

**Taxonomic notes, faunistics and species descriptions  
of the austral South American polyommatine lycaenid genus  
*Pseudolucia* (Lepidoptera: Lycaenidae): the chilensis  
and collina species-groups**

ZS. BÁLINT & D. BENYAMINI\*

*Department of Zoology, Hungarian Natural History Museum*

*H-1088 Budapest, Baross utca 13, Hungary*

*e-mail: balint@zoo.zoo.nhmus.hu*

*\*91 Levona Street, Bet Arye 71947, Israel*

*e-mail: dubi\_ben@netvision.net.il*

BÁLINT, ZS. & BENYAMINI, D.(2001): Taxonomic notes, faunistics and species descriptions of the austral South American polyommatine lycaenid genus *Pseudolucia* (Lepidoptera: Lycaenidae): the chilensis and collina species-group. – *Annales historico-naturales Musei nationalis hungarici* **93**: 107–149.

**Abstract** – The *chilensis* and the *collina* species-groups of the polyommatine lycaenid genus *Pseudolucia* NABOKOV, 1945 occurring in austral South America (Chile and Argentina only) are reviewed. Two species, *P. oraria* sp. n. (type locality: Chile, Pan de Azucar, Atacama Pacific coast) and *P. ugartei* sp. n. (type locality: Chile, Cuesta la Dormida) are described. For taxonomic stability a neotype for *Lycaena collina* PHILIPPI, 1859 is designated. It is demonstrated that, historically, the species name *collina* has been misinterpreted, with *Pseudolucia collina* auct. now needing a scientific name (introduced here as *Pseudolucia dubi* sp. n. [type locality: Chile, Coquimbo, Choapa, 55 km S of Salamanca, Batuco]). The taxon *Cherchiella scintilla* BALLETO, 1993 is reviewed and proved to be not synonymous with *P. kinbote* BÁLINT et JOHNSON, 1995 but, instead, related to *P. shapiro* BÁLINT et JOHNSON, 1995 (thus *Pseudolucia kinbote* status revised). A key for all the species based on appended taxonomic characters is provided, along with data on geographic distribution, larval foodplants, life histories and behaviour. With 60 figures.

**Key words** – Lepidoptera, Lycaenidae, Polyommadini, Cuscutaceae, Polygonaceae, Portulacaceae, Andes.

## INTRODUCTION

Since 1995 the junior author has been undertaking annual summer expeditions to Chile and Argentina. Two goals drive the project: (1) discovering distinctive new populations or new species in previously unexplored biotopes and (2)

elaborating life histories of *Pseudolucia* species. Another aspect of this pioneer work is locating historical specimens in Chile. Thus it was necessary to visit LUIS PEÑA, the nestor of Chilean entomology in the 20th century who, by that time, was already seriously ill and almost completely incapacitated. He saw (in proof) the original colour plates of the immature stages of *Pseudolucia* later published in "Synopsis on biological studies..." (BENYAMINI 1995).

Before his terminal illness, Mr. PEÑA had also begun a search for suspected undescribed *Pseudolucia* in his collection, presently held by his relative Dr. PEDRO VIDAL of the Universidad Católica de Chile. This collection included undescribed entities not only from PEÑA's own work but also that of other collectors. In the collection, labels "Coll. L. PEÑA G." indicate specimens not collected by PEÑA himself (but originating from other collectors and placed in PEÑA's collections) while the labels "Leg. L. PEÑA G." indicate he himself was the collector. In addition, quite often Mr. PEÑA marked suspected new species by a printed label "*Pseudolucia* nov. sp."

When visited by BENYAMINI, Mr. PEÑA suggested a loan of his polyommatine collection for two purposes: (1) identification of known taxa and systematic arrangement of the collection and (2) recognition of undescribed entities. Mr. PEÑA's intent was to bequeath the types of any taxa described from his collection to the collections of Museo Nacional de Historia Natural at Quinta Normal, Santiago de Chile. However, for the interim study suggested by PEÑA for the authors of the present paper, two courses were followed: first, abdomens of specimens in the PEÑA Collection suspected as representing undescribed species were excised, catalogued, and forwarded to the senior author for taxonomic study; second, many specimens collected more recently in Chile by the junior author were also transported to Budapest and examined jointly by the present authors at Hungarian Natural History Museum.

The first result of this study is published here, reviewing taxa which have previously been poorly known or misinterpreted, and also describing new species.

## MATERIAL AND METHODS

Taxonomic keys and synonymies, along with geographic and biological data, are provided for all species. Taxonomic treatments follow the sequence of the Keys. The Material Examined section lists the material deposited in the Lepidoptera collection of Hungarian Natural History Museum. Notes concerning ecological, historical or taxonomic data are given for each species. Further, hitherto unpublished data of newly collected material or hitherto not elaborated historical samples are given as Appendix I. Genital dissections are listed with numbers from the genital dissection database executed by the senior author at the Hungarian Natural History Museum. The Appendix II lists all the host plants involved in the present paper giving the species names of the butterflies as references.

Institutional acronyms are given parenthetically as follows: AME: Allyn Museum of Entomology, Sarasota (USA); AMNH: American Museum of Natural History, New York (USA); BMNH: The Natural History Museum, London (United Kingdom); CUC: Concepción University Collection (Chile); FMC = Field Museum of Natural History, Chicago, USA; HNHM: Hungarian Natural History Museum, Budapest (Hungary); IMS: Instituto de Molina, Santiago (Chile); MHNS: Museo Nacional de Historia Natural, Santiago (Chile); MHNP: Muséum National d'Histoire Naturelle, Paris (France); NRS: Naturhistoriska Riksmuseet, Stockholm (Sweden); USNM: National Museum of Natural History, Smithsonian Institution, Washington (USA); ZMUC: Zoologisk Museum, Universitets Copenhagen, (Denmark).

