

HIGH ANDEAN *CHLOROSTRYMON* (LYCAENIDAE) AND A NEW SPECIES FROM MT. LARANCAGUA, CHILE

KURT JOHNSON

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

ABSTRACT. *Chlorostrymon larancagua*, new species, is described and contrasted to another, little known, sympatric high Andean endemic, *C. kuscheli* (Ureta). Additional records are provided for *C. kuscheli* and a recently described austral endemic, *C. patagonia* Johnson. Previously unknown male genitalia of *C. kuscheli* are illustrated.

Additional key words: Eumaeini, systematics, biogeography, *Chlorostrymon larancagua*, *Chlorostrymon kuscheli*.

I recently revised *Chlorostrymon* Clench (Lycaenidae) to comprise six species, including as a new combination high Andean *C. kuscheli* (Ureta) and the new austral species *C. patagonia* and *C. chilleana* (Johnson 1989). Local or regional endemism in these latter three species contrasts with cosmopolitanism in the mainland Neotropical type species *C. telea* (Hewitson), Antillean *C. maesites* (Herrich-Schaeffer) and pan-Neotropical *C. simaethis* (Drury).

Subsequently, Z. D. Ajmat de Toledo (Instituto Miguel Lillo, Tucumán, Argentina "IML") sent the American Museum of Natural History (AMNH) specimens believed to be additional representatives of *C. kuscheli* from Mt. Larancagua (18°08'S, 69°08'W), Tarapacá State, Chile. *Chlorostrymon kuscheli*, a small species (forewing, base to apex ["FW"] 8.0–9.5 mm, $n = 4$) with white forewing and hindwing under surface bands somewhat similar to *C. simaethis*, has been known only from the short type series collected from 2700–3650 m on Mt. Larancagua by Ureta (Ureta 1949). Male genitalia of the type series were not fully intact though generic placement was readily confirmed from the extant male aedeagus and female genitalia (Johnson 1989).

The three specimens forwarded from IML included a male and female of *C. kuscheli* (Figs. 1, 2), easily identified by small size (FW's, respectively, 9.5, 8.5 mm), narrow but continuous white under surface bands, and upper surface hindwing rufous limbal patch. The third specimen, however, clearly represented an undescribed species of the *C. telea*-like complex of *Chlorostrymon*. Under surface bands in *C. telea*, *C. maesites*, and *C. patagonia* are limited to a jagged or broken postmedial line on the hindwing.

Because cosmopolitan *C. simaethis*, *C. telea*, and *C. maesites* are widely sympatric throughout the neotropics (Johnson 1989, Fig. 4) discovery of sympatric high Andean elements of the genus is of great interest. This paper describes the new species, further documents *C. kuscheli*, and, because high Andean and austral members of *Chlorostry-*

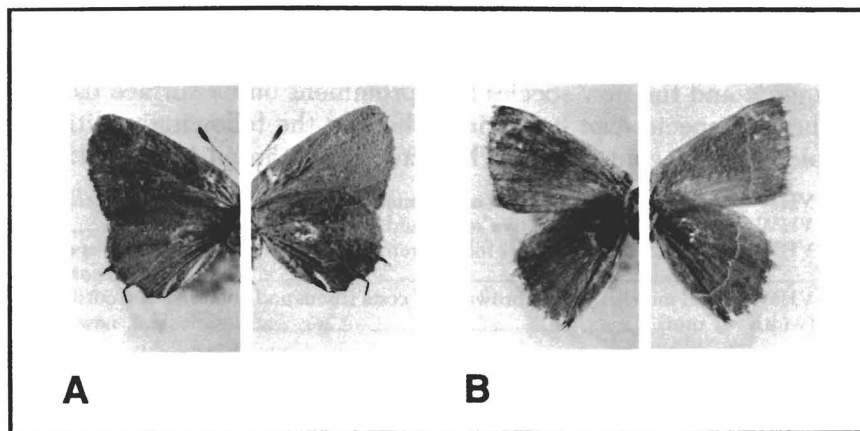


FIG. 1. Females of *C. larancagua* (A) and *C. kuscheli* (B) from Mt. Larancagua, Chile (dorsal, left; ventral, right). Medial <-shaped mark on *C. larancagua* VHW is wing damage.

