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EISELIANA AND *HEODA*, HIGH ANDEAN AND AUSTRAL GENERA OF THE NEOTROPICAL EUMAEINI (LEPIDOPTERA: LYCAENIDAE)

EISELIANA Y HEODA, GENEROS ALTO ANDINOS Y AUSTRALES DE EUMAEINI NEOTROPICALES (LEPIDOPTERA: LYCAENIDAE)

KURT JOHNSON [1], LEE D. MILLER [2] and JOSÉ HERRERA G. [3]

ABSTRACT

Genera *Eiseliana* Ajmat de Toledo 1978 and *Heoda* Johnson, Miller & Herrera 1992 are revised to include two clades of species restricted to high Andean and austral distributions in South America. A Key distinguishes *Eiseliana* and *Heoda* from taxa of the pan-Neotropical *Strymon eurytulus* (Hübner) complex, somewhat similar in under surface wing pattern . *Eiseliana* and *Heoda* belong to a large worldwide clade of unrevised Eumaeini including species rich *Strymon* Hübner and may eventually be considered subgeneric high montane and austral lineages of *Strymon*. Formerly monotopic *Eiseliana* is expanded to include six species with differential occurrence of male forewing androconia ("brands") and brown or orange upper surface wing coloration but shared under surface pattern and structural characters. As such, *Eiseliana* includes the widely distributed, polymorphic, "*Thecla bicolor* complex" of southern South America along with other species occurring northward to Peru. Type species *E. koehleri* Ajmat de Toledo is synonymized with *Thecla punona* Clench 1944 and *Eiseliana* divided into two subclades: (1) brown species *punona* (Peru to Argentina), *flavaria* Uruta 1956 (Chile) (transferred from *Thecla*), new species *patagoniensis* (Patagonia) (all lacking forewing brands) and new species *ollantaitamba* (Peru) (with forewing brands); (2) orange and brown species *bicolor* Phillipi 1859 (junior synonym *Thecla quadrimaculata* Hewitson 1874; "forms" *leptocosma* Hayward 1949 and *tricolor* Ureta 1949) (Chile to Patagonia) and new species *probabila* (Coquimbo Desert and Central Valley biotic provinces, Chile, distinguished from continuous variation in the *bicolor* complex). *Heoda* includes type species *heodes* Druce 1909 (Peru), *wagenknechti* Ureta 1947 (Chile) (both transferred from *Thecla*) and new species *colombiana* (Colombia), *suprema* and *nivea* (both Patagonia). A lectotype is designated for *Thecla heodes*. All *Heoda* species have male forewing brands; the genus exhibits a unique integumental morphology. Biogeographical significance in the geographic distributions of *Eiseliana* and *Heoda* in discussed.

Key words: biogeography, systematics, Theclinae, Eumaeini, *Strymon*, Chile, Argentina, Patagonia.

INTRODUCTION

Johnson, Eisele and MacPherson (1990, hereafter "Johnson *et al.*") recently enumerated twenty-eight species of southern South American hairstreak butterflies sharing the generic characters of *Strymon* Hübner ("*Strymon sensu stricto*") and distinguished these from two other groups of neotropical hairstreak butterflies-- *Eiseliana*

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

[2]Allyn Museum of Entomology, Florida Museum of Natural History, 3621 Bayshore Road, Sarasota, Florida 34234.

[3]Universidad Metropolitana de Ciencias de la Educación, Instituto de Entomología, Casilla 147, Santiago, Chile

Ajmat de Toledo (1978) and the "*Thecla wagenknechti/T. heodes* assemblage" (Johnson *et al.*, p.3). The latter two groups are generally high Andean and austral and composed of little known (or undescribed) species distinctive in certain characters of the wing and genitalia. Previously, understanding these groups has been complicated by confusion surrounding the nomenclature of southern South American *Strymon* and ignorance of the actual diversity and distributions of the Andean and austral groups.

Reviewing type specimens and extensive southern South American samples of *Strymon*, Johnson *et al.* synonymized several taxa (*Thecla americensis* Blanchard, *T. nigra* Lathy, *T. tucumana* Druce and *T. argona* Hewitson) with *Strymon eurytulus* based on apparent continuous variation. These taxa had been widely confused with certain undescribed neotropical hairstreaks occurring in the high Andes and austral regions (Ureta, 1956; Hayward 1973; Johnson *et al.*, 1990). With the *S. eurytulus* complex demonstrated as one widespread and highly variable entity (itself including some high Andean and austral populations), we could undertake elucidating the numerous undescribed high Andean and austral thecline species which make up the *Eiseliana* and *T. wagenknechti/T. heodes* assemblages. As Descimon (1986) and Johnson *et al.* (1990) pointed out, since these groups are each of homogeneous character and widely sympatric with neotropical *Strymon*, they probably warrant consideration as distinct genera.

Worldwide *Strymon sensu lato* is itself structurally heterogeneous and in need of systematic revision. In addition to *Eiseliana* and the *T. wagenknechti/T.heodes* group, Johnson *et al.* reported unique characters in the neotropical "*Strymon basilides* group". Thus, there are a number of lineages within *Strymon sensu lato* requiring individual definition. As we note below, the origins of *Eiseliana* and the *T. wagenknechti/T. heodes* assemblage are closely tied to the clade of pan-Neotropical *Strymon* including the polytypic complexes *S. eurytulus*, *S. bubastus* Stoll and *S. columella* Fabricius (Johnson *et al.*, 1990; Johnson and Matusik, 1988). Widespread and overlapping distributions of cosmopolitan and locally endemic taxa in these groups suggest the complexes are very old.

METHODS AND MATERIALS

To facilitate clear characterization of *Eiseliana* and the *T. wagenknechti/T. heodes* assemblage, we recognize *Eiseliana* as a genus and expand the genus *Heoda* to contain species of the *Thecla wagenknechti/T. heodes* group. Although these genera might be considered subgenera of worldwide *Strymon sensu lato*, their characters define them as distinct lineages and their geographic distributions widely overlap those of neotropical *Strymon*. We have based species criteria on standard taxonomic procedures involving consistent differences in characters of the wings and genitalic and tergal morphology; we have also paid special attention to apparent continuous variation in the austral *Strymon eurytulus* complex (results reviewed in Johnson *et al.*, p. 31-32) and the *Thecla bicolor* Phillipi complex (reported herein).

Specimens from the following collections were studied (abbreviations cited used hereafter in Material Examined sections):

AME: Allyn Museum of Entomology, Florida Museum of Natural History
AMNH: American Museum of Natural History including B. MacPherson (Argentina) Collection
BMNH: British Museum (Natural History)
UMCE: Universidad Metropolitana de Ciencias de la Educación, Instituto de Entomología, Santiago, Chile
CH: Collection J. Herrera
CLP: Collection Luis Peña
CMNH: Carnegie Museum of Natural History
CPM: Collection Pedro A. Mazry (currently Chicago, Illinois)
CRE: Collection Roberto C. Eisele. (Jujuy, Argentina)
IML: Instituto Miguel Lillo, Tucumán, Argentina
MCZ: Museum of Comparative Zoology, Harvard University
MNHN: Muséum National d'Histoire Naturelle, Paris
MNHN: Museo Nacional de Historia Natural, Santiago de Chile
MPM: Milwaukee Public Museum
UCD: University of California, Davis

Since differences between *Eiseliana* and *Heoda* are most apparent when comparing each

to *Strymon*, all three groups are included in the taxonomic key below. Similarly, generic diagnoses begin with differentiation from *Strymon* and conclude with statements about *Eiseliana* or *Heoda*. Johnson, MacPherson and Ingraham (1986) (followed by Bridges, 1988) first used some of the taxonomic combinations followed herein. Since these uses occurred only in informal lists or indices and cited the present paper, we consider combinations herein (formally based on the type specimens and synonymies) as new. Material Examined is organized alphabetically by the biotic provinces listed by Irwin and Schlinger (1986) and Davis (1986) and, therein, alphabetical by political provinces as treated in I.D.B.G.N. (1968a,b)[1]. Relevant biotic provinces abbreviations include:

AHP: Andean High Plateau
CDP: Coquimban Desert Province
CCCP: Central Coastal Cordillera Province
CVP: Central Valley Province
IDP: Intermediate Desert Province
NVFP: Northern Valdivian Forest Province
PSP: Patagonian Steppe Province
VFP: Valdivian Forest Province

To aid accurate analysis of infraspecific variation in specimens of *Eiseliana* and *Heoda*, and because of disparity in details of collection data, we distinguish data in the Material Examined as derived either from a known collector ("leg. x") or from a historical depository ("x Coll.").

Wing Character Key to *Strymon*, *Eiseliana* and *Heoda*

1. a Upper surfaces of fore-and hindwings with brilliant, orange patches dominating central ground color of wings. 2
   b Upper surface of fore-and hindwings concolorous. 3
2. a Under surface hindwing with cell SC + R1 element of medial band greatly displaced basally out of line with rest of medial band. . . . . *Heoda* (*heodes* species group)
   b Under surface hindwing with cell SC + R1 element of medial band generally in line with rest of medial band or, at most, displaced basally no more than two times the diameter of the spot itself. . . . . *Eiseliana* (*bicolor* species group)
3. a Hindwing without tails. 4
   b Hindwing with tails. . . . . *Strymon*
4. a Under surface hindwing with cell SC + R1 element of medial band greatly displaced basally out of line with rest of medial band. . . . . *Heoda* (*nivea* species group)
   b Under surface hindwing with cell SC + R1 element of medial band generally in line with rest of medial band or, at most, displaced basally no more than two times the diameter of the spot itself. 5
5. a Hindwing under surface, postbasal area with two spots, one each at vein 2A and in the discal cell. . . . . *Strymon eurytulus* complex
   b Hindwing under surface, postbasal area with one, two or three slashes located either at cell 2A, CuA2 or in the discal cell. . . . . *Eiseliana* (*punona* species group)

EISELIANA

Introduction. Ajmat de Toledo (1978) described *Eiseliana* as a monobasic genus from the western Argentine Andes (type species *E. koehleri* Ajmat de Toledo, Type locality, Tilcara, Cerro Negro, 3200 m, Jujuy Province, Argentina). Subsequently, it was apparent that (1) *Eiseliana* was part of a larger assemblage, some taxa of which had been grouped by Draudt (1919) in his "*americensis* Group" of the large polyphyletic "genus" *Thecla* (*sensu* Bridges, 1988); (2) *E. koehleri* was a synonym of Clench's *Thecla punona* (1944); and (3) *Eiseliana* was of uncertain relation with taxa of the Holarctic and Neotropical assemblage traditionally included in *Strymon*. Descimon (1986, citing personal communication with Johnson) summarized these views in a synopsis of high Andean butterflies.

Hitherto, most taxa of *Eiseliana* have been poorly represented in American and European museum

[1]The collecting places of the Chilean examples examined had been adjusted and up-dated by one of the authors (J. Herrera) to fit the Regions and provinces recognized and accepted by the Instituto Geográfico Militar de Chile (1983) according to the new administrative organization of the Republic ordered by the Government.

collections. We assembled a comparatively large sample by consulting numerous sources. This allowed study of temporal and spatial variation in specimens taken at many places over duplicate time periods. Recognition of several unique characters in *Eiseliana* (see Diagnosis, below) allowed us to define it as a distinctive Andean and austral genus. This study also indicated that several taxa previously associated with taxa of *Eiseliana* in the *"americensis* Group" of Draudt (1919) do not belong in the group. These latter are either part of the *Strymon eurytulus* complex (Johnson *et al.*, 1990) or not closely related to either *Eiseliana* or *Strymon* (see Appendix I).

Taxonomy

EISELIANA Ajmat de Toledo

(Figures 1 - 10)

Eiseliana Ajmat de Toledo 1978: 80. Descimon 1986: 520; Johnson, Macpherson and Ingraham 1986: 5; Bridges 1988: II.33; Johnson, Eisele and MacPherson 1988: 1; 1990: 3.

Diagnosis: *Eiseliana and Strymon.* Compared to *Strymon sens. strict.* (Johnson *et al.*, 1990) *Eiseliana* species are tailless and exhibit postbasal hindwing patterns derived from three postbasal elements (cells 2A, CuA2 and the discal cell) variously expressed as disjunct or continuous slashes. These postbasal markings parallel a medial band comprised of meandering spots or dashed elements. *Strymon* species (like *S. eurytulus* and *S. bubastus*) have two postbasal spots, one each at vein 2A and in the discal cell, paralleling medial spot-lines or fully continuous bands. Like *Strymon*, *Eiseliana* taxa show interspecific variation in occurrence of male forewing androconia ("brands" *sensu* Eliot, 1973). In *Eiseliana* females, the ductus bursae and its terminal lamellae are thinner than in *Strymon* and the ductal spiral consequently of much greater diameter. Males of *Eiseliana* exhibit a generally rounded vinculum and moderately sized valvae, usually of obtuse triangular shape. Vincula in diverse taxa of *Strymon* are more sculptured or oblong and exhibit variously tapered valvae which are sometimes sculptured, elongate or terminally constricted (Johnson *et al.*, 1990, Figs.14-45). Tergal morphology in both *Strymon* and *Eiseliana* shows no notable specialization.

Eiseliana and *Heoda.* Like *Strymon*, species of *Heoda* most often have tails. In addition, *Heoda* species exhibit (1) basal displacement of the SC + R1 element of the under surface medial band, (2) location of the female ductal spiral comparatively remote from the cervix bursae and (3) modification of the eight female tergite.

Description:
ADULT: Figs. 1-4. Wings marked as noted in Diagnosis and Key. *Male Genitalia* and *Tergal Morphology.* Figs. 5-9 [for comparison to *Strymon* species see Johnson *et al.*, 1990, Figs. 14-45]. Eighth tergite unspecialized; valvae with parabolic bilobed configuration and evenly tapered caudal extension; saccus displaced to left of ventral plane. Interspecific differences, when apparent, supralimital and usually including unusual features of the aedeages, saccus or (less occasionally) valvae. *Female Genitalia* and *Tergal Morphology.* Figs. 5-8,10 [for comparison with many *Strymon* species see Johnson *et al.*, 1990 figs. 14-45]. Eighth tergite not specialized (except by occasional thin sclerotization of the tergite margin dorsad of the lamella postvaginalis). In the genitalia, because of thinner sclerotized elements in the ductus bursae, exhibiting ductal spiral of greater diameter than typical of most *Strymon* (see Remarks).

Type Species: *Eiseliana punona* (Clench), NEW COMBINATION (*E. koehleri* Ajmat de Toledo by original designation). *E. koehleri* Ajmat de Toledo, 1978, p. 80, = *Thecla punona* Clench, 1944, p. 256, NEW SYNONYMY. The holotype male, *E. koehleri* (IML) was examined for us by Robert C. Eisele (Jujuy, Argentina). In addition, we dissected three paratype males and one paratype female (AMNH) (Figs. 1B, 6) along with other specimens (Material Examined). *E. koehleri* is synonymous with *Thecla punona* Clench (1944, p. 256) based on examination and dissection of the *T. punona* holotype female and a paratype male (Figs. 1A, 5) (respectively bearing the labels "Puno, Peru, 1 November 1898, 12,500 ft.", "A.G. Weeks, Jr", "MCZ Holotype 26258" and same data except "MCZ Paratype 26258".

Distribution: Spatial (Fig. 20, 21): generally high Andean (2600 - 4200 m.) and austral (abundant 32° S - 42° S Latitude). Widespread in HAP biotic province of Peru, Bolivia, Argentina and Chile, the CDP, CCCP, CVP, IDP, NVFP, and VFP biotic provinces of Chile and the PSP biotic province in Argentina. Temporal: in high Andes and most of the austral region known mostly from October to February depending on local conditions; in Chile occasionally reported as well from July and August.

Remarks:

Included Species: *Eiseliana* includes type species *punona* (Clench) [= *koehleri* Ajmat de Toledo]; *bicolor* (Philippi) [= *quadrimaculata* (Hewitson)]; *flavaria* (Ureta); and three new species (plus, see Addendum).

Monophyletic unity of Eiseliana. Though the under surface patterns of *Eiseliana* species are distinctive, salient differences in upper surface colors, and the unifying characters apparent only in undescribed species, prevented previous recognition of the group (Draudt, 1919; Ajmat de Toledo, 1978). As noted in the taxonomic key, we recognize two species groups within *Eiseliana.*

- 1. The "*punona* species group", including three generally brown taxa lacking male forewing brands (*E. punona, E. flavaria,* and *E. patagoniensis* n. sp.) and one brown taxon with brands (*E. ollantaitamba* n. sp.). Consistent with interspecific variation in occurrence of forewing androconia in species of *Strymon* (Johnson *et al.*, 1990) the latter species represents a phenetic link between the brown *punona* species group and members of the orange-patched group listed below.

- 2. The "*bicolor* species group", including taxa with bright oranges patches on the upper wing surfaces (*E. bicolor* complex and one apparent sibling species) and male forewing brands.

Considering overall homogeneity of structural characters, lack of tails, and the sharing of a basic postbasal wing pattern not otherwise occurring in *Strymon*, it appears that *Eiseliana* is a natural group. We take a similar view of *Heoda*, described below, since its species share a number of salient characters and each of these groups and *Strymon* have widely overlapping pan-Andean distributions. The alternative view, that "*Eiseliana*" and "*Heoda*", are polyphyletic groups of homoplasic high montane *Strymon* vicariates, is not parsimonious because it implies multiple independent origins for the characters we show are diagnostic. On the contrary, if *Eiseliana* and *Heoda* are monophyletic subgroups of worldwide *Strymon sensu lato*, their diversity and overlapping geographic distributions may correlate with patterns of *in situ* vicariance associated with the historical process of Andean uplift across the South American region.

As noted in detail under *Heoda*, *Eiseliana* females have an unspecialized eigth tergite externally contiguous with the other abdominal segments. We indicate this in Figs. 5-8 and 10 by extending a dashed line from the stippled eighth tergite. By contrast, the specialized eighth tergite of *Heoda*, which typically extends subcordate beneath the seventh tergite, is figured discretely. When comparing tergal morphology of *Eiseliana* and *Heoda* with *Strymon* species cited herein as "*sensu* Johnson *et al.* 1990, Figs. 14-45" it should be noted that, although no species of *Strymon* exhibited a specialized eighth tergite, similar dashed lines were not included in these figures. The unspecialized eighth tergites of *Eiseliana* and *Strymon* are similar.

SPECIES

punona group:

EISELIANA PUNONA (Clench), new combination

(Figures 1AB, 5, 6)

Thecla punona Clench 1944: 256. Comstock and Huntington, 1958-1964 [1963]: 46; Johnson, MacPherson and Ingraham 1986: 5; Johnson, Eisele and MacPherson 1990: 3.

Eiseliana punona: Descimon 1986: 520; Johnson, MacPherson and Ingraham 1986: 5; Bridges

1988: II.33; Johnson, Eisele and MacPherson 1989: 3 [all citing present paper as authority for binomen].

Eiseliana koehleri Ajmat de Toledo 1978: 80. Johnson, MacPherson and Ingraham 1986: 5; Bridges 1988: 11.33; Johnson, Eisele and MacPherson 1990: 3.

Diagnosis: This species, *E. patagoniensis* and *E. flavaria* are brown on the wing upper surfaces and lack forewing androconial brands in males. On the under surface, *E. punona* has a distinctive, boldly spotted, medial line and two to three postbasal slashes. Comparatively, *E. patagoniensis* has an absolescent pattern beneath, except for black and orange suffusions in medial and postbasal areas; *E. flavaria* has a distinctive "cross-hatched" pattern formed by variously hued ground colors and outstanding metallic gold color along its hindwing bands and submargins. *E. ollantaitamba* has forewing brands in males and a dark hindwing basal disc outlined by full postbasal and medial bands. Length of forewing: 11.0 mm. (holotype and paratype, *punona*); 9.0 mm-12.0 mm. (*koehleri* paratypes). *E. punona* differs genitalically from other group members as noted below.