### GENUS *PSEUDOLUCIA* NABOKOV, 1945

The genus *Pseudolucia* was erected by NABOKOV with type species *Lycaena chilensis* BLANCHARD, 1852 and including a second species, *Lycaena collina* PHILIPPI, 1859 (NABOKOV 1945). The genus was then by and large forgotten, with subsequent synoptic papers, such as DESCIMON (1986) and ETSCHEVERRY (1989), not even mentioning it. Finally, in the last decade of the 20th century, old and new material representing the genus was accumulated and the genus became the focus of significant lepidopterological research (see BÁLINT & JOHNSON 1995c: 212–216). However, subsequent efforts by the present authors have amassed even more historical and new material of *Pseudolucia* (Table 1) and these data point to still more substantial discoveries regarding this diverse genus. The subject of the present paper regards two of the five species groups now recognized in the genus. A brief general overview of *Pseudolucia* is first given below.

The monophyly of *Pseudolucia* is based on the following consilience of characters: Female genital ductus bursae eversible, ostia membranous with sclerotized parts or heavily sclerotized with a central tubular structure. Although a long eversible ductus bursae can also be generally observed in some taxa of two other polyommata sections, the sections *Eichochochrysops* (sensu ELIOT 1973: 448) and *Nabokovia* (BÁLINT & JOHNSON 1997: 24), there it is considerably wider with a uniquely shaped anterior lamella (in *Eichochochrysops*) or thin and very long with a simple tubular ostium (in *Nabokovia*).

**Table 1.** Historical overview of material examined by NABOKOV (1945), BÁLINT (1993), new HNHM material and coll. BENYAMINI

	NABOKOV	BÁLINT	HNHM	coll. BENYAMINI
number of taxa	2	8	28	37
number of individuals	6	191	229	631 + 376

We hypothesize that the sister group of *Pseudolucia* is the *Nabokovia* genus-group (genera *Echinargus* NABOKOV, 1945 and *Nabokovia* HEMMING, 1961), based on the fact that the female genital ostium of the most isolated, and presumably most basal, *Pseudolucia* species are tubular, as in the females of *Nabokovia* and certain *Echinargus* (see Figs 55–58). This trait appears to be basally synapomorphic for the two lineages.

BALLETTO (1993) erected several genera for taxa we include in *Pseudolucia*. The senior author has previously synonymized these generic names with *Pseudolucia* (BÁLINT 1995) because, at the generic level for such a broadly homogeneous assemblage, he believes, monophyly serves taxonomic stability better than splitting.

Accordingly, the present paper also declines to apply the generic names proposed by BALLETO as interpolated subgeneric names. This is because (1) subgenera are often casually elevated to the generic level by lepidopterists who only focus on continentally restricted (or other) faunas of limited geographic distribution and (2) several of the names were also objectively invalid according to the International Commission on Zoological Nomenclature Code (see BÁLINT 1995). In this regard, a review of the genera erected by BALLETO (1993) is instructive:

BALLETO's genus *Facula* is monotypic, with its type species *Cupido sibylla* KIRBY, 1871. The female of *sibylla* possesses a sclerotized genital ostium comprised of a laterally pointed tube and males have a membranous genital sagum, both of these characters are qualitatively identical with structures of *Pseudolucia plumbea* (BUTLER, 1881) and its relatives.

BALLETO's genus *Cherchiella* was erected with the type species *Lycaena grata* KÖHLER, 1934 and with following taxa included within it: *Lycaena andina* BARTLETT-CALVERT, 1894, *Cherchiella argentina* BALLETO, 1993, *Lycaena patago* MABILLE, 1890, *Scolitantides plumbea* BUTLER, 1881 and *Cherchiella scintilla* BALLETO, 1993. According to our results these taxa belong to three different species groups of *Pseudolucia* (see below and BÁLINT & BENYAMINI, in prep.) with the type species belonging to the *plumbea*-species group (whose species have structural characteristics identical with those of BALLETO's *Facula*). Consequently we consider *Cherchiella* to be a junior subjective synonym of *Facula* (see also BÁLINT 1995: 7–8).

BALLETO's genus *Pallidula* was also monotypic, with the type species *Pallidula vicunha* BALLETO, 1993. The genus is objectively invalid because it was introduced explicitly as an adjective (see International Commission on Zoological Nomenclature 1999: 13, Art 11.8). Moreover, it is objectively synonymous with *Pseudolucia* because the type species, *Pallidula vichuna* BALLETO, 1993 is a junior subjective synonym of *Lycaena chilensis* BLANCHARD, 1852, the type species of the two genera being identical (BÁLINT 1995: 8).

Key to the species groups of the genus *Pseudolucia*  
based on male and female genital characters

- 1 Male genital uncus horse-shoe shaped, male aedeagus with very short (less than 0.1 subzonal length) suprazonal element, female genital ostium membranous (*collina* and *chilensis* species-groups) 2
- Male genital uncus pointed, male aedeagus suprazonal element longer (than 0.3 subzonal length), female genital ostium heavily sclerotized (*andina*, *plumbea* and *charlotte* species-groups) 3
- 2 Male genital aedeagus with pointed suprazonal element, female genital ostium pointed in dorsal view *collina* species-group
- Male genital aedeagus with stout suprazonal element, female genital ostium not pointed in dorsal view *chilensis* species-group
- 3 Male genital uncus with concave outer margin, sagum strongly sclerotized around aedeagus, female genital ostium sclerotized with narrow central tube with wide lateral opening *charlotte* species-group
- Male genital uncus with convex outer margin, sagum sclerotized or membranous around aedeagus, female genital ostium with wide central tube (*andina* and *plumbea* species-groups) 4
- 4 Male genital sagum with sclerotized anal edges and bristles, valval costa highly convex without brokening angle, female genital ostium with very wide central tube *andina* species-group
- Male genital sagum membranous, valval costa slightly convex and broken in wide obtuse angle, female genital sagum with wide central tube laterally pointing *plumbea* species-group

THE *CHILENSIS* SPECIES-GROUP

The monophyly of the species-group is based on the following characters: (1) male genital aedeagus with stout suprazonal element; (2) female genital fibula membranous with central sclerotized element quadrant shaped in dorsal view and (3) larval host is Cuscutacea, the exceptional host plant of *P. chilensis* may also be indicative for this species group. At present three species are known; each of them represents an endemic of limited distribution, isolated either on the western or eastern side of the Andes, or in SE Brazil.