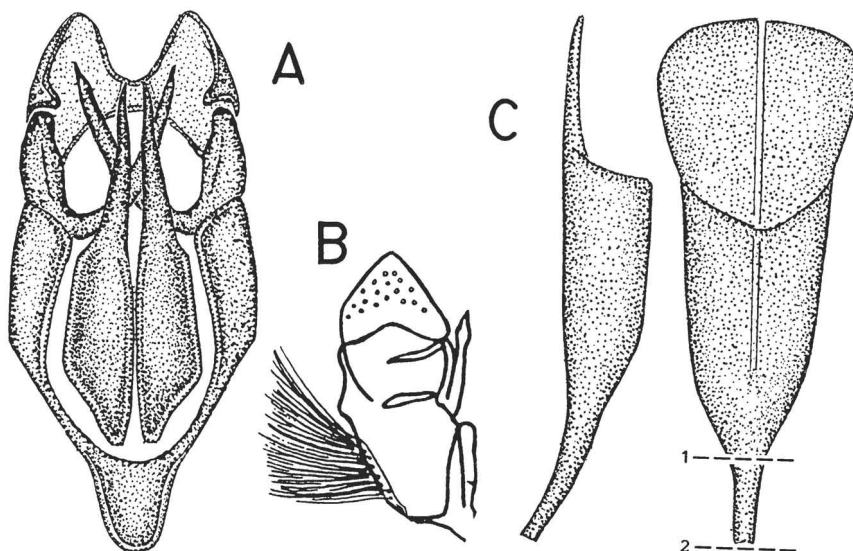


FIG. 2. Genitalia. A, B. Previously unknown male genitalic parts of *C. kuscheli* (AMNH): A, ventral view, aedeagus removed (for aedeagus see Johnson 1989, Fig. 5N); B, lateral view, vinculum dorsal margin with brush organs abutting (for *C. kuscheli* female, see Johnson 1989, Fig. 6M). C. Female genital plate, *C. larancagua* holotype (lateral view, left; ventral view, right); lines 1, 2 for comparative purposes (1, juncture of maximal ductal sclerotin and elongate membranous tube preceding corpus bursae in *C. patagonia* and *C. chilleana*; 2, location of direct attachment of corpus bursae in *C. larancagua*).

mon have only recently been recognized (Johnson 1989), provides further records of the Patagonian endemic, *C. patagonia*. *Chlorostrymon patagonia* and the new species lack prominent under surface bands.

The new species can be distinguished by the following addition to couplet 3 of the generic wing character key (Johnson 1989, p. 123).

- 3[A] VHW postdiscal band distinctive only costad vein M3 *chileana*
 VHW postdiscal band distinctive only caudad vein M3 3[B]
 3[B] VHW ground green, FW costal fold extremely wide (≥ 1 mm) and rufous colored
 *patagonia*
 VHW ground mottled yellow-brown, FW costa fuscus and not otherwise outstanding
 (width < 1 mm) *larancagua*, new species

Description below follows on the generic diagnosis, species criteria and character terminology of the generic revision ("DFW, DHW" and "VFW, VHW" refer to dorsal and ventral fore- and hindwing surfaces, respectively).

Chlorostrymon larancagua, new species

(Figs. 1A, 2C)

DIAGNOSIS. Superficially distinguished by small size (FW 8.0 mm), VFW, VHW mottled yellow & brown ground, VHW with banding restricted to slight white dashes (cells CuA1 to CuA2) and limbal suffusion limited to a brown tint. Sympatric *C. kuscheli* (FW 8.0–9.5 mm) distinguished on VFW, VHW by green ground with narrow but continuous white bands and DHW rufous limbal patch. Female genitalia of *C. larancagua* distinctive with wide terminal lamellae, steeply tapering antrum and short, thin (but fully sclerotized) ductus bursae (see below and Johnson 1989, Fig. 6).

