

AN UPDATED LIST OF THE BUTTERFLIES OF CHILE (LEPIDOPTERA, PAPILIONOIDEA AND HESPERIOIDEA) INCLUDING DISTRIBUTION, FLIGHT PERIOD, CONSERVATION STATUS AND COMMENTS ON BIOLOGY. PART III/2, SUBFAMILY THECLINAE (LYCAENIDAE)

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ABSTRACT

Part III/2 of the updated list of Chilean butterflies deals with 18 species of the subfamily Theclinae (Lycaenidae). One species is described as new: *Strymon coquimbanus* Bálint, Ugarte and Benyamini sp. n. (Type locality: Pisco Elqui, Coquimbo). Data on regional distribution, flight periods, conservation status and comments on biology, nomenclature and taxonomy are also included. The following eight taxa erroneously or conditionally recorded from Chile are annotated: *Calycopis valparaiso* Johnson, Eisele and MacPherson, 1988 (= *Calycopis caulonia* (Hewitson, 1877)), *Chlorostrymon chileana* Johnson, 1990 (= *Chlorostrymon simaethis rosario* Nicolay, 1980); *Penaincisalia oribata* (Weymer, 1890), Johnson, 1990 (= *Penaincisalia culminicola* (Staudinger, 1894) misidentification); *Penaincisalia patagonaevaga* Johnson, 1990 (= *Penaincisalia penai* Johnson, 1990 - a chimera); *Pontirama coquimbiensis* Johnson, 1992 (nomen dubium); *Rekoa palegon cyrriana* (Hewitson, 1874); *Tergissima shargeli* Johnson, 1990 (= *Electrostrymon callao* Druce, 1907; stat. rev.), and the polyommatine *Zizina oxleyi* (C. and R. Felder, [1865]). The following nomenclatural actions are introduced for Chilean taxa: *Chlorostrymon laracangua* Johnson, 1990 is placed as new synonym of *Chlorostrymon kuscheli* (Ureta, 1949); *Pontirama coquimbiensis* Johnson, 1992 is considered as nomen dubium; *Strymon americensis* (Blanchard, 1852) is reinstated as a species from synonymy of *Strymon eurytulus* (Hübner, [1819]); *Strymon sapota* (Hewitson, 1877) is reinstated as a species from synonymy of *Strymon bubastus* (Stoll, 1780); *Strymon probabila* (Johnson, Miller and Herrera, 1992) is reinstated as a species from synonymy of *Strymon bicolor* (Philippi, 1859); *Strymon suprema* (Johnson, Miller and Herrera, 1992) is reinstated as a species from synonymy of *Strymon bicolor* (Philippi, 1859); and *Thecla davara joannisi f. pallida* is placed as a new synonym of *Strymon daraba* (Hewitson, 1867). Neotype for *Lycaena bicolor* Philippi, 1859 has been designated.

Key words: Chile, Argentina, Peru, regional distribution, flight period, conservation status, biology, nomenclature, taxonomy, new species, reinstated status, neotype, doubtful records, Lepidoptera, Lycaenidae.

RESUMEN

Lista actualizada de las mariposas de Chile (Lepidoptera, Papilionoidea y Hesperioidea), incluyendo distribución, periodo de vuelo, estado de conservación y comentarios sobre su biología. parte III/2, subfamilia Theclinae (Lycaenidae) La parte III/2 de la lista actualizada de las mariposas de Chile trata 18 especies de la subfamilia Theclinae (Lycaenidae). Se describe una especie nueva: *Strymon coquimbanus* Bálint, Ugarte and Benyamini sp. n. (Localidad tipo: Pisco Elqui, Coquimbo). También se incluyen datos sobre distribución regional, periodos de vuelo, estado de conservación y comentarios sobre biología, nomenclatura y taxonomía. Se comenta sobre los siguientes ocho taxa erróneamente o condicionalmente registrados en Chile: *Calycopis valparaiso* Johnson, Eisele and MacPherson, 1988 (= *Calycopis caulonia* (Hewitson, 1877)); *Chlorostrymon chileana* Johnson, 1990 (= *Chlorostrymon simaethis rosario* Nicolay, 1980); *Penaincisalia oribata* (Weymer, 1890), Johnson, 1990 (= *Penaincisalia culminicola* (Staudinger, 1894), identificación errónea); *Penaincisalia patagonaevaga* Johnson, 1990 (= *Penaincisalia penai* Johnson, 1990; quimera); *Pontirama coquimbiensis* Johnson, 1992 (nomen dubium); *Rekoa palegon cyrriana* (Hewitson, 1874); *Tergissima shargeli* Johnson, 1990 (= *Electrostrymon callao* Druce, 1907; stat. rev.); y el polyommatino *Zizina oxleyi* (C. and R. Felder, [1865]).

Se introduce los siguientes actos nomenclaturales para taxones chilenos: *Chlorostrymon laracangua* Johnson, 1990 nuevo sinónimo de *Chlorostrymon kuscheli* (Ureta, 1949); nomen dubium para

Pontirama coquimbiensis Johnson, 1992; *Strymon americensis* (Blanchard, 1852) revalidada desde la sinonimia de *Strymon eurytulus* (Hübner, [1819]); *Strymon sapota* (Hewitson, 1877) revalidada desde la sinonimia de *Strymon bubastus* (Stoll, 1780); *Strymon probabila* (Johnson, Miller and Herrera, 1992) revalidada desde la sinonimia de *Strymon bicolor* (Philippi, 1859); *Strymon suprema* (Johnson, Miller and Herrera, 1992) revalidada desde la sinonimia de *Strymon bicolor* (Philippi, 1859); y *Thecla davara joannisi f. pallida* nuevo sinónimo de *Strymon daraba* (Hewitson, 1867). Se designa un neotipo para *Lycaena bicolor* Philippi, 1859.

Palabras claves: Chile, Argentina, Peru, distribución regional, período de vuelo, estado de conservación, biología, nomenclatura, taxonomía, nueva especie, estatus, neotipo, registros dudosos, Lepidoptera, Lycaenidae.

INTRODUCTION

In the previous chapter of the series, Part III/1: the Lycaenidae fauna of Chile was the subject and 46 species representing the subfamily Polyommatae were listed, evaluated, and commented on by Benyamini *et al.* (2020). The present chapter contrasts what we know regarding the Neotropical Lycaenidae fauna, which is greatly overwhelmed by the subfamily Theclinae, being two magnitudes higher than polyommatae (Robbins and Lamas, 2004). Thus, on the basis of pure logic we would expect approximately 400 species of Theclines, however there are only 18! This ratio mirrors the situation in the Palaearctic region, where Eumaeini hairstreaks are far less diverse than polyommatae blues (Bálint, 2022a). This reflects the geological and climatic history of the region. The continuous rising of the Andes combined with the effects of the cold Humboldt current caused the aridization of the Chilean Pacific coast at an alarming speed and resulted in complete isolation from the Neotropical region, classified sometimes as “Chilean Region (South Andes)” (Brown, 1993).

The Chilean hairstreak fauna is characterized on one hand by the presence of widely distributed species, which can easily colonize new habitats formed by drastic biotic or physical changes: severe droughts, landslides, volcanic eruptions, earthquakes, environmental destruction via human development, road and dam construction, overgrazing, and local pollution caused by various chemicals, etc. On the other hand, endemic and local species with restricted distribution, which in the past may have had a wider range, are now forced to occupy microhabitats typified by highly specific variables caused by recent climatic, geographic, or edaphic conditions. In the case of the hairstreaks of Chile, the larger percentage of the species represents the first group, whilst the second group is represented mainly by members of the *Strymon bicolor* group.

The last word on the Chilean hairstreak fauna has not yet been uttered. We are convinced that the hairstreaks got less attention previously, due to (1) some species which gave the impression of being “weeds” and they look the same everywhere; or (2) some species are extremely difficult to sample, and the investigation efforts required are hardly rewarding. However, it has been demonstrated recently that the hairstreaks are indeed an extremely promising group for lepidopterological studies in Chile. The “weedy” species *Strymon bicolor* (Philippi, 1859) encompasses several species endemic to the region (Bálint and Benyamini, 2017; 2019), and the most recent studies have resulted in interesting discoveries (Ramírez-Fischer *et al.*, 2014; Vargas and Duarte, 2014 and 2016, Da Silva *et al.*, 2016; Vargas-Ortiz *et al.*, 2018). Hence, in this article, we integrate all the new results, list and discuss the nomenclature, classification, distribution, phenology, and conservation status, and comment on the biology and taxonomy of 18 Eumaeini lycaenid species currently known to occur in Chile. A high percentage of them are endemic to the Pacific side of the Andes ($n = 12$, i.e. = 75 %). Our purpose with this paper is aligned to the aims of the previously published parts, with the additional intent that all the parts of the series (Benyamini *et al.*, 2014 and 2020,

Pyrz *et al.*, 2016) may serve as a basis for the updated and new edition of the already classic work of “La Mariposas de Chile” produced by the late Luis Enrique Peña Guzmán († 1995) and Alfredo Ugarte.

MATERIALS AND METHODS

The numbering of species follows on from Part I (nos 1–86: HesperIIDae, Papilionidae and Pieridae) (Benyamini *et al.*, 2014), via Parts II (nos 87–124: Nymphalidae) (Pyrz *et al.*, 2016) and III/1 (nos 125–170: Lycaenidae (Polyommatainae)); plus no. 171 (Benyamini *et al.*, 2020). Here we add no. 172 *Dione dodona* Lamas and Farfán, 2022 (Nymphalidae, Heliconiinae) and start the Theclinae with no. 173.

Genera and species are listed in systematic order according to Robbins (2004). Literature references are given for the original descriptions, and subsequent binominal combinations supported by descriptions or figures as documented in the basic literature for Neotropical butterflies. Acronyms used in the legends are given in the end of the paper (p. 60).

The species entries are divided into two groups: (I) species with confirmed records and (II) species with doubtful records. Group (I) harbors all the species which have a confirmed record or records for their breeding in Chile. Group (II) contains species with doubtful Chilean records or specimens with questionable provenance. Some of them are definitely erroneous, but certain species may occur in Chilean territories with high probability.

Wing pattern and coloration provides qualitative and quantitative traits to discriminate species (see Benyamini and Bálint, 2011). When deemed necessary, abdomens were dissected using conventional methods (Winter, 2000); dissections were databased and documented in the HNHM laboratories. The dissected abdomen with genitalia is retained in a glycerol vial pinned beneath the corresponding specimen. Determination of *Pseudolucia* specimens was supported by DNA sequencing. Molecular analysis was carried out at the Institut de Biologia Evolutiva (CSIC-UPF), Universitat Pompeu Fabra, Barcelona, Spain.

For every species, we present all information known to us in the following order:

Distribution (D)

Region numbers are presented by Roman numerals I (first), II (second), etc. New region numbers XIV and XV and many recently published maps (which are inconsistent with one another), cause considerable misunderstanding. To eliminate this, we provided a relevant map with a list of regions in the first part (see Benyamini *et al.* 2014, plate II).

The list of regions (north to south) is given below:

Región de Arica y Parinacota (XV)

Región de Tarapacá (I)

Región de Antofagasta (II)

Región de Atacama (III)

Región de Coquimbo (IV)

Región de Valparaíso (V)

Región Metropolitana (13)

Región del Libertador Bernardo O'Higgins (VI) (abbreviated – O'Higgins)

Región del Maule (VII)

Región del Biobío (VIII)

Región de la Araucanía (IX)

Región de los Lagos (XIV)

Región de los Ríos (X)

Región de Aisén del General Carlos Ibáñez del Campo (XI) (abbreviated – Región de Aisén).

Región de Magallanes y de la Antártica Chilena (XII) (abbreviated – Región de Magallanes)

Flight Periods (FP)

Flight periods are denoted by numbers, representing months from 1 (January) to 12 (December) 'FP: 1-12' means flight period the whole year around, but usually in warm, preferred localities.

Definition of Conservation status (C)

(Note: Some of these terms are not mutually exclusive, so that several may apply in a given case.)

1) Not endangered

2) Possibly not endangered

3) Migrant

4) Rare. Rabinowitz (1981) argued that species rarity could occur in three different ways, which applies also to Chile: a) restricted geographic distribution, b) narrow habitat distribution and c) low local population abundance.

5) Under increasing stress/threat, not yet endangered

6) Endangered

7) Highly endangered

8) Close to extinction

- 9) Locally extinct (it may or may not exist elsewhere)
- 10) Data deficient
- 11) Geographically restricted (endemic)

Chile is known for having two great natural isolating terrestrial barriers: the high mountain chain of the Andes reaching almost 7000 m – known as ‘the continental divide’ – and the Atacama absolute desert in the north. Both have contributed to the remarkably high endemism of the Chilean flora and fauna, including butterflies, making Chile an ‘island’ in a biogeographical sense. The level of endemism is 25% for animals, but for plants it is higher, reaching 50%. Endemic polyommata species to Chile are marked with ‘11’. The present conservation status as we perceive it is given for all species, many of them are under constant existing stress. To our knowledge, no butterfly species in Chile has yet been accorded a ‘listed’, ‘threatened’ or ‘endangered’ status either by the Chilean national or provincial/regional governments or by any conservation body such as the International Union for Conservation of Nature (IUCN). We thus present our own perceptions based on our cumulative experience, which we hope may serve as a guideline for future action. In addition to habitat loss and conversion, there are other recent threats to the Chilean fauna. Introduction of foreign predators, especially *Vespula germanica* and *V. vulgaris* (Hymenoptera: Vespidae) the German and European wasps, both destroy vast numbers of lepidopterous larvae and occasionally even adults, and microhymenopterous parasitoids (such as the braconid *Cotesia glomerata*, introduced as a biological control agent against the naturalized pest *Pieris brassicae*, but now attacking and suppressing populations of endemic Chilean Pieridae as well) cause further threats to the existence of native species.

It is our hope that this work will serve Chilean authorities - Ministry of Interior, Ministry of the Environment, Ministry of Agriculture, CONAF, Universities, Municipalities, Regional Management, ‘Green’ organizations and Mine companies (!) - to institute protection of the endangered species, thereby helping them to survive and live under ever-increasing anthropogenic pressure. The Chilean butterfly biodiversity, with its very high level of endemism, is a national resource which must be preserved and protected before being destroyed and lost forever.

Comments

We give comments on the nomenclature, distribution, biology (including some larval hostplants) and conservation threats of the species involved.

Butterfly biological data including larval hostplants, myrmecophily, natural enemies, ethology and annual number of broods (which is still far from being complete) will be published in future years. This publication will update and nearly complete the project of Peña and Ugarte (2006).

How to read the data – an example of a fictitious species:

Chilucia chila

D: XV-X; FP: 10(M)-2(E), 4(?); C: 4, 8, 11.

Distribution (D): from XV Region of Arica-Parinacota to X Region of De Los Lagos.

Flight Period (FP): Middle October to early February, April questionable record.

Conservation status (C): rare, close to extinction, endemic.

LIST OF SPECIES

172. *Agraulis dodona* (Lamas and Farfán, 2022)

I – Confirmed species

Genus **Muelana** Bálint, 2022

173. *Muelana muela* (Dyar, 1913)

Genus **Rhamma** Johnson, 1992

174. *Rhamma amethystina* (Hayward, 1949)

Genus **Strymon** Hübner, 1818

175. *Strymon daraba* (Hewitson, 1867)

176. *Strymon crambusa* (Hewitson, 1874)

177. *Strymon davara* (Hewitson, 1868)

178. *Strymon americensis* (Blanchard, 1852), stat. rev.

179. *Strymon eurytulus* (Hübner, [1819])

180. *Strymon sapota* (Hewitson, 1877), stat. rev.

181. *Strymon oribata* (Weymer, 1890)

182. *Strymon nivea* (K. Johnson, L.D. Miller and G. J. Herrera, 1992)

183. *Strymon flavaria* (Ureta, 1956)

184. *Strymon bicolor* (Philippi, 1859)

185. *Strymon coquimbanus* Bálint, Ugarte and Benyamini, sp. n.

186. *Strymon probabila* (Johnson, Miller and Herrera, 1992), stat. rev.

187. *Strymon suprema* (Johnson, Miller and Herrera, 1992), stat. rev.

188. *Strymon wagenknechti* (Ureta, 1947)

Genus **Ministrymon** Clench, 1961

189. *Ministrymon azia* (Hewitson, 1873)

Genus **Chlorostrymon** Clench, 1961

190. *Chlorostrymon kuscheli* (Ureta, 1949)

II - Doubtful species

Calycopis valparaiso Johnson, Eisele and MacPherson, 1988 = *Calycopis caulonia* (Hewitson, 1877)

Chlorostrymon chileana Johnson, 1990 = *Chlorostrymon simaethis rosario* Nicolay, 1980

Penaincisalia oribata (Weymer, 1890), Johnson 1990 = *Penaincisalia culminicola* (Staudinger, 1894)

Penaincisalia patagonaevaga Johnson, 1990 = *Penaincisalia penai* Johnson, 1990

Pontirama coquimbensis Johnson, 1992 = *nomen dubium*

Rekoa pelagon cyrriana (Hewitson, 1874) = *Rekoa palegon cyrriana* (Hewitson, 1874)

Tergissima shargeli Johnson, 1990 = *Electrostrymon callao* Druce, 1907; stat. rev.

Zizina oxleyi (C. and R. Felder, [1865])

DISCUSSION OF SPECIES

172. *Agraulis dodona* (Lamas and Farfán, 2022) - (Fig. 1)

Agraulis dodona Penz, 2022: 395.

Dione (*Agraulis*) *dodona* Lamas and Farfán, 2022; Farfán *et al.*, 2022a: 203; Farfán *et al.*, 2022b: 2.

D: XV–I; FP: 10–12; C: 2.

Comments: *Agraulis dodona* inhabits the arid western slopes of the Andes of central Peru and northern Chile, between about 800 and 3,000 m elevation, using at least seven species of *Malesherbia* (Passifloraceae) as host plants (Farfán *et al.*, 2022a, b). The results of an assessment of the genetic variation based on analysis of mitochondrial DNA sequences and microsatellites suggested a continuum of gene flow through high adult dispersal among geographic disjointed populations of this butterfly (Farfán *et al.*, 2022b). Specimens collected in Arica N Chile (male and female paratypes in Fig. 1 A and B) are worn, suggesting that they migrated southwards from Peru (Fig. 1 C).

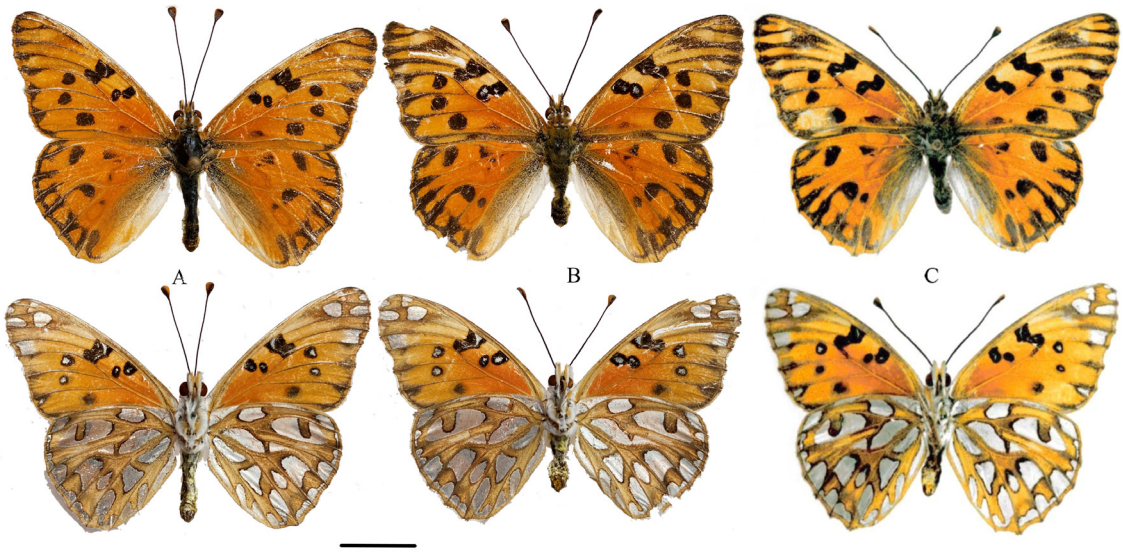


Figure 1. *Agraulis dodona* (Lamas and Farfán, 2022) paratypes from Chile. A = male, Arica, Las Peñas, 1580 m, 02.XII.2020, H. A. Vargas leg. [IDEA-LEPI–2022–008]. B = female, same data as the male, except 10.XI.2020; [IDEA-LEPI–2022–007]. The two paratypes are deposited in the "Colección Entomológica de la Universidad de Tarapacá", Arica, Chile. Photographed by H. A. Vargas. C = paratype female from Peru, Arequipa, Chaparra (source: BOA).

Genus *Muelana* Bálint, 2022

The genus *Muelana* has been established for the type species *Thecla muela* Dyar, 1913 and for its undescribed congener(s) (Bálint, 2022). Previously the type species was placed in different genera (see under Comments below).

173. *Muelana muela* (Dyar, 1913) - (Fig. 2)

Thecla muela Dyar, 1913: 637.

Thecla dissentanea Draudt, 1919: 758; Ureta, 1947: 54; Ureta, 1949: 97; Robbins, 2004: 118 (a synonym of *Thaeides muela*).

Abloxurina dissentanea (Draudt); Johnson, 1992: 30; D'Abrera, 1995: 1139.

Abloxurina dissentanea putreensis Johnson, 1992: 31; Peña and Ugarte, 1996: 218; Robbins, 2004: 118 (in [new] synonymy of *Thaeides muela*).

Thaeides muela (Dyar); Robbins, 2004: 118 (new combination).

Muelana muela (Dyar); Bálint, 2022b: 97 (new combination)

D: XV, I–II; FP: 9–11, 2–4; C: 10.

Comments:

Bionomics. Benyamini, (1995) associated the biology of the species with *Baccharis* sp. (Asteraceae), and this has been recently confirmed by laboratory rearings on *B. alnifolia* (Vargas and Duarte, 2014). In June 2022 H. A. Vargas (Universidad de Tarapacá, DB unpubl.) found a larva on *Stevia philippiana* (Asteraceae) inflorescence at Socoroma (Reg. Arica and Parinacota) and reared it to the male adult stage. In Ecuador the larva has been found in the flowers of *Bactris latifolia* (Arecaceae) (voucher specimen depositor: Staatliches Museum für Naturkunde, Stuttgart (Germany), examined and documented by Zs. B., unpublished), suggesting that the species is polyphagous.

Generic placement. Johnson placed the species in *Abloxurina* (Johnson, 1992) on the basis of wing pattern elements, and recorded some unusual distinguishing characters of the male genitalia structures. On the basis of genitalia traits Robbins (2004) transferred the species to *Thaeides*. Later Prieto-Martinez and Lorenz-Brudecka (2014) clarified the anomalies of *Abloxurina* and fixed the type species as *Penaincisalia ismaeli* Busby and Hall, 2005. We are of the opinion that *Thecla muela* represents a lineage distinct from *Abloxurina* and *Thaeides*, and the curious male genitalia structure is the result of homoplasy (Bálint, 2022b).

Synonyms. The nominal species *Thecla muela* was described on the basis of two (female) specimens collected at Cotohausi, Peru in October of 1911. Subsequently Draudt overlooked *T. muela* and introduced the name *Thecla dissentanea* based on an unstated number of female specimens collected at Cuzco, Peru (lectotype designated by Johnson, 1992). Furthermore Johnson described *Abloxurina muela putreensis* based on the holotype male from Putre, Parinacota, Chile. The types of the mentioned nominal taxa cannot be discriminated on the basis of any characters which may prove their taxonomic distinctness. These three names represent the same biological species (Robbins, 2004).