Description:
Ajmat de Toledo, 1978, p. 80, Figs. 1-6.
ADULT: MALE: forewing 9.0 - 12.5 mm. Figs. 1B, 5A, 6A. FEMALE: forewing 9.0 - 12.5 mm. Figs. 1A, 5B, 6B. *Male Genitalia.* Figs. 5A, 6A. Differing from congeners only by a comparatively smaller saccus and thinner, more distended, ventro-cephalic shape in the adjacent vincular arc (male genitalia of *E. ollantaitamba* and *E. patagoniensis* with unique characters noted in their entries below). *Female Genitalia.* Figs. 5B, 6B. Differing negligibly from *E. patagoniensis.* Differing from species of the "*bicolor* Group" principally by a relatively smaller diameter in the ductal spiral and location of the spiral farther from the distal end of the corpus bursae.

Types: See generic treatment.

Distribution: Spatial (Fig. 20): known from disjunct high montane localities (HAP, 2600-4200 m.) in Peru, Bolivia and Argentina. Temporal: known from October to February, depending on local conditions.

Remarks:
Diagnostics. Clench (1944, p. 256) cited the sex of his holotype as undetermined; dissection indicates it is a female (Fig. 5B). Comstock and Huntington's (1958-1964 [1963]) citation of type locality altitude as "1200 ft." is a misprint of the 12,000 ft. altitude of the original data.

Intraspecific Variation. Pattern variation in known specimens is limited to the degree of expression of postbasal and medial markings on the hindwing under surface. We suspect eventual confirmation of a continuous distribution in high Andean regions from Peru to northwestern Argentina Accordingly, we do not recommend use of the names *punona* and *koehleri* as subspecies of *punona*.

Material Examined:

ARGENTINA. Jujuy Prov., Tilcara, Cerro Negro, 23 January 1974, leg. R. Eisele, [paratypes of *koehleri*], three males, two females (AMNH); Jujuy Prov., Abra y Cerro Azul Pampa, 3775-3850 m., 29 February 1986, leg. R. Eisele, three males, same data but 23 January 1986, two males, same data but 3700-3800m., 29 February 1986, two males (AMNH); Jujuy Prov., Huacalera, NW on Cerro Amarillo, 3150-3250 m., 4 January 1980, leg. R. Eisele, four males, one female (CRE); Cerro Amarillo NW Huacalera, 3829 m, 28 January 1991, leg. Kurt Johnson, fifteen males, twelve females (AMNH); Jujuy Prov., Tres Cruces, 2 km. W of cemetery, 3700-3800 m., 23 January 1986, leg. R. Eisele, three males, same data but 22 January 1986, one male (AMNH); Jujuy Prov., Humahuaca to Mina Aguilar, slopes of Colonia Mancayue, 3750 m., 29 December 1978, leg. R. Eisele, three males, two females (AMNH); Salta Prov., Piedra de Molina, Cumbres de Obispo, Rt. 33, 3620 m., 22 January 1968, leg. R. Eisele, two males; Salta Prov., Abra Molina, 3300 m., 28 November 1989, leg. A.M. Shapiro, one male (AMNH); Tucumán Prov., Abra del Infiernillo, Rte. 307, 3042 m., Río Tafí del Valle watershed of Sierra de Aconquija in semi-humid grasslands, 20 January 1986, leg. R. Eisele, two males, one female (IML), one male, one female (AME); Tu-

cumán Prov., Abra Infiernillo, 3000 m., 26 November 1989, leg. A.M. Shapiro, one male (AMNH);

BOLIVIA. Challapata, 3780 m., 26 October 1901, leg. Simons, three males, two females (BMNH); La Paz, 4000 m., "v 10" [May 1910?], leg. Simons, one male;

PERU. Puno Dept., Puno, 1 November 1898. 12,500 ft., leg. A.G. Weeks, Jr., M.C.Z. holotype [sic], 26258, one female and same data but M.C.Z. paratype [sic] 26258", one male (MCZ).

***EISELIANA PATAGONIENSIS*, new species**

(Figures 3AB, 7)

Diagnosis: Known only from Patagonia; upper wing surfaces suffused reddish brown. Under surface without outstanding under surface postbasal and medial lines; rather, pattern elements typical of genus occur only as distally black and basally orange suffusions or small spots in the postbasal and medial areas; genitalia distinctive as noted below. Sympatric in Patagonia with four noncongeners readily distinguished by generic characters (*Strymon eurytulus*, *S. rhaptos* Johnson, Eisele and MacPherson, *Heoda nivea* and *H. suprema*, see below and Remarks).

Description:

MALE. Upper surface of wings: Ground color slightly reddish-brown. Under surface of wings: ground color mottled brown, grizzled with reddish suffusion throughout. Forewing with very light, thin, brown postmedian from costa to cell CuA1. Hindwing generally obsolescent in markings except postbasal and medial areas with slightly outstanding black (distal) and orange (basal) suffusions or spots. Length of forewing: 11.0 mm. (holotype).

FEMALE. Upper surface of wings; similar to male but without androconial brand. Under surface of wings: similar to males. Length of forewing: 9.0 mm. (see Remarks). *Male Genitalia.* Fig. 7B. Differing markedly from congeners: saccus elongate and broadly triangular, length equalling that of caudal expanse of vincular arc; valvae with sharply angled bilobed configuration and stairstep terminal taper. *Female Genitalia.* Fig. 7A. Typical of generic configuration, differing only in a generally more robust ductus bursae caudad of the ductal spiral and a more cephalically expansive eighth tergite (length minimizing that of apophyses papillae anales protruding cephalad of the tergite).

Types: Holotype, male, allotype female ARGENTINA. Neuquén Prov., Zapala, 7 November 1988, shrub-steppe, on flowering *Haplopappus*, leg. A.M. Shapiro, deposited AMNH. Paratypes. AMNH: ARGENTINA, Neuquén Prov., Estancia Huechahue between Junín and La Rinconada, November 1988, shrub-steppe, on a mustard flower at a ranch, leg. A.M. Shapiro (one female); Neuquén Prov. Las Lajas, 9 November 1988, on flowering *Haplopappus*, *Perezia* and other Asteraceae, leg. A. M. Shapiro (one male). BMNH: ARGENTINA, Río Negro/Neuquén Prov., Nahuel Huapí, 1 November 1912 (one male), Parque Nacional Nahuel Huapí (one female). IML: ARGENTINA, Neuquen Prov., San Martín de los Andes, 6-7 November 1946, leg. Hayward and Willink. UCD: same data as primary types (one male).

Distribution: Spatial (Figs. 20,21): known only from Patagonia. Temporal: all specimens are from November.

Remarks: *E. patagoniensis* is readily distinguished from the sympatric Patagonian form of *Strymon eurytulus* (Fig. 19 C, D). The latter, although somewhat obsolescent on the under surface, still exhibits the large under surface forewing postmedial spots and hindwing medial and postbasal spots characteristic of this widespread *Strymon* species (Figs. 19 A, B). As noted by Hayward (1973) and Johnson *et al.* (1990), some specimens of *S. eurytulus* in Patagonia lack hindwing tails (the "americensis morph" *sensu* Johnson *et al.*, 1990). However, typical of the variability of hindwing tail occurrence in *S. eurytulus*, A.M. Shapiro has also collected tailed *S. eurytulus* in Chubut Prov., Argentina (Trelew). In addition, *E. patagoniensis* greatly differs from boldly spotted sympatric species *S. rhaptos* (Johnson *et al.*, 1990, Fig. 8) and the new species *Heoda nivea* described herein. The latter has bright white postmedian under surface markings and an upper surface hindwing gray marginal

line which extends from the anal lobe to cells M3 or M2. Though *E. patagoniensis* has brandless forewings like *E. punona*, structural characters and restricted under surface wing pattern strongly suggest *E. patagoniensis* is distinct from *E. punona*.

Etymology: The name refers to the Patagonian region.

EISELIANA FLAVARIA (Ureta), new combination

(Figures 1CD, 8B)

Thecla flavaria Ureta 1956: 258; 1957: 165. Johnson, Eisele and MacPherson 1990: 3.

Diagnosis : Known only from the Cordillera de Antofagasta in Chile, brown above and lacking male forewing brands. Under surface unique :pattern elements typical of genus "cross-hatched" by dark markings along the veins resulting in checkered ground color variously hued gray and beige-yellow. Also, bright metallic gold suffusion borders the postmedian forewing band, the hindwing medial band and the hindwing submargins. Since the original Spanish description of *Thecla flavaria* may be confusing, we redescribe the species below.

Description:

MALE. Upper surface of wings: ground color shiny brown with slight gold suffusion; marginal fringe white; no androconial brand. Under surface of wings: forewing ground color light tawny, postmedial line of dark dashes bordered basally by metallic gold in the cell interspaces from costa to cell CuA1. Hindwing with darkened veins forming cross-hatch pattern with thin concentric hindwing bands located postbasally, medially, submarginally and marginally. Ground color between cross-hatches variegated basally brown, postbasally beige, postmedially white and submarginally iridescent gold (see Remarks). Metallic gold color basally bordering postmedial line of forewing, medial line of hindwing and the cell interspaces of hindwing submargin. Length of forewing: 9.5 mm. (holotype).

FEMALE. Marked similar to male (Ureta, 1956) but not seen by us. *Male Genitalia*. Fig. 8B. Differing from congeners in (a) widely angled vincular base with relatively more thinly pointed saccus and (b) short aedeagus (relative to vincular expanse only slightly longer than configuration in *E. ollantaitamba*) radically recurvate at two consecutive angles before its terminus.

Types: Holotype, male (Figs. 1C, D), Chile, II Región Antofagasta, El Loa Prov., Chinina, camino a Talabre, 4000 m., Cordillera de Antofagasta [AHP biotic province], 6 October 1955, leg. L. Peña, deposited MNHNC. Allotype female I Región Tarapacá, Parinacota Prov., Belén, 3240 m., 18 October 1952. L. Peña coll. MNHNC Nº 1982. One Paratype male one female, Belén, 22 October 1952, L. Peña coll. (CLP).

Distribution: Spatial (Figs. 20, 21): presently known only from the type data. Temporal: all specimens are from October.

Remarks: Ureta's original Spanish description can be misleading if his upper surface "yellow-orange" is taken to mean coloration similar to taxa of the *bicolor* group. From the type, it is apparent Ureta was referring to the yellow-gold suffusion prominent on the upper surface of *E. flavaria* and unaware of a possible confusion with *E. bicolor* by northern workers. With the holotype in hand, the rest of the original description is readily deciphered. Without such reference, the description might be construed as referring to specimen we note as the "obsolescent morph" of *E. bicolor* (see below). Ureta's laterally portrayed genitalic figure could also be misleading since the ventral view of the species is the most distinctive and shows a marked caudal recurvature of the aedeagus not apparent in the original figure.

EISELIANA OLLANTAITAMBA, new species

(Figures 3CD, 8A)

Diagnosis: Of the brown group of *Eiseliana*, males uniquely marked with forewing brands. Wing under surface with broad postbasal and medial bands and, in addition, wing shape very distinctive, forewing length (base/apex 8.0 mm.) only about one-third longer than antennae length.

Male genitalia with valval terminus distinctively elongate and laterally dentate (see below).

Description:
MALE. Wings of compact size, forewing base to apex 1.2 x antennal length. Upper surface of wings: ground color dull brown, forewing slightly darker in area of very blackish androconial brand distad in discal area. Under surface of wings: ground color beige, forewing with postmedian continuous line, costa to vein CuA2. Hindwing with prominent blackish brown postbasal line about 1mm. width across entire wing and deep brown postbasal disc bordered distally by a blackish brown arc of large spots variously merging into a band. Length of forewing: 8.0 mm.

FEMALE. Unknown. *Male Genitalia.* Fig. 8A. Differing markedly from congeners in (a) elongate and thin caudal extension of valvae, which exceed the labides terminus widely and are notably dentate along their inner margins, (b) short aedeagus, hardly exceeding expanse of genitalia from saccal and labides termini.

Type: Holotype, male, PERU, Cuzco Dept., Ollantaitambo, Mt. Ollantaitambo, 3-5000 m., 25 March 1947, leg. J.C. Pallister, deposited AMNH.

Distribution: Spatial (Fig. 20): Known only from the type locality. Temporal: Known only from 25 March date of holotype.

Remarks: This specimen was collected by Dr. John Pallister, late Curator Emeritus in Entomology at the AMNH, on the Frank Johnson Expedition to Peru in 1947 (Pallister, 1956). From detailed notes made by Pallister concerning his collecting areas (some of which were published in 1956) we learn that the type locality is an "Inca village" in the valley of the Río Urubamba, latitude 13° 13' S., longitude 72° 20' W., elevation "9,200 ft.", valley arid temperate zone clime with surrounding montane areas semi-arid montane shrub-steppe. Very few insects were collected at the site.

Etymology: The name is taken from the type locality, used in the nominative with ending conformed to the feminine gender.

bicolor group :

EISELIANA BICOLOR (Philippi), new combination

(Figures 2, 4, 9, 10)

Lycaena bicolor: Philippi 1859: 1092. Kirby 1879: 161.

Chrysophanus bicolor: Butler 1881: 469; Bartlett-Calvert 1886: 10. Ureta 1934: 79.

Thecla bicolor: Hewitson 1863-1878 [1876]: 83, fig. 695, 696, 697; 1877: 208; Butler 1881: 468; Elwes 1903: 289; Draudt 1919 (5): 810, pl. 145, fig. k; Köhler 1923: 31; 1928: 4; Ureta 1938: 298; 1949: 104; 106 (named ab. *tricolor*, see "intermediate morphs":, below); 1963: 101; Comstock and Huntington 1958-1964 [1959]: p. 164; [1961]: 109; [1963]: 48; Hayward 1949: 578 (named form *leptocosma*) 1973: 163; Johnson, MacPherson and Ingraham 1986; 6; Descimon 1986: 520; Johnson, Eisele and MacPherson 1990: 3.

Thecla quadrimaculata Hewitson 1874: 106; 1877: 208; Reed 1877: 74; Elwes 1903: 289; Draudt 1919: 810; Butler 1881: 468 (see Remarks below); Comstock and Huntington 1958-1964 [1963]: 48; Ureta 1963: 103; Johnson, MacPherson and Ingraham 1986: 6; Descimon, 1986: 520; Johnson, Eisele and MacPherson 1990: 3.

Chrysophanus quadrimaculata: Butler 1881: 469; Bartlett-Calvert 1886a: 318; 1886b: 10.

Eiseliana bicolor: Bridges 1988: II.33 (citing the present paper as authority for binomen).

Diagnosis: A widespread species with distinctive upper surface orange patches dominating the central ground color of each wing; under surface showing great variation in pattern elements typifying the genus (see Remarks). Distinguished from sympatric orange-patched non-congeners (*Heoda wagenknechti* and *H. suprema*) by generic wing and structural characters (including hindwing tails in *H. wagenknechti* and, in *H. suprema*, vivid gray patches on the under surface forewing radial area and hindwing anal and costal

areas).

Description:
Adult. MALE: forewing 6.5 - 15.5 mm., Fig. 4. FEMALE: forewing 7.0 - 15.5 mm. Figs. 2, 4. See description of various infraspecific wing pattern morphs in Remarks. *Male Genitalia*. Fig. 9. Shape of certain components varying somewhat with specimen size, extremely small specimens usually with vincular arc more compact and saccus elongate (Fig. 9A), larger specimens with arc and saccus more robust (Fig. 9C). Otherwise, configuration generally similar throughout the species and differing from other *Eiseliana* only by a generally constricted base on the valval caudal extension and more prominent saccus with wide adjoining vincular margin. *Female Genitalia*. Fig. 10. Varying slightly in configuration depending on specimen size, extremely small specimens with configuration more expansive. Otherwise, configuration generally similar throughout the species and differing only slightly from species of the *punona* group by having spiral of ductus bursae of relatively larger diameter and located closer to the distal end of the corpus bursae.

Types: The type of *L. bicolor* is not known to be extant (Comstock and Huntington, 1958-1964 [1959], Bridges, 1988). Original description is unambiguous concerning generalized characters but the phenotypes to which it has historically been applied have been various (see Remarks). We examined and dissected the type of *T. quadrimaculata* (BMNH) (Fig. 2AB, 10C) a female bearing the ambiguous label "Chili". According to our analysis of continuous variation in *E. bicolor* (see Material Examined), we determine *T. quadrimaculata* to be a synonym of *L. bicolor*. We also examined and dissected the type of *bicolor* form *leptocosma* Hayward (1949) (IML, Fig. 2CD, 10D), a female bearing the labels "Thecla bicolor f. leptocosma, Holotipo, K.J. Hayward Det.", "Type", "Holotipo", "Argentina, Zapala, Neuquén", "Colección Inst. Fund. M. Lillo, S.M. Tucumán, Tucumán, Argentina". It is not specifically different than *bicolor* but represents the dominant wing morph of the species in Patagonia (see below).

Distribution: Spatial (Figs. 20, 21): reported from Atacama Prov., Chile south to Valdivia Prov. in Chile and, in Argentina, in Neuquén, Río Negro and Chubut provinces (provinces *sensu* I.D.B.G.N., 1968 a,b). Therein reported widely in the CDP, CVP, NVFP and PSP biotic provinces, less often in the IDP, CCCP and VFP. Temporal: reported primarily from October to February. Occasional Chilean specimens are dated July and August.

Remarks:
Conspecificity of the orange-patched members of Eiseliana. The view that all orange-patched specimens constitute one widely distributed polytypic species is compelling because, as we note below, examination of preserved specimens suggests continuous variation. Few museum curators or other workers have previously followed the original synonymy of all the orange-patches forms forms proposed by Draudt (1919). Consequently, most museums still include old "species" identifications as *Thecla bicolor* (small and bright) and *T. quadrimaculata* (large and dull) instead of a single arrangement as *bicolor*.

As delineated in series listed in the Material Examined, continuous variation between various pattern morphs of the *bicolor* complex is apparent in museum samples and these samples represent all the biotic provinces where the complex occurs. It is prudent to infer from this that only one species is involved. However, caution is warrented. Shapiro (1990 a,b) has demonstrated probable biological species with differing local habitus and foodplant utilizations in species of Andean and austral Pieridae otherwise inseparable by genitalic characters. It is possible that similar segregations occur in the *bicolor* complex and may be represented by some locally or regionally restricted wing morphs. Biological study is necessary to distinguish such forms and, accordingly, we arrange the Material Examined to note the occurrence of such morphs.

We describe one extreme morph as a separate species because it differs from apparently sympatric *E. bicolor* in characters of the hindwing under surface, male androconial brand and female genitalia. These character extremes exceed those typical of specimens readily associated with the range of *E. bicolor* variation. Preserved speci-

mens suggest this taxon is the most likely candidate for sibling species status in the *E. bicolor* complex. However, this view requires biological verification in the field (see Addendum).