Key to the species of the *chilensis* species-group

- 1 Forewing ventrum with basal and median area orange or yellowish coloured (*P. chilensis*, *P. jujuyensis*) 2
- Forewing ventrum without basal or median orange colour (Figs 1–2)  
*P. parana*
- 2 Forewing ventrum with basal and median area orange coloured (Figs 3–6)  
*P. chilensis*
- Forewing ventrum basal and median area yellowish grey or beige (Figs 7–8)  
*P. jujuyensis*

*Pseudolucia parana* BÁLINT, 1993  
(Figs 1–2)

*Lycaena griqua* – SCHAUS 1902: 24; homonym of *Lycaena griqua* TRIMEN, 1887; type locality: BRAZIL, Paraná, Castro (USNH holotype, #5919)

*Pseudolucia paraná* – BÁLINT 1993: 17; replacement name of *Lycaena griqua* SCHAUS, 1902.

*Distribution* – Brazil: state Paraná.

*Larval hosts* – Unknown.

*Material examined* – 14 males, 2 females (see BÁLINT *et al.* 2000), more recent material was not found. Genital dissections: Brit. Mus. slide Nos. 19110, 19111 (males); Nos 569, 570 (males), 971 (female).

*Pseudolucia chilensis* (BLANCHARD, 1852)  
(Figs 3–6)

*Lycaena chilensis* – BLANCHARD, 1852: 7; type locality: CHILE, Coquimbo (MHNP lectotype female, designated by BÁLINT 1993: 17, fig. 125, examined).

*Polyommatus atahualpa* – WALLENGREN 1860: 37, junior subjective synonym; *type locality*: CHILE, Valparaíso (NRS lectotype female, designated by BÁLINT 1993: 17, fig. 56 examined).

*Pallidula vicunha* – BALLETTTO, 1993: 239 (*Pallidula*), junior subjective synonym; *type locality*: CHILE, Vicuña (MHNS holotype male, examined).

*Distribution* – Chile, Central Pacific coast to lower Andes at 2000 m.\*

*Larval hosts* – *Cuscuta micrantha*, *C. racemosa* (Cuscutaceae) (BENYAMINI 1995); possibly all *Cuscuta* in Chile.

\* The occurrence in Peru (see BÁLINT *et al.* 2000: 169, footnote) is not confirmed.

*Material examined* – 93 males, 52 females (see BÁLINT *et al.* 2000). Genital dissections: Nos 227, 349 (females); 895, 897 (males).

*Identity of *Pallidula vicunha** – The monotypic genus *Pallidula* was erected by BALLETO for a new species *Pallidula vicunha* (BALLETO 1993: 238–139) described from a holotype male (Chile, La Serena), plus five males and two female paratype specimens (all from Chile). Figures did not accompany the description. The senior author suggested that *Pallidula* and *Pseudolucia* are objective synonyms (BÁLINT 1995: 3 and 8, and see also above). These were subjective assumptions, however, based on BALLETO's description, because the senior author could not then examine the type of *Pallidula vicunha* first hand.

The junior author accomplished this examination when he visited the collections of MHNS on 12.I.1999. He photographed the type material and sent colour glossy photos to the senior author (Fig. 51). The holotype of *Pallidula vicunha* is indistinguishable from *Lycaena chilensis*; accordingly, the subjective synonymy of the senior author suggested in 1995 is objectively confirmed.

*Pseudolucia jujuyensis* BÁLINT, JOHNSON et EISELE, 2000  
(Figs 7–8)

*Pseudolucia jujuyensis* – BÁLINT *et al.* 2000: 166; type locality: ARGENTINA, Prov. Jujuy, Dept. Humhuaca, Coraya, 3500 m (AME holotype male, examined).

*Distribution* – Argentina: province Jujuy.

*Larval host* – Unknown.

*Material examined* – 1 male (see BÁLINT *et al.* 2000), more recent material was not found. Genital dissection: No. 896 (holotype male).

*Probably occurrence of *P. jujuyensis* in Chile* – There are several Trans-andean *Pseudolucia* species which occur both in Chile and Argentina (see eg. *P. collina*, *P. shapiro* and *P. tamara* below). Therefore we also mention *P. jujuyensis* as a potential species for the Chilean fauna especially since the Andean fauna of NE Chile, adjacent to the type locality of *P. jujuyensis*, is poorly explored lepidopterologically (SHAPIRO 1991).

#### THE *COLLINA* SPECIES-GROUP

The *collina* species-group, as interpreted herein, differs from our previous view (cf. BÁLINT & JOHNSON 1993, 1995*b*). Therein, we formerly considered cer-

tain externally *collina*-like taxa not monophyletic because of what appeared to be tremendous morphological heterogeneity. However, extensive new material (cf. Table 1.) has revealed the intermedial character states allowing a view that this diverse morphology is indeed homologous at base and that the externally *collina*-like taxa do form a monophyletic group. This group, herein called the *collina* species-group, includes the previously constructed *benyamini*, *collina*, *lyrnessa* species-groups. Its monophyly is supported by the following shared characters: (1) male genital uncus horseshoe-shaped; (2) male genital aedeagus with very short supra-zonal element and (3) female genital ostium membranous with sclerotized edges at the vaginal opening (such that, if the entire ostium is sclerotized slightly, it shows a bifurcate structure in lateral view). This monophyly is also supported by the fact that larvae of all these species are breed or feed on the Portulacaceae genus *Montiopsis* (subgenus *Calandrinia*) and the Polygonaceae genus *Chorizanthe* (BENYAMINI 1995 and Appendix II below).