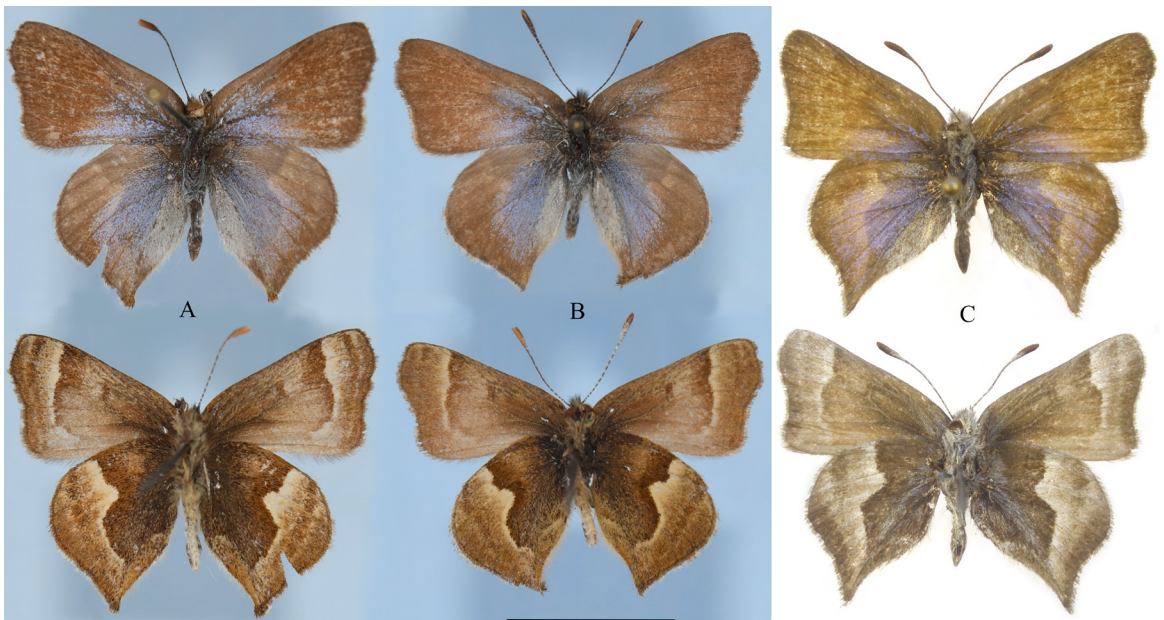


Figure 2. *Muelana muela* (Dyar, 1913) – A = DBC male from Chile: Tarapaca, Zapahuira, 3000 m, 5.II.1994, D. Benyamini leg.; B = DBC male from Chile: Tarapaca, Putre, 3400 m, 16.IV.1996, D. Benyamini leg.; C = HNHM male from Peru: Apurímac, Saywite, 3700 m, 11.II.2005, J. Wojtusiak and T. Pyrcz leg.

Genus *Rhamma* Johnson, 1992

The genus *Rhamma* has been established for the type species *Thecla oxida* Hewitson, 1870 and for further 25 taxa placed in the genus (Johnson, 1992). Robbins (2004) indicated 28 species for *Rhamma*, but without presenting evidence why his taxonomy was highly divergent from the one proposed by Johnson. In the works of Prieto, many of the Robbins' changes have been confirmed (Prieto and Vargas, 2016; Prieto, Nuñez and Hausmann, 2019). The representatives of the genus are primarily high altitude dry area species distributed from the Venezuelan Cordillera Merida throughout the Colombian, Ecuadorian, Peruvian and Bolivian Andes to the Argentine-Chilean region, where the range reaches the most southern limit.

174. *Rhamma amethystina* (Hayward, 1949) - (Fig. 3)

Thecla amethystina Hayward, 1949: 567; D'Abbrera, 1995: 1246.

Rhamma amethystina (Hayward); Johnson, 1992: 136 (new combination); Robbins, 2004: 121.

Rhamma chilensis Johnson, 1992: 144; Peña and Ugarte, 1996: 220; Robbins, 2004: 121 (in [new] synonymy of *Rhamma amethystina*).

Shapiroana herrerae Johnson, 1992: 275; Peña and Ugarte, 1996: 221; Robbins, 2004: 121 (in [new] synonymy of *Rhamma amethystina*).

Rhamma chiliensis[!] (Johnson); Peña and Ugarte, 1996: 220 (misspelling).

D: XV-III; FP: 10-12?; C: 10.

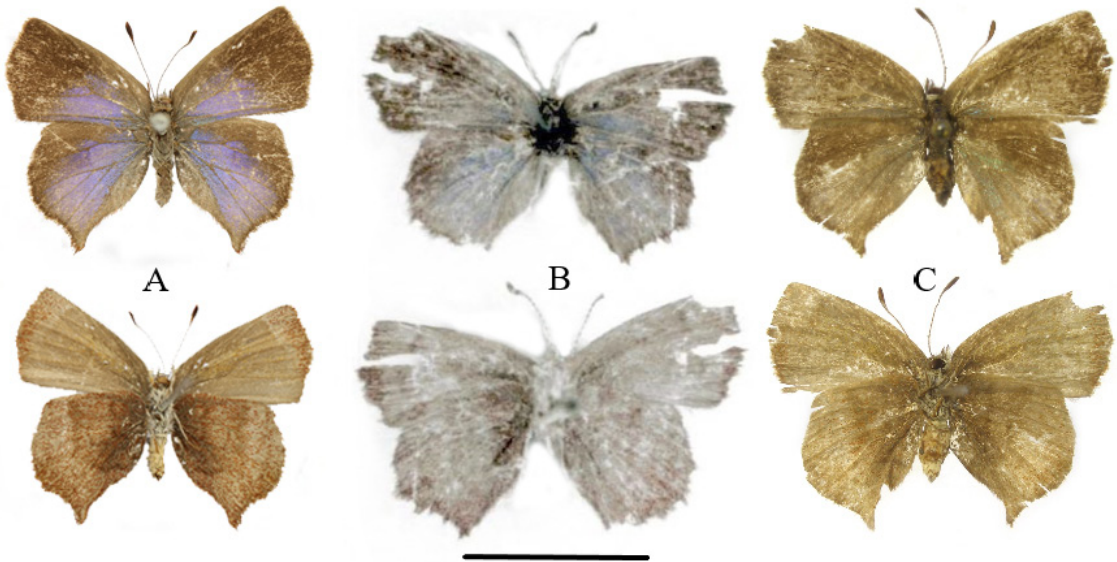


Figure 3. *Rhamma amethystina* (Hayward, 1949) material – A = *Thecla amethystina* Hayward, 1949, topotypic specimen; from Tucumán, 13.5.1992, Rothschild Bequest, B.M. 1939-1 (with permission of NHMUK); B = *Rhamma chilensis* Johnson, 1992 holotype (AMNH); C = *Rhamma amethystina*, voucher female specimen from Argentina: Salta, Cachi, Piedra de Molino, 3150 m, I.1986, Carpentero leg. (HNHM).

Comments:

Synonyms. In his Elfin butterfly monograph Johnson (1992) discussed the name *Thecla amethystina*, which represented a *Rhamma* species described from Argentina (Tucuman, Villa Nogués), and was present in the BMNH collection by paratypic material (D’Abrera, 1995). In describing new taxa Johnson introduced five subjective synonyms of *Rh. amethystina*, two of them were based on specimens originating supposedly from Chile (Robbins, 2004). These were discussed in the book of Peña and Ugarte, (1996) as distinct species, and we discuss them below here.

Rhamma chilensis. Type locality: “Quebrada de Timar, 3400 m, NE of Codpa, Tarapacá”. The holotype was sent to the AMNH geometrid moth specialist Frederick H. Rindge (1921–1996), as a specimen taken by light trap. Although there is no other record for the occurrence of the species in Chile, it is highly probable that *Rh. amethystina* is native in the region, where species with similar distribution have already been found in northeastern parts of the country: *Muelana muela*, *Strymon flavaria* and *S. oribata*.

Shapiroana herreraei. Type locality: “Atacama, 40 km (s) Copiapo”. The whereabouts of the holotype is unknown. On the basis of the original description and documentation it is most probably a male *Rh. amethystina* specimen as suggested by Robbins (2004). This record is highly doubtful. DB visited the locality, which is in the Atacama Desert 400 m asl an improbable habitat for *Rhamma* species, all living in much higher altitudes. The field notes of Luis Peña were also checked but the species was not in the list of species collected on the given day and locality. Probably the specimen was mislabeled.

In sum *Rhamma amethystina* is a visitor and may become temporary resident in N Chile: Arica and Parinacota region, but recently it has not been sampled, most probably because of its extreme seasonality and high-altitude habitats difficult to access.

Genus *Strymon* Hübner, 1819

Peña and Ugarte, (1996) discussed the genera *Eiseliانا* Ajmat de Toledo, 1978 (type species: *Eiseliانا rojasi* Ajmat de Toledo, 1978), *Heoda* Johnson, Miller and Herrera, 1992 (type species: *Thecla heodes* Druce, 1909) and *Strymon* Hübner, 1819 (type species: *Rusticus melinus* Hübner, 1818) as different genera. In a review of *Strymon* Robbins and Nicolay (2002) listed these three genera as synonyms with good reasons. New data on *Strymon* taxonomy and systematics have been supplemented by various authors (Faynel and Johnson, 2000; Nicolay and Robbins, 2005; Robbins, 2010; Costa-Cicognani *et al.*, 2018; Bálint *et al.*, 2019a and 2019b; Bálint and Tomer, 2019). Bálint and Benyamini (2017) especially addressed and discussed the identity of *Thecla heodes*. Based on Robbins and Nicolay (2002) three *Strymon* groups can be recognized in Chile: (1) *S. melinus* group, (2) *S. mulucha* group and (3) *S. istapa* group. The species represented in these groups can be identified with the help of the characters provided by Robbins and Nicolay (2002).

Strymon melinus group

Characters (based on Robbins and Nicolay, 2002): Male lacking a scent patch on the dorsal surface of the forewing, no basal patch of white scales on the ventral surface of the hindwing (except *S. daraba*), penis tip down-turned with a single slender cornutus, ductus bursae with simple sclerotized loop, ductus seminalis arises from the unsclerotized posterior end of the corpus bursae, female with 8th tergum unfurrowed and lacking imbedded vestigial spiracles.

175. *Strymon daraba* (Hewitson, 1867) - (Fig. 4)

Thecla daraba Hewitson, 1867: 105; Hewitson, 1874: 105; Draudt, 1920: 808 (in [new] synonymy of *Thecla yojoa*).

Thecla tyleri Dyar, 1913: 636.

Thecla davara joannisi f. pallida Dufrane, 1939: 291; Peña and Ugarte, 1996: 195; **new synonym.**

Strymon daraba (Hewitson) Johnson and Salazar, 1993: 12; Peña and Ugarte, 1996: 199; Robbins and Lamas, 2002: 97 (in synonymy of *Strymon yojoa*); Robbins, 2004: 130.

Strymon tyleri (Dyar); Robbins and Nicolay, 2002: 97; Robbins, 2004: 130 (in [new] synonymy of *Strymon daraba*).

D: XV; FP: -?; C; 10.



Fig. 4. *Strymon daraba* (Hewitson, 1867) – HNHM male from “Peru: Lima, Santa Rosa, Guiberez [= Gutierrez], 800 m, 11.VII.1999, G. Gere leg.”

Comments:

Identity. Although *S. daraba* was clearly identified by Johnson and Salazar (1993), in spite of this the species was placed in the synonymy of *Strymon yojoa* by Robbins and Nicolay (2002). The lectotype of *Thecla daraba* is from Guayaquil, situated on the Pacific coast of Ecuador (Robbins and Lamas, 2002). The species *S. yojoa* is distributed from Mexico via Central America to the Amazon basin but does not penetrate into the Pacific region. The species *S. daraba* and *S. yojoa* can be distinguished on the basis of wing pattern traits: in *S. daraba* fore and hindwing ventral wingsurface postmedian lines are continuous; whilst in *S. yojoa* these are broken. These results were reflected by Robbins (2004), where *Thecla tyleri* (type locality: Coropuna, Peru) was placed in the synonymy.

New synonymy. Robbins (2004) placed the name *Thecla pallida* (type locality: Trujillo, Peru) in the synonymy of *S. davara*, but forma *pallida* shows the wing traits of *T. daraba* (see Warren *et al.*, 2017). We consider *S. daraba* as an endemic species for the Pacific coast of South America.

Occurrence. A rare visitor to Arica and Parinacota Region. Peña and Ugarte (2006: 199) stated that “this species has been found only occasionally, in far northern Chile”; but we never saw any authentic specimen collected in the region. In the HNHM there is material collected in the vicinity of Lima; Alfred

Moser collected several specimens in Arequipa and believes that it may penetrate N Chile from time to time and may establish colonies.

Strymon mulucha group

Characters (based on Robbins and Nicolay, 2002): Male with a scent patch on the dorsal surface of the forewing, with basal patch of white scales on the ventral surface of the hindwing, in lateral view penis tip down-turned with a single slender cornutus, ductus bursae with simple sclerotized loop (except for some individuals of *S. cestri*), ductus seminalis arises from the unsclerotized posterior end of the corpus bursae, female with 8th tergum unfurrowed and lacking imbedded vestigial spiracles.

176. *Strymon crambusa* (Hewitson, 1874) - (Fig. 5)

Thecla crambusa Hewitson, 1874: 20; Draudt, 1919: 760; D’Abrera, 1995: 1142.

Strymon crambusa (Hewitson); Johnson, Eisele and McPherson, 1990: 15; Peña and Ugarte, 1996: 197; Robbins, 2004: 130.

D: XV, (II-III)?; FP: 9-11; C: 10.



Figure 5. *Strymon crambusa* (Hewitson, 1874) – HNHM male from Brasil: Mato Grosso, Conceição dos Ouros, Rio Sapucaí, 900 m, 2007, G. P. Almeida leg.

Recorded twice in Chile; from SE Calama (Antofagasta) and Arica (Arica and Parinacota Reg.). Although it is highly probable, breeding in the Pacific region is not yet confirmed. There is a slight possibility that this species was accidentally introduced to Chile with the ornamental *Althernantera* sp. in the last century and became partially established in the wild (Calama II region / Huasco-Freirina in S costal Atacama III region). The source of Atacama references was Johnson *et al.* (1990), based most probably on misidentifications or mislabeled specimens. It is highly improbable that the species breeds in Copiapó, which is a relatively well explored area. The Arica record is more reliable as the species is distributed from Bolivia (Cochabamba) via the Mato Grosso region to the Atlantic coast of Brazil (vouchers in the HNHM collection), therefore the possibility that the specimen in Arica was a stray cannot be excluded. In the Cerrado region of Brazil the species specializes on Oxalidaceae (Da Silva *et al.*, 2016). If the species is native in Chile, the caterpillars should be looked for on *Oxalis* spp.

177. *Strymon davara* (Hewitson, 1868) - (Fig. 6)

Thecla davara Hewitson, 1868: 31; Draudt, 1920: 810.

Thecla davara joannisi Dufrane, 1939: 290; Ureta, 1947: 55; Ureta, 1949: 100.

Strymon davara (Hewitson); D'Abbrera, 1995: 1244; Robbins, 2004: 130.

D: XV, IV; FP: 10–5; C: 1.

Comments:

Biology. It is a widespread species in the dry and open areas on the western side of the Andes in Ecuador and Peru and also known from the Peruvian Pacific coast (HNHM vouchers). The life history of the species in Chile was documented by Vargas and Duarte, (2016) and DB breeding notes - the larval host plant in Arica and Parinacota region XV (also recorded from Vicuña, Elqui, Coquimbo) is the weed *Alternanthera halimifolia* (Lam.).

Nomenclature. The name *Thecla davara* was proposed on the basis of an unstated number of specimens of unstated sex from an unspecified locality. The species was redescribed, and the wing undersides were illustrated subsequently by Hewitson. According to Kirby, (1879) a single specimen was deposited in the Hewitson-collection, without any indication of locality. The species was also described under the name *Thecla davara joannisi* from the coastal region of northern Peru and was first reported from Chile by Ureta, (1947 and 1949).

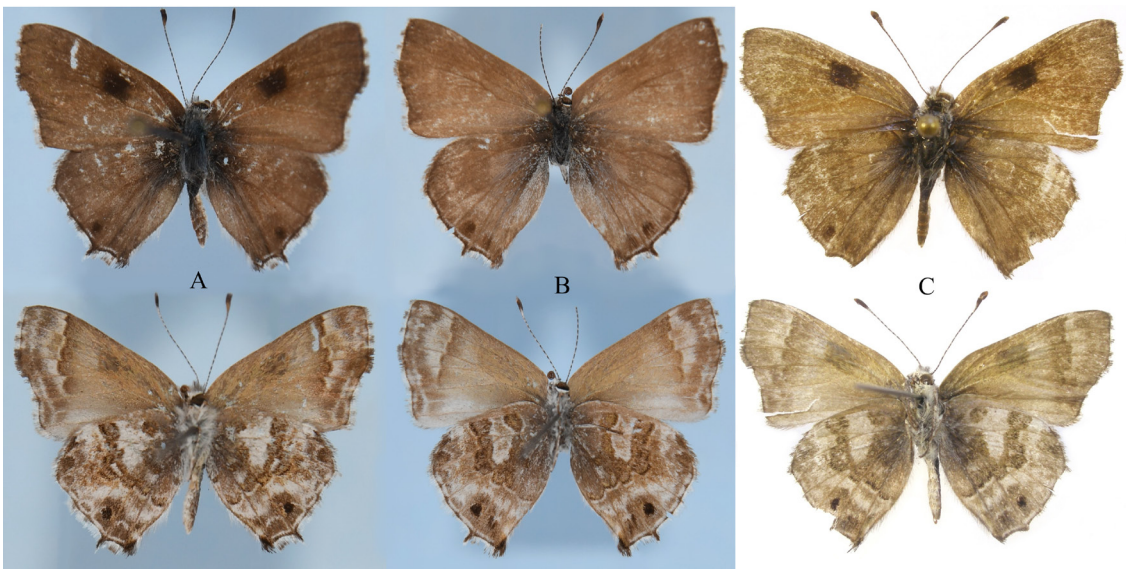


Figure 6. *Strymon davara* (Hewitson, 1868) – A = DBC male from Chile: Tarapaca, 7km E of Arica, Valle de Azapa, 100 m, 5.IV.2007, D. Benyamini leg.; B = DBC female from Chile: Tarapaca, Arica, sea level, 26.XI.1996, D. Benyamini leg.; C = HNHM male from “Peru: Lima, Santa Rosa, Guiberez [= Gutierrez], 800 m, 11.VII.1999, G. Gere leg.

***Strymon istapa* group**

Characters (based on Robbins and Nicolay, 2002): Males often with a scent patch on the dorsal surface of the forewing (except for *Strymon nivea* and *S. oribata*), no basal patch of white scales on the ventral surface of the hindwing, penis tip down-turned with a single slender cornutus, ductus bursae with sclerotized loop simple (except in *S. acis*), ductus seminalis arises either from the unsclerotized posterior end of the corpus bursae or from a point anterior of a sclerotized patch on the dorsal surface of the corpus bursae, female with 8th tergum furrowed (except in *S. acis*) and with imbedded presumed vestigial spiracles. The group can be discriminated into further subgroups. Although this splitting is based primarily on wing characters, the subgroups are most probably reflecting monophilies: (1) *Eurytulus* subgroup, and (2) *Bicolor* subgroup

***Eurytulus* subgroup**

The titular species of this group is *Strymon eurytulus* (Hübner, [1819]) (described as *Tmolus eurytulus*, male and female syntype, no locality, see Hübner, [1819]), which is a widespread species in the Amazonas basin and the neighbouring regions, but does not occur west of the Andes. The members of the groups have no orange colouration on the forewing underside.

178. *Strymon americensis* (Blanchard, 1852), reinstated status (Fig. 7)

Thecla americensis Blanchard, 1852: 38; Draudt, 1920: 810.

Strymon americensis (Blanchard); Elwes, 1903: 290; D'Abrera, 1995: 1243.

Thecla americensis americensis Blanchard; Ureta, 1949: 101.

Strymon peristictos Johnson, Eisele and MacPherson, 1990: 16; Robbins, 2004: 131 (as [new] synonym of *Strymon eurytulus*).

Heoda nivea Benyamini and Johnson, 1995: 16, fig. 5a, male "Potrerillos" (misidentification).

Strymon eurytulus (Hübner); Peña and Ugarte, 1996: 194.

Strymon peristictus [!] Johnson, Eisele and MacPherson; Peña and Ugarte, 1996: 198 (misspelling).

D: III–X; FP: 8–2; C: 1.

Comments:

Biology. In El-Niño years in the Atacama Desert periphery the species takes advantage of the numerous "carpets" of available "Malvelas" to breed quickly in large numbers. The eggs are usually laid on the flower buds and the larvae do not consume the eggshell.

Nomenclature. The species *Strymon eurytulus* sensu Robbins (2004) needs revision. This is out of the scope of the present work, but we highlight some aspects:

On the western side of the Andes in Chile the dominating phenotype was described as *Thecla americensis* Blanchard, 1852 (type locality: Chile, Coquimbo; on the basis of an unstated number of female syntypes; lectotype designated by Johnson, 1991a: 153), which is similar to *S. eurytulus*, but differs in that (a) the blue marginal coloration in the hindwing dorsal wingsurface is missing or just reduced to a few

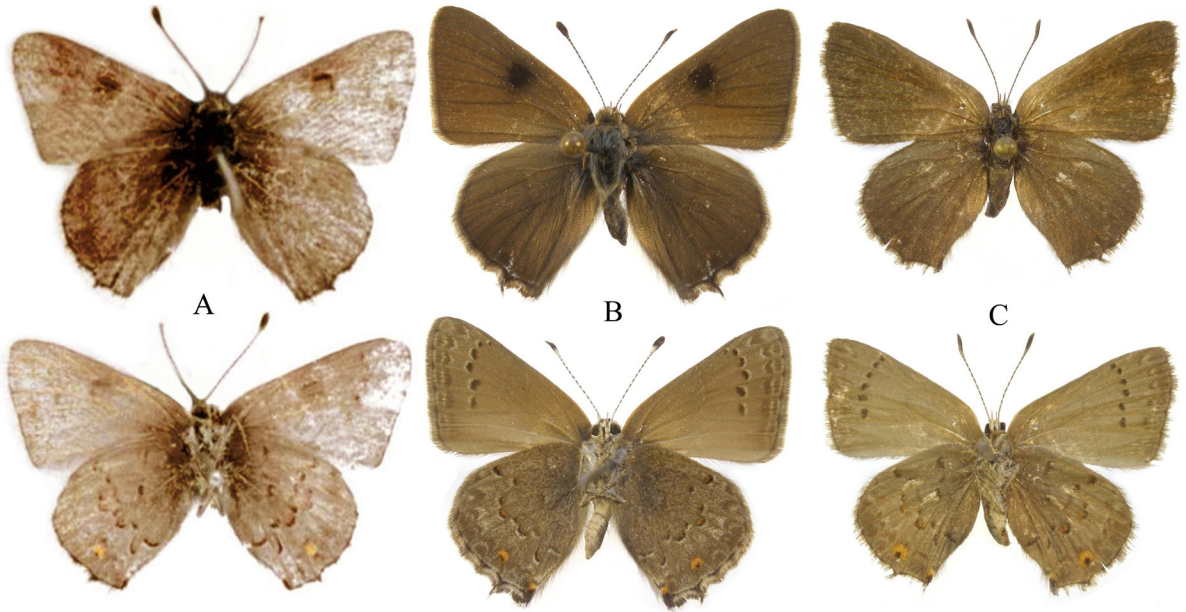


Figure 7. *Strymon americensis* (Blanchard, 1852) – A = *Thecla americensis* Blanchard, 1852 lectotype (MNHN); B = DBC male from Chile: Atacama, 40 km S of Copiapo, ex larva on *Crystaria* sp. (Malvaceae), pupa: 13.I.1999, adult: 11.II.1999, D. Benyamini leg.; C = DBC female from Chile: Santiago Metropolitan, Río Yeso, 1900 m, 8.XII.1992, D. Benyamini leg.

antemarginal scales, (b) the tail at the hindwing vein CuA2 terminus is very short or missing, and (c) the abdomen does not have orange scaling.