DESCRIPTION. Female: Fig. 1A. DFW, DHW, brown, slightly suffused blue at bases. VFW dusky yellow, distally tinted brown; VHW ground dusky yellow mottled with brown, postmedial area of cells CuA2 and CuA1 with obscure white dashes, limbal area tinted darker brown. **Female Genitalia:** Fig. 2C. Terminal lamella wide and antrum steeply tapered; ductus bursae short *sensu* Johnson 1989 (Fig. 7B, ratio of transparent dorsal suture line of ductus bursae to remaining length of ductus bursae ["d.s.l./d"] = 5.00), and thin (maximal ductus bursae width/maximal antrum width = 0.15) [d.s.l./d other taxa (Johnson 1989): *simaethis* = 0.37, *telea* = 0.39, *maesites* = 0.30, *patagonia* (all types) = 0.31, *chileana* (all types) = 0.62]; corpus bursae lacking signa (see Discussion).

TYPE. Holotype female, CHILE, Tarapacá State, Mt. Larancagua, 2700 m, 9 December, collector and year not noted (see Discussion); deposited IML.

ETYMOLOGY. The name is taken from the local area of endemism.

DISCUSSION

COLLECTION DATA. All three IML Larancagua specimens have identical month/day notations and the altitudes recorded are similar; the male specimen of *C. kuscheli* is marked as a Ureta collection. No label gives a year but day/month notations correspond to the data on Ureta's 1946 collections (Ureta 1949). Thus, it is probable that all three specimens derive from the 1940–48 Ureta samples (see Ureta 1949, Johnson 1989). If so, it is apparent why Ureta did not include them in his 1949 description of *Thecla kuscheli* or recognize the species described herein: the specimens were given to K. Hayward in 1946. According to affixed labels, Hayward took the specimens to the British Museum (Natural History) where they were all identified as "sp. nr. *telea*" and returned to the IML in 1948.

CHARACTERS. Wings: except for occasional dwarf *C. telea* or *C. maesites*, both *C. kuscheli* and *C. larancagua* appear consistently much smaller than congeners (see above and Johnson 1989). From generic characters it can be suggested that the dorsal wing coloration in male *C. larancagua* is probably iridescent blue (as in *C. telea* and *C. maesites*) or red-violet (as in *C. patagonia*). Of the *C. telea*-like complex, only *C. patagonia* displays limited VFW-VHW markings like *C. larancagua*. However, *C. patagonia* (FW 10.0–13.0 mm, $n = 12$) has a green ground color, rusty red and gray VHW limbal suffusion and a distinctive rufous FW costal fold.

Female genitalia: the ductus bursae in all *Chlorostrymon* species terminates with a widely fluted antrum (Johnson 1989, Fig. 6). In *C. simaethis*, *C. telea*, *C. maesites*, and *C. kuscheli*, a constricted, elongate, sclerotized tube joins the antrum to the corpus bursae. In *C. chileana* and *C. patagonia*, connection of the antrum to the corpus bursae, although elongate, is completely membranous. In *C. larancagua* there is a distinct sclerotized tube cephalad of the antrum (Fig. 2C1, 2) but, although it connects directly with the corpus bursae, it is extremely short and constricted.

Male genitalia: genitalia of the type series of *C. kuscheli* were not fully intact (Johnson 1989). Based on new specimens, genital parts of *C. kuscheli* not previously illustrated are included in Fig. 2A, B. Distinctive are a broad valval ventrum (2A), centro-terminal production of the labides (2A, B), and a curvate ventral vincular margin with consequent clustering of the brush organs (2B).