Key to the species of the *collina* species-group occurring in Chile and Argentina based on hindwing ventral markings

- |   |   |                    |
|---|---|--------------------|
| 1 | Horizontal median marking elements lineal ( <i>P. collina</i> , <i>P. humberi</i> , <i>P. shapiroï</i> , <i>P. tamara</i> and <i>P. vera</i> )    | 2                  |
| – | Horizontal median marking elements lorate ( <i>P. benyamini</i> , <i>P. dubi</i> , <i>P. oraria</i> , <i>P. scintilla</i> and <i>P. ugartei</i> ) | 6                  |
| 2 | Median line generally continuous with conspicuous black tornal spot in cell CuA2 ( <i>P. collina</i> , <i>P. humberi</i> and <i>P. shapiroï</i> ) | 3                  |
| – | Median line interrupted with less prominent tornal spot in cell CuA2 ( <i>P. vera</i> and <i>P. tamara</i> )                                      | 5                  |
| 3 | Tornal spot in cell CuA2 rounded (Figs 9–12)  | <i>P. collina</i>  |
| – | Tornal spot in cell CuA2 lineal or triangular ( <i>P. humberi</i> , and <i>P. shapiroï</i> )  | 4                  |
| 4 | Tornal spot in cell CuA2 lineal (Figs 13–14)  | <i>P. shapiroï</i> |
| – | Tornal spot in cell CuA2 triangular (Figs 15–16)  | <i>P. humberi</i>  |
| 5 | Postbasal spot in cell Sc+R1 three times smaller than postmedian spot in cell Sc R1 (Figs 17–20)  | <i>P. tamara</i>   |
| – | Postbasal spot in cell Sc+R1 two smaller than postmedian spot in cell Sc R1 or equal in size (Figs 21–24)   | <i>P. vera</i>     |

- 6 Postbasal spots equal in size (*P. benyamini* and *P. dubi*) 9
- Postbasal spots not equal in size (*P. scintilla*, *P. oraria* and *P. ugartei*) 7
- 7 Postbasal spot in discal cell larger than postbasal spot in cell Sc+R1 (Figs 25–32) *P. scintilla*
- Postbasal spot in discal cell not larger than postbasal spot in cell Sc+R1 (*P. oraria* and *P. ugartei*) 8
- 8 Postbasal and postmedian spots equal in size in cell Sc+R1 (Figs 33–36) *P. oraria*
- Postbasal spot in cell Sc+R1 smaller in size than postmedian spot in cell Sc+R1 (Figs 37–40) *P. ugartei*
- 9 Postbasal spot in cell Sc+R1 pararellogrammic (Figs 41–44) *P. benyamini*
- Postbasal spot in cell Sc+R1 rounded (Figs 45–50) *P. dubi*

*Pseudolucia collina* (PHILIPPI, 1959)  
(Figs 9–12)

*Lycaena collina* – PHILIPPI, 1859: 1093; type locality: CHILE, Metropolitana Santiago (HNHM Neotype male, designated below).

*Lycaena collina* – PHILIPPI, 1860: 270; redescription; type locality: CHILE, in the hills around Santiago.

*Lycaena lyrnessa* – HEWITSON, 1874: 107, junior subjective synonym of *collina*; type locality: CHILE, Santiago (BMNH Lectotype male, designated by BÁLINT 1993: 18, examined).

*Pseudolucia collina* – NABOKOV 1945: 34, fig. COL, pls 5, 7; revision.

*Pseudolucia zembla* – BÁLINT & JOHNSON 1993: 6, junior subjective synonym; type locality: CHILE, Reg. Ñuble, 9 km N of Los Trancas (IMS holotype male, not examined).

*Distribution* – Chile: regions Metropolitana, Rancagua, and Maule. Argentina: provinces Lago Aluminé and Neuquén.

*Larval hosts* – *Montiopsis capitata*, *M. discolor*, *M. gayana*, *M. gilliesii*, *M. sericea* and *M. trifida* (Portulacaceae) and *Chorizanthe vaginata* (Polygonaceae) (BENYAMINI 1995).

*Material examined* – 2 males, 1 female: prov. Ñuble, 3 km N. Las Trancas, 15.I.1967, L. Stange; (HNHM, *P. zembla* paratypes). 1 male, 1 female: Concepción, 30.XI.1907, P. Herbst. 2 males, 2 females: Reg. Maule, Constitución, sea level, 2.II.1995, leg. Dubi Benyamini. 1 female: Santiago, San José de Maipo, 800 m, 30.IX.1994., leg. Dubi Benyamini (plus see Appendix I). Genital dissections: Nos 234 (male); 553, 581 (females).

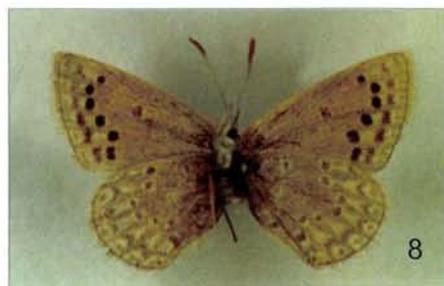
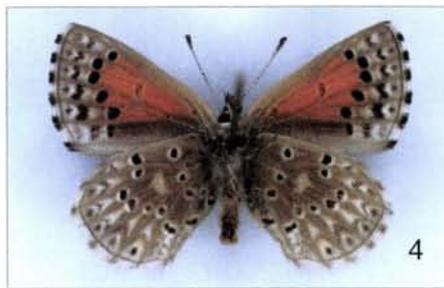
*Neotype selection of Lycaena collina* – The taxon “*Lycaena collina*” was described from an unstated number of male specimens from the hills around Santiago (“In collibus prope Santiago legi”, see PHILIPPI 1860: 270). No figures were provided and no original PHILIPPI material is currently known to exist. Thus, given the diversity of *collina*-like taxa in Chile the identity of the taxon requires clarification.