Besides *Thecla americensis*, Robbins (2004) lists four junior subjective synonyms under the name *Strymon eurytulus*. The names *Thecla argona* Hewitson, 1874 (type locality: Uruguay), *T. tucumana* H. H. Druce, 1907 (type locality: Argentina, Tucumán), and *T. eurytulus nigra* Lathy, 1926 (type locality: Argentina, Tucumán) do not affect our region, but *Strymon peristictos* K. Johnson, Eisele and McPherson, 1990 (type locality: Chile, Atacama) does. The species *S. eurytulus* is discussed as species no. 179, *S. peristictos* is dealt with in the next entry.

Robbins and Nicolay (2002) and Robbins (2004) regarded *S. peristictos* as a synonym or subspecies of *S. eurytulus*. We have a series of specimens ($n = 15$) collected close to the type locality and from other localities (3 males, 1 female: 35 km W of Copiapo. 6.X.1990; Alcohuaz, 1400 m, X.1992; male, female: Copiapo, 200m, 14.VIII.1994; 2 males and 7 females: Alcohuaz, 1450-1700 m, 3-9.IX.1990) with the characters regarded by Johnson *et al.* as specifically distinct: (a) hindwing ventral surface with “basal disc dark brown (not marked internally with any macules)” and (b) “submarginal area with white suffusion”. The trait (a) originates from the insufficient handling of the specimen, when during the relaxation process wing parts close to the body could not be properly dried as too much grease seeped from the body and the scales became stuck together (see the documentation in Warren *et al.*, 2017). The trait (b) often occurs in the *S. americensis* phenotype. We are of the opinion that the holotype specimen represents *S. americensis*. This phenotype was documented in colour under the name *Heoda nivea* (Benyamini and Johnson, 1995, fig. 3e). One of our breeding attempts involved one population 40 km south of Copiapo. The specimens of the parental stock (showed typical “*americensis*” traits) were collected on *Heliotropium* sp., but most probably this was only the nectar source of the males. The caterpillars, which exhibited cannibalistic behavior, were reared on *Cristaria* sp. (Malvaceae) and resulted in both imagines typical of “*americensis*” and “*peristictos*”,

as well as in intermediates (DB breeding notes). Further investigations are needed on this topic, but at the moment we follow Robbins (2004) who did not recognize *S. perstictos* as a biological species.

At our disposal (Benyamini collection) there are two male and two female specimens from Paso del Córdoba (Nequén, Argentina) and eight male and two female specimens from Esquel (Chubut, Argentina) showing clear affinity to *S. americensis* with male androconia, which is smaller, without any hindwing tail, the hindwing ventral wing surface is somewhat differently patterned, especially at vein termini where there are stark black scales resulting in a spotted margin. This undescribed species may also occur in Chile.

179. *Strymon eurytulus* (Hübner, [1819]) - (Fig. 8)

Tmolus eurytulus (Hübner, [1819]): pl. 90, figs. 1–4.

Thecla tucumana Druce, 1907: 627; Draudt, 1920: 810; Robbins, 2004: 131 (in [new] synonymy of *Strymon eurytulus*).

Thecla americensis tucumana Druce; Ureta, 1949: 101.

D: II-VII in their eastern border with Argentina; FP: 11-2; C: 10.

Comments:

Distribution. On subspecific level Ureta (1949) clearly distinguishes *Thecla americensis americensis* and *Thecla americensis tucumana*. He remarks that the former is widely distributed in Chile “desde Atacama hasta Castro”, whilst the latter one is known by a single specimen with the data “Linares, 7–II–1946, Sergio Barros”. In the Argentine Mendoza and San Juan provinces *S. eurytulus* occurs in many places on the eastern side of the Andes (vouchers in DB collection, Ferrer *et al.* 2020), and we do not know whether there are populations on the Chilean side of this species, or if the specimen recorded by Ureta was just a stray.

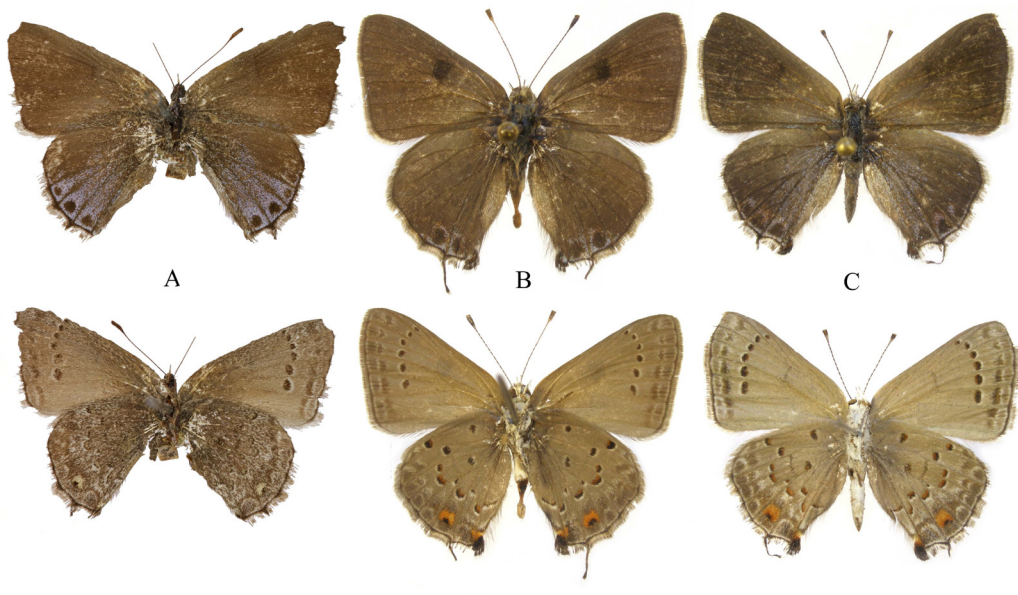


Figure 8. *Strymon eurytulus* (Hübner, [1819]) A = *Thecla tucumana* Druce, 1907 holotype (BMNH) (with permission of NHMUK); B = DBC male from Argentina: Mendoza, San Rafael, 1600 m, 17.XII.1999, D. Benyamini leg.; C = DBC female specimen from Argentina: Mendoza, La Paz on Ruta 7, 492 m, 25.XII.2010, D. Benyamini leg.

Possible species. According to the material at our disposal (HNHM: ten males, three females) in the Argentinian provinces Chubut and Neuquén the species *Strymon patagoniensis* (Johnson, Miller and Herrera, 1991) can be found; it may also occur in Chilean territory. *S. patagoniensis* dorsal wing surfaces in both sexes are entirely brown, male is with androconia, hindwing is not tailed, and ventral wing pattern is vestigial, and far less white coloured. This species is erroneously considered as synonym of *Strymon rana* (Schaus, 1902) (= *Thecla rana*, male and female syntypes, type locality: Brazil, Paraná, Castro) by Robbins, (2004); this species has no androconia, but it is tailed, and has submarginally blue coloured hindwings.

180. *Strymon sapota* (Hewitson, [1877]), reinstated status - (Fig. 9)

Thecla sapota Hewitson, [1877]: 203; Draudt, 1920: 809; Ureta, 1947: 54; Ureta, 1949: 99; Robbins, 2004: 130 (as synonym of *Strymon bubastus*).

Thecla cestri peruensis Dufrane, 1939: 290.

Strymon sapota (Hewitson); D’Abrera, 1995: 1243; Peña and Ugarte, 1996: 196.

D: XV; FP: 10–4; C: 1.

Comments: Robbins, (2004) lists six names under *Strymon bubastus* (Stoll, 1780) as junior subjective synonyms including *Thecla sapota*. Besides *T. sapota*, only the name *T. cestri peruensis* was based on material originating from the Pacific side of the Andes. We consider the nominal taxon *sapota* (with its junior synonym *peruensis*) as a distinct species because of the following: (1) the *sapota* phenotype can be discriminated easily on the basis of wing characters; (2) the *sapota* phenotype is restricted to the Pacific coast of South America and the adjacent dry areas of the Andes; and (3) the *sapota* phenotype is irrelevant to host plant and climatic conditions (cf. Vargas *et al.*, 2016). The species was common on the Peruvian Pacific coast, where imagines swarmed around stocks of *Phyla canescens* (Bálint, 1999). The species utilizes *Phyla* (Verbenaceae) and *Waltheria* (Malvaceae) as larval hosts (Vargas *et al.* 2016, DB breeding notes).

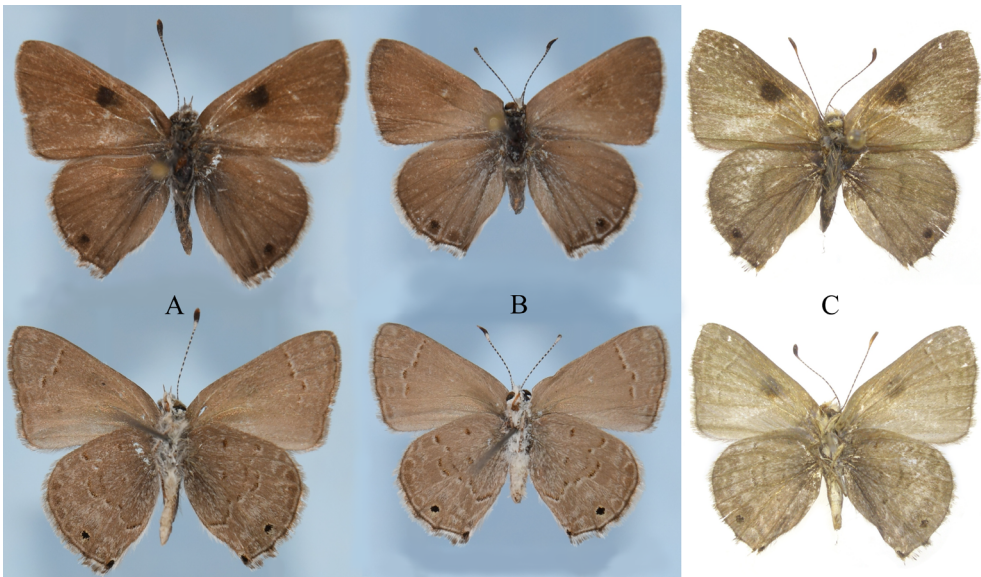


Figure 9. *Strymon sapota* (Hewitson, [1877]) – A = DBC male from Chile: Tarapaca, Arica, Quebrada Vitor, 265 m, 18.III.1996, D. Benyamini leg.; B = DBC female from Chile: Tarapaca, Arica, Quebrada Vitor, 225 m, 2. I.1998, D. Benyamini leg.; C = HNHM male from Peru: Ica, Paracas, sea level, 14.II.1995, Zs. Bálint and G. Lamas leg.

181. *Strymon oribata* (Weymer, 1890) - (Fig. 10)

Thecla oribata Weymer, 1890: 123; Draudt, 1921: 823.

Thecla rojasi Ureta, 1956: 258; Robbins, 2004: 131 (as junior synonym of *Strymon oribata*).

Eiseliana koehleri Ajmat de Toledo, 1978: 80.

Eiseliana rojasi (Ureta); Peña and Ugarte, 1996: 209.

Strymon oribata (Weymer); Robbins, 2004: 131.

D: II; FP: 10; C: 9.

Comments:

Biology. In Chile the species was taken in the Puna belt of Antofagasta at 3000 to 4000 meters by Ureta (1956). Since then, there has been no new record for the country. The species should be looked for in February–April after the Bolivian winter, in the biotope of *Pseudolucia oligocyanea* Ureta, 1956 (see Benyamini *et al.*, 2020). Jörgensen (1934) reared the species on the low-growing *Tephrosia heterantha* (Leguminosae) in Catamarca (Argentina). Guerra Serrudo *et al.* (2013) reported several *Dalea* species as larval host in La Paz region (Bolivia). DB and OT bred it on *Krameria* sp. (Krameriaceae) in N Argentina (new hostplant, MS in prep.). DB recorded egg laying on *Evolvulus* sp. (Convolvulaceae) at Yavi, N Argentina (new hostplant, MS in prep.).

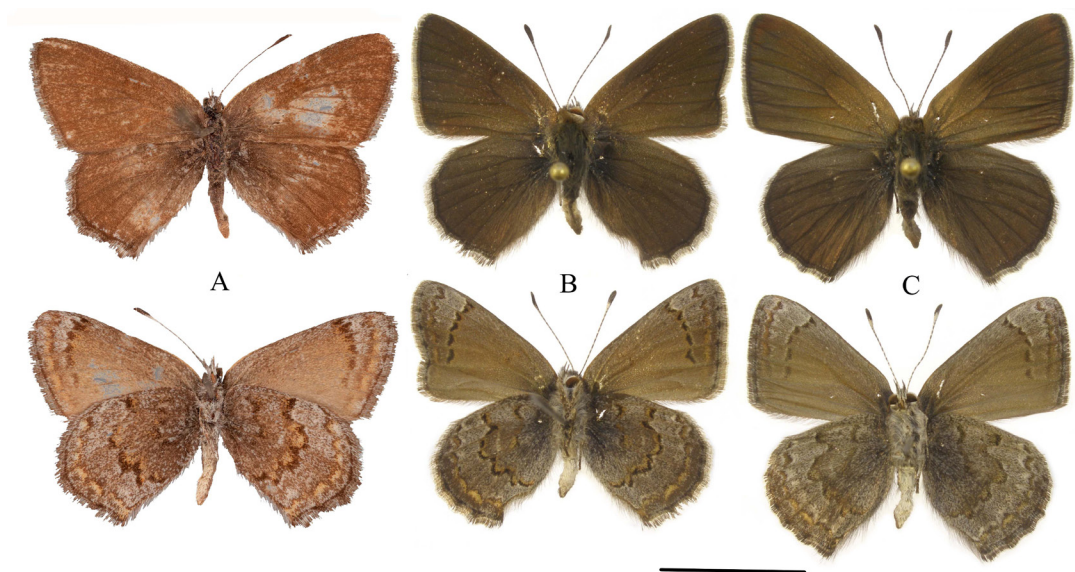


Figure 10. *Strymon oribata* (Weymer, 1890). A = *Thecla oribata* Weymer, 1890 holotype (HUZM) (photographed by MfN/© Eran Wolff). B = DBC male from Argentina: Jujuy, 9 km E of La Quiaca, 3950 m, 9.XII.2018, ex egg on *Krameria lappacea*, adult: 1.I.2019, D. Benyamini leg.; C = DBC female, ditto, but adult: 25.I.2019.

Misapplied name. Johnson (1990a) misapplied the name *Thecla oribata* for the female phenotype of *Thecla culminicola* Staudinger, 1894 (type locality: Huallatani, Bolivia via lectotype designation of Johnson, 1992), which resulted in the new combination of *Penaincisalia oribata* (Weymer, 1890), Johnson, 1990 (cf. Johnson, 1992). This nomenclatural action is based on misidentification and lead to the erroneous Chilean record of the biological species known today as *P. culminicola* (see doubtful species).

Synonymy. The species was described on the basis of a single female (holotype) taken “bei Tacora, Bolivien” (located in the Stübel collection in Berlin, Fig. 10A). Robbins (2004) lumped under *Strymon oribata* the nominal taxa *Eiseliena koehleri* (type locality: Argentina, Jujuy, Tilcara, Cerro Negro), *Thecla arenicola* Jörgensen, 1934 (type locality: Argentina, Catamarca, Campo del Arenal), *T. punona* Clench, 1944 type locality: Peru, Puno), and *T. rojasi* (type locality: Chile, Antofagasta, Lequena). The types of *E. koehleri*, *T. oribata* and *T. rojasi* share the trait that the female wings are dorsally brown, and the hindwing ventral surface postmedian line is composed of light brownish-yellow scales. Since their discovery these taxa have been rarely sampled or documented. The taxon *T. punona* seems to be a different species (Bálint, in prep.).

182. *Strymon nivea* (K. Johnson, L D. Miller and G. J. Herrera, 1992) - (Fig. 11)

Heoda nivea Johnson, Miller and Herrera, 1992: 132; Peña and Ugarte, 1996: 216; Robbins and Nicolay, 2002: 98 (as [new] synonym of *Strymon eurytulus*).

Strymon nivea (Johnson, Miller and Herrera); Robbins, 2004: 131 (reinstated status).

D: XI; FP: 10-11; C: 10.

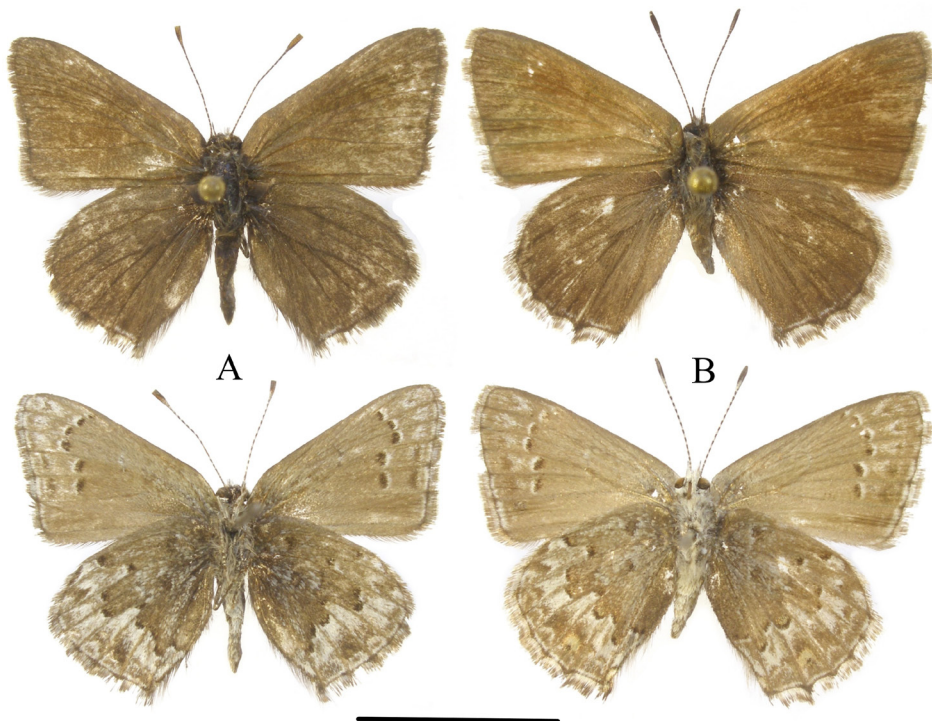


Figure 11. *Strymon nivea* (K. Johnson, L. D. Miller and G. J. Herrera, 1992) – A = DBC male from Chile: Aisen, Chile Chico, 250 m, 23.X.2001, D. Benyamini leg.; B = DBC female from Argentina: Neuquén, Rahue (S Aluminé), 2.I.2004, A. Ugarte leg.

Comments:

Distribution. For the species Peña and Ugarte, (1996) indicates a wide, but isolated distribution from Chile Chico in Aisen. According to our data *S. nivea* does not live on the western side of the Andes in Central Chile. These records are most probably based on misidentifications (cf. Benyamini and Johnson, 1995: 16, fig. 5e: *H. nivea* male, “Potrerillos” = *S. peristictos*). The species is easy to identify as the male has no dorsal forewing surface androconia and the ventral hindwing surfaces are conspicuously patterned with white postmedian and submarginal patches (*nivea* = snowy). The known occurrences of the species in Chile are restricted to Aisen.

Possible species. In the Mendoza region of Argentina there is a phenotype somewhat reminiscent of *S. nivea* (cf. Ferrer *et al.*, 2020), which is most probably an undescribed taxon (Benyamini and Bálint, in prep.).

This undescribed species itself (or its not yet collected sister), may also occur on the western side of the Andes east of the Metropolitan area. For this geographical pattern there are examples in the genus *Pseudolucia* (see Benyamini *et al.*, 2020).

183. *Strymon flavaria* (Ureta, 1956) - (Fig. 12)

Thecla flavaria Ureta, 1956: 258.

Heoda erani Benyamini and Johnson, 1996: 15, Peña and Ugarte, 1996: 217; Robbins, 2004: 131 (a synonym of *Strymon flavaria*).

Strymon flavaria (Ureta); Robbins and Nicolay, 2002: 98 [new combination], Robbins, 2004: 131.

Eiseliaria flavaria (Ureta); Peña and Ugarte, 1996: 208.

D: XV–II; FP: 10–5; C: 2.

Comments:

Discovery. It seems that in Chile the species was first collected by Luis E. Peña in Chiniña, Camino a Talabre on 6.X.1955, and subsequently it was found on 23. X. 1955 by Juan G. Rojas in the Antofagasta mountains. DB collected adults and early stages along the road to the ALMA Observatory, Antofagasta II region during December 2009 at 4137m and April 2011 between 3038–3365m. In April 1994 DB found a similar species in Tarapaca, 700 km north from the type locality of (*E. flavaria*). *Strymon flavaria* has been discovered in southern Peru very recently (Farfán-Larico, 2018) and the life history of *S. flavaria* is documented by Ramírez-Fischer *et al.*, (2016), revealing that it is a host-specialist hairstreak, strongly connected to *Krameria lappacea* (Krameriaceae). *Identity.* Dr. Robert K. Robbins of the Smithsonian Institution, Washington DC, in a letter to DB speculates on *H. erani*’s close resemblance to *Thecla flavaria*, suggesting that they are identical. Based on new morphological and molecular data the status of *H. erani* needs to be evaluated posing the question whether populations named as *flavaria* and *erani* represent the same taxon or are distinct, and represent well definable sister lineages.

Bicolor subgroup

The titular species of this group is *Strymon bicolor* (Philippi, 1859) (described as *Lycaena? bicolor*, male and female syntype(s), “prope Santiago”), which is a widespread species in Chile, in the coastal region and in the adjacent mountains. The members of the group have orange colouration on the grey forewing

underside. Johnson, Miller and Herrera (1992) revised the taxon and documented its wide phenotypic plasticity. They distinguished five *bicolor* “morphs” (= phenotypes), and described three taxa representing the *bicolor* species complex, although they placed them in different genera as *Eiseliaria probabila*, *Heoda shapiro* and *H. suprema*. Another species, also belonging to this group was introduced later under the name *Heoda atacama* Johnson and Miller, 1992. This situation was mirrored by Peña and Ugarte (1996). Although Johnson and his co-workers identified the phenotype “*bicolor*”, that definition remained in controversy, because of the complex wing pattern and androconia variability which the species displays in several habitats. Moreover, the identity of *Thecla heodes* Druce, 1909 (the type species of *Heoda*) was controversial (Bálint and Benyamini, 2017, Bálint *et al.*, 2019) – Fig. 15b. Based on 163 Chilean and 52 Argentinian specimens ($\Sigma = 215$), recently collected or reared, and reevaluated historical material, we revised the group (Bálint and Benyamini, in prep.). Regarding Chilean taxa some of our results are published here. According to our best knowledge five species can be discriminated in Chile, and with the help of the key below they can be identified based on wing traits. The recognized species are discussed below in alphabetical order.



Figure 12. *Strymon falvaria* (Ureta, 1956) specimens of DBC from Chile – A = male, ex larva, Arica and Parinacota, Socoroma, X.2011, H. Vargas leg.; B = female, ditto, but. XII.2010; C = male, ex ova, Antofagasta, S. P. de Atacama, km 19280, Alma Observatory, 3266 m, 6.IV.2011, D. Benyamini leg.; D = female, Tarapaca, Zapahuira, 3100 m, 17.III.1996, D. Benyamini leg.; E = male, km 20 [Alma observatory road] , 11.2009, A. Ugarte leg.