Continuous Variation in E. bicolor: For diagnostic purposes, infraspecific variation in *E. bicolor* is best considered in light of the names proposed by early authors who relied primarily on characters of the wing. Included are *Lycaena bicolor* (Fig. 4B), *Thecla quadrimaculata* (Figs. 2AB, 4A), Chilean aberration *tricolor* Ureta (1949), Patagonian form *leptocosma* Hayward (1949) (Fig. 2CD), some unnamed forms and intermediates. Complete spatial and temporal intergradation is apparent between all these morphs as represented in museum collections. To record this variation we divide our Material Examined into historically recognized morphs along with a few others. These include:

(1) ***"bicolor" morph*** (Fig. 4B, C): can be extremely small , forewings of males to only 6.5 mm, females 8.0 mm. *Upper surface* orange in both sexes bold and concolorous (not mottled or suffused), veins usually overscaled black; orange patches distinctly margined from fuscous submargins (not fading gradually into them); extent of hindwing orange ranging from the limbal areas to entire central areas, on forewing from central medial areas to cells M3, CuA1, and CuA2 or abutting the androconial brand (females the most broadly marked). *Under surface* of forewing always with vivid central orange; hindwing pattern with obsolescent medial line of light slashes, dots or combinations of these. Hindwing postbasal markings obscured by dark basal suffusions; other suffusion variable with altitude and season (occurring in gray or brown tones in submargin or limbal area, or making submarginal line obsolescent).

Material Examined:

Specimens with specific data:

CHILE. IDP: V Región Valparaíso, Valparaíso Prov., El Salto, 31 August 1958, coll. H. Toro, one male (AME), CDP: VI Región O'Higgins, Cardenal Caro Prov., Pichilemu, leg. Herrera, 26-30 October 1964, two males, one female (MNH); IV Región Coquimbo, Choapa Prov., Hda. Illapel, 16 November 1963, coll. J. Herrera, one female (CH); [X3A] VII Región Maule, Cauquenes Prov., leg. Elwes, 18 December 1901, two males (BMNH); [X4A] VII Región Maule, Talca Prov., Constitución, leg. Montes, one male, one female (CCEUC); [X5A] V Región Valparaíso, Valparaíso Prov., Valparaíso, 1920, leg. R. Martín, five males, six females (MNHN). CVP: VII Región Maule, Linares Prov., Cordillera de Parral, September 1958, leg. M. Rivera, one male (AME); VII Región Maule, Linares Prov., Quilipin, one male, leg. P. Mazry (CPM); VII Región Maule, Linares Prov., Quinamávida, 8 December 1984, 11 October 1983, 6-18 January 1985, three males, leg. P. Mazry (CPM); [X2A] VI Región O'Higgins, Cachapoal Prov., Rancagua, one male (BMNH), CVP/CCCP: XIII Región Metropolitana de Santiago, Santiago Prov., El Cóndor, leg. Ramírez, one male (CCEUC); VII Región Maule, Talca Prov., Maule, one male (BMNH). NVFP: VIII Región Bío-Bío, Concepción Prov., Lota, one female (BMNH); VII Región Maule, Talca, Prov. Maule, one male (BMNH). VIII Región Bío Bío, Concepción Prov.,Lota, one female (BMNH); VIII Región Bío-Bío, Concepción Prov. Concepción, 26-28 July 1926, four males, one female (BMNH); VIII Región Bío-Bío, Arauco Prov., Contulmo, one female (CH); [X6A] VIII Región Bío-Bío, Concepción Prov., Coronel, 20 December 1901, leg. Elwes, one male (BMNH).

Specimens with general data:

CHILE. "Central Chile" 1883, leg. H.B. James, one female (BMNH); "Chile", leg. Edmonds, one male (BMNH); "Chile", Boisduval Coll., one male (BMNH); "Chile", two males (BMNH); "Chile", J.J. Joicey Coll. 1929, two males (BMNH); "Chile", Hewitson Coll "(1) & (2), two males (BMNH)"Central Chile" 1883-1885, leg. H.B. James one male (BMNH); "Chile", Druce Coll., one male (BMNH).

(2) ***"quadrimaculata" morph*** (Fig. 2AB, 4A): can be relatively large, male forewing to 15.0 mm., females to 16.0 mm. *Upper surface* orange in both sexes variegated or of varying intensity and fading into fuscous margins, veins not often overscaled black; extent of hindwing orange on males ranging from area of "Thecla-spot" to entire limbal area or central wing area, on forewing from none to some in cells CuA1 and CuA2 or

the entire central area (but not flush with androconial brand in males, females most broadly marked). Hindwing usually with two to three black marginal dots in cells CuA2 to cell M3. *Under surface* hindwing pattern with vivid medial arc of spots, a discal marking (dot or slash) and one to two postbasal spots or slashes. Ground color varition limited to occasional darker basal ground; usually no suffusion over other parts of the wing.

Material Examined:
Specimens with specific data:
CHILE. CDP: V Región Valparaíso, Aconcagua Prov., Pisicultura, Río Blanco, 26-30 November 1958, leg. L. Peña, one male (AME); IV Región Coquimbo, Elqui Prov., Coquimbo, Tongoy, 12 December 1976, leg. J. Herrera, one male, 15 November, 1970, leg. J. Herrera, one male. (CH); [X3C] VII Región Maule, Cauquenes, leg. Elwes, 18 December 1901, one male (BMNH); [X4C] VII Región Maule, Talca Prov., Constitución, leg. Montes (CCEUC); V Región Valparaíso, Valparaíso Prov., Quinteros, February 1977, three males, two females (CH); V Región Valparaíso, Valparaíso Prov., Reñaca, 18 February 1973, leg. Cerda, three males (AME); [X5C] V Región Valparaíso, Valparaíso Prov., Valparaíso, 1923, leg. R. Martín, one male, one female (MNHN). VII Región Maule, Linares Prov., Fundo Malcho, Cordillera Parral, December 1957, leg. L. Peña, two males (AME); VII Región Maule, Linares Prov., Pejerreyes, 12 October 1956, leg. R. Achifreno (AME); [X2B] VI Región O'Higgins, Cachapoal Prov., Rancagua, one female (BMNH); XIII Región Metropolitana de Santiago, Santiago Prov., Macul, 18 November 1972, one male (CH); XIII Región Metropolitana de Santiago, Santiago Prov., San Cristóbal, leg. Gallizia, one female (AME); [X1B] XIII Región Metropolitana de Santiago, Santiago Prov., Santiago, one male, (BMNH); VII Región Maule, Talca Prov., Talca, 26 December 1976, leg. J. Herrera, one male (CH). CVP/CCCP: V Región Valparaíso, San Antonio Prov., Cerro de Córdoba, El Tabo, 18 November 1969, leg. J. Herrera, three males (CH). NVFP: [X6C] VIII Región Bío-Bío, Concepción Prov., Coronel, one male (BMNH), VFP: X Región Los Lagos, Valdivia Prov., Valdivia, one male, one female (BMNH).

Specimens with general data:
CHILE: "Chile", J. Doll Coll., one male (BMNH): "Chile", Druce Coll., one male (BMNH); "Chile", "192_", LeMoult Coll., one male (MNHN); erroneous "BRAZIL", one male (BMNH).

(3) ***"bicolor" / "quadrimaculata" intermediate morphs*** (Fig. 4D): patterns intermediate between the above two morphs, including: (1) hindwing medial line and postbasal markings partially dotted, slashed or obsolescent; (2) hindwing basal area and/or submargin with suffused or variegated ground color; (3) hindwing submargin with vivid orange patches and/or white suffusion (latter morph named ab. *tricolor* by Ureta, 1949, type male, MNHNC).

Material Examined:
Specimens with specific data:
CHILE. IDP: III Región Atacama, Copiapó Prov., Puente del Inca, October-November 1912, one male (BMNH); [X5B] V Región Valparaíso, Valparaíso Prov., Valparaíso, December 1908, leg. H. and C. Watkins, two males, December 1909, two males (BMNH); V Región Valparaíso, Valparaíso Prov., Valparaíso, 1920, leg. R. Martín, two males, one female (MNHN); V Región Valparaíso, Valparaíso Prov., Viña del Mar, one male (BMNH). CVP: VII Región Maule, Linares Prov., San Javier, three males (AMNH); NVFP: [X6B] VIII Región Bío-Bío, Concepción Prov., Coronel, Chile, 1909 leg. Elwes, one male (BMNH); [X2C] VI Región O'Higgins, Cachapoal Prov., Rancagua, one male, two females (BMNH): [X1C] XIII Region Metropolitana de Santiago, Santiago Prov., Santiago, one male, one female (BMNH).

Specimens with general data:
CHILE. "Chile", Culver Coll., one male (BMNH); "Chile", Joicey Coll., Two males (BMNH); "Chile", 1901, leg. Crowley, one male (BMNH); no deta, leg. Crowley, one male (BMNH); "Chile", one male (BMNH); "Chile", one male (BMNH).

(4) ***"leptocosma" morph*** (Fig. 2CD): commonest morph in Argentina, forewing usually 10.0 - 11.5 mm., *upper surface* similar to "*bicolor* morph" but more red-orange and with crisper margin against the brown ground; *under surface* hind-

wing with ground suffused mostly gray or beige and with only the medial band (of black to brownish spots) usually apparent.

Material Examined:
ARGENTINA. PSP: Neuquén Province, Zapala, 7 November 1988, from vicinity of flowering chacay (*Chacaya trinervis*, Rhammaceae), leg. A.M. Shapiro, three males, one female (AMNH), one male, one female (UCD); Neuquén Prov., Las Lajas, 9 November 1988, from vicinity of flowering chacay (not nectaring), leg. A.M. Shapiro, four males, four females (AMNH).

(5) ***obsolescent morph*** (Fig. 4B, right): size varies, upper surface typical of either "*bicolor*" or "*quadrimaculata*" morph, *under surface* nearly lacks pattern and has only variegated ground of yellow, tawny or beige with occasional expression of pattern elements typifying the genus. This morph does not fit the wing character KEY but can be readily diagnosed by its upper surface pattern and lack of under surface pattern from species of *Heoda* or *Strymon*. We have found nothing distinctive in the genitalia of specimens exhibiting this morph (Fig. 10A); this morph should be carefully distinguished from species *E. probabila* which is also generally patternless below but has unique characters.

Material Examined:
Specimens with specific data:
CHILE. IDP: III Región Atacama, Copiapó Prov., 20 mi. S. Caldera, 16 October 1957, leg. L. Peña, one male, one female (AMNH). CDP: [X5D] V Región Valparaíso, Valparaíso Prov., Valparaíso, 1929, leg. R. Martin, five males, four females (MNHN). CVP: VII Region Maule, Linares Prov., Quinamávida, 8 December 1984, leg. P. Mazry (CPM); [X1D] XIII Region Metropolitana de Santiago, Santiago Prov., Santiago, one male, one female (BMNH). CVP/CCCP: XIII Región Metropolitana de Santiago, Santiago Prov., Los Cóndores, leg. Ramírez, one male (CCEUC). NVFP: VIII Region Bío-Bío, Concepción Prov., Concepción, 26-28 December 1926, leg. F. & M. Edwards. one female (BMNH); VIII Region Bío-Bío, Ñuble Prov., Quirihue, one male (BMNH). [Prov. unknown] "Lifiaca", one male (BMNH).

Specimens with general data: "Chile", one male (BMNH).
(6) **occasional supralimital morphs**: occasional specimens occur with unusual under surface patterns. Of particular interest are specimens with hindwing postbasal markings duplicating those of the *punona* Group (fig. 4C); others exhibit outstanding hindwing basal discs with constrasting mottled ground colors (fig. B, left).

Material Examined:
Specimen with under surface resembling *punona* Group: CVP: XIII Región Metropolitana de Santiago, Santiago Prov., Macul, no other data, one male (fig. 4B) (MPM). Specimen of Fig.4C, left: CVP: VII Región Maule, Linares Prov., Quilipin, one male, leg. P. Mazry (CPM).

Examples of Continuous Variation: There are six examples of various morphs occurring at the same time and place and these suggest the morphs of *E. bicolor* listed above continuously intergrade. To avoid writing a separate section on these examples, we locate them by a simple scheme in the Material Examined. An "X" marked in the specimen data designates an example. The examples are numbered with consecutive numerals ("1", "2", etc.) meaning "example 1", "example 2", and so on. Components within each example which indicate the continuous variation are noted with consecutive letters ("1A", "1B"...; "2A", "2B"..., etc.). Thus, a series of specimens, made up of different morphs with duplicate spatial and temporal data can be readily identified in the Material Examined by locating members of series "X1A, X1B, X1C," etc.

Data concerning infraspecific variation in these series (X1A-X1B-X1C-X1D, X2A-X2B-X2C, X3A-X3B-X3C, X4A-X4B-X4C, X5A-X5B-X5C-X5D and X6A-X6B-X6C) can be summarized as follows. Series X1, X5 include examples of the "*quadrimaculata*", "*bicolor*" and "*bicolor/ quadrimaculata* and "obsolescent" morphs occurring at the same place at the same time; X2, X3, X4, X6 include examples of the "*quadrimaculata*", "*bicolor*" and "*bicolor / quadrimaculata* intermediate" morphs occurring at the same place at the same time.

Other Remarks: Butler (1881) stated that specimens historically regarded as males of *T. quadri-*

maculata were females of *T. bicolor* and that he had properly identified females and males of "true" *T. quadrimaculata*. Examination of the BMNH collection indicates Butler's view probably resulted from his examining the type female *T. quadrimaculata* and comparing it with examples of the morphs we refer to as *"bicolor"* and *"quadrimaculata"*, respectively. Considering the range of variation in large series of *E. bicolor* and the fact that Butler did not dissect specimens, his comments do not appear meaningful and may have simply resulted from the paucity of specimens. Particularly, it is hard to understand how male and females could have been confused in a complex with prominent male forewing brands.

EISELIANA PROBABILA, new species

(Figures 4EF, 9D, 10D)

Diagnosis: Small, as in *E. bicolor's* diminutive "bicolor morph" (range 8.5 - 10.0 mm., see *E. bicolor* above); hindwing with under surface of obsolescent pattern except for a thin, continuous, medial line displaced radically distad at cells M1 and M2. Male androconial brand differing from other *E. bicolor*, diameter being about twice as large in relation to crossvein of discal cell and not concolorous; instead, centrally with lighter sheen and surrounded by a black ring of smoother textured scales (see Remarks).

Description:

MALE. Upper surface of wings: Ground color dark brown with varying extents of orange patches central to postmedian on either or both wings depending on individual variation. Large, ovate androconial scent brand over entire distal area of discal cell centrally light gray and of course texture, surrounded with black suffusion of smoother texture. Under surface of wings: Both wings with ground color finely mottled, appearing as finely grained marbling of gray to tawny. Forewing with postmedian band from costa to cell CuA1 variously obsolescent. Hindwing devoid of markings except for slightest evidence of darker marbling in area of medial line. Medial line continuous and thin, rounded over most of wing, radically displaced distally in cells M1 and M2. Length of forewing: 9.5 mm. (holotype).

FEMALE. Upper surface of wings: as on male but without androconial brand and with larger, darker and more crisply defined orange patches. Under surface of wings: as on males. Length of forewing: 8.5 mm (allotype). *Male Genitalia*. Fig. 9D. Similar to *E. bicolor* but differing in elongate saccus and comparatively long aedeagus, length approaching 2X caudal expanse of vincular arc and with caecum angled oblique to plane of shaft. *Female Genitalia*. Fig. 10D. Distinctive in (a) widely circular spiral of ductus located very close to distal end of corpus bursae and (b) corpus bursae with expansive sclerotized hood at distal juncture with ductus.

Types: Holotype, male, allotype female CHILE, CDP: V Región Valparaíso, Valparaíso Prov., Valparaíso, Chile, 1920, leg. R. Martin, deposited MNHN. Paratypes: MNHN: data as on primary types, four females, three males; BMNH: CHILE, CVP: XIII Región Metropolitana de Santiago, Santiago Prov., Santiago, Chile, 1924, leg. F.C. Platts, one female; VI Región O'Higgins, Cachapoal Prov., Rancagua, Chile, one female, one male (plus, see Addendum).

Distribution: Spatial: Fig. 20, 21. Currently known from old specimens representing several localities in the CDP and CVP (but, see Addendum).

Remarks: Considering the range of variation in *E. bicolor*, these specimens have puzzled us and we suggest biological study may differentiate this taxon from *E. bicolor* at the species level. As Johnson (1989a,b) and Johnson *et al.* (1989, 1990) noted, MNHN chilean specimens collected by R. Martín, 1920-23, included various undescribed thecline species. Examples of *E. probabila* derive either from these samples or from specimens collected by other early collectors at "Valparaíso" or "Santiago". Johnson *et al.* considered these generalized data as possibly representing several Chilean localities. The specimens differ from apparently sympatric *E. bicolor* in characters of the hindwing under surface, male androconial brand and female genitalia. These character extremes exceed that typical of specimens readily associated with the range of *E. bicolor* variation. Notably, some specimens of the randomly occurring "obsolescent morph" of *E.*

bicolor (see above) approach the under surface pattern of *E. probabila* but these do not share the latter's unique characters.

There are two possibilities concerning specimens with the extreme characters referred here to *E. probabila:* (1) they represent a sympatric sister species of *E. bicolor;* (2) they are an extreme aberration and appear in these samples simply because of the frequency of collecting. If contemporary study is possible of natural populations representing the *E. probabila,* we feel it is the most likely candidate (that we have seen) for authentication as a sibling species of the widely variable *E. bicolor* complex (see Addendum).

Etymology: The species name is Latin for "probable" referring to the potential biological distinction of this taxon from *E. bicolor.*

HEODA

Introduction. This genus is erected for five species of high Andean and austral hairstreak butterflies, including three previously unknown species which share unique characters with *Thecla heodes* H.H. Druce (1909) and *Thecla wagenknechti* Ureta (1947). *Thecla heodes* is known to us only from the type and a few old, high montane, Peruvian specimens at the BMNH. *Thecla wagenknechti* has, hitherto, been generally unknown to workers outside of Chile. We were surprised, therefore, to discover obvious wing pattern and morphological similarities between these species and the widespread undescribed species (two from Patagonia and one from Colombia). Considering the shared characters, and geographic distributions overlapping those of *Eiseliana* and *Strymon,* generic status is appropriate for the same reasons cited regarding *Eiseliana.* Contrasting infraspecific variability in some taxa of *Eiseliana,* however, known species of *Heoda* are very distinctive and, since generally restricted to high Andean and Patagonian locales, have been unfamiliar simply because of the paucity of samples.

Taxonomy

HEODA, Johnson, Miller & Herrera

(Figures 11 - 18)

Heoda Johnson, Miller & Herrera 1992 (in Johnson and Miller 1992):5.

Diagnosis: Compared to *Strymon* and *Eiseliana,* all *Heoda* species have forewing androconial brands in males and exhibit marked basal displacement of the SC+R1 element of the under surface medial band (regardless of expression of band as "band", "line", or "spot-band"). Some species have hindwing tails. As in *Eiseliana,* two upper surface wing patterns occur: concolorous brown, and brown with bold medial orange patches. Structurally, *Heoda* species are unique in having the female's eighth tergite modified to a "subcordate incised posterior cavity" (*sensu* Field, 1967ab, the "*sipc*" *sensu* Johnson, 1988, 1989a, b, c; Johnson and Matusik, 1988). This structure extends cephalad beneath the seventh tergite, enclosing two spiracular openings with heavy sclerotin. Male genitalia are robust with ventral vincular shape generally ovate and saccus broad and thickly attached to the vincular base; female genitalia have the ductal spiral located relatively remote from the distal end of corpus bursae, often near the midpoint of the total ductus bursae length.