“*Lycaena collina*” was regarded as bona fide species, listed in the combination “*Scolitantides collina*”, with a junior synonymy “*Lycaena lyrnessa*”, by DRAUDT (1921: 822). The taxon “*Lycaena lyrnessa*” was described from an unstated number of male specimens from Chile by HEWITSON (1874: 107). NABOKOV, when erecting the genus *Pseudolucia*, redescribed the taxon *Lycaena collina* and placed it in his new genus as “*Pseudolucia collina* Philippi”. Indeed, NABOKOV’s description matches with the taxon described by HEWITSON, thus supporting DRAUDT’s synonymy. NABOKOV’s view is also supported by historical material. There is one male specimen located in the BMNH collection which originates from HEWITSON’s work and it has been designated as lectotype (cf. BÁLINT 1999: 43, pl II, figs 33–36). NABOKOV also described the “*collina*” female and figured its genital structure. It does not show the bifurcate shape in lateral view thought to be characteristic of *collina* by BÁLINT & JOHNSON (1993: 5), but the simple “winged” tubular habitus mentioned for *P. zembla* BÁLINT et JOHNSON, 1993 (later placed as a junior subjective synonym of “*Lycaena lyrnessa*”, see BÁLINT 1995: 7). Accordingly, the taxon *Pseudolucia collina* reviewed first by NABOKOV (1945: 34–36) is not identical with the taxon discussed as *Pseudolucia collina* by BÁLINT & JOHNSON (1993: 5). The consequences of this situation are the followings:

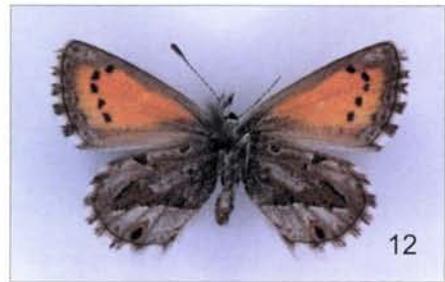
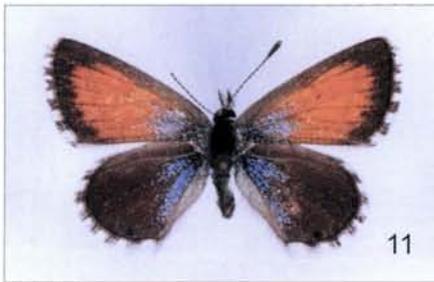
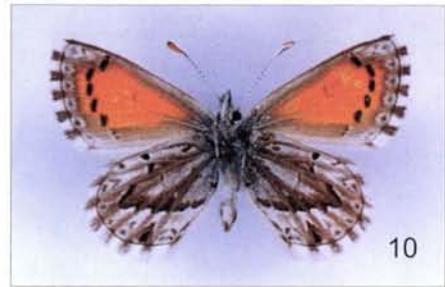
Since *collina*-like taxa show great structural and ecological diversity in Chile, it is necessary to objectively fix the identity of *Lycaena collina* by Neotype selection. This should be a female specimen because the male genital structures of species level differ quantitatively but not qualitatively, whilst the female genital structures differ qualitatively.

The female specimen from “Penco, Chile” ex coll. WEEKS (deposited in Museum of Comparative Zoology, Harvard University) with gen. prep. No. 591 of NABOKOV, examined, described and figured as *Pseudolucia collina* by NABOKOV (1945: 34–36 (discussion), figs as COL on p. 58, pl. 7, female genital structures) cannot be selected as Neotype, because the origin of the specimen is about 400 kms south from Santiago, near Concepción, where the material of PHILIPPI was collected.

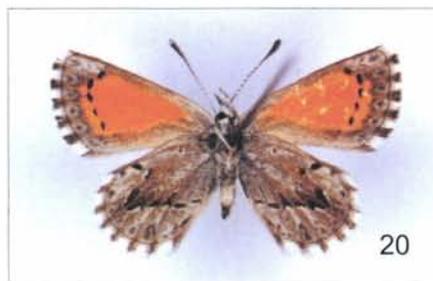
Therefore, we select here the female specimen with the labels: “San José de Maipo/Santiago, Chile/800 m 30.9.1994/ Leg. Dubi Benyamini female”; “gen. prep. No. 553, Zs. Bálint”, deposited in HNHM. We add the red-bordered label “Neotypus [printed], *Lycaena collina* Philippi; [♀:] des. by Zs. Bálint and D.



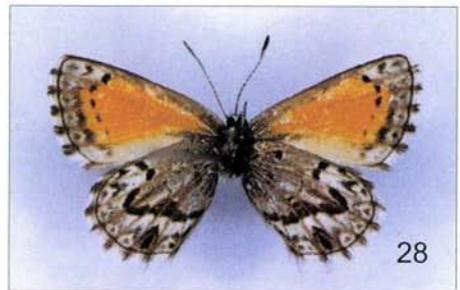
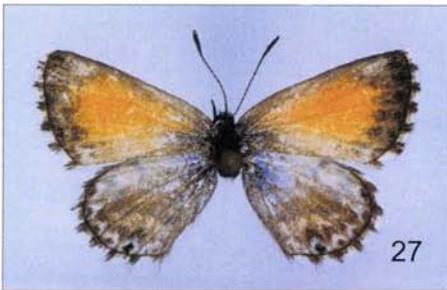
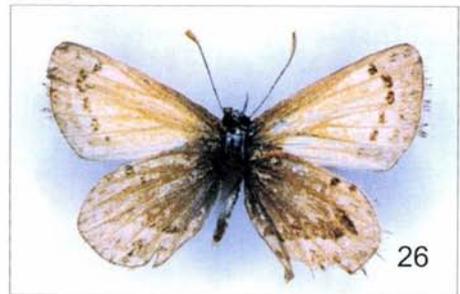
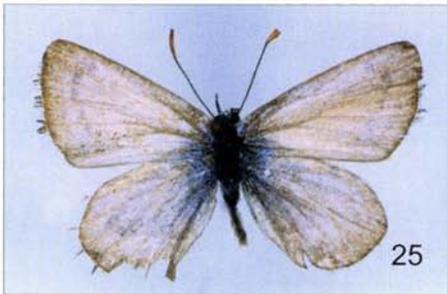
**Figs 1–8.** *Pseudolucia* imagines. 1–2 = *P. parana* BÁLINT: 1 = male (BMNH) topotype, dorsum, 2 = ditto, ventrum; 3–6 = *P. chilensis* (BLANCHARD): 3 = male (coll. BENYAMINI), Chacabuco, 1150 m, Chile, dorsum, 4 = ditto, ventrum, 5 = female (coll. BENYAMINI), Totoralillo, sea level, Chile, dorsum, 6 = ventrum; 7–8 = *P. jujuyensis* BÁLINT, JOHNSON et EISELE, 7 = holotype (AME), dorsum, 8 = ditto, ventrum