BIOGEOGRAPHY. Both *C. kuscheli* and *C. larancagua* are recorded from 2700–3650 m, Mt. Larancagua, Chile. Cerro Larancagua (summit 5368 m), located along the border between Chile and Bolivia (18°08'S, 69°08'W), exhibits a high altitude desert flora and altiplano fauna more

typical of immediately adjacent high volcanic mountains of Bolivia and Peru than the rest of Chile (A. M. Shapiro, pers. comm.). It is possible that *C. larancagua* and *C. kuscheli* occur throughout this immediate high montane region. Johnson (1989) and Nicolay (1980) noted that other montane *Chlorostrymon* populations (occurring up to 1820 m in Ecuador [Baños, Brown 1941]) fit the species diagnoses of either *C. simaethis* or *C. telea*. Records of these two species from Argentina (Johnson 1989 and below) are from lowland (250–500 m) chaco biomes.

Ventral wing pattern and genitalia indicate *C. kuscheli* and *C. larancagua* are high montane endemics of the respective "simaethis" and "telea" subgroups of *Chlorostrymon*. Johnson (1989) suggested that widespread neotropical sympatry of these subgroups, and lack of a clear eumaeine outgroup, imply *Chlorostrymon* may be very old. High montane sympatry of *C. larancagua* and *C. kuscheli* might be similarly construed since a vicariant origin for the distribution would require simultaneous, *in situ*, upland isolation of ancestral elements representing both *Chlorostrymon* subgroups. Andean uplift in the Mt. Larancagua region began in the Miocene (Gansser 1973).

MATERIAL EXAMINED (high Andean, temperate & austral S American records additional to Johnson 1989): New records of *C. kuscheli*: CHILE. Mt. Larancagua, 2800 m, 9 December, leg. Ureta (one male, IML), same data but 2700 m and no leg. (one female, AMNH). New southern range extreme for *C. telea*: ARGENTINA. Catamarca Prov., San Antonio, 18 February 1958, leg. R. Golbach (one male, IML) (typical of Fig. 2B, Johnson 1989); additional new N Argentina records: Sante Fe Prov., Villa Ana [at 250 m], December 1928, leg. K. Hayward (one male, IML); Salta Prov., Santa María, 250 m, 5 November 1974, leg. B. MacPherson (one male, MacPherson Collection "MC"), same data but leg. R. Eisele (one male, Eisele Collection "EC"), Pichanal, 300 m, 17 May 1972, leg. R. Eisele (one female, EC), Tartagal, 500 m, 20 December 24, leg. B. MacPherson (one female, MC) (all typical of figs. 2B, females figs. 6K, Johnson 1989). New records of *C. patagonia*: ARGENTINA. Río Negro Prov. [Patagonia], San Carlos de Bariloche, 2 January 1950, leg. not noted (four males, AMNH).

ACKNOWLEDGMENTS

I thank Z. D. Ajmat de Toledo (IML), Robert C. Eisele, and Ruth Eisele for facilitating hand delivery of IML specimens. I again thank L. D. Miller (Allyn Museum, Florida Museum of Natural History) for facilitating the original loans of *C. kuscheli* and David Matusik (Field Museum of Natural History) for aiding in specimen acquisition. Arthur M. Shapiro (University of California, Davis) made extremely helpful review comments.

LITERATURE CITED

- BROWN, F. M. 1941. A gazetteer of entomological stations in Ecuador. *Ann. Entomol. Soc. Amer.* 34:809–851.
 GANSSE, A. 1973. Facts and theories of the Andes. *J. Geol. Soc. London* 13:93–131.
 JOHNSON, K. 1989. Revision of *Chlorostrymon* Clench and description of two new austral Neotropical species (Lycaenidae). *J. Lepid. Soc.* 43:120–146.
 ——— in press. *Penaincisalia*, a new genus of "elfin"-like butterflies from the high Andes (Lepidoptera: Lycaenidae). *Pan-Pacific Entomol.*

- NICOLAY, S. S. 1980. The genus *Chlorostrymon* and a new subspecies of *C. simaethis*. J. Lepid. Soc. 34:253-256.
- URETA, R. E. 1949. Lepidopteros de Chile (Rhopalocera). IV Parte. Familia Lycaenidae. Bol. Mus. Nac. Hist. Nat. Chile 24:93-123.

Received for publication 17 October 1989; revised and accepted 5 July 1990.