Description: ADULT. Antennae fuscous, finely striped white, length one third to two-fifths that of forewing base to apex; head with frons fuscous, eyes outlined white; thorax fuscous with gray to fuscous hairs distally profuse; abdomen fuscous. MALE. Upper surface of wings: depending on the species (i) ground color concolorous brown or with pronounced central orange patches; (ii) androconial scent brands size varying greatly; (iii) hindwing tailed or untailed. Under surface of wings: depending on species (i) forewing ground concolorous or with central orange patch; (ii) postmedian line, costa to cell CuA1 or CuA2, bold to obsolescent. In all species, hindwing ground colors gray or gray-brown with bold bipartite (distally white, basally black) jagged medial line or spot-band marked by pattern element in cell SC+R1 being greatly dis-

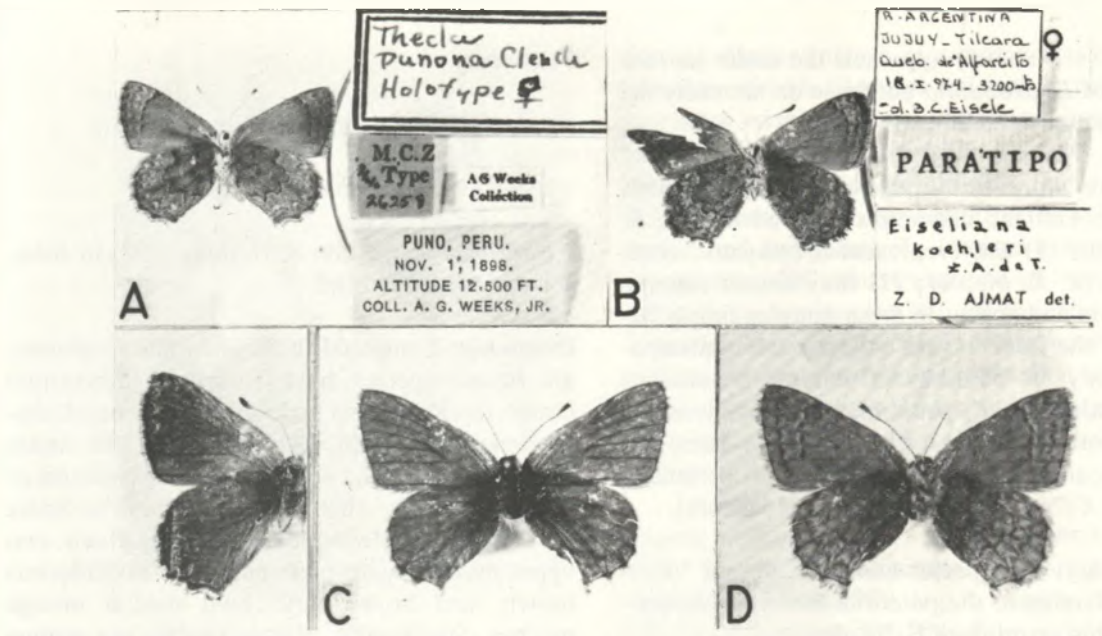


Figure 1. Type specimens of *Eiseliana* and *Thecla* taxa referable to *Eiseliana*. **A** *Thecla punona*, holotype (under surface). **B**. *Eiseliana koehleri*, paratype (under surface; below left, upper surface). **C,D.** *Thecla flavaria*, holotype (C, upper surface; D, under surface).

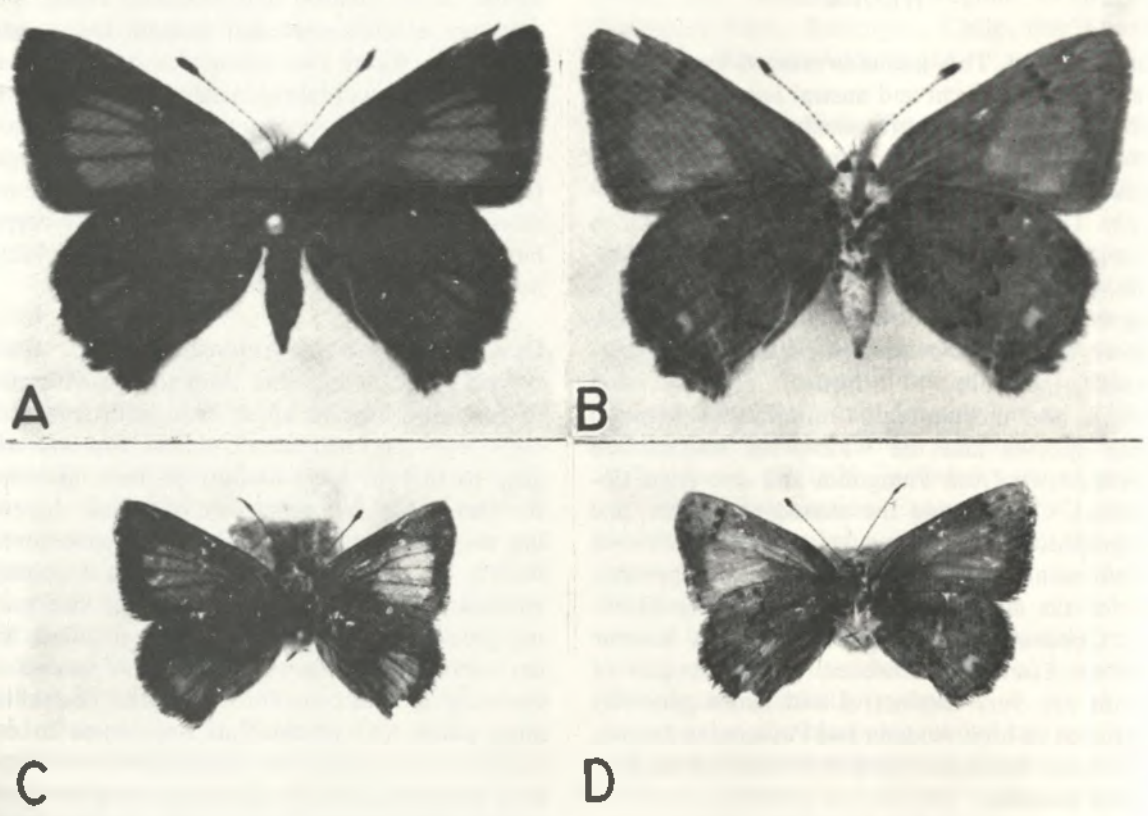


Figure 2. Type specimens of *Thecla* taxa referable to *Eiseliana*. **A,B**. *Thecla quadrimaculata*, holotype (A, upper surface; B, under surface, black and white reproduction of color slide). **C,D.** *Thecla bicolor* f. *leptocosma*, holotype (same format).

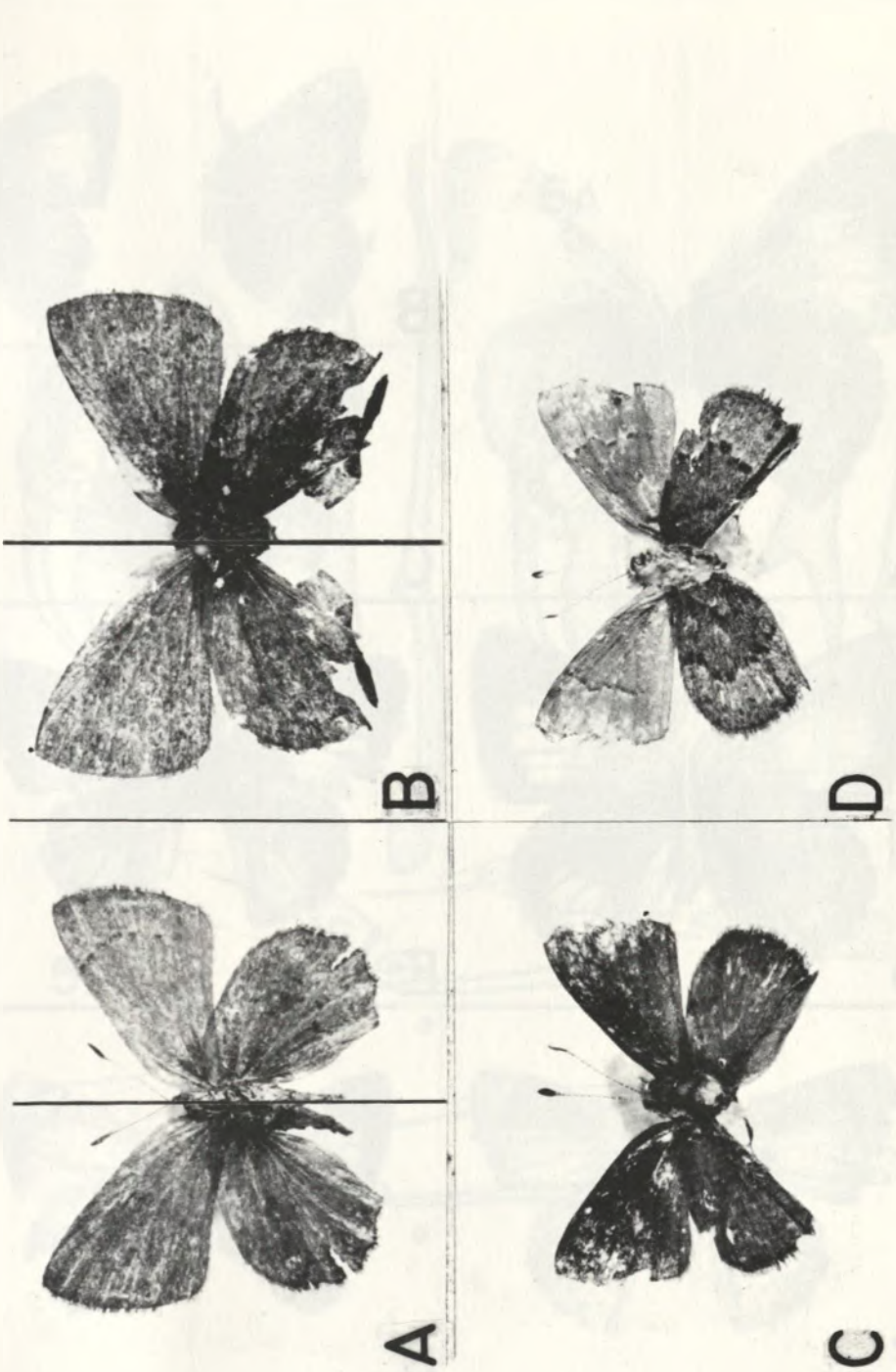


Figure 3. Adults of *Eiseliana*, *punona* species group (left, upper surface; right, under surface except as noted) . **A**,*E. patagoniensis*, holotype. **B**, same, allotype. **C**, *E. oltaraitamba*, holotype, upper surface. **D**. same, under surface.

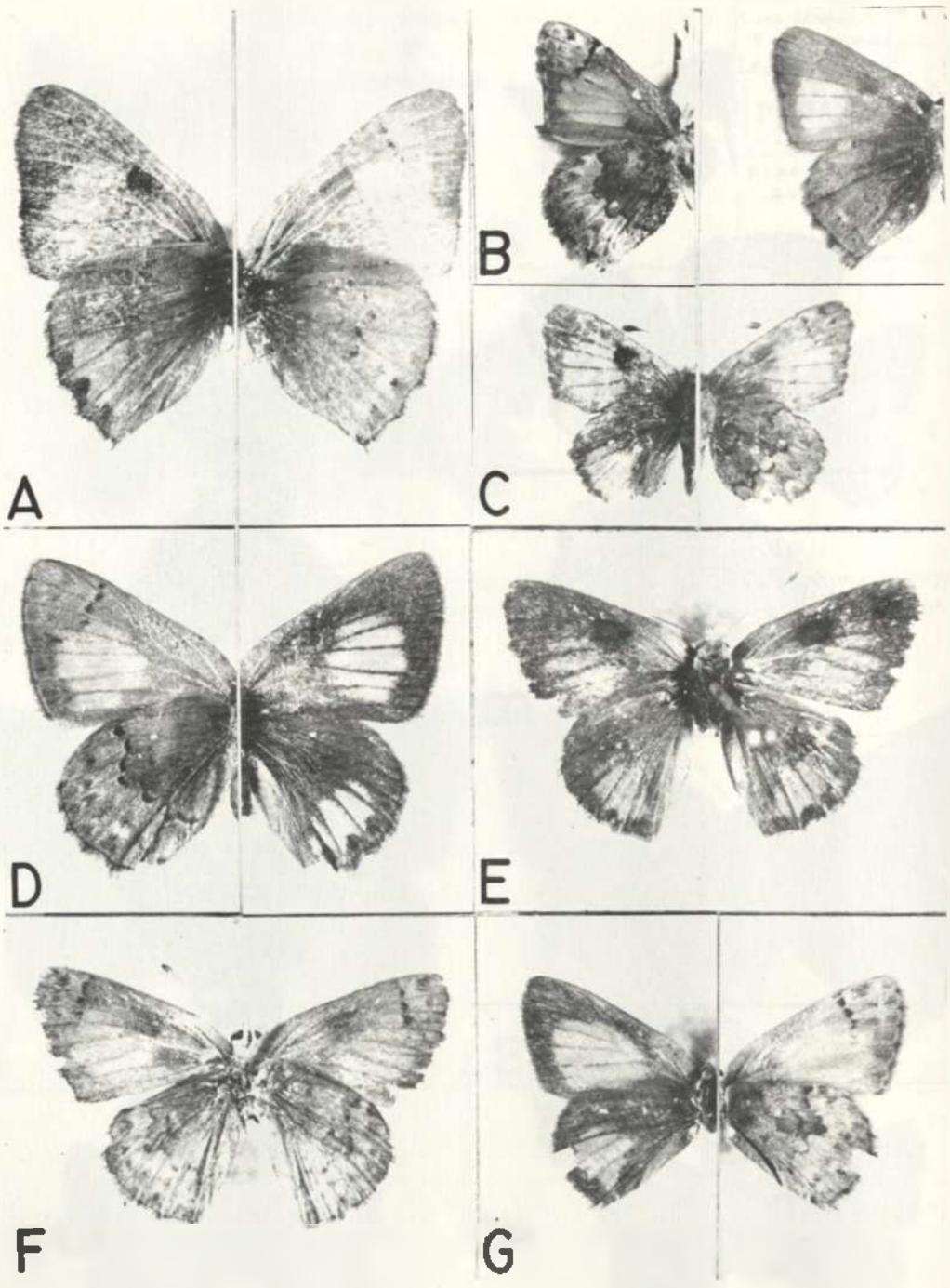
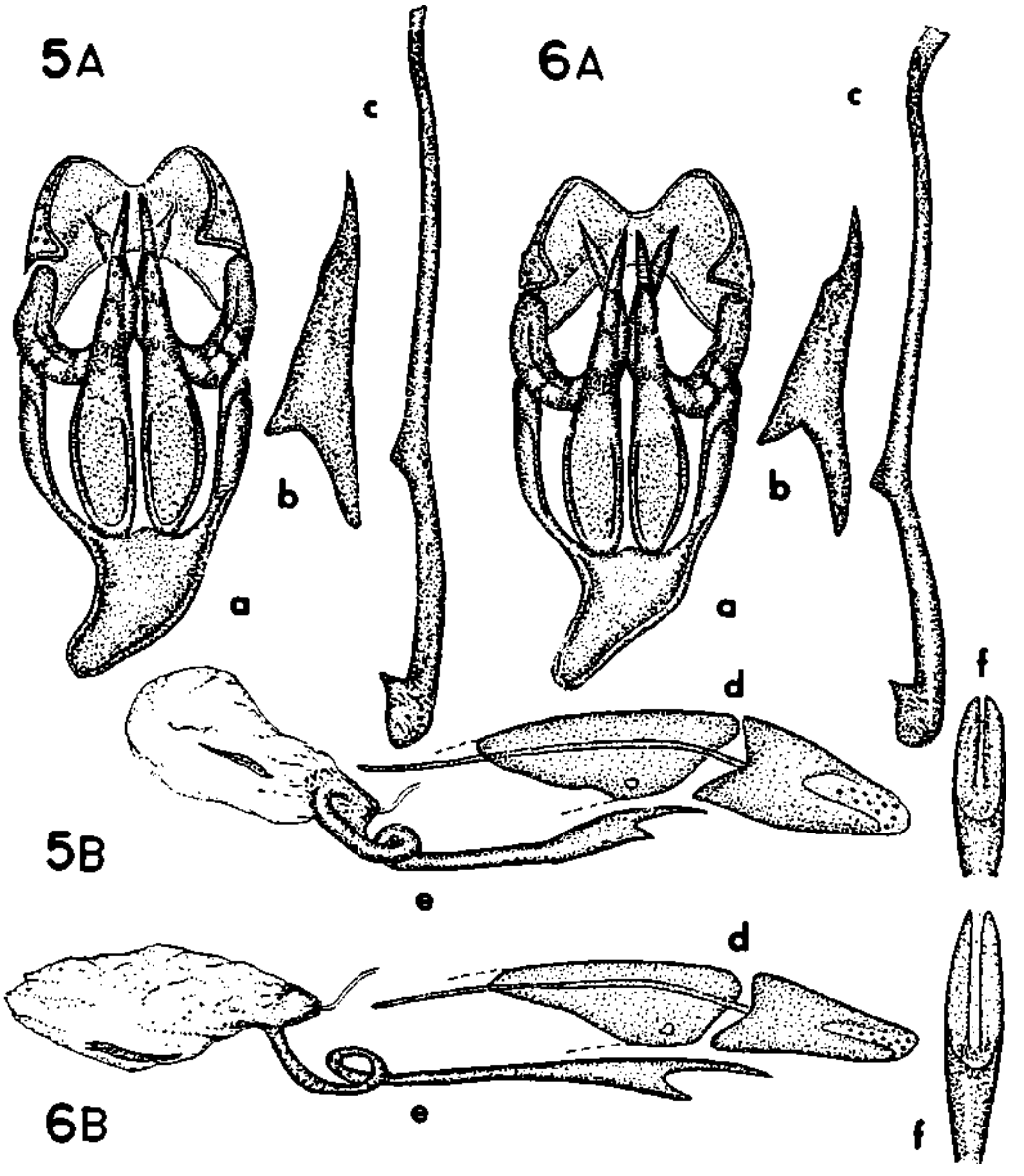
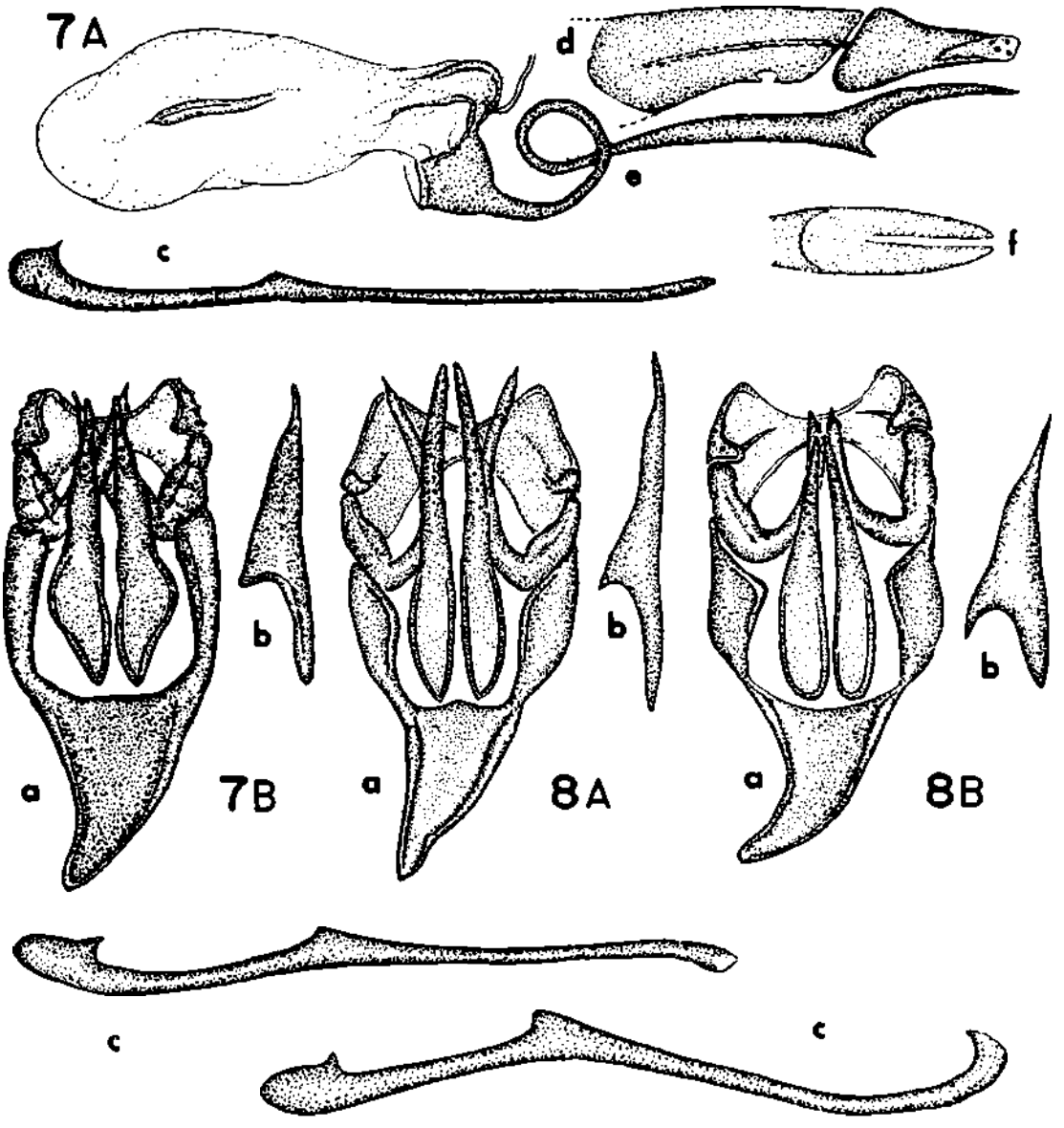


Figure 4. Adults of the *Eiseliana bicolor* complex and *E. probabila* (left, upper surface; right, under surface, unless otherwise specified). *E. bicolor:* **A.** "quadrimaculata" morph (male, FW 15.5 mm., "Chile" BMNH). **B.** "bicolor" morph, variant under surfaces (left-- female with dark basal disc, FW 7.5 mm., CHILE, VII Región Maule, Linares Prov., Quilipín, AMNH; right-- male of "obsolescent morph", FW 9 mm., CHILE, VII Región Maule, Linares Prov., Quinamávida, AMNH. **C.** "bicolor" morph with under surface similar to *punona* group (male, FW 8.0 mm., CHILE, XIII Región Metropolitana de Santiago, Santiago Prov., Macul, MPM). **D.** Intermediate of "quadrimaculata" and "bicolor" morphs (female, 11.4 mm., CHILE, VII Región Maule, Talca Prov., San Javier, AMNH). *E. probabila:* **E.** Upper surface, holotype (MNHN). **F.** Same under surface. **G.** Allotype (MNHN).