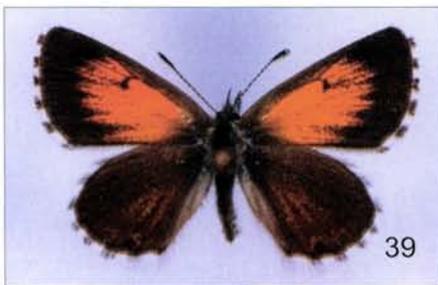
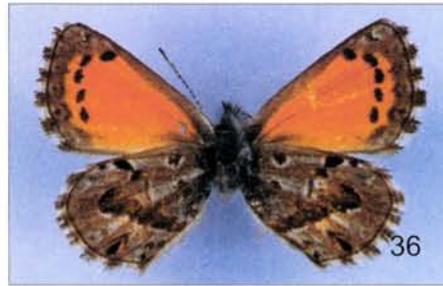
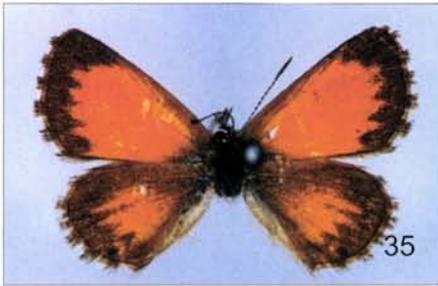
**Figs 9–16.** *Pseudolucia* imagines. 9–12 = *P. collina* (PHILIPPI): 9 = male (coll. BENYAMINI), ex larva, San José de Maipo, Chile, dorsum, 10 = ditto, ventrum, 11 = female (coll. BENYAMINI), ex larva, Parc Nacional El Morado, Maipo, 1850 m, Chile, dorsum, 12 = ditto, ventrum; 13–14 = *P. shapirooi* BÁLINT et JOHNSON: 13 = holotype (AMNH), 14 = ditto, ventrum; 15–16 = *P. humberi* BÁLINT et JOHNSON: 15 = holotype (ZMUK), dorsum, 16 = ditto, ventrum



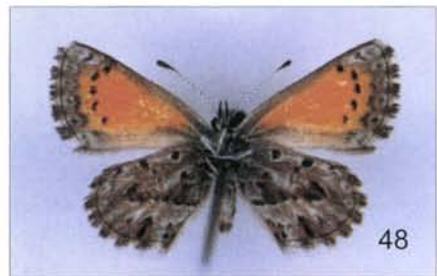
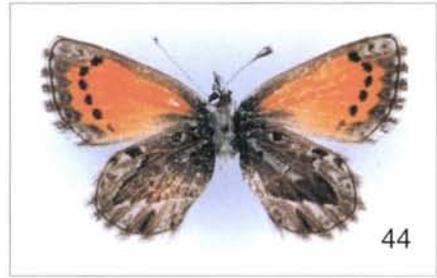
**Figs 17–24.** *Pseudolucia* imagines. 17–20 = *P. tamara* BÁLINT et JOHNSON: 17 = male (coll. BENYAMINI), Río Limay, Confluencia, 665 m, Neuquén, Argentina, dorsum, 18 = ditto, ventrum, 19 = female (coll. BENYAMINI), ditto, dorsum, 20 = ditto, ventrum; 21–24 = *P. vera* BÁLINT et JOHNSON: 21 = male (coll. BENYAMINI), Volcano Longimay, 1100 m, Chile, dorsum, 22 = ditto, ventrum, 23 = female (coll. BENYAMINI), Volcano Llaima, 1200–1400 m, Chile, dorsum, 24 = ditto, ventrum



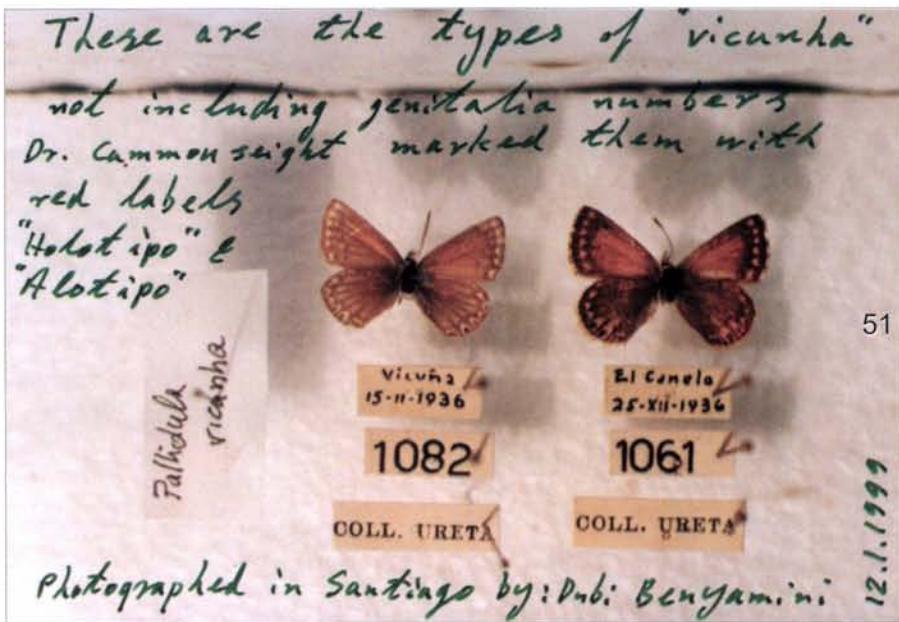
**Figs 25–32.** *Pseudolucia scintilla* (BALLETO): 25 = male (coll. BENYAMINI), 20 km North of Caren, 2500 m, Chile, dorsum, 26 = ditto, ventrum, 27 = female (coll. BENYAMINI), Cespedes, Illapel, Choapa, Chile, dorsum, 28 = ditto, ventrum, 29 = holotype male (MNHS), dorsum, 30 = ditto, ventrum, 31 = paratype (“allotype”) female (MNHS), dorsum, 32 = ditto, ventrum