Key for the bicolor subgroup

1_ ventral hindwing surface ground colour grey with faint pattern, no tail ... 2 (*S. bicolor*, *S. coquimbanus*, *S. probabila*, *S. suprema*)

__ ventral hindwing surface green with conspicuous pattern comprised by submedian and median zigzagged transverse lines white basally, black distally, vein CuA2 terminus tailed ... *S. wagenknechti* (Ureta, 1947) (Figs 13A, 18)

2_ dorsal forewing androconial patch black and trapezoid in shape; situated distally and occupying one third of discalis, orange colouration not reaching androconial patch and neither penetrating beyond median area towards base ... 3 (*S. bicolor*, *S. coquimbanus*, *S. suprema*)

__ dorsal forewing androconial patch brown, oval shaped; situated distally and occupying half of discalis; orange colouration reaching androconial patch and penetrating beyond median area towards base ... *S. probabila* (Johnson, Miller and Herrera, 1992) (Figs 13B, 16)

3_ male forewing outer margin straight or slightly convex; ventral forewing surface submarginal and hindwing surface postmedian area somewhat lighter than brown submedian region or with the same ground colour; ventral hindwing postmedian area between costa and vein M3 with ground colour, always with orange submarginal spot present in space of veins of Cu1-Cu2 ... 4 (*S. bicolor*, *S. coquimbanus*)

__ male forewing outer margin straight or slightly concave; ventral forewing surface apical area with submarginal and ventral hindwing postmedian area lighter than submedian region, often with white or ash-grey coloured scales; ventral hindwing postmedian area between costa and vein M3 coloured white, without orange submarginal spot in space of veins of Cu1 and Cu2 ... *Strymon suprema* (Johnson, Miller and Herrera, 1992) (Figs 13C, 17)

4_ ventral forewing submarginal and hindwing postmedian region with colour of hindwing submedian region, hindwing small orange submarginal spot present in space of veins of Cu1-Cu2, male genitalia without brush organ ... *Strymon bicolor* (Philippi, 1859) (Figs 13D, 14A)

1) _ ventral forewing submarginal and hindwing postmedian area somewhat lighter than brown submedian region or with the same ground colour, but hindwing submarginal area always with extensive orange spot present in space veins M3-Cu2; male genitalia with brush organ... *Strymon coquimbanus* sp. n. (Figs 13E, 15aandc)



Figure 13. Androconia of species representing the *Strymon bicolor* group – A = *S. wagenknechti* (Ureta, 1947); B = *S. probabila* (Johnson, Miller and Herrera, 1992); C = *S. suprema* (Johnson, Miller and Herrera, 1992); D = *S. bicolor* (Philippi, 1859); E = *S. coquimbanus* Bálint, Ugarte and Benyaimni, sp. n.

184. *Strymon bicolor* (Philippi, 1859) - (Figs 14aandb)

Lycaena? bicolor Philippi, 1859: 1092; Elwes, 1903: 289; Draudt, 1920: 810.

Thecla bicolor (Philippi); Elwes, 1903: 289; Draudt, 1920: 810; Ureta, 1949: 104.

Thecla quadrimaculata Hewitson, 1874: 106; Elwes, 1903: 289; Draudt, 1920: 810 (in synonymy of *Thecla bicolor*); Johnson, Miller and Herrera, 1992: 115 (in synonymy of *Eiseliana bicolor*); Robbins and Nicolay, 2002: 99 (in synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in synonymy of *Strymon bicolor*).

Thecla bicolor ab. *tricolor* Ureta, 1949: 106 (unavailable); Johnson, Miller and Herrera, 1992: 115 (in synonym of *Eiseliana bicolor*); Robbins and Nicolay, 2002: 90 (in synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in synonymy of *Strymon bicolor*).

Thecla bicolor f. *leptocosma* Hayward, 1949: 578; Johnson, Miller and Herrera, 1992: 120 (in synonymy of *Eiseliana bicolor*); Robbins and Nicolay, 2002: 99 (in synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in synonymy of *Strymon heodes*); Bálint and Benyamini, 2017: 65 (in synonymy of *S. bicolor*).

Eiseliana bicolor (Philippi); Johnson, Miller and Herrera, 1992: 115; Peña and Ugarte, 1996: 210; D'Abbrera, 1995: 1244.

Heoda atacama Johnson and Miller, 1992: 7; Benyamini and Johnson, 1995: 16; Peña and Ugarte, 1996: 215; Robbins and Nicolay, 2002: 90 (in [new] synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in synonymy of *Strymon heodes*); Bálint and Benyamini, 2017: 65 (in synonymy of *S. bicolor*).

Strymon bicolor (Philippi); Robbins and Nicolay, 2002: 90 ([new combination]); Robbins, 2004: 131; Bálint and Benyamini, 2017: 65.

D: IV–IX; FP: 7–1; C: 2.

Comments:

Neotype designation. The nominal species *Lycaena bicolor* was described on the basis of an unstated number of male and female specimens from “prope Santiago”, probably from similar locality where “*Lycaena collina*” type material originated: “collibus prope Santiago”. As in the case of *L. collina*, the type material of *L. bicolor* is also lost (see Bálint and Benyamini, 2001: 116). Because of the existence of several subsequently proposed names and confusing taxonomy, the identity of *Lycaena bicolor* is not straightforward. Therefore, we select a specimen and designated as neotype for clarifying the taxonomic status and the type locality of *Lycaena bicolor*.

Selection of the neotype. The hairstreak species *Strymon bicolor* nowadays is a highly localized butterfly in Metropolitan Santiago area, but it may be common restricted to the site around its hostplants. It the area since the early 1990s it was collected by DB only in five biotopes (a-e):

a) One male at “Santiago, 1200m, 12.10. 1993”, leg. and coll. DB – Fig. 14a J.

b) Three males at “La Disputada, 1250m, 8.10,1994”, leg. and coll. DB – Fig. 14a I.

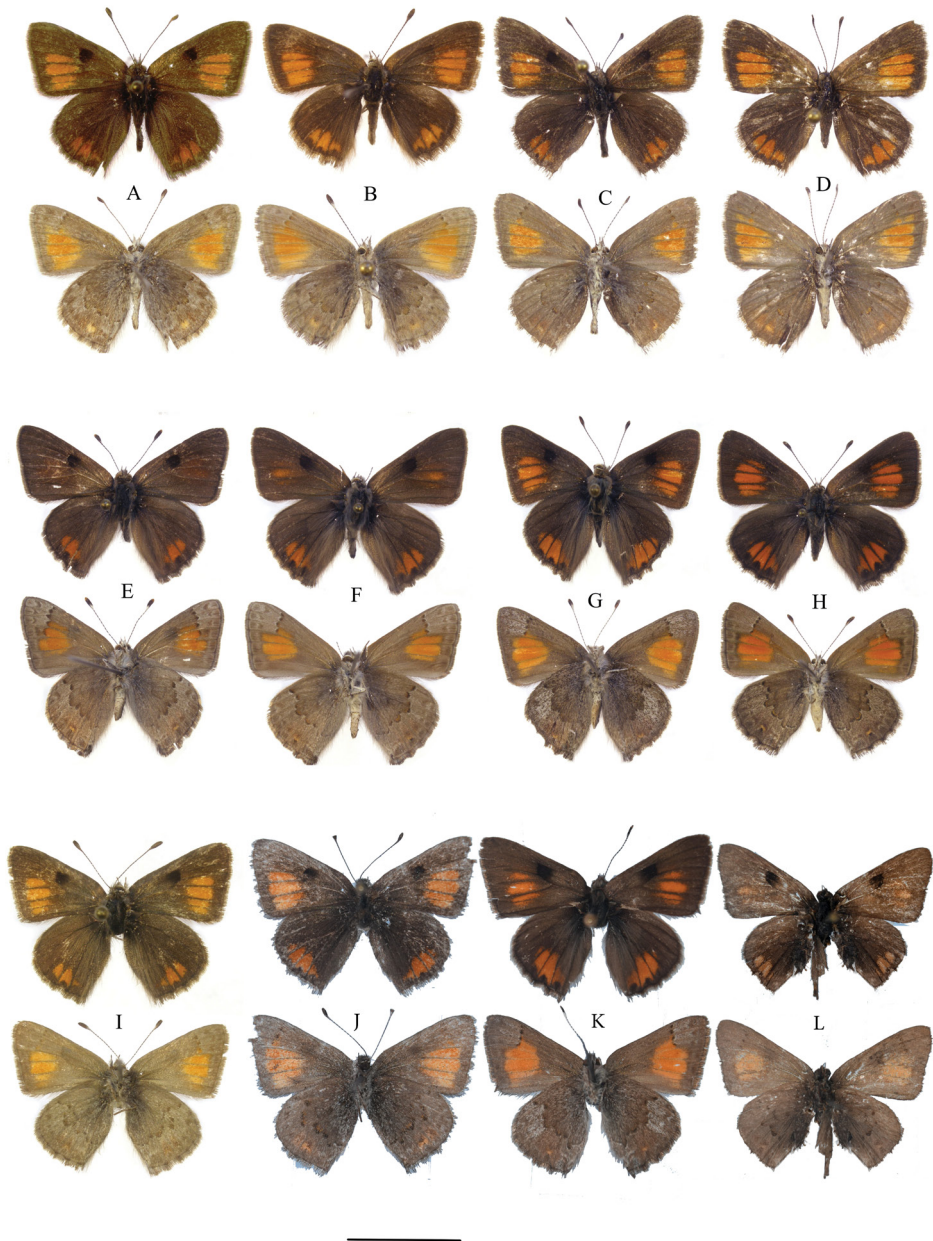


Fig. 14a. *Strymon bicolor* (Philippi, 1859) specimens of DBC from Chile – A = male: Metropolitan, Parque Nacional El Morado, 2400 m, 8.XII.1994, D. Benyamini leg.; B = female: ditto; C = male: Biobío, Ñuble, Termas de Chillán, 20.XII.2010, A. Ugarte leg.; D = female: ditto; E = male (without dorsal forewing orange spot): Valparaíso, Pichicuy, sea level, 23.X.1993, D. Benyamini leg.; F = male (with small dorsal forewing orange spot): ditto; G = male (with extensive dorsal forewing orange spot): ditto, but ex larva, pupa: 19.XI.1993, adult: 19.X.1994; H = female: ditto, but pupa 6.XII.1993, adult: 20.XII.1993; I = male: Metropolitan, La Disputada, 1250 m, 8.X.1994; J = male: Santiago, 1200 m, 12.X.1993, D. Benyamini leg.; K = neotype, male: ex larva on *Astragalus berterianus*, Villa Paulina (Parque cordillera yerba loca), 2000 m, pupa 28.XII.1994, adult 9.XII.1995, D. Benyamini leg.; L = male: Farellones, 2000 m, 11.XII.1994, D. Benyamini leg.



Figure 14b. *Strymon bicolor* (Philippi, 1859), male: La Disputada, 1250m, 8.X.1994, D. Benyamini leg.: genitalia in lateral view.

c) One female at “Villa Paulina, 2000m, 28.12.1994” leg. and coll. DB.

One male “ex larva on *Astragalus berterianus*, Villa Paulina (Parque cordillera yerba loca), 2000m, pupa 28.12.1994, adult 9.12.1995”. After one year in pupal diapause, leg. and coll. DB – the selected neotype – Fig. 14a K.

One female “ex larva on *Astragalus berterianus*, Villa Paulina, 2000m, pupa 27.12.1994, adult June 1995”. After six months, in house, pupal diapause, leg. and coll. DB.

d) One male at “Farellones, 2000m, 11.12.1994”, leg. and coll. DB – Fig. 14a L.

e) Four males and one female from “El Morado N.P. 2350m, 8.12.1994”, leg. and coll. DB – Figs 14a A and B .

Checking this handful of specimens, we realize that while a) and b) are within Santiago city. d) is a specimen from the ski complex up at Farellones and e) are specimens from the Maipo valley and river transverse ecosystem south of Santiago. The only biotope among these five biotopes that agrees with “prope Santiago” is c) Villa Paulina where its “valle de la yerba loca” (valley of the crazy grass) permanently inhabit one of *S. bicolor*’s hostplants; *Astragalus berterianus* that grows there along streams and wet pastures and where the three specimens were collected / bred from larvae. It includes only one male = our selected neotype.

The differentiating characters of the species are given above in the key. The selected specimen is identical with the male individual we have already documented (Bálint and Benyamini, 2017, Figs. 6-7). With this designation the type locality of *Lycaena bicolor* is now “Chile, Santiago, Villa Paulina (Parque cordillera yerba loca), 2000m”. It is certainly matching the information given by the original description. The holotype will be deposited in the butterfly type collection of “Museo Nacional de Historia Natural de Santiago” Quinta Normal, Chile.

Thecla quadrimaculata. The original description is based on one male and one female specimen originating from “Chili”. Already Elwes doubted the distinctness of *bicolor* and *quadrimaculata*, and this opinion was followed by Draudt. The female syntype, still extant in the NHM and displayed by the BOA site (Warren *et al.* 2017), is a typical *bicolor* phenotype. Johnson and his co-workers discussed it as a distinct morph and remarked that it can be relatively large.

Thecla leptocosma. The holotype of *leptocosma* comes from Zapala (Neuquén, Argentina) 100 km east of the Chilean border, approximately at the latitude with Temuco, where *S. bicolor* has also been recorded. According to Johnson and his co-workers this is the commonest form in Argentina. In Chile specimens with *leptocosma* phenotype occurs with the *bicolor* phenotype syntopically and synchronically (Figs. 14a C–D). There are no genitalia or androconial differences between these forms.

Heoda atacama. This taxon was never properly documented, just a poor line drawing was made available. According to the original description the male holotype is deposited in UMCE. It was not found there. We suspect that the *Heoda atacama* model for the colour drawing in Peña and Ugarte book is the holotype. The type locality of this species is “Coquimbo, Elqui, Cta. Pajunales”. No etymology has been provided as to why the species is named as “Atacama”, but we suspect that “Cta. Pajunales” refers to “Cuesta Pajunales”, N La Serena, Atacama (at km 582 on the Panamerican highway). Benyamini and Johnson (1996) figured specimens as “*H. atacama*” from Pichicuy (Valparaíso), which is a locality about 350 km south of the type locality at sea level. The diagnosis underlines the large size, the restricted extension of wing surface orange colouration and more suffusive ventral pattern. None of these are diagnostic as demonstrated by the three specimens originating from Pichicuy (Figs 14a E–G). We conditionally consider the nominal species *H. atacama* and *S. bicolor* to represent the same biological species (Bálint and Benyamini, 2017), as Nicolay and Robbins (2002) suggested, but we do not rule out that the coastal populations represent a distinct taxon. According to field observations of DB in Pichicuy the individual specimens are not only larger, but they also behave differently from the smaller *bicolor* phenotype. The larger “*atacama*” are shy and hide below leaves when threatened, unlike the typical *bicolor* which fly away when disturbed. Also, the “*atacama*” phenotype in Pichicuy feeds on *Astragalus amatus*, *A. curvicaulis*, and *A. edmonstonei*, while the typical *S. bicolor* feeds on *A. berterianus*, *A. cruckshanksii*, and *A. aff. darumbium*. Further field work and nucleus DNA analysis on this phenomenon is necessary to clarify the situation.

185. *Strymon coquimbanus* Bálint, Ugarte and Benyamini, new species - (Fig. 15a)

D: IV; FP: 12; C: 10.

Type material (n = 6): Holotype male, set dorsally, forewing costa length 12 mm, in good condition (legs missing: DNA sampling), with labels: (1) “Pisco Elqui, Coquimbo, Chile [//] 14.10. 1992 [//] Leg. Ugarte Pena” (white label, printed); (2) “HNHM, Budapest [//] Lepidoptera collection [//] 2000-11. [//] don. Dubi Benyamini” (white paper, printed) (3) “DNA [//] 34A” (yellow paper, handwritten with graphite). The holotype will be deposited in the butterfly type collection of “Museo Nacional de Historia Natural de Santiago” Quinta Normal, Santiago, Chile. Paratypes (n=5): “Cord. Alcohuaz, Coquimbo, Chile, 12. 1993, Leg. Ugarte Pena” (DBC male: Bálint gen. prep. no. 1720; female: Bálint gen. prep. no. 986); “Sept 1993 Elqui, Coquimbo, Chile, Leg. Pena/col. Benyamini” (DBC female); Parque Nacional El Morado, 2100 m, 18.12.1994, leg. D. Benyamini (HNHM male: Bálint. gen prep. no. 1721), ditto, but 2200 m, 8.12.1994 (HNHM female: Bálint. gen prep. no. 1722).

Diagnosis and description: Habitus (Figs 15a, A–B): Dorsally the species resembles a pale and middle-sized *S. bicolor*, because the male dorsal forewing androconial patch is black and trapezoid in shape, situated distally and occupies one third of the discalis, the orange colouration not reaching the androconia and neither penetrating beyond the median area towards the base. However, in contrast to *S. bicolor*, the orange color is pale. The forewing ventral surface ground colour is also pale orange with grey colouration restricted to costa, outer margins and basal area. The hindwing ventral surface ground colour is pale grey with indistinct median pattern and the area between veins M3 and CuA2 with an extensive pale orange patch. Genitalia typical *Strymon* features brush organ on the upper part of the tegumen and with aedeagus tip downturned (Fig. 15c, A) (cf. Johnson *et al.*, 1990; Nicolay and Robbins, 2002, Robbins and Nicolay,

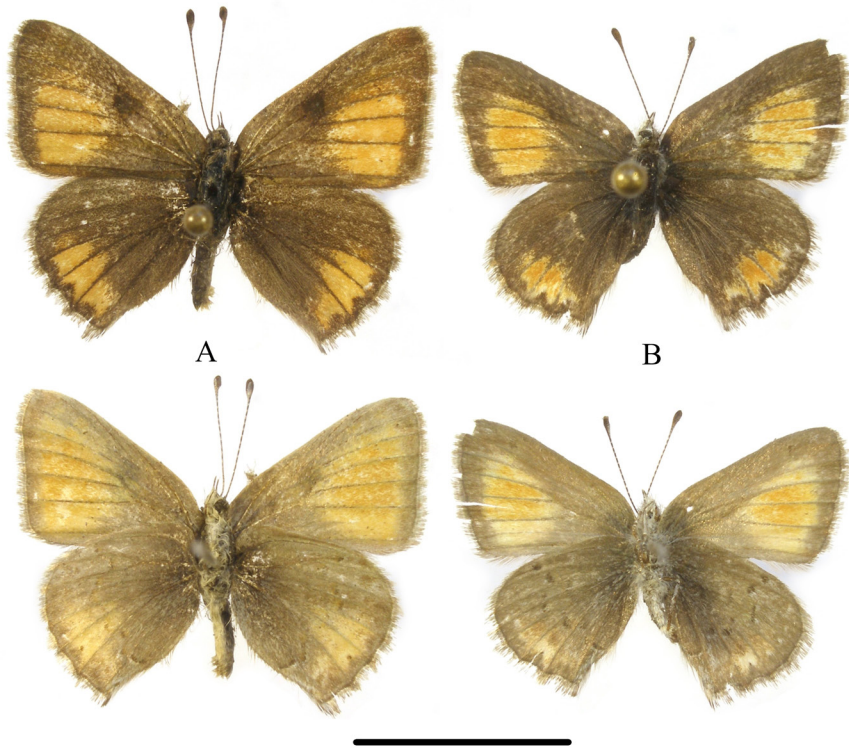


Figure 15a. A = *Strymon coquimbanus* Bálint, Ugarte and Benyamini, sp. n. holotype male: Chile, Coquimbo, Pisco Elqui, 14.X.1992, A. Ugarte leg.; B = female, paratype with holotype data.

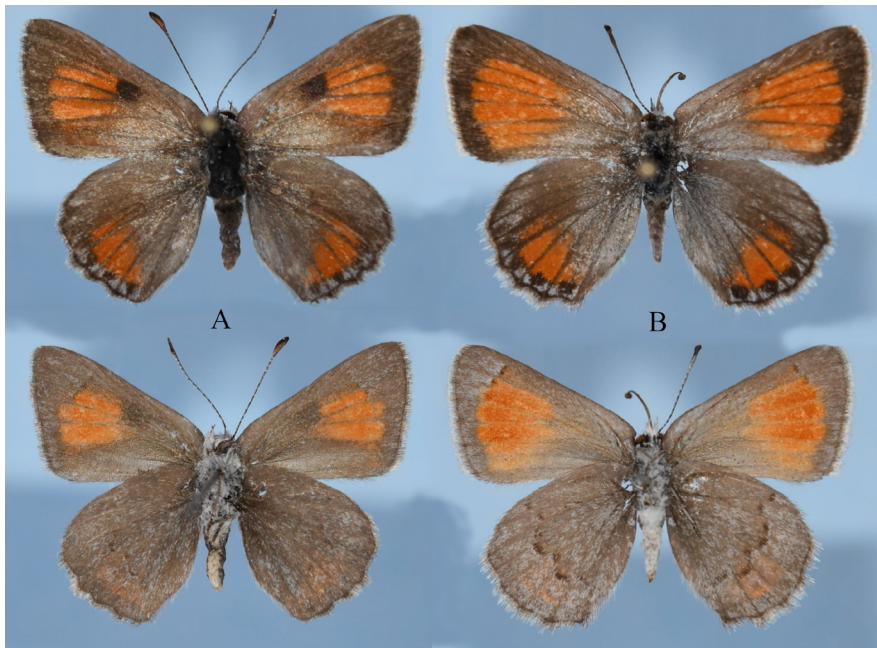


Figure 15b. A = *Strymon heodes* (Druce, 1909) male: Peru, Ancash, S entrance to Huaylas, 2791 m, 22.XII.2018, D. Benyamini leg.; B = ditto, female: Peru, Ancash, 6 km NE of Huaylas, 2400 m, 22.XII.2018, D. Benyamini leg.

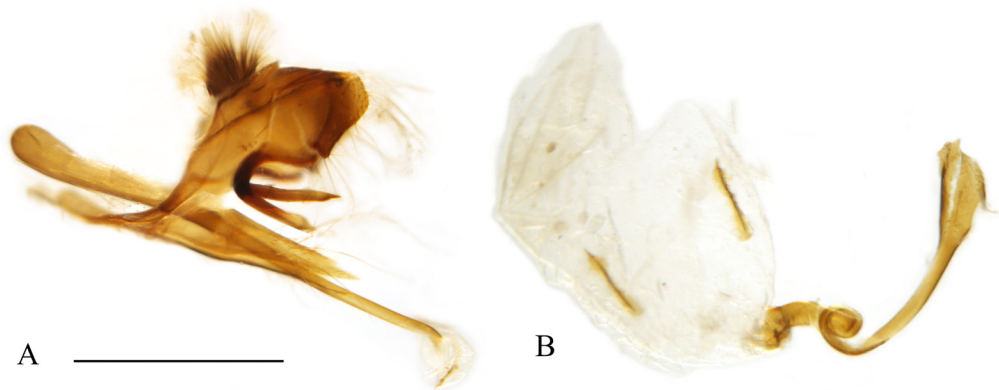


Figure. 15c. *Strymon coquimbanus* Bálint, Ugarte and Benyamini, sp. n. type material genitalia in lateral view A = male, paratype: Chile, Parque Nacional El Morado, 2200 m, 18.XII.1994, D. Benyamini leg.; B = female, paratype: Chile, Parque Nacional El Morado, 2200 m, 18.XII.1994, D. Benyamini leg.

2005). Female wings as male (no androconia); genitalia typical *Strymon* features with looped ductus bursae (Fig. 15c, B) (cf. Johnson *et al.*, 1990; Nicolay and Robbins, 2002; Robbins and Nicolay, 2005).

Measurements: Forewing costal length (measured from base to apex; n = 6): 9–12 mm. Male genitalia (n = 2) aedeagus length: 1,2 mm; aedeagus subzonal + suprazonal portions: 1,0 + 1,2 mm; valval length: 1,2 mm; valval height: 1,0 mm.

Etymology: The species group name “*coquimbanus*” is a Latinized noun with masculin gender, formed from the Spanish name “Coquimbo”, used to signify the type locality.

Comments:

Somewhat similar phenotype with ventral hindwing yellow patch lives in the Mendoza and San Juan regions of Argentina (in coll. DB).