Figures 5-6. Genitalia of *Eiseliana*. Fig. 5. *Thecla punona*, paratype male (5A), holotype female (5B). Fig. 6. *Eiseliana koehleri*, paratype male (6A), paratype female (6B). Format: **a.** male genitalia, ventral view; **b.** male valve, lateral view; **c.** male aedeagus, lateral view; **d.** female, papillae anales (right), apophyses papillae anales and eighth tergite (left); **e.** genitalia, lateral view; **f.** lamellae of female genitalia, ventral view.



Figures 7-8. Genitalia of *Eiseliana*. Fig. 7. *Eiseliana patagoniensis*, allotype female (7A), holotype male (7B). Fig. 8. *Eiseliana ollantaitamba*, holotype male (8A); *Thecla flavaria*, holotype male (8B). Format: **a.** male genitalia, ventral view; **b.** male valve, lateral view; **c.** male aedeagus, lateral view; **d.** female, papillae anales (right), apophyses papillae anales and eighth tergite (left); **e.** genitalia, lateral view; **f.** lamellae of female genitalia, ventral view.

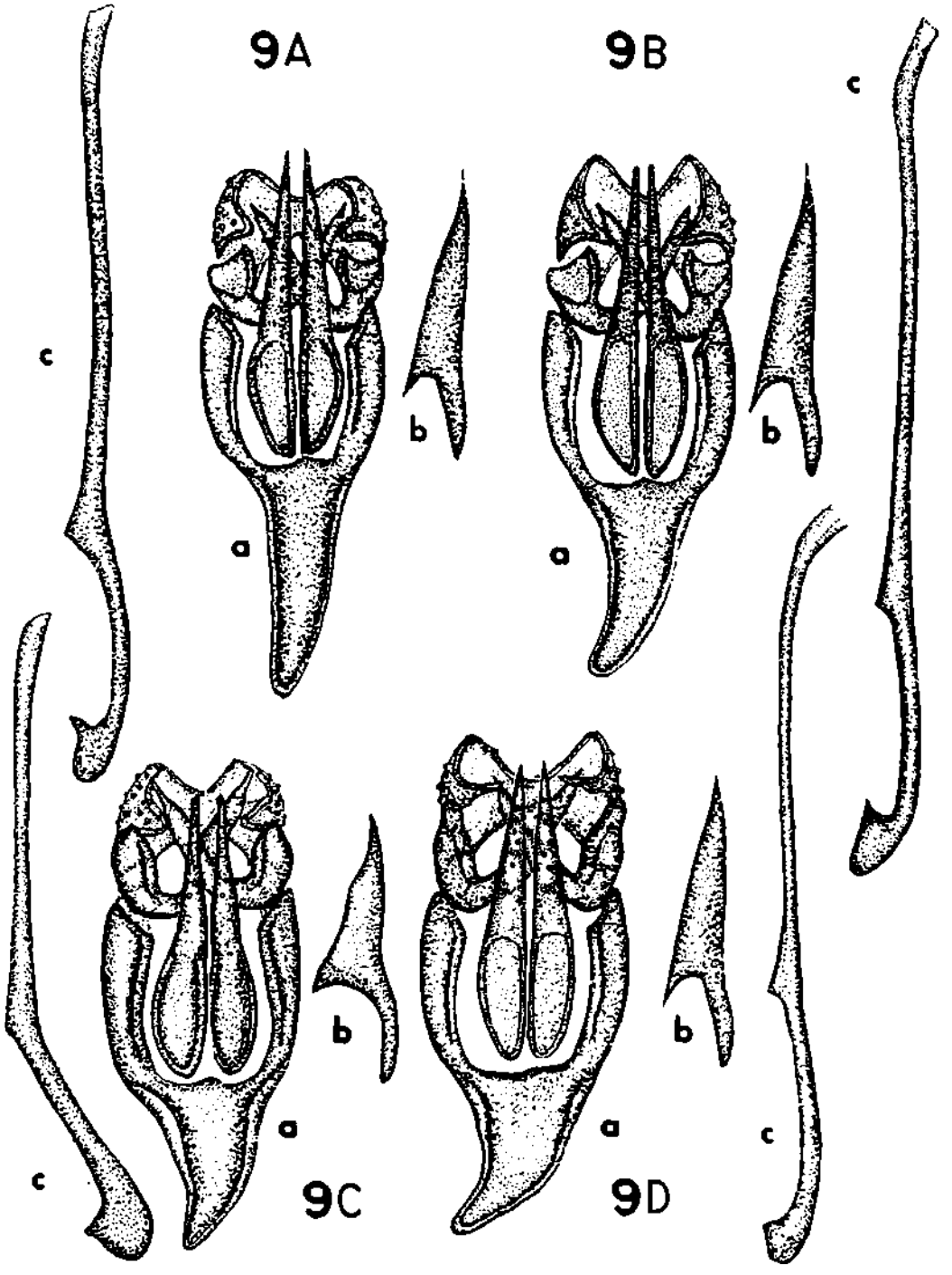


Figure 9. Male Genitalia of *Eiseliana bicolor* complex and *E. probabila*. *E. bicolor:* (9A) "bicolor morph", CHILE, XIII Región Metropolitana de Santiago, Santiago Prov., Los Cóndores, L.D. Miller dissection number ("LDM#") 6298 (AME); (9B) "obsolescent morph", CHILE, VII Región Maule, Linares Prov., Las Cruces?, LDM# 6300 (AME): (9C) "quadrimaculata morph", CHILE, V Región Valparaíso, Aconcagua Prov., Piscicultura, dissection K. Johnson ("KJ") (AME). *E. probabila:* (9D) holotype male (MNHN). Format: **a.** male genitalia, ventral view; **b.** male valve, lateral view; c. male aedeagus, lateral view.

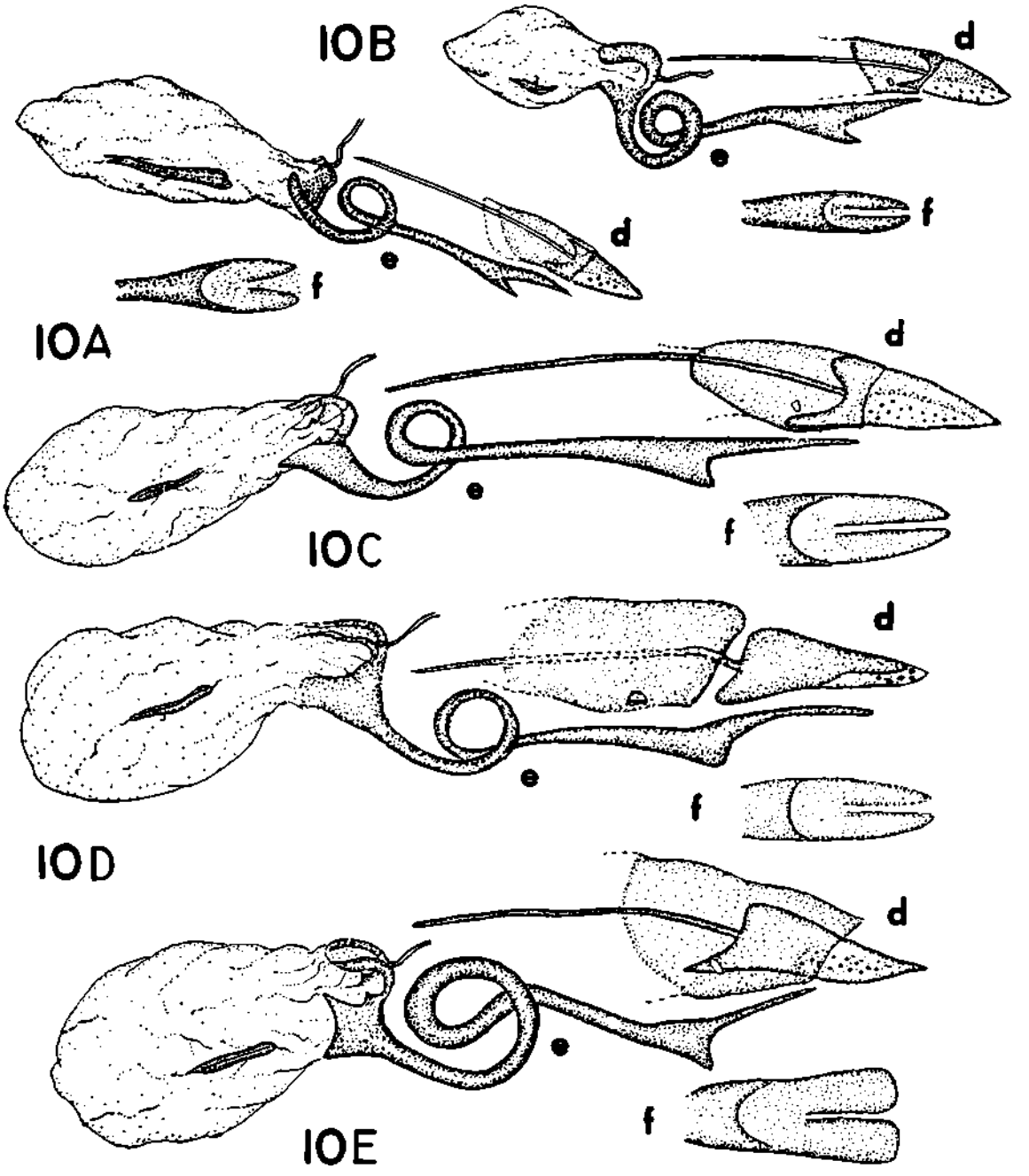


Figure 10. Female Genitalia of *Eiseliana bicolor* complex and *E. probabila*. *E. bicolor:* (10A) "bicolor morph", CHILE, VII Región Maule, Linares Prov., Quilipín, KJ (AMNH); (10B) "obsolescent morph", CHILE, III Región Atacama, Copiapó Prov., 20 mi. S. Caldera, KJ (AMNH) (10A,B figured one-half size of 10C,D). (10C) holotype female, *Thecla quadrimaculata* Hewitson (BMNH). *E. probabila:* (10D) allotype female (MNHN). Format: **d**. female, papillae anales (right), apophyses papillae anales and eighth tergite (left); **e**. genitalia, lateral view; **f**. lamellae of female genitalia, ventral view.

placed basally. Depending on species, hindwing distal areas (i) broadly and boldly gray, or (ii) with additional pattern elements (patches or chevrons); limbal Thecla-spot prominent, orange or yellow. FEMALE. Upper surface of wings: similar to male but with more extensive orange in orange-patched taxa and without scent brands. Under surface of wings: similar to male except in *H. heodes* and *H. suprema* which show slight sexual dimorphism in degree of basal displacement in cell SC+R1 of the medial hindwing band (see below). *Male Tergal Morphology and Genitalia.* Figs. 14-18. Eighth tergite normal (*sensu* Johnson *et al.*, 1990). Genitalia generally similar to taxa of "*eurytulus* group" of *Strymon* (Johnson *et al.*, 1990) or *Eiseliana* (see above) but generally more robust, with saccus more prominent, valvae more obtusely triangular and aedeagus less undulate toward the terminus. *Female Tergal Morphology and Genitalia.* Figs. 14-17. As noted in Diagnosis, eighth tergite specialized to subcordate incised posterior cavity (*sipc*) extending cephalically beneath the seventh tergite, surrounding two spiracles with heavy sclerotin, and encompassing all but the cephalic tip of the apophyses papillae anales. Dorsal plate of cavity heavily sclerotized from spiracular opening ventrally to juncture with lamella postvaginalis. Genitalia with spiral area of ductus bursal located remote from distal end of corpus bursae, spiral generally occurring centrally on the ductal shaft; apophyses papillae anales very short, cephalic ends barely exceeding cephalic expanse of *sipc*.

Type Species: *Thecla heodes* H.H. Druce (1909).

Distribution: Spatial (fig. 22): generally pan-Andean and austral. Two species occur in disjunct high montane (present data including 2500-2800m.) areas of Colombia and Peru; one species occurs in coastal mountains of the Chilean CDP biotic province; two species are sympatric in the PSP biotic province of Chile (Patagonia). Temporal: specimens are reported from November to January.

Remarks: As heretofore noted, *Heoda* is given generic rank because of its distinctive morphological characters and sympatric ranges with *Eiseliana* and montane members of *Strymon sensu stricto*. These conditions suggest *Heoda* is a separate evolutionary lineage.

Contrasting the modified female eight tergite (sipc) in *Heoda*, *Eiseliana* and the *S. eurytulus* complex exhibit (a) the eighth tergite only slightly sclerotized dorsad the lamella postvaginalis (including a single spiracular opening, and otherwise unspecialized) and (b) the apophyses papillae anales widely exceeding the eighth tergite cephalically and extending to, or beyond, the characteristic spiral configuration of the ductus bursae. Contrasting the comparatively remote location of the ductal spiral from the distal end of the corpus bursae in *Heoda*, in *Eiseliana* and the *S. eurytulus* complex the spiral more closely abuts the corpus bursae. Also, the corpus bursae signa in *Eiseliana* and *Strymon* do not appear as expansive as in *Heoda*. In males of *Heoda*, vincular structures and the adjoining saccus appear more robust than in *Eiseliana* or the *S. eurytulus* complex.

There is some sexual dimorphism in the expression of basal displacement of the SC+R1 element of the under surface medial band. It is radical in both sexes of *H. wagenknechti*, *H. nivea* and in the single known male of *H. columbiana*. In *H. heodes* the displacement is less notable in the female, in *H. suprema* less notable in the male.

Etymology: The name is a euphonious modification of the type species name and considered feminine.

SPECIES

heodes group:

HEODA HEODES (Druce), new combination

(Figures 11AB, 14)

Thecla heodes Druce 1909: 437, pl. 11, figs. 10, 11. Draudt 1919: 810, pl. 154, fig. k; Comstock and Huntington; 1958-1964 [1960]: 180; Johnson, MacPherson & Ingraham 1986: 6; Johnson, Eisele and MacPherson 1990: 3.

Eiseliana heodes: Bridges 1988: II.33 (citing present paper as authority for binomen).

Diagnosis: Known only from Peru; upper surface with orange patches on both wings, hindwing patches suffused distally with distinctive gray coloration. Forewing under surface with basal orange patch and distal gray-white ground color separated by vivid black postmedial spot-band (costa to cell M3). Hindwing ground color basally gray-white, edged with medial band of irregulary edged velvety black, spot at cell SC+R1 displaced basally (more radically in male) and limbal area flushed brighter white, somewhat obscuring orange Thecla-spot. Both sexes with short hindwing tails; otherwise, sexes differing slightly, more expansive upper surface orange in females and more compact and vivid under surface markings in males.

Description: ADULT. Male: forewing 11.0 - 11.5 mm. FEMALE: forewing 11.0 - 11.5 mm. Fig. 11. *Male Genitalia.* Fig. 14B. Vinculum robust, saccus elongate and greatly displaced to left of ventral plane. Aegeagus straight, length about two times caudal expanse of vincular arc; caecum prominent, comprising about one-third of aedeagal length. *Female Genitalia.* Fig. 14A. *Sipc* prominent: extending cephalically beneath seventh tergite and surrounding all but cephalic tip of apophyses papillae anales; lateral edges of *sipc* heavily sclerotized from spiricular openings ventrally to juncture with dorsum of lamella postvaginalis. Genitalia with lamella postvaginalis prominent, ovate and with widely bifurcate distal lobes; ductus bursae elongate with diminutive spiral located near midpoint of ductal length; cervix bursae without specialized dorsal elements but with unique, ventrally located, sclerotized tabs. Apophyses papillae anales short, hardly exceeding cephalad edge of the *sipc*.

Types: BMNH syntype male and female examined and dissected by us labelled, respectively, PERU "Uramarca [=Yuracmarca, Vaurie 1972], Dept. Ancash, North Peru", "male", "leg. Simons" and "San Marcos, Dept. Ancash, North Peru", "female", "leg. Simons", We designate the female (Fig. 11) as lectotype.

Distribution: Spatial (Fig. 22): known from several localities in montane regions of Ancash Dept., Peru; data on one specimen, if properly referred, also suggests montane Ayacucho Dept. Temporal: known dates include November and December.

Remarks: This species has apparently been seldom collected; all of the specimens are old. Tough worn, the original presence of hindwing tails is apparent on all known specimens. Vaurie (1972) records the original collecting localities of Simons in relation to his spellings "Uramarca" and "Carohuas".

Material Examined (in addition to types): PERU. Carohuas [=Carhuas, Vaurie 1972], 2500 m. December 1899, leg.Simons, one male (BMNH); Uramarca [=Yuracmarca, Vaurie 1972], one female (BMNH); Guarajunga, 2840 m. November 1900, wet season, leg. Simons, one male (BMNH), San Marcos, one female (BMNH). Pampa Incas [Pampa del Inca, Ayacucho Dept.?], one male (BMNH).