**Figs 33–40.** *Pseudolucia* imagines. 33–36 = *P. oraria* sp. n.: 33 = holotype (CUC), dorsum, 34 = ditto, ventrum, 35 = paratype female (CUC), leg. WAGENKNECHT, dorsum, 36 = ditto, ventrum; 37–40: *P. ugartei* sp. n.: 37 = paratype male (coll. BENYAMINI), Cuesta la Dormida, Quillota Valparaíso, 1350 m, Chile, dorsum, 38 = ventrum, 39 = paratype female (coll. BENYAMINI), ex larva, dorsum, 40 = ditto, ventrum



**Figs 41–48.** *Pseudolucia* imagines. 41–44 = *P. benyamini* BÁLINT et JOHNSON: 41 = male (coll. BENYAMINI), Concon, Valparaiso, 50 m, Chile, dorsum, 42 = ditto, ventrum, 43 = female (coll. BENYAMINI), topotype, dorsum, 44 = ditto, ventrum; 45–50 = *P. dubi* n. sp.: 45 = paratype male (coll. BENYAMINI), Cerro la Virgen, Illapel, Coquimbo, 2200 m, dorsum, 46 = ditto, ventrum, 47 = paratype female (coll. BENYAMINI), ex larva, El Chacay, Los Pelambres, Illapel, Coquimbo, 1800 m, dorsum, 48 = ditto, ventrum



Figs 49–53. 49–50 = *Pseudolucia dubi* n. sp.: 49 = holotype (HNHM), dorsum, 50 = ditto, ventrum; 51 = the MHNS holotype (left) and "allotype" (right) specimen of *Pallidula vicunha* BALLETO as documented *in situ* by BENYAMINI; 52–54 = *Pseudolucia collina* (PHILIPPI), 52 = neotype (HNHM), dorsum, 53 = ditto, ventrum

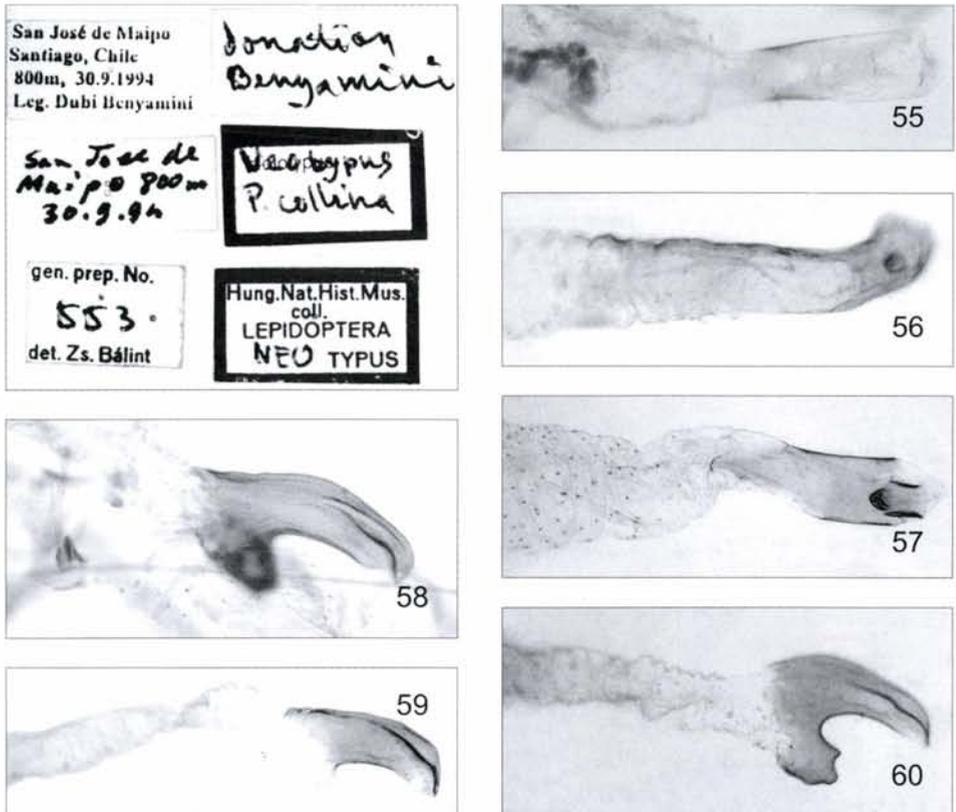
Benyamini, 2000.II.21, Budapest, Hungary". This action objectively stabilizes the identity of *Lycaena collina*. The specimen is documented here in Figs 52–54.

As a result, the taxon with bifurcate female genitalia characterized as *Pseudolucia collina* by BÁLINT & JOHNSON (1993: 5) would be without applicable scientific name except that we have provided for that purpose the description of *Pseudolucia dubi*.

*Pseudolucia shapiro* BÁLINT et JOHNSON, 1995

(Figs 13–14)

*Pseudolucia shapiro* – BÁLINT & JOHNSON 1995a: 17, type locality: ARGENTINA: Prov. Mendoza, Valle de Las Leñas, ca. 7000 ft (AMNH holotype female, examined)



Figs 54–60. Top left (54) = labels of the *Pseudolucia collina* neotype specimen; Female genital structures: everted ductus bursae with ostium in lateral view: 55 = *Nabokovia faga* (DOGNIN), 56 = *Pseudolucia parana* BÁLINT, 57 = *P. chilensis* (BLANCHARD), 58 = *P. oraria* sp. n., 59 = *P. ugartei* sp. n., 60 = *P. dubi* sp. n.

*Distribution* – Chile: region Coquimbo (?); Argentina: province Mendoza.

*Larval host* – Unknown.

*Material examined* – See Appendix I. Genital dissection: No. 759 (female).

*Occurrence in Chile* – The taxon was described from a single female collected on the eastern (Argentine) side of the Andes. A new, Chilean, specimen shows closely similar wing pattern and genital morphology and is therefore tentatively identified as *P. shapiro*.

This second known female was collected in Tongoy, central coast of Region Coquimbo, Chile on 4.I.1992, leg. P. MAZRY (coll. BENYAMINI). During numerous visits to the region, the junior author could not find additional adults of “*P. shapiro*” at this locality. Only *P. dubi* was present.

