. 1981. The Audubon field guide to North American butterflies. Alfred A. Knopf (Chanticleer), New York. 916 pp.
- WILEY, N. D. 1975. Field guide to the butterflies of the West Indies. Collins, London. 244 pp.
- RINDGE, F. H. 1952. The butterflies of the Bahama Islands, British West Indies (Lepidoptera). *Amer. Mus. Novit.* 1563, 18 pp.
- ROJAS, E. U. 1964. Catalogo de Lepidopteros de Chile. *Bol. Mus. Nac. Hist. Nat. Chile* 28(2):67-140.
- ROSS, G. N. 1975-77. An ecological study of the butterflies of the Sierra de Tuxtla, in Veracruz, Mexico. *J. Res. Lepid.* 14:103-124, 169-188, 233-252; 15:41-60, 109-128, 185-200, 225-240; 16:87-130.
- SCHWARTZ, A. 1988. The butterflies of Hispaniola. Univ. Florida Press, Gainesville, Florida. 604 pp.
- SCHWARTZ, A. & J. C. CORREA. 1986. The status of *Calisto hysius batesi* (Lepidoptera, Satyridae) with the description of a new species of *Calisto* from Hispaniola. *Florida Sci. (Biol. Sci.)* 49:11-18.
- SCHWARTZ, A. & F. GALI. 1984. Five new species of *Calisto* (Satyridae) from Hispaniola. *Bull. Allyn Mus.* 5:1-18.
- SCHWARTZ, A. & C. J. JIMENEZ. 1982. The butterflies of Montserrat, West Indies. *Bull. Allyn Mus.* 66:1-18.
- SCHWARTZ, A. & W. W. SOMMER. 1986. A new subspecies of *Synapte malitiosa* (Lepidoptera: Hepseriidae) from Hispaniola. *Florida Sci. (Biol. Sci.)* 49:18-22.
- SCHWEIZER, F. & R. G. WEBSTER KAY. 1941. Lepidópteros del Uruguay. II. Catálogo sistemático, parte 1. Rhopalocera and Grypocera. *Anal. Mus. Hist. Nat. Montevideo* 2.a, Serie-Tomo V, No. 3:4-24.
- SCOTT, J. A. 1986. The butterflies of North America, a natural history and field guide. Stanford Univ. Press, Stanford, California. 583 pp.
- SCUDDER, H. 1872. A systematic revision of some of the American butterflies. *Ann. Rep. Peabody Acad. Sci.* 4:24-83.
- 1876. Synonymic list of the butterflies of North America, north of Mexico. *Bull. Buffalo Soc. Nat. Sci.* 3:98-129.
- SKINNER, H. 1895. Notes on Rhopalocera, with descriptions of new species. *Entomol. News* 6:112-114.
- 1898. A synonymic catalogue of the North American Rhopalocera. Philadelphia, 215 pp.
- STÅHL, A. 1882. Insects, pp. 82-102. *In* Ståhl, A. (ed.), Fauna Puerto Rico. San Juan.
- STALLINGS, D. B. & J. R. TURNER. 1947. Texas Lepidoptera (with description of a new subspecies). *Entomol. News* 58:37-41.

- THORNE, F. 1975. *Chlorostrymon*, pp. 277–278. In Howe, W. H. (ed.), The butterflies of North America. Doubleday, Garden City, New York. 633 pp.
- URETA, R. E. 1949. Lepidopteros de Chile (Rhopalocera). IV Parte. Familia Lycaenidae. Bol. Mus. Nac. Hist. Nat. Chile 24:93–123.
- WOLCOTT, G. N. 1936. "Insectae borinquenses", a revised checklist of the insects of Puerto Rico. J. Dept. Agric. Puerto Rico 20(1):1–600.
- YOUNG, F. N. 1937. Notes on the occurrence of *Strymon maesites* (Herrich-Schaeffer) in Florida. Entomol. News 48:80–81.
- ZIEGLER, B. J. 1960, 1961. Preliminary contribution to a redefinition of the genera of North American hairstreaks (Lycaenidae) north of Mexico. J. Lepid. Soc. 14:19–23.
- ZIKÁN, J. F. & W. ZIKÁN. 1968. Insecto-Fauna de Itatiaia e da Mantiqueira. Seq. Entomol. Fito Patulog. Pesq. Agropec. Braz. 3:45–109.

Received for publication 23 November 1987; accepted 18 November 1988.



Johnson, Kurt. 1989. "REVISION OF CHLOROSTRYMON CLENCH AND DESCRIPTION OF TWO NEW AUSTRAL NEOTROPICAL SPECIES LYCAENIDAE." *Journal of the Lepidopterists' Society* 43, 120–146.

View This Item Online: <https://www.biodiversitylibrary.org/item/128070>

Permalink: <https://www.biodiversitylibrary.org/partpdf/80894>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.