HEODA WAGENKNECHTI (Ureta), new combination

(Figures 12AB, 15)

Thecla wagenknechti Ureta 1947: 55, plt. 1. Ureta 1949: 106; 1963: 103; Johnson, Eisele and MacPherson 1990: 3.

Diagnosis: Upper surfaces of both wings with brilliant central orange patches; male androconial brand often with wide surrounding fuscous suffusion. Hindwings with elongate tails. Under surface with medial and postbasal pattern elements pronounced-- medial line brightly bipartite (white and black), continuous and generally jagged (SC+R1 element greatly displaced basally), postbasal spots vivid white and black; Thecla-spot pronounced and bright orange. Female with *sipc* most expansive of group (see below and Fig. 16).

Description: See Ureta 1947 (OD [Spanish] short, color illustration of adult, line drawing of male genitalia, lateral view). ADULT. MALE: forewing 11.0 - 11.5 mm. Fig. 12A. FEMALE: forewing 11.0 - 11.5 mm. Fig. 12B. *Male Genitalia.* Fig. 15B. Typical of genus and differing negligibly from *H. heodes. Female Genitalia.* Fig. 15A. *Sipc* nearly rectangular in shape and laterally expansive, each side surrounding two promi-

nent spiricular openings with heavy sclerotin. Genitalia with elongate, heavily sclerotized, lamella postvaginalis and bifurcate lobes adjoining eighth tergite along the caudal edge of the *sipc*. Ductus bursae elongate, ductal spiral wider than in congeners, located about one-third of ductal length from cervix bursae. Cervix bursae marked laterally by sclerotized pads. Apophyses papillaes short, fully enclosed by *sipc*.

Type: Holotype male, MNHNC, CHILE, IV Region Coquimbo, Elqui Prov., Río Los Choros [CDP biotic province].

Distribution: Spatial (Fig. 22): Known from montane coastal and river course localities in the Coquimban Desert Biotic Province (see Remarks). Temporal: Known specimens date from November to January.

Remarks: This little-known species was not located by us in any American or European collection. Herrera supplied a damaged male, but Mr. Pedro R. Mazry supplied Mr. Rick Rozycki (Chicago, Illinois) with seven fresh specimens, four of which have been deposited at the AMNH and one at the AME. The species is remarkably distinct and can be confused with no other South American thecline. From the localities represented we suspect this species is an endemic to disjunct relict coastal forests described from the Coquimban Desert Biotic Province by Irwin and Schlinger (1986) and Davis (1986).

Material Examined: CHILE. CDP: IV Región Coquimbo, Elqui Prov., Tongoy, 1 January 1985, leg. Mazry, two females (AMNH), one female (AME), 17 January 1984, two females (AMNH), one male, one female (CPR); IV Región Coquimbo, Elqui Prov., Lomas de Peñuelas, 6 Km. from La Serena, 12 November 1966, one male, leg. J. Herrera (AME).

HEODA SUPREMA, new species

(Figures 12CD, 16)

Diagnosis: A large species (forewing 14.0 - 15.0 mm.) with upper surface resembling either *Heoda wagenknechti* (but without tails) or a gigantic *E. bicolor* (though with notably smaller black androconial brands in males and a unique black mark at a similar location in females). Under surface with ground color distad of medial spot line vivid gray and with two, unique, boldly incised, gray patches occurring (i) across forewing radial area and (ii) from hindwing anal area basad vein CuA2 and the postbasal spots. Female *sipc* heavily sclerotized and with a salient prong directed ventrocephalad; genitalia with cervix bursae enveloped by a prominent sclerotized shield. Male genitalia with ventral vincular shape robust and ovate, saccus comparatively small; valvae elongate and ellipsoidal in shape (see Remarks).

Description: MALE. Upper surface of wings: ground color black at costa and in submargins; broad central areas of both wings brilliant red-orange. Androconial brands small (2 mm.), ovate and black. Under surface of wings: forewing with central orange patch, a postmedian line of black spots from costa to cell CuA2 and a distal gray patch across radial veins at wing apex. Hindwing with variegated gray-brown ground broken by bold medial band of black spots across entire wing (SC+R1 element not as basally displaced as in female); distad of band, ground vivid gray and with gray extending across anal area basad of vein CuA2 to the postbasal spots. Length of Forewing: 14.5 mm (allotype), 14.0 (paratype). FEMALE. Upper surface of wings: similar to males, including black mark at apex of discal cell, but forewing orange more extensive than in male. Under surface of wings: marked similar to males but with SC+R1 element of hindwing medial band more basally incised. Length of Forewing: 15.0 mm.(holotype). *Male Genitalia*. Fig. 16B. Vinculum robust and ovate, relatively small compared to other sclerotized parts (lateral expanse of vinculum, expanse of saccus and base of falces all of about equal size); saccus short, parabolic, displaced laterally. Valvae robust with parabolic bilobed area and gradually tapered caudal extension. Aedeagus comparatively straight for genus, caecum robust, comprising slightly less than one-third aedeagal length. *Female Genitalia*. Fig. 16A. *Sipc* rectangular, heavily sclerotized along basal margin, with a ventrocephalically directed prong and dark sclerotized ridges along ventroterminal margin. Papillae anales robust, apophyses length equalling length of genital ductus caudad of ductal spiral. Genitalia robust with

compact ductal spiral and dorsally inclined terminal lamellae; cervix bursae enveloped by prominent sclerotized hood; corpus bursae with signa broad-based and large, length equalling about one-half length of corpus bursae cephalad of cervix bursae hood.

Type: Holotype female, allotype male, ARGENTINA, Chubut Prov., Esquel, 17 November 1988, shrub-steppe, leg. A.M. Shapiro. Paratype. AMNH: ARGENTINA, Neuquén Prov., Zapala, 7 November 1988, shrub-steppe in vicinity of flowering chacay (*Chacaya trinervis*, Rhamnaceae) (one male).

Distribution: Spatial (Figs. 20, 21): Known from shrub-steppe localities in the Patagonian Steppe Biotic Province in Neuquén and Chubut provinces, Argentina. Temporal: all known specimens are from November (also, see Addendum).

Remarks: In 1988, at two locations (one sympatric and syntopic with *E. bicolor*, one with *H. nivea*), A.M. Shapiro collected this rather spectacular species. At Zapala, Shapiro also collected *Strymon rhaptos* (see Johnson, Eisele and MacPherson, 1990), *S. eurytulus*, *Eiseliana bicolor*, *E. patagoniensis* and *Heoda nivea*. It is interesting that the hindwing under surface in *H. suprema* exhibits a vague discal slash and postbasal spots, markings which are prominent in the incised, mottled, pattern of *H. wagenknechti*. It should also be noted that the sclerotized shield surrounding the cervix bursae in females of *H. suprema* occurs far cephalad of the small sclerotized lateral prong that occurs near the cephalic ductal terminus in all species of *Heoda*.

Etymology: The Latin name means "supreme" referring to the spectacular markings of this species.

nivea group:

HEODA NIVEA, new species

(Figures 13AB, 17)

Diagnosis: Known only from Patagonia. Upper surface in both sexes concolorous brown; male with small, ovate, androconial brands. Under surface beige and with unique, bright, white patches across entire postmedial area of hindwing distad pronounced black medial spot-band.

Description. MALE. Upper surface of wings: ground color bronze-tinted brown with slightly darker suffused margins. Forewing with small, ovate, androconial brand matching general wing ground. Hindwing in fresh specimens with vivid gray marginal line from anal lobe to cell CuA1. Under surface of wings: ground color beige. Forewing with postmedian line of blackish brown spots, costa to cell CuA2. Hindwing with black postbasal markings typical of genus and medial band of vivid black spots (spot in cell SC+R1 basally displaced) bordered distally throughout the postmedial area with bright white patches. Remaining distal area to margin beige with bright yellow Thecla-spot in limbal area. Length of forewing: 11.5 - 13.5 mm. FEMALE. Upper surface of wings: marked similarly to male but lacking androconial brands. Under surface of wings: marked similar to males. Length of forewing: 11.5 - 13.5 mm. *Male Genitalia*. Fig. 17B. Most similar to *H. colombiana*, with ventral vincular shape elliptical, labides set widely apart and saccus prominently pointed; valvae parabolic at base and terminally tapered, comparatively short for genus; aedeagus terminally undulate. *Female Genitalia*. Fig. 17A. *Sipc* rather square-shaped, heavily sclerotized ventro-laterally and with rasp-like sclerotizations at the ventro-terminal margin. Ductus bursae with spiral occurring at juncture of cephalic one-third of ductal length and terminal lamellae dorsally inclined; cervix bursae with lightly sclerotized dorsal shield.

Types: Holotype female, allotype male, ARGENTINA, Neuquén Prov., Zapala, 7 November 1988, shrub-steppe, collected on flowering *Haplopappus*, leg. A.M. Shapiro, deposited AMNH. Paratypes. AMNH: ARGENTINA, same data as primary types (one male, one female); Neuquén Prov., Las Lajas, 9 November 1988, shrub-steppe, collected on flowering *Haplopappus* and *Perezia* and other Asteraceae, leg. A.M. Shapiro (one male, two females). BMNH: ARGENTINA, Las Lajas, 9 November 1988, shrub-steppe, collected on flowering *Haplopappus* and *Perezia* and other Asteraceae, leg. A.M. Shapiro (one female). AME: ARGENTINA, Chubut Prov., 40 mi.

N. Río Mayo, Leg. J. Herrera (one male, one female). CMNH: ARGENTINA, Neuquén Prov., Loncopué, 8 November 1988, mud-puddle in shrub-steppe, leg. A.M. Shapiro (one female). IML: ARGENTINA, Mendoza Prov., Potrerillos, 15 November 1957, leg. not noted. UCD: ARGENTINA, same data as primary types (one male, one female).

Distribution: Spatial (Figs. 20, 21): known from Argentina in several shrub-steppe localities of the Patagonian Steppe Biotic Province in Neuquén and Chubut provinces and, in Mendoza Province, from montane (high desert) shrub-steppe characterized by monte vegetation with a riparian corridor (A.M. Shapiro, pers. comm.). Temporal: all known specimens are from November (see Addendum).

Remarks: At Zapala the species was sympatric with *H. suprema, Eiseliana bicolor, E. patagoniensis, Strymon eurytulus* and *Strymon rhaptos*. At Las Lajas, *H. nivea* was sympatric with *E. bicolor, E. patagoniensis* and *Strymon eurytulus*.

Etymology: The Latin name means "snow" and refers to the brilliant white postmedial markings characterizing the species.

HEODA COLOMBIANA, new species

(Figures 13CD, 18)

Diagnosis: Upper surface gold-tinged bronze throughout with parabolic androconial brand at distal end of male's discal cell. Under surface beige with pattern elements typical of genus relatively thin and indistinct; hindwing medial band thin and continuous, bipartite (basally black, distally tawny) and undulate (plus extremely displaced basally at cell SC+R1).

Description: MALE. Upper surface of wings: forewing shape in known specimen not broad as in congeners, but more obtusely triangular; ground color of both wings gold-tinged bronze throughout, margins slightly suffused darker. Forewing androconial brand dark brown and thinly elipsoid. Under surface of wings: ground color beige; forewing with obsolescent brown postmedian line (costa to cell CuA2). Hindwing with thin medial band (vaguely bipartite, basally brown, distally tawny) thin, continuous and undulate across wing, particularly displaced basally in SC+R1. Postbasal elements obsolescent. Limbal area generally unmarked; Thecla-spot light yellow-orange. Length of forewing: 12.5 mm. (holotype). FEMALE. Unknown. *Male Genitalia*. Fig. 18. Most similar to *H. nivea*, though ventro-lateral margins of vincular arc slightly rounded and labides less protrusive; saccus parabolic, valvae basally parabolic and terminally tapered; caudal end of falces somewhat bulbous before terminal prongs; aedeagus bowed and with caecum displaced from plane of aedeagal shaft.

Type: Holotype male, COLOMBIA, labelled "high Andes", "Interior of Colombia", deposited BMNH.

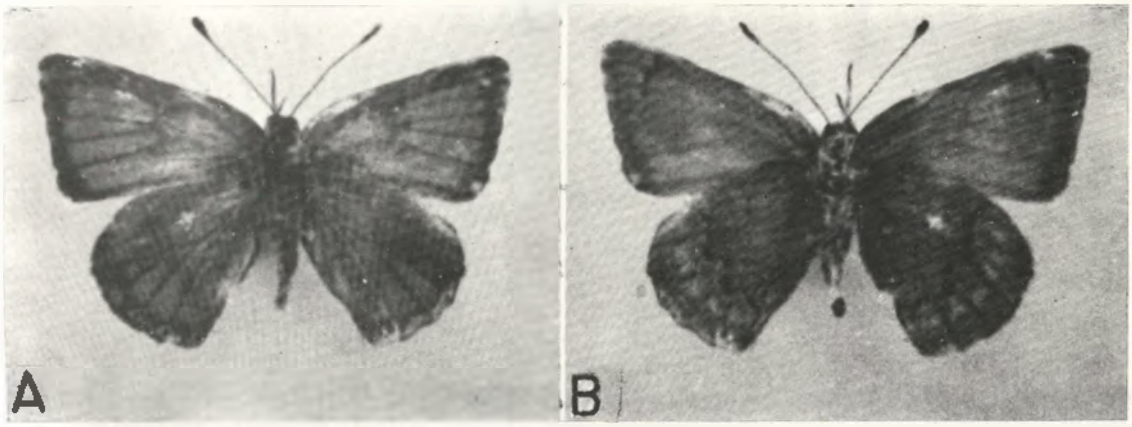


Figure 11. Type specimens of *Thecla* taxa referable to *Heoda*. **A,B.** *Thecla heodes, lectotype* (A, upper surface; B, under surface, black and white reproduction of color slide).

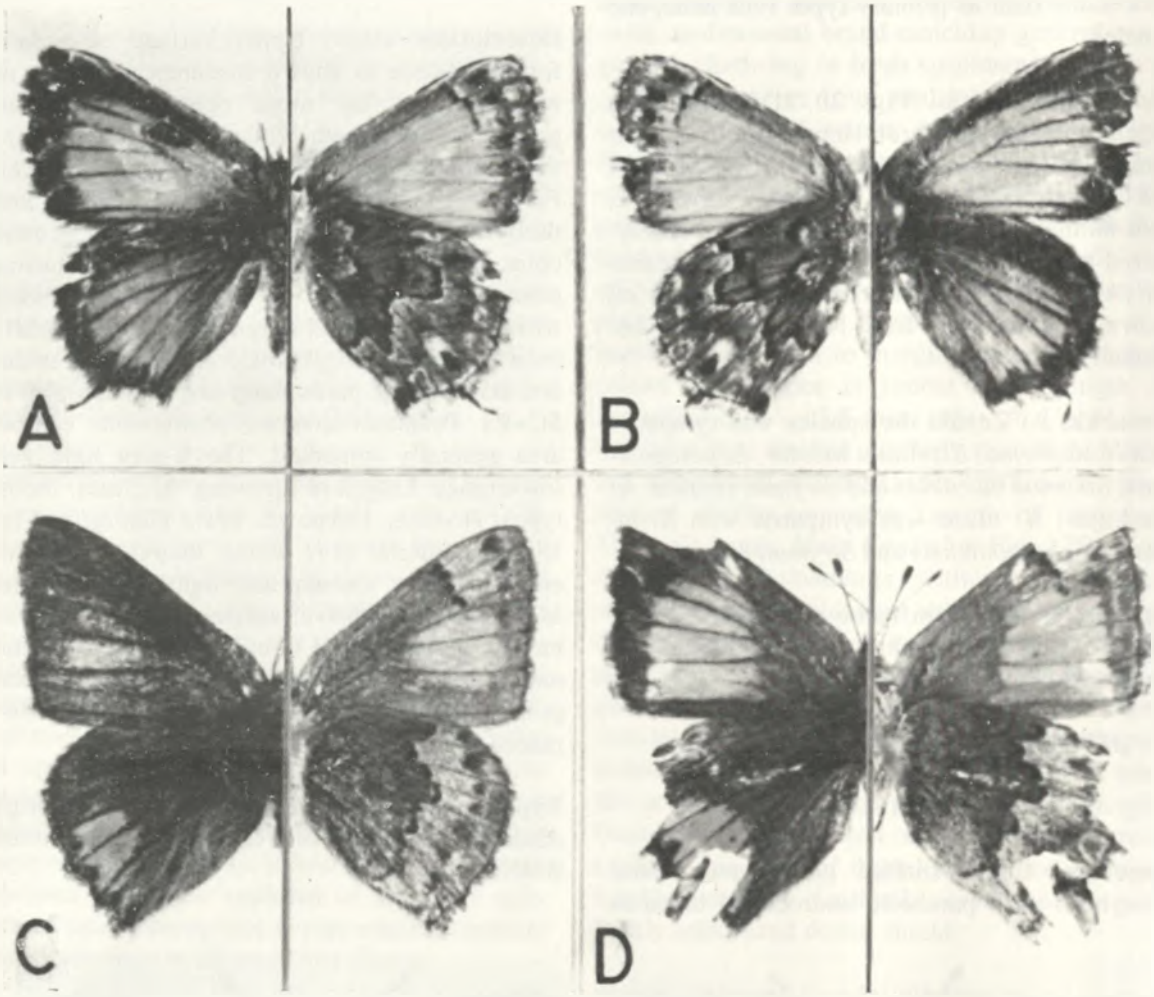


Figure 12. Adults of *Heoda, heodes* species group (left, upper surface; right, under surface [except for B, opposite]. A. *H. wagenknechti*, male (11.5 mm., CHILE, Coquimbo Prov., Tongoy, AMNH); B.,same female (data as A). C. *H. suprema*, allotype male. D, Same, holotype female.