186. *Strymon probabila* (Johnson, Miller and Herrera, 1992), reinstated status - (Fig. 16)

Eiseliana probabila Johnson, Miller and Herrera, 1992: 120, 145; Peña and Ugarte, 1996: 211; Robbins and Nicolay, 2002: 99 (in [new] synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in [new] synonymy of *Strymon heodes*).

Heoda shapiro Johnson, Miller and Herrera, 1992: 144; Peña and Ugarte, 1996: 214; Robbins and Nicolay, 2002: 90 (in [new] synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in [new] synonymy of *Strymon heodes*); Bálint and Benyamini, 2017: 65 (in synonymy of *S. bicolor*).

D: IV–VII; FP: 8–1; C: 2.

Comments:

Eiseliana probabila. In the original diagnosis it was remarked that “*Eiseliana probabila* is a small, diminutive *bicolor* morph” and the peculiarity of the male dorsal forewing androconia was also noted. It was indicated that the holotype is deposited in MHNP and originates from the Coquimbo Desert Region, Valparaíso, collected by R. Martin in 1920. However, in the paper a male specimen from the Felder collection (BMNH) has been documented as the holotype, which has a generalized “Chili” label (Warren *et al.*, 2017). The paratypic series contained specimens from Santiago (Región Metropolitana), Rancagua, Cachapoal Province (Región O’Higgins), and supplemented by specimens from Cerro el Roble, Province



Figure 16. *Strymon probabila* (Johnson, Miller and Herrera, 1992) specimens of DBC from Chile – A = male: Valparaíso, Pichicuy, sea level, 7.XI.1993, D. Benyamini leg.; B = female: ditto, but 17.IX.1993; C = male: Metropolitan, San José de Maipo, 900 m, 30.IX.1994, D. Benyamini leg.; D = female: ditto, but 800 m, 24.XI.1994; E = male: Metropolitan, La Disputada, 1250 m, 8.X.1994.

Quillota (Región Valparaíso). These data indicate sympatry with *S. bicolor* in distribution, which we could also detect. As there are good distinguishing characters (see the key) and the taxon is sympatric with *S. bicolor*, we reinstate the taxon in its original status.

Heoda shapiro. The documentation of the original description is poor, the holotype female and the allotype male have been depicted in halftone figures. Both of them have the wing traits of *S. probabila* (see the key above). Later Benyamini and Johnson (1996) drew two specimens from Cordillera Parral as “*Heoda shapiro*”; one of them is indicated as male, but actually it is a female *S. bicolor*. The other specimen, the female, is a phenotype representing *S. coquimbanus*, hence the provenance of the species is questionable. The image given by Peña and Ugarte (1996) seems to be a mixture of the male and female types. The type material of *Heodes shapiro* should be in UMCE, where it was not found. In his checklist Robbins (2004) placed *E. probabila* and *H. shapiro* in the synonymy of *S. heodes*, clearly distinguishing them from *S. bicolor*. We put them in the *S. bicolor* group with the remark that most probably the group hides several taxa and should be recognized as a number of species (Bálint and Benyamini, 2017).

187. *Strymon suprema* (Johnson, Miller and Herrera, 1992), reinstated status - (Fig. 17)

Heoda suprema Johnson, Miller and Herrera, 1992: 131; Benyamini and Johnson, 1996: 16, fig 3b; Peña and Ugarte, 1996: 213; Robbins and Nicolay, 2002: 90 (in [new] synonymy of *Strymon bicolor*); Robbins, 2004: 131 (in [new] synonymy of *S. heodes*).

D: XI; FP: 10–12; C: 6.

Comments:

The species *Heoda suprema* was described on the basis of the female holotype and male “allotype” from Esquel (Chubut, Argentina), approximately 50 km east of the Chilean border. More than 300 km south from the type locality, the species has been found by DB south of Chile Chico in two sites. Caterpillars were collected on *Astragalus patagonicus* and were successfully reared to adult stage. Adults were nectaring on *Adesmia boronioides* N Lago Jeinimeni. Although in the original description it is stated that *H. suprema* is a large species having 14.0–15.0 mm forewing length, our material contradicts this with the measurements 10–11 mm (n = 7). The species is easy to recognize based on the characters given above in the key, and as there are subtle differences in morphology and biology, we reinstate the taxon in its original status.

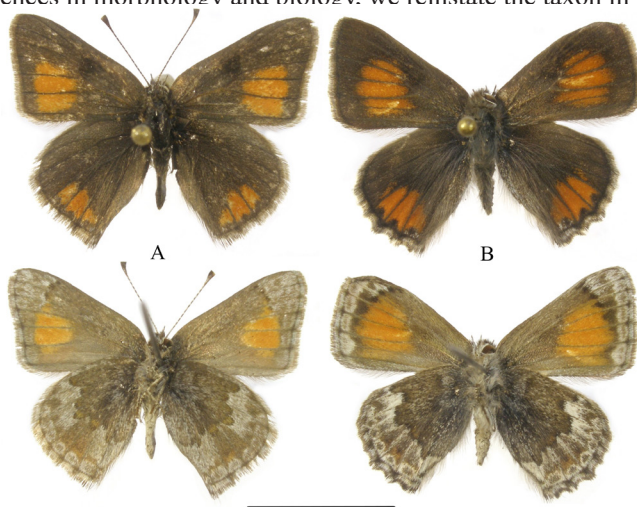


Figure 17. *Strymon suprema* (Johnson, Miller and Herrera, 1992) specimens of DBC from Chile – A = male: Aisen, 47 km S Chile Chico, Rio Jeinimeni, 800 m, 24.X.2001, D. Benyamini leg.; B = female: Aisen, 15.5 km S of Chile-Chico, 13.XII.2012, larva on *Astragalus patagonicus*, pupa: 1–3.I.2013, adult: 15.V.2013, D. Benyamini leg.

188. *Strymon wagenknechti* (Ureta, 1947) - (Fig. 18)

Thecla wagenknechti Ureta, 1947: 55; 1949: 106.

Heoda wagenknechti (Ureta); Johnson, Miller and Herrera, 1992: 130; Benyamini and Johnson, 1995: 16; Peña and Ugarte, 1996: 212.

Strymon wagenknechti (Ureta); Robbins and Nicolay, 2002: 99 ([new combination]); Robbins, 2004: 131.

D: coastal I–IV; FP: 9–1(E); C: 6.

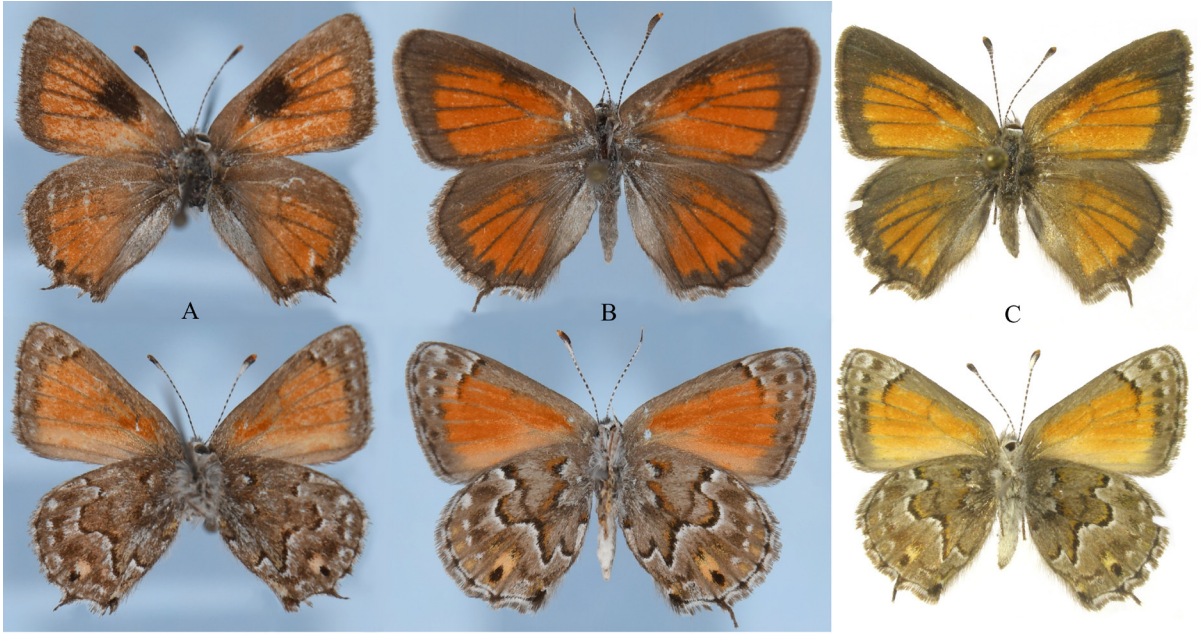


Figure 18. *Strymon wagenknechti* (Ureta, 1947) specimens from Chile. A = DBC male: Coquimbo, Totalillo, 18.XI.1950, coll. Wagenknecht; B = DBC female: Atacama, 40 km S of Copiapo, 450 m, 28.XII.1997, D. Benyamini leg.; C = HNHM male: Antofagasta, Parc Nacional Pan de Azucar, Chañaral, 10.I.2001, A. Moser leg.

Comments:

It is easy to identify based on the hindwing ventral surface colouration and pattern (see the key above). An endemic species for the Pacific coast (occurs also on the island Pan de Azucar) and the adjacent hills of Chile, the holotype male was collected in La Serena, Rio Los Choros (Coquimbo). DB found its larvae on buds and flowers of *Frankenia chilensis* (Frankeniaceae), 40 Km S Copiapo and bred them to adults (pupal diapause) and observed egg laying S of Antofagasta near Hwy 1, on the Pacific coast, 50 km N Paposo. Juan Enrique Barriga collected a few adults on the island Choros possibly on the same hostplant (pers. comm. to DB; <http://coleoptera-neotropical.org/paginas/8-Parques/ch/Ping-Humboldt/3lista-col.html>).

Genus *Ministrymon* Clench, 1961

A panamerican hairstreak genus with 25–30 species, one of the species is also native in Chile. Their biology is insufficiently known, the recorded larval hostplants are *Prosopis* for the North American *M. leda* (Edwards, 1882) and *Acacia caven* for the Argentinian *M. sanguinalis* (Burmeister, 1878) (Volkman and Núñez Bustos, 2010).

189. *Ministrymon azia* (Hewitson, 1873) - (Fig. 19)

Thecla azia Hewitson, [1873]: 144; Draudt, 1920: 805; D’Abrera, 1995: 1235.

Thecla guacanagari Wallengren, 1860: 37; Robbins, 2004: 132 (in synonymy of *M. azia*).

Thecla brocela Dyar, 1913: 637; Robbins, 2004: 132 (in synonymy of *M. azia*).

Ministrymon azia (Hewitson); Johnson and Miller, 1991: 185; Peña and Ugarte, 1996: 200.

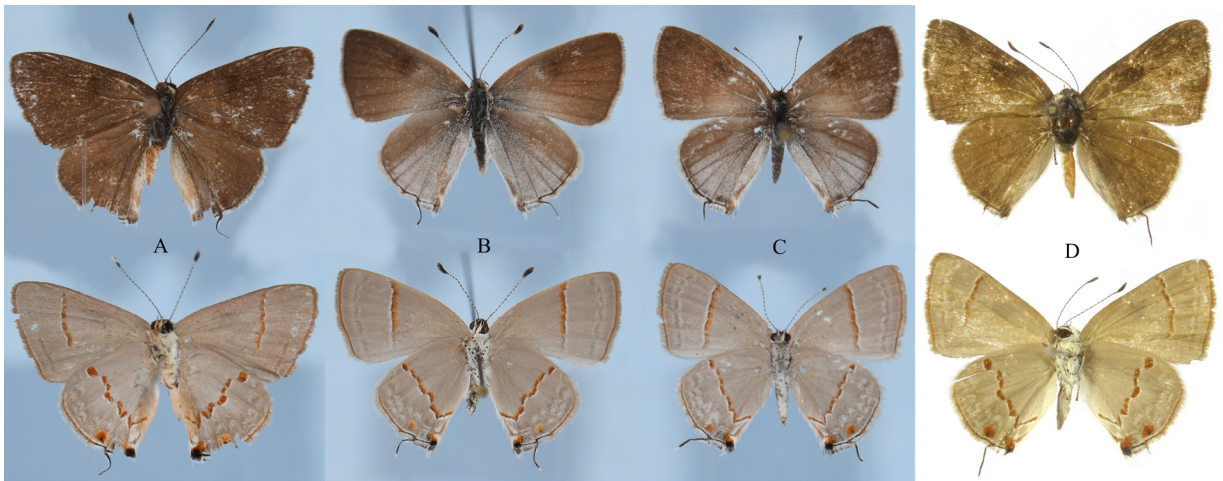


Figure 19. *Ministrymon azia* (Hewitson, [1873]). A = DBC male from Argentina: San Juan, Las Flores, 1800 m, 21.I.1995, Peña-Ugarte leg.; B = DBC female from Chile: Arica and Parinacota, Valle de Azapa, 12.V.2007, ex larva, D. Benyamini leg.; C = ditto, but 7 km E of Arica, 100 m, 5.IV.2007, D. Benyamini leg.; D = HNHM male from Argentina: Salta, Orán, Abra Grande, 10.III.1967, R. Golbach leg.

Ministrymon quebradivaga Johnson and Miller, 1991: 186; Johnson and Miller, 1992: 8; Peña and Ugarte, 1996: 202; Robbins, 2004: 132 (in synonymy of *M. azia*).

D: XV–I, II?; FP: 1–4; C: 2.

Comments:

Biology. The eggs are laid singly on the flower buds of the Mimosaceae trees *Acacia farnesiana*, *A. macracantha* and *A. visco* (Vargas and Parra, 2009; DB breeding notes). On 6.4.2007 at Valle de Azapa DB observed a female laying eggs on the flower buds of *Acacia visco* (det. Emilio Ulibari), indicating that its flight period is longer than known and possibly depends on availability of host plants and winter temperatures which may slow its development in July and August.

Distribution. This is a panamerican species distributed from southern United States and Mexico via Mesoamerica and Amazonia to Paraguay. It is migratory and also dispersed by seasonal winds (Beebe, 1951; Robbins and Small, 1981; Bálint pers. obs. in Venezuela 2009).

Nomenclature and taxonomy. Johnson and Miller, (1992) distinguished *M. quebradivaga* and *M. azia*, however Peña and Ugarte, (1996), and later Robbins, (2004) synonymized them, but they did not present any evidence to formulate the synonymy. On the Pacific side of the Andes the species shows some distinctive wing traits (cf. Johnson and Miller, 1991: 186; Robbins and Glassberg, 2013: 14), these can also be observed in the known Chilean specimens. For the Pacific populations beside *M. quebradivaga* there are two available senior names: *T. brocela* (type locality: Cotohausi, Peru) and *Thecla guacanagari* (type locality: Island Puna, Ecuador). It would be necessary to analyze larger samples of the Pacific *M. azia* and decide its final status. Provisionally we follow the opinion of Robbins, (2004).

Genus *Chlorostrymon* Clench, 1961

A Panamerican hairstreak genus with five to ten species, all of them possess structurally coloured blue dorsal and green ventral wing surfaces. One widely distributed species is probably also native in Chile, and there is a species endemic for the Pacific region as it is known only from the dry areas of the Peruvian

and Chilean Andes. Their biology is insufficiently known, the recorded larval hostplants are *Cardiospermum* spp. (Sapiandaceae) for the North American *Ch. simaethis* (Drury, 1773), *Guazuma* sp. (Malvaceae) for the Costa Rican *Ch. telea* (Hewitson, 1868), and most recently *Piscidia piscipula* (Fabaceae) for *Ch. maesites* (Herrich-Schaeffer, 1864) in Florida (Williams *et al.*, 2017).

190. *Chlorostrymon kuscheli* (Ureta, 1949) - (Fig. 20)

Thecla kuscheli Ureta, 1949: 98-99

Chlorostrymon kuscheli (Ureta); Johnson, 1989: 13; Peña and Ugarte, 1996: 203; Robbins, 2004: 124

Chlorostrymon larancagua Johnson, 1990c: 190; Robbins, 2004: 124 (in [new] synonymy of *Chlorostrymon telea*), **new synonym.**

D: XV; FP: 12–2; C: 9.

Comments:

The discovery. Guillermo (Willy) Kuschel (1918–2017) was originally a Catholic priest who taught entomology at the University of Chile (Santiago) (Oberprieler *et al.*, 2018). On early December 1946 Kuschel arrived in Tarapaca, N Chile. Based in Arica he started to look for insects in the north Chilean transverse valleys and on 8.XII collected the first unknown blues, he returned to the same biotope fourteen and a half months later and on 25.II.1948 collected the same species – 15 males and 9 females in total. It was just in time for Dr Emilio Ureta, the manager of the entomology section and curator of butterflies in MNHNC (Santiago) who was writing a series of articles on the Chilean butterflies (Rhopalocera) and in 1949 in part IV of the series described it as a new species *Thecla kuscheli* dedicated to its collector and discoverer. Ureta designated a male holotype from Kuschel’s first visit with the following collecting data: “Larancagua, 9-XII-1946, 2.800 m. G. Kuschel” and a female allotype from the second visit of 25-II-1948 to the same type-locality. Ureta carefully and thoroughly described the male’s upper wing ground colour as brilliant violet-red and the underside as clear apple green, while the female’s upper side was bluish grey. All other parts of the wings, the antennae, thorax and abdomen were described accurately. Both sexes had the same “wing expansion of 15-18 mm”.

The type locality. The hand-written labels of all types (possibly by Kuschel himself) read “Larancagua 2700 m” or “Laracagua 2800 m”. No additional information is given by Ureta / Kuschel or was found by us anywhere. The altitudes suggest a location of the TL at lower margins of the pre-puna belt (the first record of *kuscheli* in Peru by Cerdeña Gutierrez *et al.*, 2015 is from Valle Chilina, Arequipa at similar elevation – 2500m). But while the dates and elevations look real – “Larancagua” posed a challenge. So, we checked the Chilean military list of places issued by Instituto Geográfica Militar de Chile 2nd ed. of Oct. 1983, Santiago. In Tomo (Vol) I page 673 we found five Larancaguas: 1. A mountain 4202m high near the Peruvian border, 2. A mountain 5368m high on the Bolivian border 3. A Larancagua mountain marked on the maps and Google Earth as Laram Q’awa 5439m high 14km NW of Parinacota, 4. “pampa” at 4650m 11 km NW Parinacota and 5. Quebrada at 4185m asl near General Lagos on the Peruvian border. DB decided to check nos 3. and 4. that were not on the Chilean borders. On 15 March 1996 he traveled north of Parinacota on A93, after 7km turned left to A155 going NW towards Coronel Alcerreca and stopped after 6.5km at about one km from the pampa (no 4) then he climbed Cerro Laram Q’awa up to 4800m but along a few kilometers of typical alpine vegetation observed, photographed and collected only *Colias* and *Yramea* spp. Not a single blue was observed (Fig. 20D). Now we realize that the altitude should guide us to look for *kuscheli*’s TL at upper; Rio Lluta, Valle de Azapa, Chaca valley, Quebrada Vitor and other transverse vallies of Arica and Parinacota Region. Summary: it seems that Guillermo Kuschel aimed at protecting this locality and

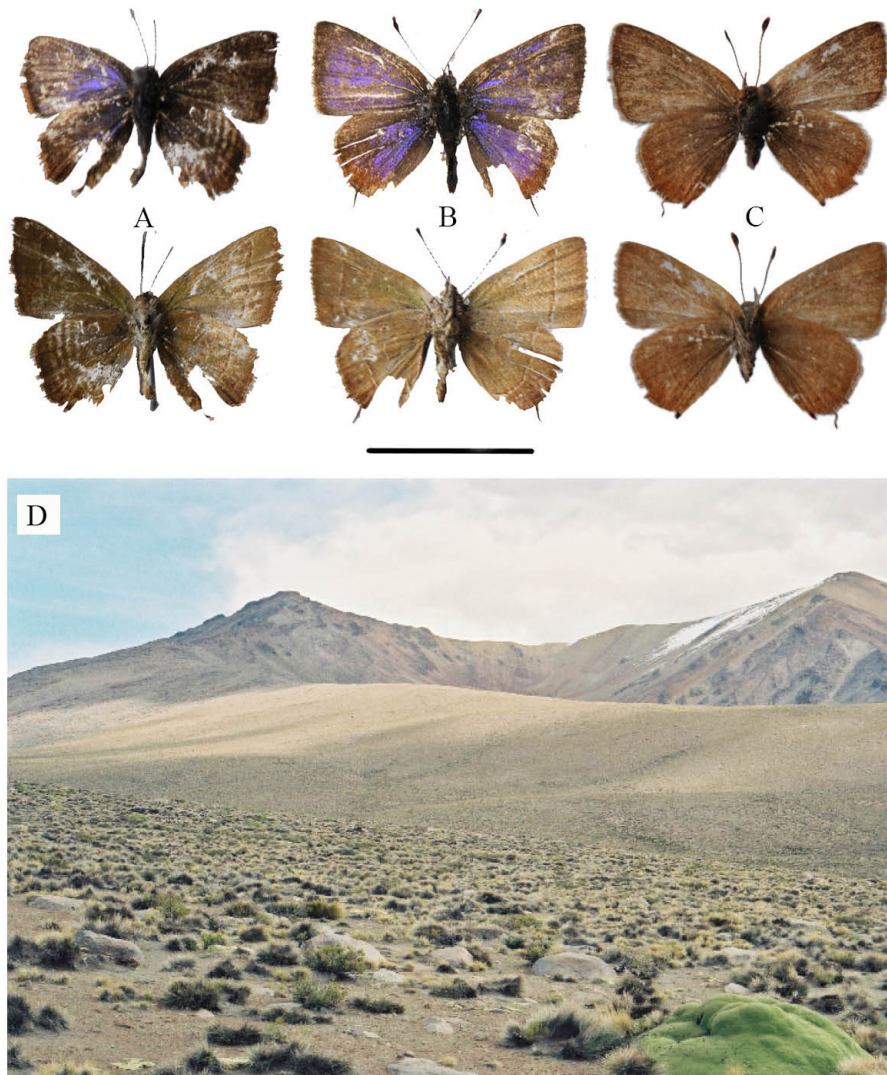


Figure 20. *Chlorostrymon kuscheli* (Ureta, 1949). A = *Thecla kuscheli* Ureta, 1949 holotype male, Larancagua 2700m 8.XII.1946, Kuschel leg. (MNHNC); B = ditto “Paratipo” male 9.XII.1946; C = *Chlorostrymon larancagua* female, Putre, 26.II.1948, Etchevery leg. (MNHNC); D = Laram Q’awa (Larancagua) Mt. 5439 m, 18°02’S : 69°08’W, XV Region of Arica and Parinacota, Chile (Photographed by DB on 15 March, 1996).

beautiful blue from destruction and over-collecting, did not report the correct location of the TL! On the 1st of August 2017 at the age of 99 Guillermo Kuschel died in Auckland, New Zealand and took his secret with him forever (Oberprieler *et al.*, 2018).

Biology. Two and a half months’ difference in the collecting dates, 8-9th December and 25th February suggest at least two annual broods. Kuschel observed adults flying around / over *Thessaria absinthioides* [sic.] *T. absinthioides* (Hook. and Arn.) DC. (Asteraceae); this medicinal desert shrub “has purple flowers and is very attractive to butterflies as a nectar source, especially skippers. It is very common in Argentina,

Chile and Peru and I have often seen it, usually with numerous butterflies in attendance. I have no idea if it is a larval host plant of anything!” (Art Shapiro’s pers. comm. to DB). On the other hand, Héctor Vargas found larvae of several moths: Gelechiidae, Pterophoridae and Pyralidae species feeding on it (pers. comm. to DB). The adults showed a different behavior over “*Escallonia salicifolia*” and H. Vargas opined that this small tree, known today as *E. angustifolia* C. Presl. (Escalloniaceae) serves the territorial males as a perch. However, in California it is also “much visited as a nectar source” (Shapiro, pers. comm.).