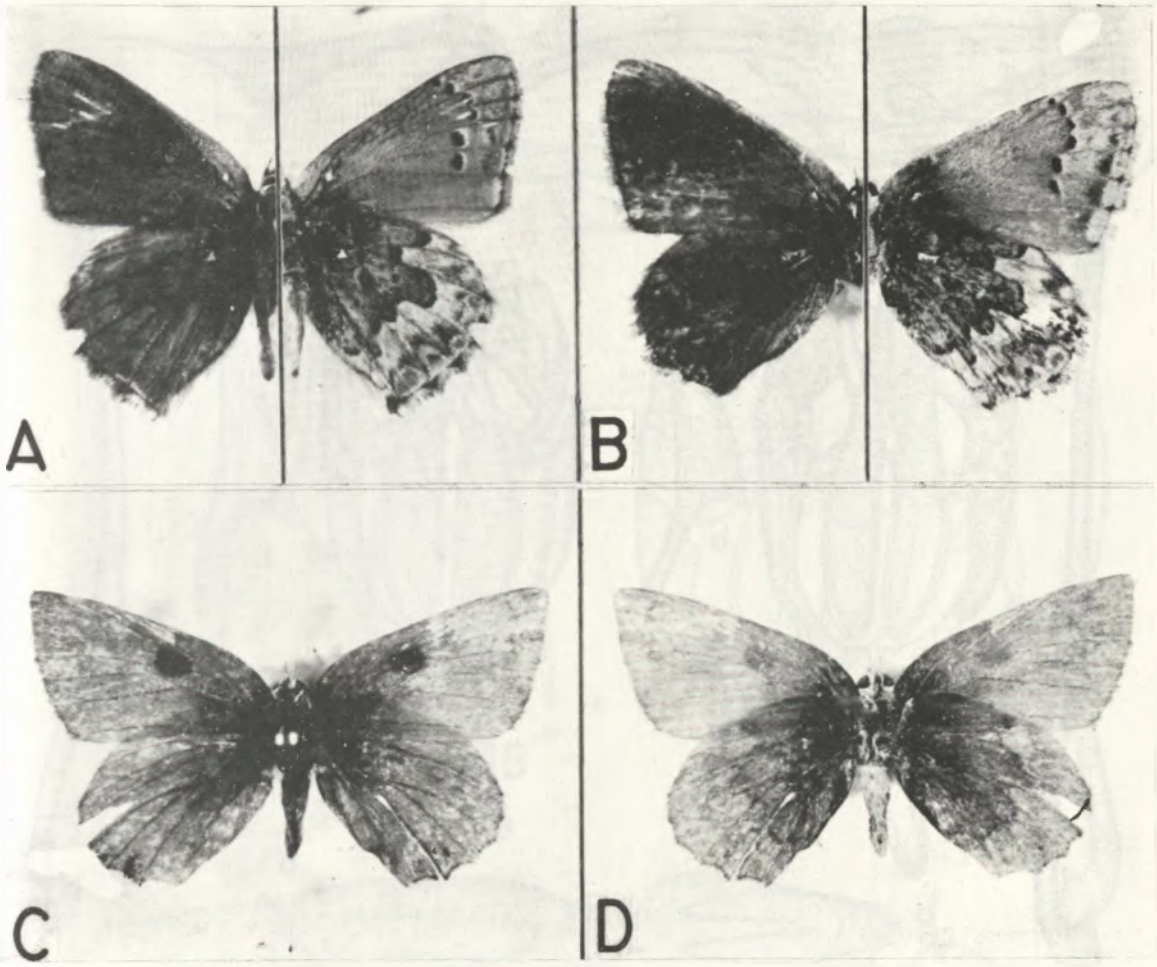
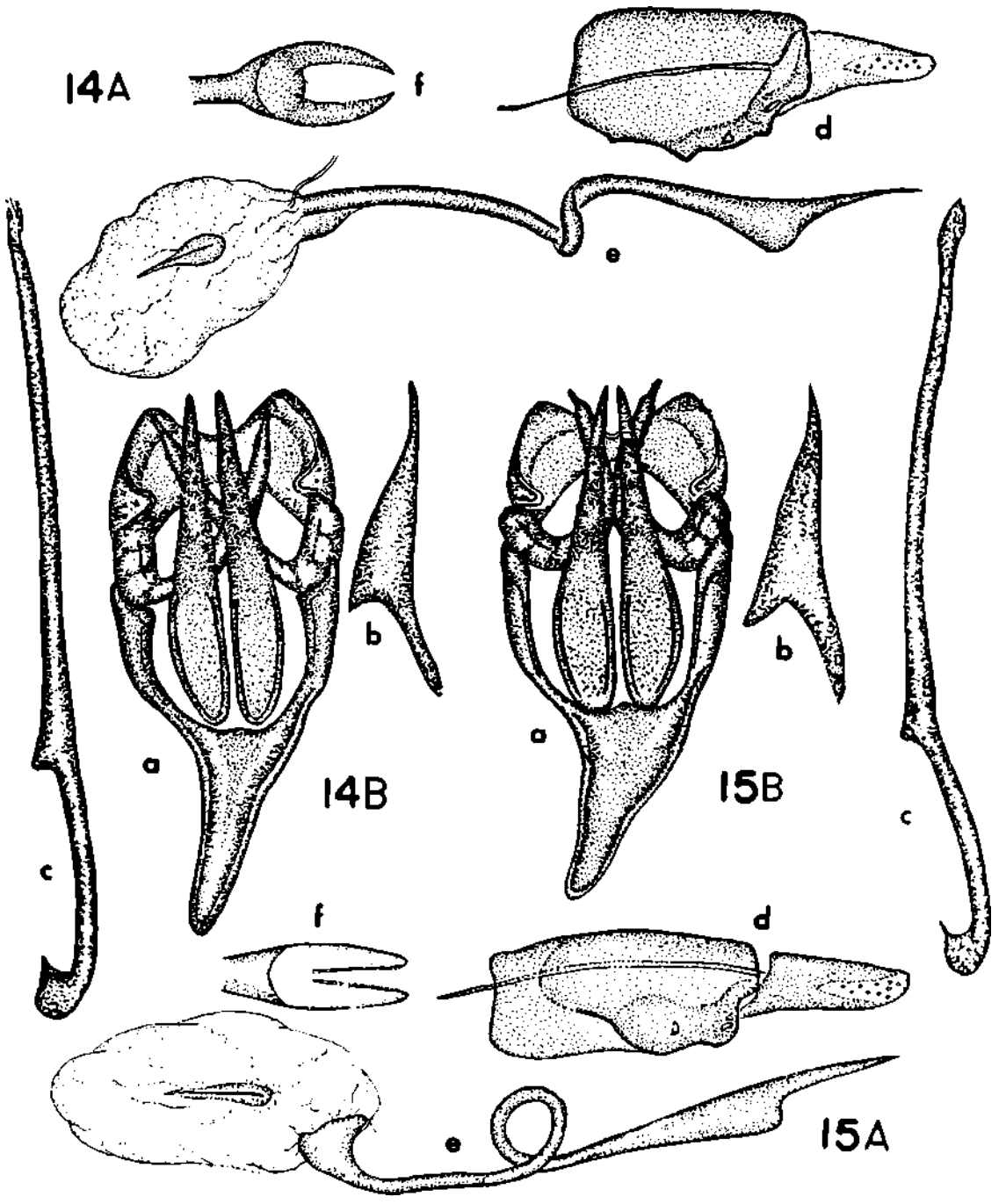
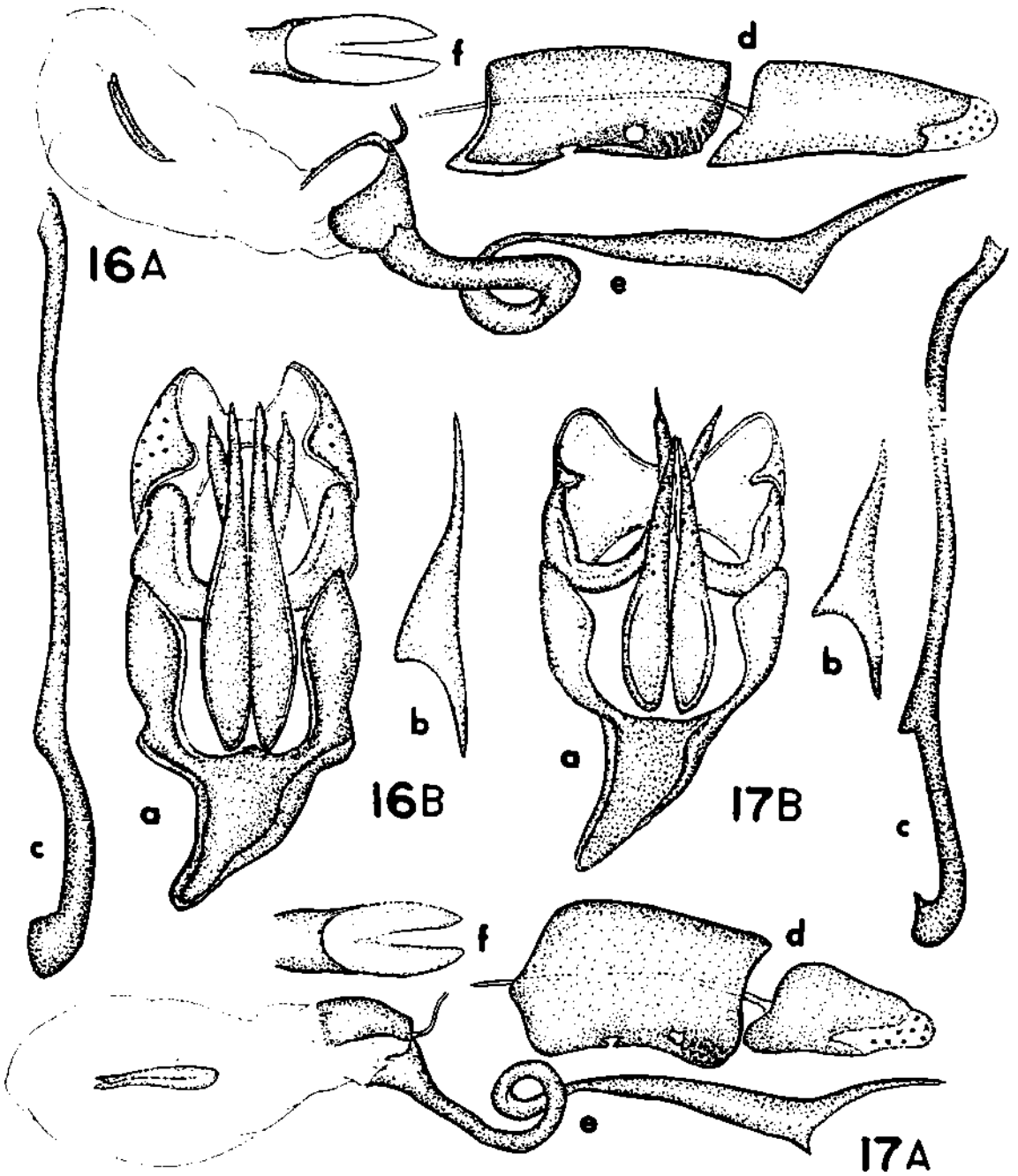


Figure 13. Adults of *Heoda, nivea* species group (left, upper surface; right, under surface). **A.** *H. nivea,* allotype male; **B.** same, holotype female; **C, D.** *H. colombiana,* holotype male (C, upper surface; D, under surface).



Figures 14-15. Genitalia of *Heoda*. Fig. 14 *Heoda heodes*, lectotype female (14A) syntype male (14B). Fig. 15. *Heoda wagenknechti*, female of Fig. 12 (15A), male of Fig. 12 (15B). Format: **a**, male genitalia, ventral view; **b**, male valve, lateral view; **c**, male aedeagus, lateral view; **d**, female, papillae anales (right), apophyses papillae anales and modified eighth tergite ("sipc") (left); **e**, genitalia, lateral view; **f**, lamellae of female genitalia, ventral view.



Figures 16-17. Genitalia of *Heoda*. Fig. 16. *Heoda suprema*, holotype female (16A), allotype male (16B). Fig. 17. *Heoda nivea*, holotype female (17A), allotype male (17B). Format: **A**, male genitalia, ventral view; **B**, male valve, lateral view; **C**, male aedeagus, lateral view; **D**, female, papillae anales (right), apophyses papillae anales and modified eighth tergite ("sipc") (left); **E**, genitalia, lateral view; **F**, lamellae of female genitalia, ventral view.

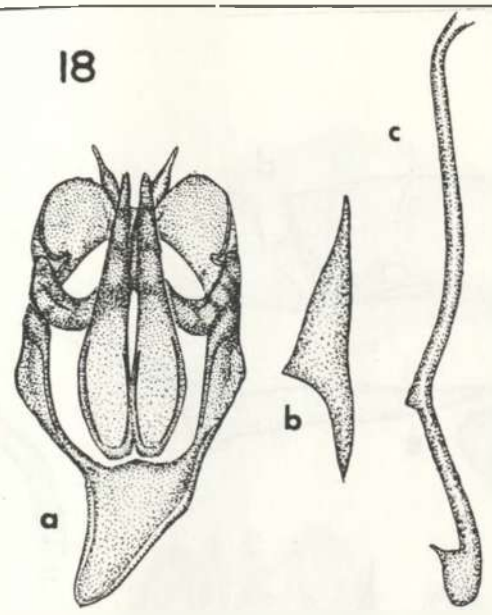


Figure 18. Genitalia of *Heoda colombiana*, holotype male. Format: **a**, male genitalia, ventral view; **b**, male valve, lateral view; **c**, male aedeagus, lateral view.

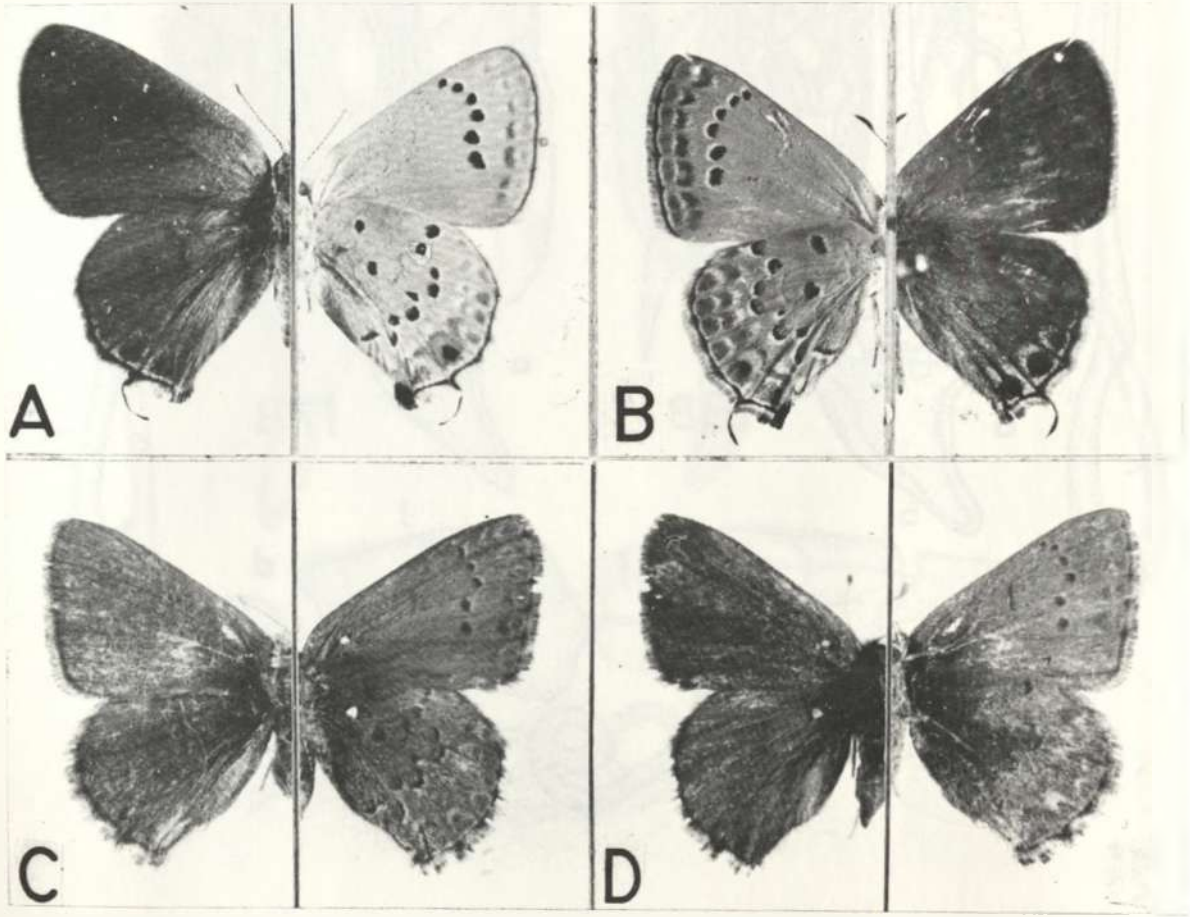


Figure 19. Wing pattern variation in southern South American *Strymon eurytulus*. Unless otherwise specified: left, upper surface; right, under surface. **A.** *S. eurytulus* "normal" morph (*sensu* Johnson *et al.* 1990) male, ARGENTINA, Salta Prov., Pichanal (AMNH). **B.** Same, female, ARGENTINA, Tucumán Prov., Yerba Buena (AMNH). **C.** *S. eurytulus* "americensis morph" (*sensu* Johnson *et al.*, 1990) male, ARGENTINA, Neuquén Prov., Las Coloradas (IML). **D.** Same, female.

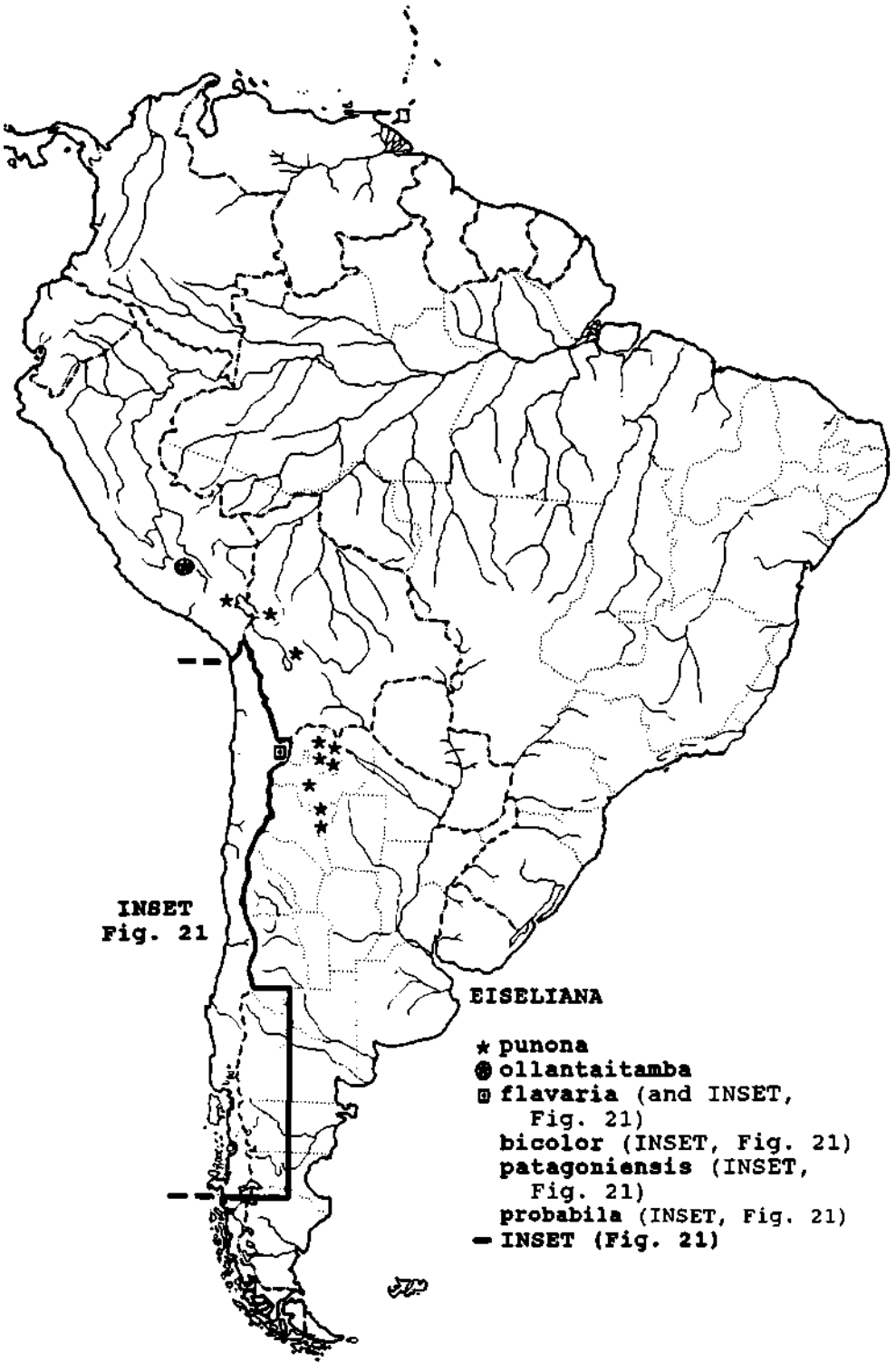


Figure 20. Distribution of *Eiseliana* taxa. Map of South America indicating distribution of *E. punona*, *E. ollantaitamba*, *E. flavaria* and region of inset (Fig. 21) figuring distributions of *E. bicolor* complex, *E. probabila*, *E. flavaria* and *E. patagoniensis*.