The single male of *Chlorostrymon kuscheli* that has been recently recorded from the Arequipa region of Peru, possibly suggests that it is more widely distributed than suspected. Probably the species is a seasonal migrant in the dry areas of the Andes (cf. Cerdeña Gutierrez *et al.*, 2015; Farfán, 2018).

Nomenclature and taxonomy. Kurt Johnson described the nominal species *Chlorostrymon laranagua* on the basis of a single somewhat aberrant female specimen, which was collected with the type material of *Chlorostrymon kuscheli*. The type specimens of the two taxa share the same distinctive hindwing surface pattern: the postmedial line is composed of small white dashes, consequently we remove the taxon from the synonymy of *Chlorostrymon telea* (Robbins, 2004): *Thecla kuscheli* Ureta, 1949 = *Chlorostrymon laranagua* Johnson, 1990, new junior subjective synonym. In the collection of MNHNC (Santiago) there is a female from Putre, collected on 26.II.1948 by Etcheverry (Fig. 20C).

II - Doubtful records

THECLINAE

Calycopis valparaiso Johnson, Eisele and MacPherson, 1988 = *Calycopis caulonia* (Hewitson, 1877) - (Fig. 21)

Thecla caulonia Hewitson, 1877: 188.

Calycopis caulonia (Hewitson); Field, 1967: 19 (new combination).

Calycopis valparaiso Johnson, Eisele and MacPherson, 1988: 18; Johnson, 1991b: 11; Peña and Ugarte, 1996: 207; Robbins, 2004: 129 (in [new] synonymy of *Calycopis caulonia*).



Figure 21. *Calycopis caulonia* (Hewitson, 1877) – HNHM male from Argentina: Jujuy, 1988, leg. K. Johnson.

Comments:

The name *Calycopis valparaiso* was proposed on the basis of a single female specimen, the holotype, originating from “Chili”. The specimen shows the traits of *Thecla caulonia* female: forewings inner and outer margins have the same length, submarginal area of ventral hindwing surface cell M3-CuA1 with a single large black spot in extensive orange colour and cell CuA1-CuA2 is blue coloured (c.f. Duarte, Robbins and Mielke, 2005). Therefore *T. caulonia* and *C. valparaiso* were considered as synonyms by Robbins. *C. caulonia* is a variable species and widespread in southern Amazonia (Argentina, Bolivia, Brazil, Paraguay, Peru, Uruguay). According to Robbins (2004) the species *C. caulonia* has been described 13 times (including *C. valparaiso*) by Johnson. All *Calycopis* are tropical or subtropical forest dwellers, during daytime they are active on shaded ground level, where males perch and females lay eggs in the debris of fallen leaves. They are very common in cocoa plantations and other secondary subtropical habitats (Bálint, *pers. obs.* in Venezuela 2009). Although it may occur in the dry areas of the Andes (e.g. Guerra-Serrudo *et al.*, 2016), it is unlikely that any *C. caulonia* might live in the climate of Valparaíso, even though suitable microhabitats may exist at the bottom of valleys. The holotype of *C. valparaiso* is either mislabeled or the specimen arrived in the region of the type locality by a trade transport and was collected *in situ* accidentally.

Chlorostrymon chileana Johnson, 1990 = *Chlorostrymon simaethis rosario* Nicolay 1980 (Fig. 22)

Papilio simaethis Drury, 1773: 1.

Thecla simaethis (Drury); Draudt, 1920: 798.

Chlorostrymon simaethis (Drury); Clench, 1961: 189 (new combination); Nicolay, 1980: 253, Johnson, 1990c: 128; Robbins, 2004: 214.

Chlorostrymon simaethis rosario Nicolay, 1980: 254; Robbins, 2004: 124 (in [new] synonym of *Chlorostrymon simaethis*).

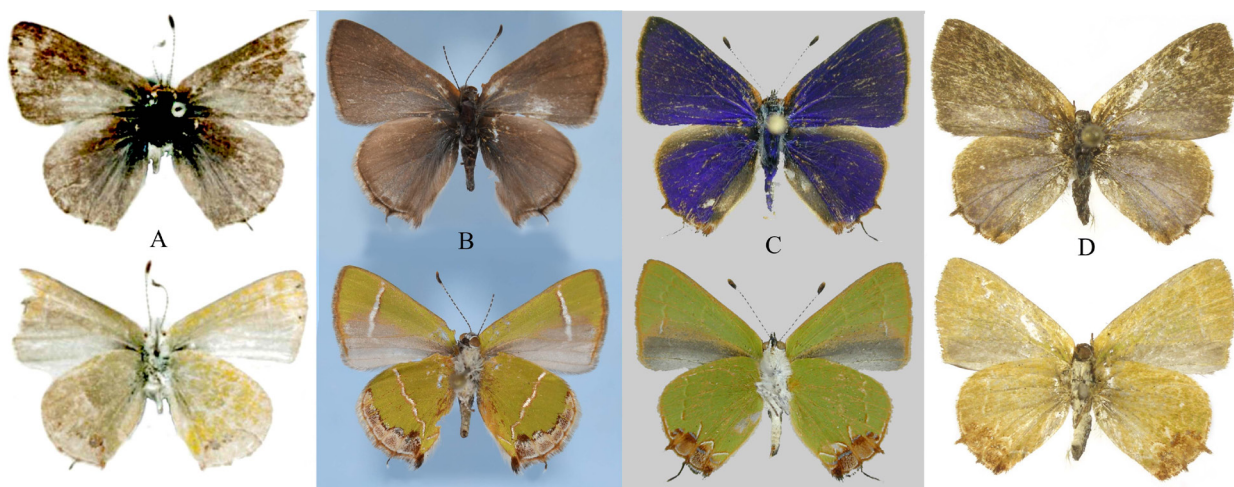


Figure 22. *Chlorostrymon* Clench, 1980. A = *C. chileana* Johnson, 1990 holotype (MNHN); B = DBC female of *C. rosario* Nicolay, 1980 from Ecuador: Quito, VIII.1995, D. Benyamini leg.; C = PBC male of *C. telea* (Hewitson, 1868) from Peru: of Lima, Chosica, 1000 m, 12.V.2017, P. Boyer leg.; D = ditto, HNHN female from Peru: Lima Jesus Maria, museum garden, 25.II.1995, Zs. Bálint leg.

Chlorostrymon chileana Johnson, 1990c: 141; Robbins, 2004: 124 (in [new] synonymy of *Chlorostrymon simaethis*).

Comments:

The nominal species *C. chilensis* was described on the basis of the holotype male and the paratype (“allotype”) female, plus further five male and one female paratype specimens all from “Santiago, Chile” and one male from “Chili”. The types cannot be discriminated on taxonomic grounds from *C. s. rosario*, which was described from Ecuador (Pichincha, La Kennedy). Robbins, (2004) listed both mentioned names in synonymy of *C. simaethis* without any comment. We suspect that the names *chilensis* and *rosario* represent the same taxon, which differs from the nominate *C. simaethis* as Nicolay (1980) demonstrated. The historical “Santiago” specimens used by Johnson for the description of *C. chileana* might be mislabelled, but it cannot be excluded that there was a native population at the time of sampling around the turn of the 19th-20th century. What is clear that since then there is no record from the region. We note, that according to the best knowledge *C. simaethis* does not occur on the dry Pacific coast, but ZsB collected *Chlorostrymon telea* (Hewitson, 1868) in Lima, in the garden of the Museo Nacional de Historia Natural (Bálint, 1999), and Pierre Boyer (pers. comm.) found the same species common east of Lima.

Penaincisalia oribata (Weymer, 1890), Johnson, 1990 = *Penaincisalia culminicola* (Staudinger -1894) (Fig. 23)

Thecla? culminicola Staudinger, 1894: 80.

Penaincisalia culminicola (Staudinger), Johnson, 1990: 108 (new combination).

Penaincisalia oribata (Weymer), Johnson, 1990a: 113; Johnson, 1992: 161; Peña and Ugarte, 1996: 223 (misidentification).

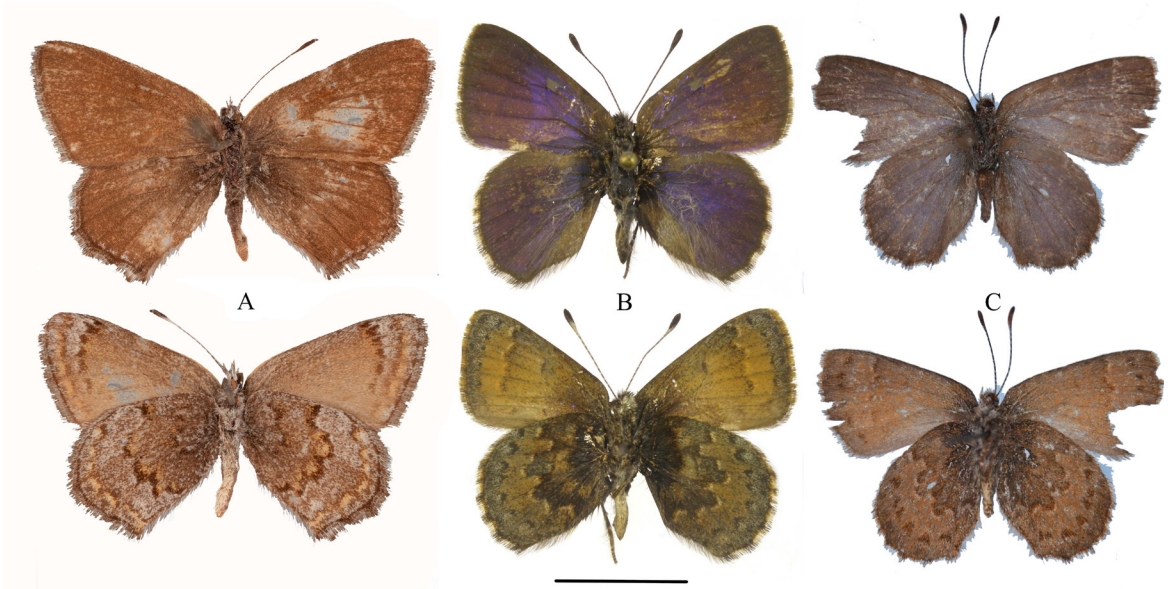


Figure 23. *Strymon oribata* (Weymer, 1890) and *Penaincisalia culminicola* (Staudinger, 1894). A = *Thecla oribata* Weymer, 1890 holotype (HUZM) (photographed by MfN/© Eran Wolff); B = HNHM male of *Penaincisalia culminicola* (Staudinger, 1894) from Peru: Apurímac, Saywite, 3700 m, 11.II.2005, J. Wojtusiak and T. Pyrcz leg.; C = ditto, DBC female from Bolivia: Titicaca, 3800 m, 10.II.1994, D. Benyamini leg.

Comments:

The name “*Thecla oribata*” was placed in the “*Culminicola*-Gruppe” by Draudt (1919: 823). Probably this was the reason why Johnson (1990) misapplied the name *Thecla oribata* for a female specimen representing the species *Penaincisalia culminicola* (Staudinger, 1894). The female specimen, figured in the book of Peña and Ugarte (and depicted also in Johnson, 1990a, as fig. 2F, 5B), was collected in “Corque” approximately 50km northwest of lake Poopo, in Bolivia. We do not know of any record for Chile. The genus *Penaincisalia* Johnson, 1990 (type species: *Thecla culminicola* Staudinger, 1894, by original designation) is a typical member of the high Andean puna region (cf. Bálint *et al.*, 2019). The best known published historical records for the type species of the genus are from the La Paz and Chocabamba regions of Bolivia in the Eastern Andean chain (Forster, 1955; Johnson, 1990), and the Arequipa region for Peru in the Western Andes (Farfán-Larico, 2018). The habitats of *Penaincisalia* are highly localized and situated along brooks or cascades of melting glaciers, at high altitudes (Fortser, 1955; Bálint, 1999; Lamas *et al.*, 2021; Bálint *et al.*, 2022c).

Penaincisalia patagonaevaga Johnson, 1990 = *Penaincisalia penai* Johnson-1990 (Fig. 24)

Penaincisalia patagonaevaga Johnson, 1990: 117; Johnson, 1992: 164; Peña and Ugarte, 1996: 207; Robbins, 2004: 122 (nomen dubium); Bálint and Benyamini, 2020: 213 (as new synonym of *P. penai*).

Penaincisalia penai Johnson, 1990a: 118; Robbins, 2004: 122; Prieto, 2008: 99.



Figure 24. *Penaincisalia penai* Johnson, 1990 Pedro Vidal collection *Penaincisalia patagonaevaga* Johnson, 1990 chimeric holotype (forewings are excluded), documentation from Bálint and Benyamini, (2020).

Comments:

The species was described on the basis of a worn and damaged male specimen (holotype) collected by José Herrera: “Argentina, 40km N Rio Mayo, Chubut Prov., Patagonia, 20 Nov 1966, nr 700 m”. The record is from the neighbouring Argentina, but in their book Peña and Ugarte, (1996) contemplated that the species may also occur in Chilean territory. The name was considered to be a *nomen dubium* by Robbins (2004). Although the type was indicated as being deposited in the “Central Entomological Collection of the University of Chile” (probably = Universidad Metropolitana de Ciencias de la Educación, Santiago, Chile), the specimen was found in the private collection of Pedro Vidal (Santiago de Chile) and evaluated by Bálint and Benyamini (2020). The holotype turned out to be a chimera of two lycaenid species: the Oriental polyommataine *Orthomiella rantaizana* Wileman, 1910 (hindwings) and the Neotropical Eumacini *Penaincisalia penai* Johnson, 1910 (forewings and body). Following the Article 73.1.5 of the International Code of Zoological Nomenclature (1999) the hindwings were excluded from the *P. patagonaevaga* holotype specimen which resulted in the synonymy indicated above. *Penaincisalia penai* does not occur in Chile.

***Pontirama coquimbiensis* Johnson, 1992 = *nomen dubium* - (Fig. 25)**

Pontirama coquimbiensis Johnson, 1992: 45; Peña and Ugarte, 1996: 219.

Rhamma coquimbiensis (Johnson); Robbins, 2004: 121 (new combination).

Comments:

Based on the original description and the accompanying documentation it is a species with a distinctive ventral hindwing surface pattern but showing typical *Rhamma* female structures (Prieto and Vargas, 2016). This phenotype is curious for the genus, as well as the type locality: “Tongoy, Coquimbo”, which suggests a coastal habitat (~ 15 m a.s.l.), but the known *Rhamma* (and “*Pontirama*”) species live at higher elevations (> 2000 m a. s. l.). Johnson remarked that “this specimen [the holotype of *P. coquimbiensis*] was among papered material including *Eiseliana bicolor* (Phillipi), the extremely rare *Thecla wagenknechti* (Ureta) and various taxa of *Itylos* sens. lat. [= *Pseudolucia*] ...”. This list reflects a typical Coquimbo lycaenid fauna at lower altitudes and suggests that either (1) *P. coquimbiensis* is indeed an endemic species and probably extinct (as it was never collected in spite of intensive searching by DB), or (2) the specimen is mislabeled, and it comes from some other region of South America , or (3) the holotype specimen is a chimera.

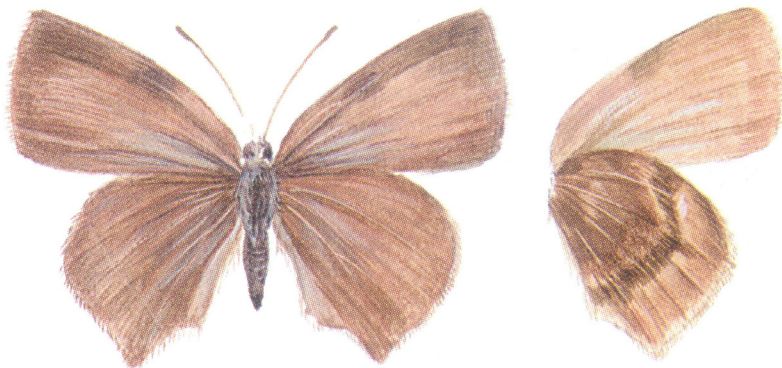


Figure 25. *Pontirama coquimbiensis* Johnson, 1992. *Nomen dubium*.

Rekoa palegon cyrriana (Cramer, [1780]) = *Rekoa palegon cyrriana* (Hewitson, 1874) - (Fig. 26)

Papilio palegon Cramer, [1780]: pl. 282.

Thecla palegon (Cramer) Westwood, 1852: 483; Hewitson, 1867: 86; Draudt, 1919: 761.

Thecla cyrriana Hewitson, 1874: 105; Draudt, 1919: 761, Robbins, 1991: 38 (as new synonymy of *Rekoa palegon*); Robbins, 2004: 123 (in synonymy of *Rekoa palegon*).

Thecla ulia Dyar, 1913: 637; Robbins, 2004: 123 (in synonymy of *Rekoa palegon*).

Rekoa palegon (Cramer) Robbins, 1991: 38; D’Abrera, 1995: 1249.

Rekoa palegon cyrriana (Hewitson); Johnson and Miller, 1992: 8.

Rekoa pelagon [!] *cyrriana* (Hewitson); Peña and Ugarte, 1996: 222 (misspelling).

Comments:

The name *Thecla cyrriana* was based on an unstated number of male specimens originating from Peru. In the original description Hewitson stated that “nearly allied to *T. palegon*” and later “differs but slightly from *T. palegon*”. In his *Rekoa* monograph Robbins considered *T. cyrriana* as a geographical form of *R. palegon* and did “not accord the *R. cyrriana* phenotype nomenclatural recognition”. Based on a poorly labeled specimen deposited in the Hope collection (NMOU) Johnson and Miller (1982) contemplated that *R. palegon cyrriana* may occur in Chile. D’Abrera (l. c.) documented distinctive *R. palegon* specimens from Peru (Callao and Chosica). Peña and Ugarte (l.c.) recognized *cyrriana* as subspecies, but the Chilean record mentioned by Johnson (l.c.) was questioned, and they were not able to present any reliable record for Chile. *R. palegon* is a widespread species along the Peruvian coastal mountains and may arrive in Arica or further south. It has many hostplants, including even *Prosopis* (= Tamarugo in Spanish).

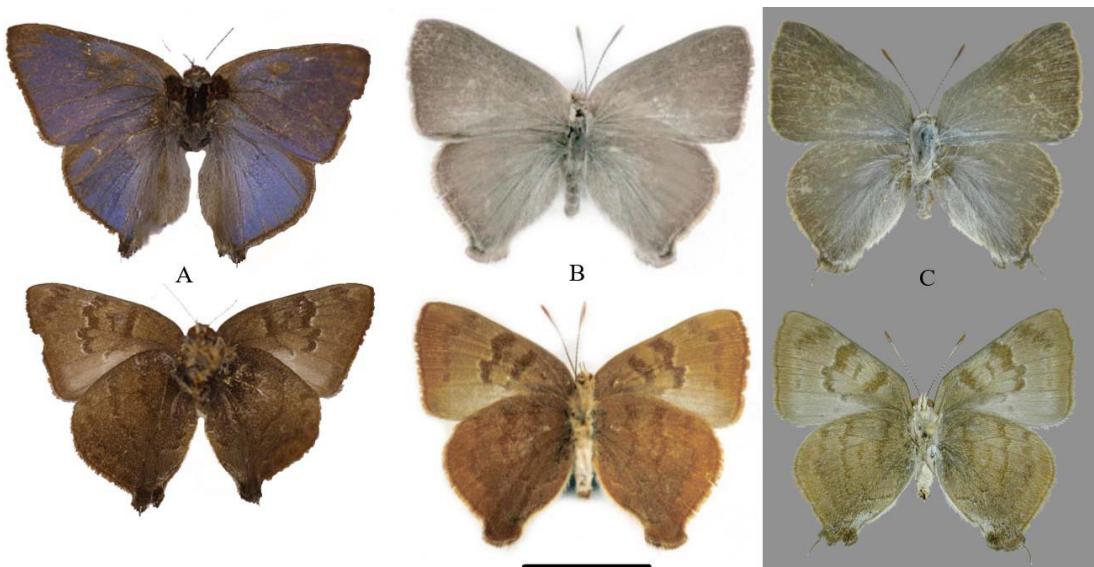


Figure 26. *Rekoa palegon cyrriana* (Hewitson, 1874). A = *Thecla cyrriana* Hewitson, 1874 lectotype, Hewitson coll. (BMNH) (with permission of NHMUK); B = *Thecla ulia* Dyar, 1913 lectotype (SMNH); C = PBC female specimen from Peru: E Lima, Chosica, 1000 m, 1.V. 2017, P. Boyer leg.

Tergissima shargeli Johnson, 1990 = *Electrostrymon callao* Druce, 1907, reinstated status - (Fig. 27)

Thecla callao Druce, 1907: 611; Draudt, 1920: 797 (in synonymy of *Thecla joya* Dognin, 1895); Robbins, 2004: 128 (in synonymy of *Electrostrymon joya*).

Thecla rugatus Druce, 1907: 611; Robbins, 2004: 128 (in [new] synonymy of *Electrostrymon joya*).

Electrostrymon joya (Dognin), Johnson and Kroenlein, 1993: 39 (new combination); D'Abrera, 1995: 1218; Robbins, 2004: 128.

Electrostrymon callao (H. H. Druce), D'Abrera, 1995: 1218 ([new combination]); Robbins, 2004: 128 (in [new] synonymy of *Electrostrymon joya*).

Electrostrymon rugatus (H. H. Druce), D'Abrera, 1995: 1218 ([new combination]); Robbins, 2004: 128 (in [new] synonymy of *Electrostrymon joya*).

Tergissima shargeli Johnson, 1990b: 201; Peña and Ugarte, 1996: 206, Robbins, 2004: 128 ([new] synonymy of *Electrostrymon joya*).

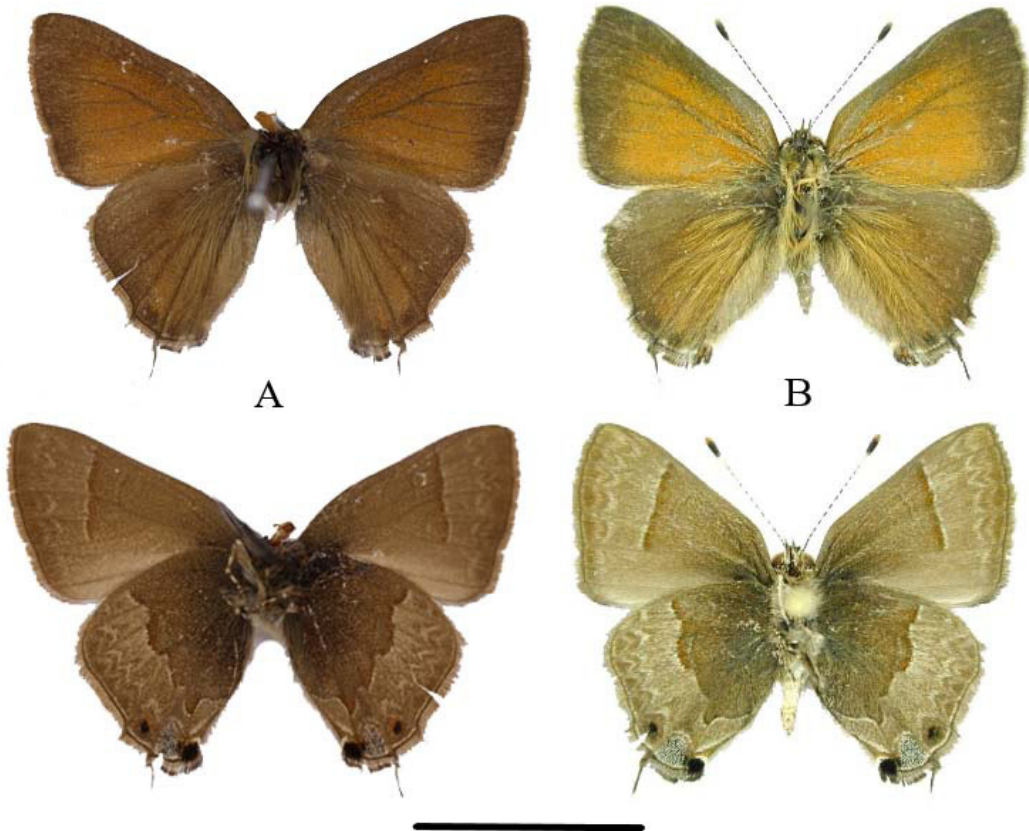


Figure 27. *Electrostrymon callao* Druce, 1907. A = *Thecla callao* Druce, 1907 holotype Godman-Salvin coll. (BMNH) (with permission of NHMUK); B = PBC specimen from Peru: E Lima, Chosica, 1000 m, 12.V.2017, P. Boyer leg.

Comments:

Chilean record. The female holotype specimen of *T. shargeli* with type locality “Santiago, Chile” is identical with the phenotype of *T. rugatus*. Although doubt has been expressed by Peña and Ugarte (1996) about the occurrence of the species in Chilean territory, it may occur in middle or higher elevations of the northern dry area regions, but not in the vicinity of Santiago. The species is not rare above the mountains in the Lima region (MZUJ vouchers) and in Arequipa (Farfán-Larico, 2018). Larval hosts representing the families Anacardiaceae and Bignoniaceae for *Electrostrymon* occurs in the Caribbean region and USA (Beccaloni *et al.*, 2008). The larval host on the Pacific side of the Andes is yet unrecorded.

Taxonomy. According to Robbins (2004) the species *E. joya* is a widely distributed species and has six available subspecific and/or synonymic names. Two of them are from the western side of the Andes: (1) *Thecla callao* Druce, 1907 (type locality: “Callao, Peru”) and (2) *Thecla rugatus* Druce, 1907 (type locality: “Vina, Peru”). These two forms denote a characteristic phenotype (see the documentation in D’Abrera, 1995). These might represent a distinct species endemic for the Pacific region of South America. As there was no evidence for supporting the action to lump these six names under *E. joya*, we follow D’Abrera, (1995) keeping *E. callao* in its original status.

Generic placement. The original combination of *Tergissima shargeli* is erroneous from a systematic point of view as the type species of *Tergissima* Johnson, 1988 is *Thecla mosconiensis* Johnson, 1988 (a junior subjective synonym of *Thecla caulonia* Hewitson, 1877) by original designation, a species representing the genus *Calycopis* Scudder, 1876 (Robbins, 2004; Duarte *et al.*, 2005).

POLYOMMATINAE

Zizina oxleyi (C. and R. Felder, [1865]) - (Fig. 28)

Lycaena oxleyi Felder and Felder, [1865]: 280.

Zizula oxley (Felder and Felder); Bálint, 1993b: 4.



Figure 28. *Zizula oxleyi* C. and R. Felder, [1865] MNHN specimens from “Chile”. A = male; B = female.

Comments:

This is an endemic New Zealand species, which occupies rocky and weedy coastal vegetation. The larval foodplants all belong to Fabaceae (*Carmichaelia*, *Chamaecytisus*, *Lotus*, *Medicago*, *Montigena*, and *Trifolium*) (Gibbs, 1980). Several, insufficiently labeled historical specimens are known from the Neotropical region, some of them with the indication “Chili”. These specimens were either mislabeled or accidentally introduced in ship ballast or animal forage.

CONCLUSIONS

Composition of the fauna - Part III/2 of the Chilean list includes 18 species of Lycaenidae (Theclinae), adding one more nymphalid (*Agraulis dodona*) we arrive at a total of 190 butterfly species recorded in Chile (see composition in Table 1).

Comparing our new checklist with the catalogue in Peña and Ugarte, (2006), a further 21 species are added to the previously reported 169 species (Table 1, updated). Importantly, the number of new species for Chile is actually 40, as 19 species are removed from the catalogue, either synonymized, or representing historical mistakes of single records of Lycaenidae species.

Table 1 (Part III/1 update) – Composition of the Chilean butterfly families

Part III/2 Summary:

The Lycaenidae are the largest family of Chilean butterflies; with 64 species or more, Satyrinae comprise 38 spp., Hesperidae 37 spp., Pieridae 33 spp. and all Nymphalidae 55 spp.

Butterfly distribution (Lycaenidae) in 15 regions in Chile – Table 2 and Fig. 1 list the number of lycaenid species per region; maximum number of species are 18 in Coquimbo IV Region, 15 in Arica and Parinacota, 14 in Valparaíso, 13 in Antofagasta, 12 in Maule, 10 in Atacama and the Metropolitan regions, 9 species in Tarapaca and Bio Bío, 7 species fly in O’Higgins and Araucania, 4 species fly in Aisen, 2 species in region of de Los Rios, 1 species flies in each of the regions of de Los Lagos and Magallanes, not a single blue was reported from Rapa Nui (Easter Island). The relatively high number of 15 species of Region XV (Arica and Parinacota) as expressed in Fig. 1, signifies its northern location on the border with Peru and Bolivia as being Chile’s northern gates to southern expanding / migrating species from these two countries. The last contribution, *Agraulis dodona* (Nymphalidae), is the latest example of this ongoing Table 2 (updated from part III/1) – Butterfly species distribution in Chilean political regions

Table 1 (Part III/1 update) – Composition of the Chilean butterfly families

Family	Num. of species	Num. of species (%)	Num. of species (Peña & Ugarte, 1997)
Papilionidae Part I	1	0.53%	1
Pieridae Part I	33	17.56%	29
Nymphalidae (Part I - Danainae, Heliconiinae, Nymphalinae, Libytheinae) + 2 new sp.	17	9.04%	11
Nymphalidae (Part II - Satyrinae)	38	20.20%	34
Lycaenidae Part III/1 (Polyommatainae)	46	24.47%	29
Lycaenidae Part III/2 (Theclinae)	18	8.51%	30
Hesperidae Part I	37	19.69%	35
Total	190	100%	169

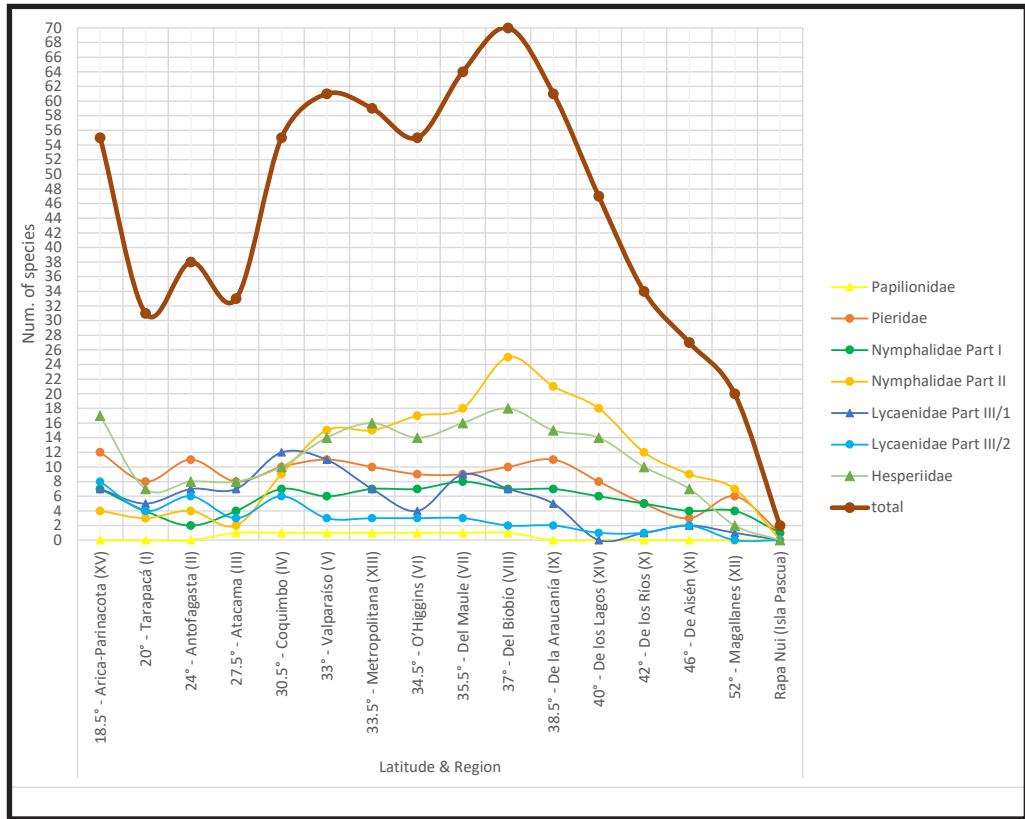


Figure 29. (Fig 3. updated from part II) Butterfly species distribution in Chilean political regions.

Flight period of the species – this is depicted in months in Table 3 and Fig. 30. The highest number of Lycaenidae (Polyommatae and Theclinae) species is found on the wing in December and January, with 48 and 43 species respectively, November, October and February with 35, 29 and 28 respectively, March with 20, September, April and August with 16, 13 and 8 respectively. May and July with 4 and 3 species. Only two species fly in June.

Conservation status of the Theclinae – is summarized in Table 4, where: 43.8% are either not endangered (18.8%) or possibly not endangered (25%). 12.5% are endangered or locally extinct. However nearly one third of the Chilean hairstreaks (31.3%) are data deficient; reflecting our poor knowledge of the conservation assessment of five species. No Theclinae is known to be a migrant or endemic in Chile.

Conservation assessment of all Chilean butterflies

No fewer than 27 species (58.7%) of the Polyommatae are geographically restricted = endemic, more than any other Chilean family. The Satyrinae with 21.1%, Hesperidae (13.5%) and Pieridae (2.9%) are far behind. This high level of endemism reflects the isolation of many Polyommatae, *Pseudolucia* spp. in the high Andes.

18 species (39.1%) and 2 species (4.3%) respectively are not endangered or possibly not endangered; 3 species (6.5%) are rare

Table 2 (updated from part III/1) – Butterfly species distribution in Chilean political regions

	Latitude & Region															
	18.5° - Antica-Parronua (XX)	20° - Tarapacá (I)	24° - Antofagasta (II)	27.5° - Atacama (III)	30.5° - Coquimbo (IV)	33° - Valparaíso (V)	33.5° - Metropolitana (XIII)	34.5° - O'Higgins (VI)	35.5° - Del Maule (VII)	37° - Del Bío Bío (VIII)	38.5° - De la Araucanía (IX)	40° - De los Lagos (XIV)	42° - De los Ríos (X)	46° - De Aisen (XI)	52° - Magallanes (XII)	Rapa Nui (Isla Pascua)
Papilionidae Part I	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0
Pieridae Part I	12	8	11	8	10	11	10	9	9	10	11	8	5	3	6	1
Nymphalidae (Part I - Danainae, Heliconiinae, Nymphalinae, Libytheinae)	7	4	2	4	7	6	7	7	8	7	7	6	5	4	4	1
Nymphalidae (Part II - Satyrinae)	4	3	4	2	9	15	15	17	18	25	21	18	12	9	7	0
Lycenidae Part III/1 (Polyommata)	7	5	7	7	12	11	7	4	9	7	5	0	1	2	1	0
Lycenidae Part III/2 (Theclinae)	8	4	6	3	6	3	3	3	3	2	2	1	1	2	0	0
Hesperiidae Part I	17	7	8	8	10	14	16	14	16	18	15	14	10	7	2	0
total	55	31	38	33	55	61	59	55	64	70	61	47	34	27	20	2

Table 3 – Flight period of Chilean butterflies

	Flight Period											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Papilionidae Part I	1	1	1	1	1	1	1	1	1	1	1	1
Pieridae Part I	29	30	22	19	8	5	6	7	11	14	16	25
Nymphalidae (Part I)	12	12	9	8	3	2	1	4	4	7	8	10
Nymphalidae (Part II - Satyrinae)	28	26	21	7	0	0	0	1	2	9	18	32
Lycenidae Part III/1 (Polyommata)	34	21	15	8	2	2	2	5	10	17	24	38
Lycenidae Part III/2 (Theclinae)	9	7	5	5	2		1	3	6	12	11	10
Hesperiidae Part I	30	31	25	14	4	2	2	4	7	15	19	21
total	143	128	98	62	20	12	13	25	41	75	97	137

Table 4 – Summary of butterfly conservation status in Chile. * Total no. of assessed sp. and spp.

	Conservation status											total*
	1	2	3	4	5	6	7	8	9	10	11	
Papilionidae	1											1
Papilionidae %	100											
Pieridae Part I	14	2	5	13	2	1	1		4	14		33
Pieridae Part I %	42.4	6.1	15.2	39.4	6.1	3	3		12.1	42.4		
Nymphalidae (Part I)	6	3	11	6						2		17
Nymphalidae (Part I) %	33.3	16.7	61.1	33.3						11.1		
Nymphalidae (Part II)	26	7		6	4	3	1	1		9	7	38
Nymphalidae (Part II) %	68.4	18.4		15.8	10.5	7.9	2.6	2.6		23.7	18.4	
Lycenidae (Part III/1)	18	2		3	2	2	5		5	9	28	46
Lycenidae (Part III/1) %	39.1	4.3		6.5	4.3	4.3	10.9		10.9	19.6	60.9	
Lycenidae (Part III/2)	3	4				2			2	5		18
Lycenidae (Part III/2) %	18.8	25				12.5			12.5	31.3		
Hesperiidae Part I	15	7	2	3		8		1		12	7	37
Hesperiidae Part I %	40.5	18.9	5.4	8.1		21.6		2.7		32.4	18.9	
total	83	25	18	31	8	16	7	2	11	51	42	190
total %	44.1	13.3	9.6	16.5	4.3	8.5	3.7	1.1	5.9	27.1	22.3	

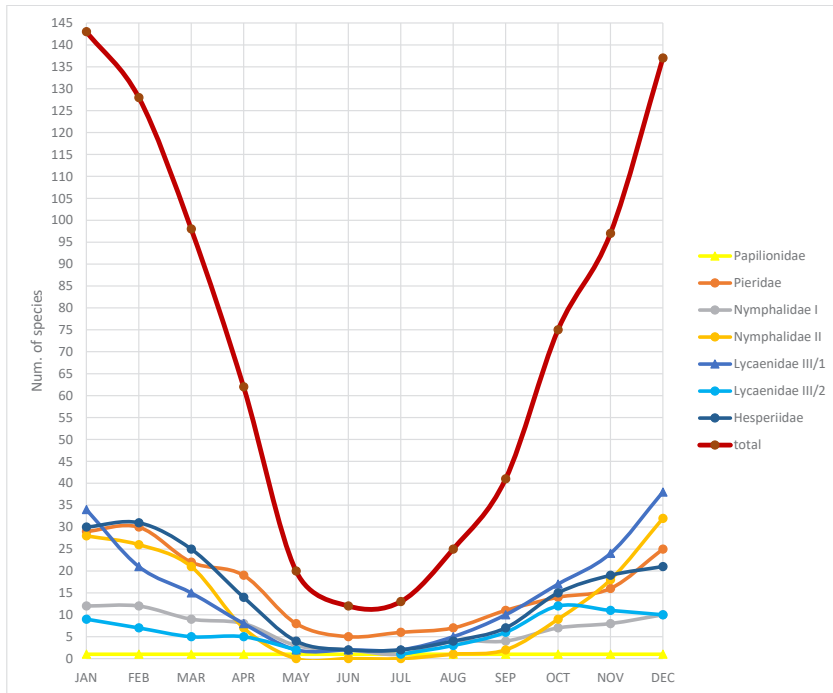


Figure 30. (Fig 4. updated from part III/1) – Phenology of Chilean butterflies by month

Table 5 . An overview of Lycaenidae records doubtful for Chile.

Original Species	name	Historical specimen data (source)	Case of doubt	Resolved name
<i>Calycopis valparaiso</i> Johnson, 1990		“Chili, Valparaiso, R. Martin, 1923” (MNHN)	mislabeling	<i>Calycopis caulonia</i> (Hewitson, 1877)
<i>Chlorostrymon chilensis</i> Johnson, 1992		“Santiago, Chile, R. Martin” (MNHN)	mislabeling	<i>Chlorostrymon simaethis rosario</i> Nicolay, 1980
<i>Penaincisalia oribata</i> (Weymer, 1890) Johnson, 1990		[Corque, Bolivia]	name misapplication	<i>Penaincisalia culminicola</i> (Staudinger, 1894)
<i>Penaincisalia patagonaevaga</i> Johnson, 1990		“Argentina, 40 km N Rio Mayo, Chubut Prov. (Patagonia), 20 Nov 1966, nr 700 m, J. Herrera”	chimeric	<i>Penaincisalia penai</i> Johnson, 1990
<i>Pontirama coquimbensis</i> Johnson, 1992		“Tongoy, Coquimbo”	mislabeling	nomen dubium
<i>Rekoa pategon cyrriana</i> (Hewitson, 1874)		“Chili” (HEOU)	mislabelling / may occur	<i>Rekoa pategon cyrriana</i> (Hewitson, 1874)
<i>Tergissima shargeli</i> Johnson, 1990		“Santiago, Chile, R. Martin” (MNHN)	mislabelling / may occur	<i>Electrostrymon callao</i> (Druce, 1907)
<i>Zizina oxleyi</i> (C. & R. Felder, [1865])		Chili (BMNH; MNHN)	mislabeling / occurrence unlikely	<i>Zizina oxleyi</i> (C. & R. Felder, [1865])

9 species (19.5%) are under increasing stress (categories 5, 6, 7, and 8); 4 species – *Nabokovia ada*, *P. kechico*, *P. johnsoni* and *P. faundezi* (8.7%) are locally or fully extinct;

No Polyommata is known to be a migrant, though *Leptotes trigrammatus* may expand beyond its permanent distribution and appear within cities, e.g. Santiago (1994). For 8 species – *P. argentina*, *P. barrigai*, *P. domeyko*, *P. hazeorum*, *P. malleco*, *P. maricunga*, *P. pascualama* and *P. valentina* (17.4%) we do not have sufficient data; this gap in our knowledge should be closed quickly while we still have time to launch conservation plans for endangered spp.

Overview of the doubtful records.

In addition to the 18 species in the literature, a further eight lycaenid species, one Polyommata and seven Theclinae were recorded as occurring in Chile. These were discussed individually in the chapter “Doubtful records”. The results are summarized in the Table 5. The record of *Penaincisalia culminicola* was based on the misapplication of the name. Two species, namely *Electrostymon callao* and *Rekoa palegon cyrriana*, characteristic of the desert on the Pacific side of the Andes, may occur in the northern regions from Arica to Antofagasta, but their Chilean records are based on poorly labelled specimens, therefore their presence is not yet confirmed. The remaining five species either have been erroneously recorded for Chile almost with certainty or their identity remains in obscurity. Accordingly, the “Santiago” specimens of *Calycopis caulonia* and *Chlorostyrom simaethis rosario* are mislabelled, the holotype of *Penaincisalia patagonaevaga* is a chimera; and because the *Pontirama coquimbiensis* holotype cannot be located, the identity of the taxon is impossible to determine objectively. The old Chilean records of *Zizina oxleyi* may be attributed to human activity, nowadays out of practice.

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REFERENCES

- AJMAT DE TOLEDO Z.N. 1978. Fauna del NOA. Contribución al conocimiento de los lepidópteros argentinos. VI. *Eiseliana* nuevo género de Lycaenidae (Theclinae, Strimonini [sic]). Acta zoologica Lilloana 33(1): 79–84, 6 Figs.
- BÁLINT ZS. 1993. New species of *Pseudolucia* Nabokov from Chile and Patagonia (Lepidoptera: Lycaenidae, Polyommatainae). Reports of the Museum of Natural History. University of Wisconsin (Stevens Point) 27: 1–25, 10 Figs.
- BÁLINT ZS. 1997. A report of an entomological expedition in Peru with special reference to lycaenid butterflies (Lepidoptera: Lycaenidae). Folia entomologica hungarica 58: 9–17.
- BÁLINT ZS.. 1999. Lepkészeti kutatóúton a perui Andokban [On a trip studying Lepidoptera in the Peruvian Andes]. Állattani Közlemények 84: 87–101, 2 tabs.
- BÁLINT ZS.. 2022a. Lycaenidae Part V. Subfamily Polyommatainae. Tribe Polyommataini. In: Bozano G.-C. (ed.) Guide to the Butterflies of the Palearctic Region. Omnes Artes, Milano, 106 pp.

- BÁLINT ZS.. 2022b. Függlék, pp 85-104. In: D'Abbrera B. and Bálint Zs: Pillangóvilág. Bevezetés és a teremtettség rendje. [World Butterflies. Introduction and the Order of the Created Diversity.] Pytheas könyvmanufaktúra, Budapest, 112 pp.
- BÁLINT ZS., P. BOYER., J. FAFRÁN, J. CERDEÑA and T.W. PYRCZ. 2022c. A new high-altitude species of *Penaincisalia* Johnson, 1990 (Lepidoptera, Lycaenidae) from the Peruvian Andes. *Zootaxa* 5154 (1), 49–59.
- BÁLINT ZS. and B. BENYAMINI. 2017. Corrected synonymies: the identities of *Strymon bicolor* (Philippi, 1859) and *Strymon heodes* (Druce, 1909) (Lepidoptera: Lycaenidae). *Opuscula zoologica* (Budapest) 48(1): 61–69, 11 figs.
- BÁLINT ZS. and D. BENYAMINI. 2020. The identity of the nomen dubium *Penaincisalia patagonaevaga* Johnson, 1990 (Lepidoptera: Lycaenidae, Polyommatainae [sic]). *Opuscula zoologica* (Budapest) 51(2): 213–217, 2 figs.
- BÁLINT ZS., J. CERDEÑA-GUTIÉRREZ, P. BOYER, K. FLORCZYK and T.W. PYRCZ. 2019. Notes on the identity of the male paralectotype of *Thecla heodes* and description of a new species: *Strymon cryptodes* sp. nov. from northern Peru (Lepidoptera: Lycaenidae). *Opuscula Zoologica Budapest* 50(1): 23–29.
- BÁLINT ZS., K. GERGELY and K. KERTÉSZ. 2019. A new species of *Penaincisalia* (Lepidoptera: Lycaenidae) from Peru. *Opuscula zoologica* (Budapest) 50(2): 137–144, 28 figs.
- BÁLINT ZS. and K. JOHNSON. 1993. New species of *Pseudolucia* Nabokov from Chile and Patagonia (Lepidoptera: Lycaenidae, Polyommatainae). *Reports of the Museum of Natural History, University of Wisconsin (Stevens Point)* 27: 1–25, 10 Figs.
- BÁLINT ZS. and O. TOMER. 2019. A new *Strymon* species from the dry area of the Peruvian Andes (Lepidoptera: Lycaenidae: Eumaeini). *Folia entomologica hungarica* 80: 293–301, 25 Figs.
- BECCALONI G.W., Á.L. VILORIA-PETIT, S.K. HALL and S.G. ROBINSON. 2008. Catalogue of the hostplants of the Neotropical butterflies. *Catálogo de las plantas huésped de las mariposas neotropicales*. Zaragoza, Sociedad Entomológica Aragonesa. (Monografías del Tercer Milenio, Vol. 8). 536 pp., Figs., 3 tabs.
- BEEBE, CH. W. 1951. Migration of Nymphalidae (Nymphalinae), Brassolidae, Morphidae, Libytheidae, Satyridae, Riodinidae, Lycaenidae and Hesperidae (butterflies) through Portachuelo Pass, Rancho Grande, north-central Venezuela. *Zoologica* (New York) 36(1): 1–16, 2 pls.
- BENYAMINI D. and K. JOHNSON. 1996. Review of Austral *Heoda*, with a new species from Chile (Lepidoptera: Lycaenidae: Eumaeini). *Tropical Lepidoptera* 7(1)(1): 13–20, 11 Figs., 1 tab.
- BENYAMINI D. 1995. Synopsis of biological studies of the Chilean Polyommataini (Lepidoptera, Lycaenidae). *Reports of the Museum of Natural History, University of Wisconsin (Stevens Point)* 52: 1–51, pls. 7–18, Figs. A–L, 10 tabs.
- BENYAMINI D., J.A. UGARTE-PEÑA, M.A. SHAPIRO, H.H.O. MIELKE, W.T. PYRCZ and ZS. BÁLINT. 2014. An updated list of the butterflies of Chile (Lepidoptera, Papilionoidea and Hesperioidea) including distribution, flight period and conservation status. Part I, comprising the families: Papilionidae, Pieridae, Nymphalidae (in part) and Hesperidae describing a new species of *Hypsochila* (Pieridae) and a new subspecies of *Yramea modesta* (Nymphalidae). *Boletín del Museo nacional de Historia natural* (Santiago de Chile) 63: 9–31, 2 pls., 4 Figs., 4 tabs.
- BENYAMINI D., J.A. UGARTE-PEÑA and ZS. BÁLINT. 2020. An updated list of the butterflies of Chile (Lepidoptera, Papilionoidea and Hesperioidea) including distribution, flight period, conservation status and comments on biology. Part III/1. Subfamily Polyommatainae (Lycaenidae) with descriptions of three new species of *Pseudolucia*. *Boletín del Museo nacional de Historia natural* (Santiago de Chile) 68 (1/2): 131–181, pls. 12–17, 2 Figs., 4 tabs.