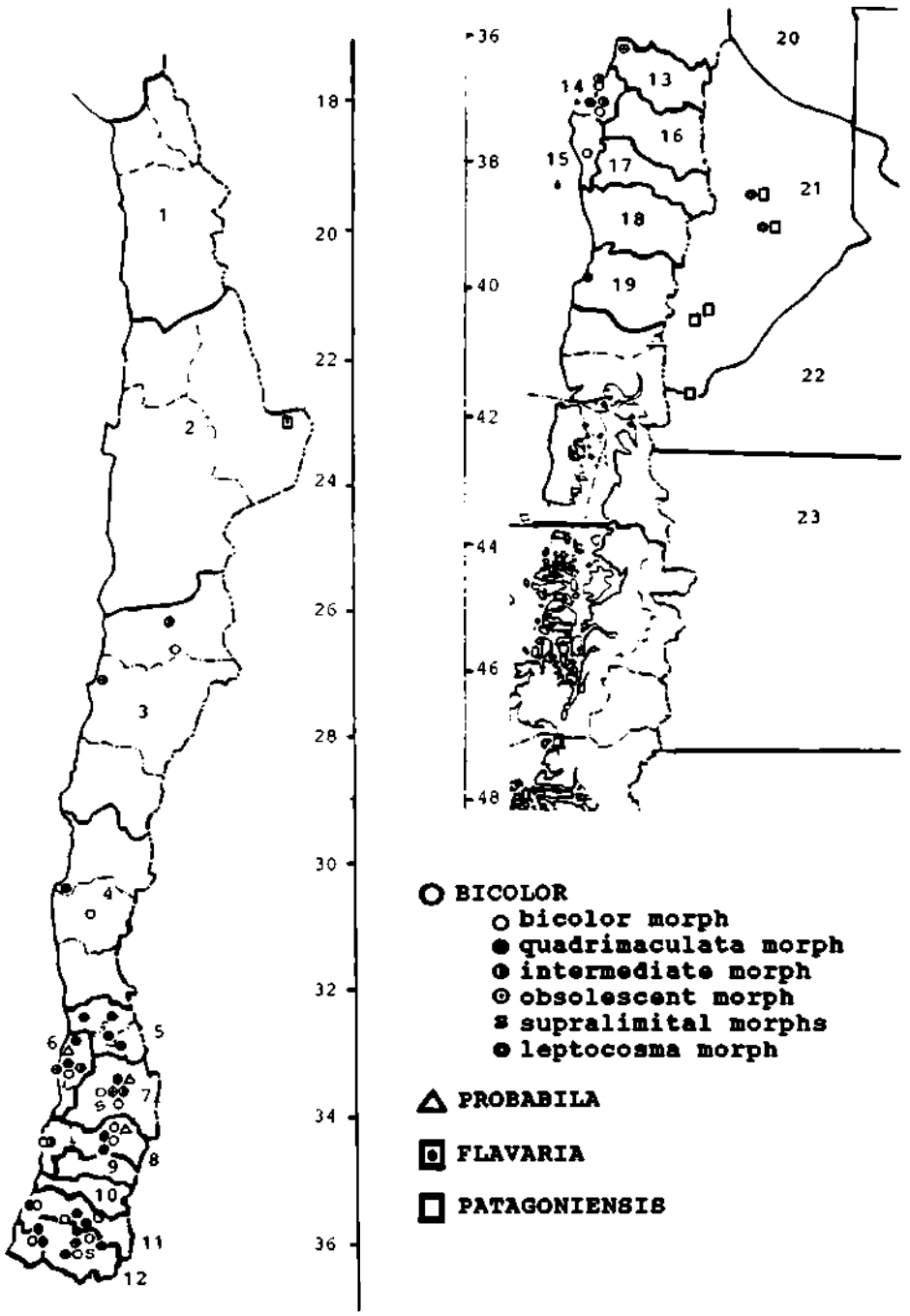


Figure 21. Inset of Fig. 20, distribution of *E. bicolor* complex, *E. probabila*, *E. flavaria* and *E. patagoniensis* in Chile and Argentina. Map of Chile (left) and from 18-36° S Latitude and Chile and Argentina (right) 36-40° S Latitude (right) from 68° W Longitude westward, with provinces (bordered by solid lines and listed as in I.D.B.G.N. 1968a,b) numbered as follow. CHILE. 1. Tarapacá; 2. Antofagasta; 3. Atacama; 4. Coquimbo; 5. Aconcagua; 6. Valparaíso; 7. Santiago; 8. O'Higgins; 9. Colchagua; 10. Curicó; 11. Talca; 12. Linares; 13. Ñuble; 14. Concepción; 15. Arauco; 16. Bío-Bío; 17. Malleco; 18. Cautín; 19. Valdivia. ARGENTINA. 20. S. Mendoza; 21. Neuquén; 22. W Río Negro; 23. W Chubut. For reference purposes, pertaining to boundaries of biotic provinces cited in text, dot/dash lines indicate other subregions listed in Davis (1986) and Irwin and Schlinger (1986) but not included in I.D.B.G.N. (1968a,b).

Figure 22. Distribution of *Heoda* taxa. Map of South America indicating distributions of *Heoda* species as keyed (exact location of *H. colombiana* is questioned since the holotype has only generalized data).

Distribution: Spatial (Fig. 22): known only from the ambiguous type locality. Temporal: Unknown.

Remarks: This species was discovered at BMNH in a small box of unincorporated specimens interestingly marked "mostly undescribed species". It is not known who assembled these specimens or placed them among the various uncurated materials at that museum. A great deal of recently donated BMNH material is placed outside the curated collection on an "as is" basis. This material is available for study but unsorted.

Etymology: The name refers to the general area of occurrence, the northern range extreme of the genus.

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The following institutions and curators made material available for study: J.Y. Miller, Allyn Museum of Entomology, Florida Museum of Natural History (AME); F.H. Rindge, American Museum of Natural History (AMNH); P.R. Ackery and R. Vane Wright, British Museum (Natural History) (BMNH); J.E. Rawlins, Carnegie Museum of Natural History (CMNH); D. Matusik (Field Museum, Chicago [Addendum]); J. Atria, Instituto de Entomología, Universidad Metropolitana de Ciencias de la Educación, Santiago, Chile (IEUMCE); Z.D. Ajmat de Toledo, Instituto Miguel Lillo, Tucumán, Argentina (IML); A. M. Young, Milwaukee Public Museum (MPM); G. Bernardi and J. Pierre, Museum National d'Histoire Naturelle, Paris (MNHN); R.O. Schuster and A.M. Shapiro (UCD). R. Eisele and B. MacPherson (Jujuy, Argentina) and A.M. Shapiro made specimens available from personal collections and also provided field notes. Aside from his unique collection contributions to this study, A.M. Shapiro also made many helpful review comments. Hector Viana, Esq. (New York/Montevideo) and Elizabeth Solano (New York) translated numerous communications between the coauthors. This research was supported, in part, by anonymous donations to the AMNH Theclid Research Fund.

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APPENDIX 1

Along with some species included by us in *Eiseliana* and *Heoda*, Draudt (1919) included the following species of *Thecla* in his "*americensis* Group" of *Thecla* which we have determined by examination of their types belong neither in *Strymon sens. strict.*, *Eiseliana* or *Heoda:*

1. ***Thecla atrana*** Schaus (1902, 24(1262): 409).
   The type female (National Museum of Natural History, Washington, D.C.) has been examined and dissected (Johnson, 1989, Fig, O) and clearly dos not belong in *Strymon*, *Eiseliana* or *Heoda*.
2. ***Thecla tarania*** Hewitson (1868: 3)
   The type male (BMNH) and Hewitson collection females (BMNH) have been examined and dissected (Johnson, 1989c, Fig. M) and clearly do not belong in *Strymon*, *Eiseliana* or *Heoda*.
3. ***Thecla tegaea*** Hewitson (1868: 2)
   The type male (BMNH) has been examined and dissected (Johnson, 1989c, Fig. N) and does not indicate affinity to either *Strymon*, *Eiseliana* or *Heoda*.
   T. atrana, *T. tarania*, *T. tegaea*, and several undescribed species, comprise a monophyletic group being treated by the senior author in revisionary work.
4. ***Hesperia titus*** Fabricius (1792-1799 [1793], 3(1): 297).
   This well-known and distinctive North American species is unambiguous and was made type species of the genus *Harkenclenus* by dos Passos (1970).

ADDENDUM

New species of *Heoda* and *Eiseliana* from Chile and first Chilean records of *H. nivea* and *H. suprema*.

Subsequent to completion of this study, we were able to prepare and examine additional Chilean Theclinae supplied by J. Herrera G. and Luis Peña. Included were three males of *Heoda suprema*, Chico, Aysén, October 1985, collector L.E. Peña (Fig. 23c) and a male and two females of *Heoda nivea*, Vicuña, Elqui, November 1990, collector G. Castillo. (Fig. 23d). Also included was the new species of *Heoda* described immediately below.

HEODA SHAPIROI new species

(Figures 24, 23)

Diagnosis: Extremely small (forewing alar 7.0 - 7.5 mm.); upper surface with broad medial orange patches on boths wings bordered with brown apices and margins; under surface hindwing ground gray-brown crossed with undulate black medial line, greatly incised in cell SC+R1 and bordered distally by a broad white-suffused postmedial band. Genitalia and tergal morphology distinctive as noted below.

Description: MALE. Upper surface of wings: compared to congeners, forewing outer margin arched, ground color brown along costa, apex and submargins; broad central areas of boths wings orange. Forewing androconial brands large (to 1.2 mm.), oblong, colored distally black, basally more fuscous. Under surface of wings: forewing with central orange patch, postmedian line from costa to cells M1 or M2 paralleled by black submarginal blotches; hindwing with variegated gray-brown ground crossed by blackish undulate medial line (greatly displaced basally in cell SC+R1) immediately bordered distad by a white-suffused postmedian band. Length of forewing: 7.0 mm (holotype), 7.5 mm. (paratype). FEMALE. Similar to male except lacking androconial brands. Length of forewing: 7.0 mm. (allotype, paratype). *Male Genitalia*. Fig. 24A. Similar to congeners in overall robust fascies of component parts, differing primarily by diminutive aedeagus, length of which exceeds rest of genitalia by only the caecum length, latter with broadly ellipsoid terminal bulb. *Female Genitalia*. Fig. 24B. *Sipc* rectangular, dorsum with heavily sclerotized cephalically-directed prong, ventrum heavily sclerotized with dark ridges caudad eighth spiracular opening, cephalad with a ridged (but rather membranous), ventral margin. Papillae anales robust, apophyses length hardly exceeding that of *sipc*. Genitalia with ductus bursae thin and elongate, widely spiralled in the cephalic one-third; cervix bursae diminutive, corpus bursae signa with pronounced, inwardly directed, keel.

Types: Holotype female, allotype male, CHILE, Las Cruces, Cordillera Parral, Linares, September 1958, collector M. Rivera, deposited UMCE. Paratypes. Same data, one male, one female, AMNH.

Distribution: Presently known only from type locality and indicated as sympatric there with *E. bicolor* (see *E. bicolor*, above).

Remarks: Unique combinations of characters in this species suggest there may be further undescribed austral members of *Heoda*. As with *H. shapiroi*, such can be readily diagnosed by generic characters, particularly the modified eighth tergite of females. Collectors should examine genitalia of any "*bicolor*"-like specimens which show unusual wing shape or pattern. Unmounted, *H. shapiroi* immediately attracted attention because of under surface similarity to *H. nivea;* however, the presence of orange medial patches on the upper surfaces showed it could not be that species.

Etymology: We name this species in honor of Dr. Arthur M. Shapiro who enhanced our knowledge of *Heoda* by his discovery of both *H. suprema* and *H. nivea*.

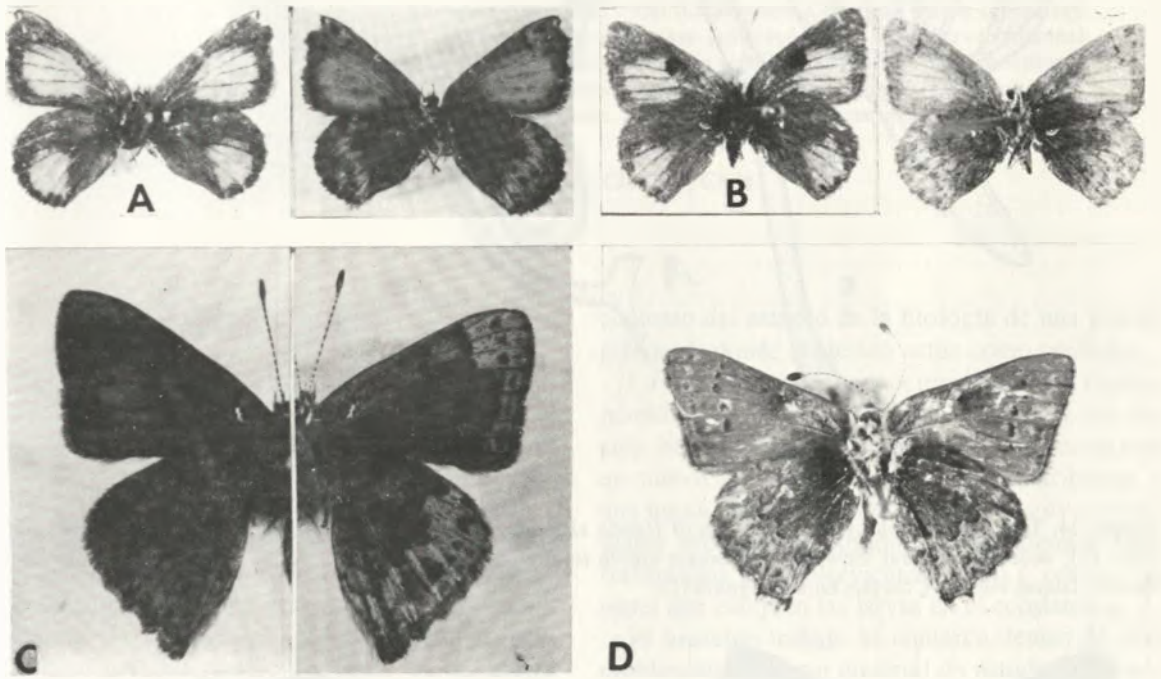

Figure 23. Adults of Chilean taxa treated in Addendum (sizes comparative). **A.** *H. shapiroi*, holotype, upper surface left, under surface right; **B.** same, allotype, same views; **C.** *Heoda suprema*, male (forewing alar 12.5 mm., hindwing distal areas grayer than topotypical); **D.** *H. nivea*, male (forewing alar 11.5 mm., hindwing markings vaguer than topotypical, more resembling specimens from Mendoza Province, Argentina).

Contemporaneous Paratypes, *Eiseliana probabila:* A.M. Shapiro collector, 5 males (AMNH), 1 male (BMNH), 1 male (UMCE), 1 male (UCD), CHILE, Prov. Quillota, Cerro el Roble, 6000 ft., 22 December 1982. This series (Fig. 25C) reinforces our view that the taxon is a sibling species of *E. bicolor*.

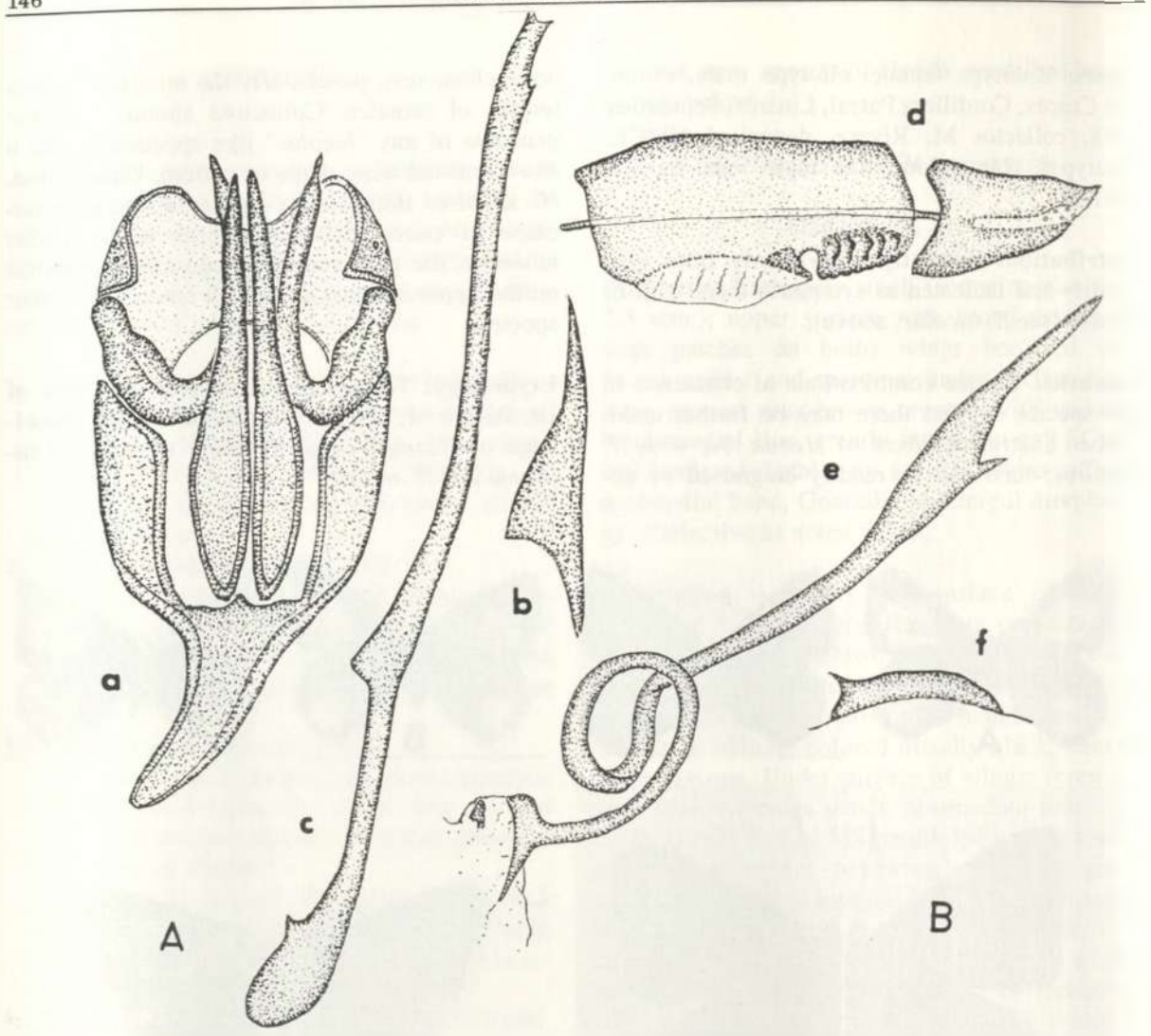

Figure 24. Tergal Morphology and Genitalia of *Heoda shapiroi*. **A.** Male genitalia, ventral view (a); valve, lateral view (b); aedeagus, lateral view (c). **B.** Female eighth tergite and papillae anales, lateral view (d); genital ductus bursae, lateral view (e), corpus bursae signum (f).

Figure 25. Additions to *Heoda* and *Eiseliana*. A. AMNH paratype male, *Heoda atacama* Johnson & Miller 1992 (Vicuña, Chile, January 1987) described in a separate study. B. Field Museum (Chicago) paratype, *Eiseliana rojasi* (Ureta, 1956), Sn. Pedro de Atacama, Chile, combination made by Johnson & Miller 1992. C. AMNH paratype *Eiseliana probabila* (Cerro el Roble, Chile, December 1982). Line marks distinctive forewing brand.