- BLANCHARD CH. É. 1852-54. Orden VI. Lepidópteros. In: Gay, C. (Ed.), Historia física y política de Chile según documentos adquiridos en esta república durante doce años de residencia en ella y publicada bajo los auspicios del Supremo Gobierno. Zoología. Paris, C. Gay. 7(1): 1–112.
- BROWN S. K. JR. 1993. Neotropical Lycaenidae: an overview. Occasional Paper of the IUCN Species Survival Commission 8: 45-61, 3 Figs., 3 tabs.
- CERDEÑA-GUTIÉRREZ J.A., J.J. FARFÁN-LARICO M. and M. DELGADO. 2015. First record of *Chlorostrymon kuscheli* (Ureta, 1949) (Lepidoptera: Lycaenidae) in Peru. Check List 11(1)(1529): 1–2, 1 fig.
- CLENCH H. K. 1961: Subtribe Strymoniti, pp. 178-220, in Ehrlich R. R. and Ehrlich A. H.: How to know the Butterflies. WM. C. Brown Company Publishers, Dubuque, Iowa, [iv] + 262 pp.
- COSTA-CICOGNANI M., L.Á. VILORIA-PETIT, S. ATTAL, M. BENMESBAH, E.F.A. NEILD and ZS. BÁLINT. 2018. Lepidoptera from the Pantepui. Part V. New Lycaenidae (Theclinae: Eumacinae). Opuscula zoologica (Budapest) 49(2): 163–179, 37 Figs., 1 tab.
- CRAMER P. 1780 De uitlandische Kapellen voorkomende in de drie Waereld-Deelen Asia, Africa en America. Papillons exotiques des trois parties du monde l'Asie, l'Afrique et l'Amérique. Amsterdam, S. J. Baalde; Utrecht, Barthelemy Wild and J. Van Schoonhoven and Comp. 3(23/24): 129-176, pls. 265–288.
- D'ABRERA L.B. 1995. Butterflies of the Neotropical Region. Part VII. Lycaenidae. Victoria, Black Rock, Hill House. pp. i–xi, 1098–1270, Figs.
- DA SILVA N.A.P., C. LEPESQUEUR, A.R. SOUZE and H.C. MORAIS. 2016. Biology of the immature stages of *Strymon crambusa* (Lycaenidae, Theclinae) on Oxalidaceae. Revista Brasileira de Entomologia 60 (1): 68–72.
- DRAUDT M. 1919-1921. Familie: Lycaenidae. In: Seitz, A. (Ed.), Die Gross-Schmetterlinge der Erde. Stuttgart, Alfred Kern. 5:744–768 (1919), 769–816 (1920), 817–831 (1921), pls. 144–159.
- DRUCE H.H. 1907. On Neotropical Lycaenidae, with descriptions of new species. Proceedings of the Zoological Society of London 1907(3): 566–632, pls. 31–36.
- DRURY D. 1770-82. Illustrations of Natural History. Wherein are exhibited upwards of two hundred and forty figures of exotic insects, according to their different genera; very few of which have hitherto been figured by any author, being engraved and coloured from nature, with the greatest accuracy, and under the author's own inspection, on fifty copper-plates. With a particular description of each insect: interspersed with remarks and reflections on the nature and properties of many of them. London, B. White. 1: xxviii + 130 pp., 50 pls. ([23 April] 1770); 2: vii+ 90 + [4] pp., 50 pls. ([14 May] 1773); 3: xxvi + 76 + [2] pp., 50 pls.
- DUARTE M., K.R. ROBBINS and H.H.O. MIELKE. 2005. Immature stages of *Calycopis caulonia* (Hewitson, 1877) (Lepidoptera, Lycaenidae, Theclinae, Eumacini), with notes on rearing detritivorous hairstreaks on artificial diet. Zootaxa 1063: 1–31, 77 Figs., 2 tabs.
- DUFRANE A. 1939. Lycaenidae. Bulletin and Annales de la Société royale entomologique de Belgique 79(7/8): 289-292.
- DYAR H.G. 1913. Results of the Yale Peruvian Expedition of 1911. Lepidoptera. Proceedings of the United States National Museum 45(2006): 627–649.
- ELWES H. J. 1903. The butterflies of Chile. Transactions of the Entomological Society of London 1903(3): 263-301, pls. 12–15.

- FARFÁN-LARICO J.J. 2018. Mariposas (Lepidoptera: Papilionoidea) de Arequipa, Perú: Lista preliminar con dos nuevos registros para Perú. *Rexvista peruana de Biología* 25(4): 357–370, 3 Figs., 2 tabs.
- FARFÁN J., J. CERDEÑA, H.A. VARGAS, G.L. GONÇALVES, G. LAMAS and G.R.P. MOREIRA. 2022. A peculiar new species of *Dione (Agraulis)* Boisduval and Le Conte (Lepidoptera, Nymphalidae, Heliconiinae) associated with *Malesherbia* Ruiz and Pavón (Passifloraceae) in xeric western slopes of the Andes. *ZooKeys* 1113: 199–227.
- FAYNEL CH. and K.D. JOHNSON. 2000. A new species of *Strymon* Hübner from French Guiana (Lepidoptera, Lycaenidae). *Bulletin de la Société entomologique de France* 105(4): 375-379, 8 Figs.
- FELDER C. and R. FELDER. 1865. Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorff-Urbair. Zoologischer Theil. Zweiter Band. Zweite Abtheilung: Lepidoptera. Wien, Carl Gerold's Sohn. (1): [4] + 1–136, pls. 1–21, (2): [2] + 137–378, pls. 22–47.
- FERRER D., G. GOMARIZ-CEREZO, O.E. NÚÑEZ-BUSTOS and P. ISOLA. 2020. Observaciones de lepidópteros en cinco áreas protegidas de la región andina de la Provincia de Mendoza, Argentina. *Historia natural (Buenos Aires)* (3)10(3): 191–218, 30 Figs.
- FORSTER W. 1955. Beiträge zur Kenntnis der Insektenfauna Boliviens. Teil I. Einleitung. Lepidoptera I. Veröffentlichungen der zoologischen Staatssammlung München 3: 81–160, pls. 25-33.
- GIBBS, G.W. 1980. *New Zealand Butterflies, Identification and Natural History*. Collins, Auckland, 207 pp.
- GUERRA-SERRUDO J. F., A.F. GUERRA CAZÓN and Y.F. GUERRA CAZÓN. 2013. *Mi Guía de Mariposas del Valle de la Paz*. Universidad Tecnológica Boliviana, 142pp.
- GUERRA-SERRUDO F. J. and A.P. APAZA-TICONA. 2016. Mariposas diurnas, pp. 42–43, 68–69, 98–99, 128–129, 173–184, Figs., tabs. In: Wallace, R. B., A. Ramírez, E. Salinas, F. Zenteno, G. Ayala, N. Bernal, L. Siles, M. Ocampo, V. H. García, G. Miranda, J. Molina and J. F. Guerra (Eds.), *Informe científico 2015. Identidad Madidi. Relevamientos de biodiversidad en el Parque Nacional y Área Natural de Manejo Integrado Madidi*. La Paz, Servicio Nacional de Áreas Protegidas.
- HAYWARD K. J. 1949. Nuevas especies [sic] de “Lycaenidae” de la Argentina (Lep. Rhop.). *Acta zoologica Lilloana* 8: 567–581, 7 Figs.
- HEWITSON W.CH. 1867-1877. Illustrations of new species of exotic butterflies, selected chiefly from the collections of W. Wilson Saunders and William C. Hewitson. Lycaenidae. London, John Van Voorst (3): 77–114, pls. 31–46 (1867); (6): 151–185 [sic], pls. 60–73 (1874), (7): 185–209 [sic], pls. 74–83.
- HÜBNER J. [1819]. *Sammlung exotischer Schmetterlinge*. Augsburg, Jacob Hübner. 1: pls. [34, 94, 191, 202]; 2: pls. [90, 180, 223]
- JOHNSON K. 1989. Revision of *Chlorostrymon* Clench and description of two Austral Neotropical species (Lycaenidae). *Journal of the Lepidopterists' Society* 43(2): 120–146, 7 Figs.
- JOHNSON K. 1990a. *Penaincisalia*, a new genus of “elfin”-like butterflies from the high Andes (Lepidoptera: Lycaenidae). *Pan-Pacific Entomologist* 66(2): 97–125, 10 Figs.
- JOHNSON K. 1990b. A revision of the South American hairstreak butterfly genera *Tergissima* and *Femniterra* (Lycaenidae: Theclinae). *Insecta Mundi* 3(3): 195–215, 11 Figs.

- JOHNSON K. 1990c. High Andean *Chlorostrymon* (Lycaenidae) and a new species from Mt. Larancagua, Chile. *Journal of the Lepidopterists' Society* 44(3): 188–193, 2 Figs.
- JOHNSON K. 1991a. Types of Neotropical Theclinae (Lycaenidae) in the Muséum National d'Histoire Naturelle, Paris. *Journal of the Lepidopterists' Society* 45(2): 142–157, 34 Figs.
- JOHNSON K. 1991b. Neotropical hairstreak butterflies: Genera of the “*Calycopis/Calystryma* Grade” of Eumacini (Lepidoptera, Lycaenidae, Theclinae) and their diagnostics. *Reports of the Museum of Natural History, University of Wisconsin* 21: [iv] + 128 pp., 87 Figs.
- JOHNSON K. 1992. Genera and species of the Neotropical “elfin”-like hairstreak butterflies (Lepidoptera, Lycaenidae, Theclinae). *Reports of the Museum of Natural History, University of Wisconsin (Stevens Point)* 22(1): [i–iv], 1–135, 205 Figs.; (2): 136–279, 241 + 2 Figs.
- JOHNSON K.D., C.R. EISELE and N.B. MACPHERSON. 1988. The “hairstreak butterflies” (Lycaenidae, Theclinae) of northwestern Argentina. I. Introduction, *Calycopis*, *Calystryma*, *Tergissima* and *Femniterra*. *Bulletin of the Allyn Museum* 123: 1–49, 18 Figs., 1 tbl.
- JOHNSON K., R.C. EISELE and N.B. MCPHERSON. 1990. The “hairstreak butterflies” (Lycaenidae, Theclinae) of northwestern Argentina. II. *Strymon*, sensu stricto. *Bulletin of the Allyn Museum* 130: 1–77, 51 Figs.
- JOHNSON K. and D.L. MILLER. 1991. The genus *Ministrymon* Clench 1961 in Chile and a new species from the Northern Desert Biotic Province (Lepidoptera: Lycaenidae). *Acta entomológica chilena* 16: 183–192, 5 Figs., 1 map.
- JOHNSON K. and D.L. MILLER. 1992. Additions to the Chilean fauna, pp. 5–8. In: Johnson, K. (Ed.), *Taxonomic additions to recent studies of Neotropical butterflies*. *Reports of the Museum of Natural History, University of Wisconsin (Stevens Point)* 23: 1–20, Figs.
- JOHNSON K., D.L. MILLER and V.J. HERRERA. 1992. *Eiseliana* and *Heoda*, high Andean and Austral genera of the Neotropical Eumacini (Lepidoptera: Lycaenidae). *Acta entomológica chilena* 17: 107–146, 25 Figs.
- JOHNSON K. and J.A. SALAZAR. 1993. New species, statuses and combinations in northern South American *Strymon* (Lepidoptera, Lycaenidae, Theclinae). *Reports of the Museum of Natural History, University of Wisconsin (Stevens Point)* 26: 1–13, pl. 2, 3 Figs.
- JÖRGENSEN P. 1934. Neue Schmetterlinge und Raupen aus Südamerika. *Deutsche entomologische Zeitschrift Iris* 48: 60–78.
- KIRBY F. W. 1879. *Catalogue of the collection of diurnal Lepidoptera formed by the late William Chapman Hewitson of Oatlands, Walton-on-Thames; and bequeathed by him to the British Museum*. London, John Van Voorst. iv + 246 pp.
- LAMAS G., L.M. MCINNIS, C.R. BUSBY and K.R. ROBBINS. 2021. The lycaenid fauna (Lepidoptera) of Cosñipata, Peru: annotated checklist, elevational patterns, and rarity. *Insecta Mundi* 861: 1–34, 4 Figs., 4 tabs.
- LATHY I. P. 1926. Notes on the American Theclinae (Lepidoptera). *Annals and Magazine of Natural History* (9)17(97): 35–47.
- NICOLAY S.S. 1980. The genus *Chlorostrymon* and a new subspecies of *C. simaethis*. *Journal of the Lepidopterists' Society* 34(2): 253–256, 3 Figs.

- NICOLAY S.S. and ROBBINS K.R. 2005. Five new dry-area South American *Strymon* species (Lycaenidae: Theclinae) and their biogeographic significance. *Journal of Research on the Lepidoptera* 38: 35–49, 29 Figs.
- OBERPRIELER R.L., C.J.L. LYAL, R.K. PULLEN, M. ELGUETA, B.A.R. LESCHEN and J.D.S. BROWN. 2018. A Trubite to Guillermo (Willy) Kuschel (1918–2017). *MDPI diversity* 10(101): 1–33.
- PEÑA-GUZMÁN E.L. and J.A. UGARTE-PEÑA. 1997. Las mariposas de Chile. The butterflies of Chile. Santiago de Chile, Editorial Universitaria. 359 pp., Figs., maps
- PENZ, CARLA M. 2022. Reinstated status of the butterfly genus *Agraulis* (Lepidoptera, Nymphalidae, Heliconiinae). *Zootaxa* 5209(3): 394–398.
- PHILIPPI A. R. 1859. Descripción de algunas nuevas especies de mariposas chilenas, principalmente de la Provincia de Valdivia. *Anales de la Universidad de Chile* 16(12): 1088–1114.
- PRIETO-MARTINEZ H.C. 2008. Taxonomía, Biogeografía y Relaciones Filogenéticas del Género Alto-Andino *Penaincisalia* Johnson (Lepidoptera: Lycaenidae: Eumacini). Thesis Doctoral. Universisad de Alicante, Alicante, 268 pp.
- PRIETO-MARTÍNEZ C.H. and A.M. VARGAS-ZAPATA. 2016. Elfin butterflies of the genus *Rhamma* Johnson (Lepidoptera: Lycaenidae: Theclinae): A review of the Colombian species. *Zootaxa* 4093(3): 323–342, 73 Figs.
- PRIETO C., R. NUÑEZ and A. HAUSMANN. 2019. Molecular species delimitation in the genus *Rhamma* Johnson, 1992 (Lepidoptera: Lycaenidae, Theclinae), Mitochondrial DNA Part A, 30:1, 101–117.
- PRIETO-MARTÍNEZ H.C. and J. LORENC-BRUDECKA. 2014. Type species fixation of the genus *Abloxurina* Johnson, 1992 (Lepidoptera: Lycaenidae: Theclinae). *Zootaxa* 3869(1): 97–100, 2 Figs.
- PYRCZ W. T., J.A. UGARTE-PEÑA, P. BOYER, M.A. SHAPIRO and D. BENYAMINI. 2016a. An updated list of the butterflies of Chile (Lepidoptera, Papilionoidea) including distribution, flight periods and conservation status. Part II, subfamily Satyrinae (Nymphalidae), with the descriptions of new taxa. *Boletín del Museo nacional de Historia natural (Santiago de Chile)* 65: 31–67, pls. 3–11, 2 Figs., 4 tabs.
- RAMÍREZ-FISCHER F.J., D. BENYAMINI and H.A.VARGAS. 2016. An endangered hemiparasitic shrub is the only host plant of the little-known Neotropical hairstreak *Strymon flavaria* (Lepidoptera: Lycaenidae) in the arid Andes. *Journal of Insect Conservation* 20: 923–928.
- ROBBINS K. R. 1991. Evolution, comparative morphology, and identification of the eumacine butterfly genus *Rekoa* Kaye (Lycaenidae: Theclinae). *Smithsonian Contributions to Zoology* 498: i–iii, 1–64, 116 Figs., 17 tabs.
- ROBBINS K. R. 2004. Lycaenidae. Theclinae. Tribe Eumacini, pp. 118–137. In: Lamas, G. (Ed.), Checklist: Part 4A. Hesperioidea - Papilionoidea. In: Heppner, J. B. (Ed.), Atlas of Neotropical Lepidoptera. Volume 5A. Gainesville, Association for Tropical Lepidoptera; Scientific Publishers.
- ROBBINS K. R. 2010. The “upside down” systematics of hairstreak butterflies (Lycaenidae) that eat pineapple and other Bromeliaceae. *Studies on neotropical Fauna and Environment* 45(1): 21–37, 20 Figs.
- ROBBINS K. R. and J. GLASSBERG. 2013. A butterfly with olive green eyes discovered in the United States and the Neotropics (Lepidoptera, Lycaenidae, Eumacini). *ZooKeys* 305: 1–20, 9 Figs.

- ROBBINS K. R. and G. LAMAS. 2002. Nomenclatural changes in the Neotropical Eumaeini (Lepidoptera, Lycaenidae, Theclinae). *Revista brasileira de Zoologia* 19(Suplemento 1): 197–214, 24 Figs.
- ROBBINS K. R. and G. LAMAS. 2002. 2004. Lycaenidae. pp. 118–140. In: Lamas, G. (Ed.), Checklist: Part 4A. Hesperioidea - Papilionoidea. In: Heppner, J. B. (Ed.), Atlas of Neotropical Lepidoptera. Volume 5A. Gainesville, Association for Tropical Lepidoptera; Scientific Publishers.
- ROBBIS K. R. and S.S. NICOLAY. 2002. An overview of *Strymon* Hübner (Lycaenidae: Theclinae: Eumaeini). *Journal of the Lepidopterists' Society* 55(3): 85–100, 45 Figs.
- ROBBINS K. R. and B.S. SMALL JR. 1981. Wind dispersal of Panamanian hairstreak butterflies (Lepidoptera: Lycaenidae) and its evolutionary significance. *Biotropica* 13(4): 308–315, 3 Figs., 1 tab.
- STAUDINGER O. 1894. Hochandine Lepidopteren. *Deutsche entomologische Zeitschrift "Iris"* 7(1): 43–100, pls. 1-2.
- URETA-ROJAS E. 1947. Nuevos ropalóceros (Lep.) de Chile. *Boletín del Museo nacional de Historia natural (Santiago de Chile)* 23: 47–61, pls. 1–2.
- URETA-ROJAS E. 1949. Lepidópteros de Chile (Rhopalocera). IV Parte. Familia Lycaenidae. *Boletín del Museo nacional de Historia natural (Santiago de Chile)* 24: 93–123, 2 pls.
- URETA-ROJAS E. 1956. Nuevas especies de Lycaenidae (Lep. Rhopalocera) de Chile. *Boletín del Museo nacional de Historia natural (Santiago de Chile)* 26(6): 257–260, 3 Figs.
- VARGAS H.A. and M. DUARTE. 2014. First host plant record for *Thaeides muela* (Lepidoptera, Lycaenidae, Theclinae, Eumaeini). *Florida Entomologist* 97(1): 288–290.
- VARGAS H.A. and M. DUARTE. 2016. First host plant record for *Strymon davara* (Hewitson) (Lepidoptera, Lycaenidae) in the highly human-modified coastal valleys of the Atacama Desert. *Revista Brasileira de Entomologia* 60: 352–355.
- VARGAS H.A. and L.E. PARRA. 2009. Prospección de lepidópteros antófagos asociados a *Acacia macracantha* Willd. (Fabaceae) en el norte de Chile. *Revista Brasileira de Entomologia* 53(2): 291–293.
- VARGAS H.A., M. VARGAS-ORTIZ, D. BOBADILLA, M. DUARTE and W. HUANCA-MAMANI. 2016. Larval polychromatism in the Neotropical hairstreak *Strymon bubastus* (Stoll) (Lycaenidae, Theclinae, Eumaeini) associated with two newly documented hostplants in the Atacama Desert. *Journal of the Lepidopterists' Society* 70: 153–157.
- VARGAS-ORTIZ M, H.A. VARGAS and H.A. BENÍTEZ. 2018. Seasonal variation and sexual shape dimorphism in wings of the Neotropical hairstreak *Strymon davara* (Lycaenidae, Theclinae, Eumaeini). *Journal of the Lepidopterists' Society* 72: 81–86.
- VOLKMANN R.L. and O.E. NÚÑEZ-BUSTOS. 2010. Mariposas serranas de Argentina central. Tomo I. Papilionidae, Pieridae, Lycaenidae, Riodinidae. Córdoba, Huerta Grande, Equipo Gráfico. 140 pp., Figs.
- WARREN, A.D., K.J. DAVIS, E.M. STANGELAND, J.P. PELHAM, K.R. WILLMOTT and N.V. GRISHIN. 2016. Illustrated Lists of American Butterflies. [21-XI-2017] < <http://www.butterfliesofamerica.com/> >
- WESTWOOD O.J. 1852. The genera of diurnal Lepidoptera: comprising their generic characters, a notice of their habits and transformations, and a catalogue of the species of each genus. London, Longman, Brown, Green and Longmans. (52): 475–486, pls. 78–79.

WEYMER G. and J.P. MAASSEN. 1890. Lepidopteren gesammelt auf einer Reise durch Colombia, Ecuador, Perú, Brasilien, Argentinien und Bolivien in den Jahren 1868–1877 von Alphons Stübel. Berlin, A. Asher and Co. [1] + xi + 182 pp., 9 pls.

WALLENGREN H.D.J. 1860. Lepidopterologische Mittheilungen. Wiener entomologische Monatschrift 4(2): 33–46.

WILLIAMS L., A. GRIMM and D.W. BECK. 2017. 200 amethyst hairstreaks: mesmerized by the sparkle of gems in the gloaming. *News of the Lepidopterists' Society* 59(4): 194–200, 8 Figs.

FIGURE CAPTIONS.

Acronyms used in the legends.

AMNH – American Museum of Natural History, New York, United States of America; BMNH – British Museum (Natural History) = NHMUK; BOA – Butterflies of America (<https://www.butterfliesofamerica.com/>); DBC – Dubi Benyamini collection, Beit Arye, Israel; HNHM – Hungarian Natural History Museum, Budapest, Hungary; HUZM – Humboldt University Zoological Museum, Berlin, Germany; MNHN – Museum National d'Histoire Naturelle Paris, France; MNHNC – Museo Nacional de Historia Natural, Santiago de Chile, Chile; NHMUK – Natural History Museum, London, United Kingdom; PBC – Pierre Boyer collection, Le Puy Sainte Reparade, France; SMNH – Smithsonian Museum of Natural History, Washington, United States of America. Scale bar for specimens: 1 cm; scale bar for genitalia: 1 mm.