The type locality of *P. shapiro*, in Valle de Las Leñas, Argentina was visited by the junior author between 17–19.12.1999. During these three days not a single *P. shapiro* was observed; however, at 1900 m a few *Montiopsis gilliesii* and one *M. cistiflora* were found concentrated within a rather level 10x10m area. These suspected foodplants were searched carefully for eggs but none were found. The dominant plant here, large *Adesmia* bushes, are the home of an undescribed *Pseudolucia* species of the *plumbea*-group and the hairstreak (Eumaeini) *Heoda nivea* JOHNSON, MILLER et HERRERA, 1992.

Obviously, both in Argentina and Chile *P. shapiro* appears to be very rare. This circumstance might suggest either that *P. shapiro* is actually rare aberration rather than a bona fide species, or, if a valid species, indeed very rare or even endangered. This matter deserves thorough study, however, because specimens identified as *P. shapiro* are outstanding in their external appearance, so much so that the initial Argentine specimen was first misidentified as to its sex (BÁLINT, BENYAMINI and JOHNSON, *in press*). Further, specimens known to date seem to show a consistent morphology.

### *Pseudolucia humbert* BÁLINT et JOHNSON, 1995

(Figs 13–14)

*Pseudolucia humbert* – BÁLINT & JOHNSON 1995a: 16, type locality: ARGENTINA: Prov. Salta, Rosario de la Frontera, Los Baños (ZMUC holotype female, examined)

*Distribution* – Argentina: province Salta.

*Larval host* – Unknown.

*Material examined* – No recent material is available.

*Pseudolucia tamara* BÁLINT et JOHNSON, 1995  
(Figs 17–20)

*Pseudolucia tamara* – BÁLINT & JOHNSON 1995a: 20; type locality: ARGENTINA: Prov. Neuquén, Lago Tromen, 1000–1100 m (ZMUC holotype male, examined).

*Distribution* – Chile: region de la Araucanía, Argentina: province Neuquén.

*Larval host* – *Montiopsis conferta*, *M. umbellata* (Portulacaceae).

*Material examined* – 1 male, Argentina, Neuquén, Rio Traful, 13 km W Confluencia, 836 m, 21.XII.1999, leg. Dubi Benyamini (plus see Appendix I). Genital dissections: Nos 939 (male), 940 (female).

*Deposition of the holotype* – The original description mistakenly gives the HNHM as depository. The specimen is deposited at ZMUC.

*Occurrence in Chile* – Three suspected males were located by the junior author in the PEÑA collection. These were collected in December 1993 by HERNAN NAVARET at Contraco, Malleco, Region de la Araucanía. Two abdomens were excised, catalogued, and forwarded to Budapest (ref. Number 36). The senior author identified them as *P. tamara*. It is hoped that location of female specimens can also further confirm this identification.

*The habitat* – The species is extremely local, occurring immediately on or around larval foodplants. On 20.12.1999 the species was located at two localities:

a) 13 km NW Confluencia, Neuquén, Argentina, 836 m, on a eleveant sandy bank along a small rivulet of the Rio Traful near the dirt road from Paso del Cordoba to Confluencia. The host plants were growing 2.5 to 5 meters from the rivulet.

b) In Confluencia, the type locality, not a single specimen was found. However, further search along the Rio Limay towards San Carlos de Bariloche was successful, with discovery of adults 1.2 km from Confluencia (15 m from Rio Limay) in a small stand of *Montiopsis* sp. The biotope is a tiny stoney alluvial hammock at 665 m with a sandy bank descending to the river.

*Adult behaviour* – On the banks of the Rio Traful males were flying near their host plants, landing on adjacent dry stems of Poaceae, or other small dry, fallen stems. When sitting, they rub their closed hindwings slowly opposite one another, and sometimes open the wings slightly, or up to 45 degrees. Small white flowers of *Nassauvia aculeata* (Asteraceae) served as a nectar source. The males seem to play territorial “games” – a male flies toward another’s territory and is attacked by the “defender”. They circulate in the air, round and round, up to 1.5 m above ground, and then return to their previous perches.

Near Rio Limay (Confluencia) females were flying very low, landing on the host plant for nectaring or to lay eggs. The females always sat with closed wings and never rubbed their hindwings together. Adults often drift over fifty meters

downwind from their hosts, seeming to return in the scent "trail" of the host plants. Flying amid scattered grassy areas they stop frequently for nectaring on yellow-white flowers of European introduced *Anthemis cotula* (Asteraceae). Males fly around the foodplants, circling and looking for females and then drift downwind suddenly, often tens of meters, only to return after 5 to 10 minutes. One small male landed on the host's flower, rubbed its hindwings slowly and remained motionless with closed wings. After few minutes it changed its position relative to the sun rays and opened its wings up to 15 degrees, apparently for thermal regulation.

*Early stages* – Eggs are typical white lycaenid in facies and laid among the young buds or calyxes. In Rio Trafal the host plant *Montiopsis umbellata* grows up to 20 cm high, whereas near Rio Limay the host is a prostrate plant *M. conferta*. Both plants are extremely local. Along hundreds of meters of the Rio Limay's western bank at the type locality, only a single stand of hosts was found. Inside it, an area of approximately 2x2 meters, were counted 17 stems of *M. conferta* plants, ranging from 3 cm to 10 cm in diameter, one with violet flowers and the other with mixed buds and flowers. This small concentrate of host plants attracted about ten adults. Two L<sub>3</sub> instar larvae were found on *M. conferta*, consuming the buds and flowers. They were 3 mm long with a red middorsal stripe margined by white, and also showing red and white sub-dorsal dashes with adjacent white slashes. The larvae were heavily setate with white setae and segments 4, 5 and 6 each had a dorsal white, caudally directed "hair". The posterior part of the lateral stripes was much wider after the 6th abdominal segment and also had peculiar elongate "tail-like" yellow marking running along its anterior. This yellow "tail" was present in all larvae eventually reared (four) and is possibly characteristic of *P. tamara*. The L<sub>5</sub> was 7.5 mm long and more reddish with the stripes along the side yellow. The DNO was visible from the L<sub>3</sub> to L<sub>5</sub> instars. The pre-pupa was 5.5 mm long reddish-brown with sub dorsal brown dashes. In the laboratory (in Israel) while rearing was going on, there was an incidental early January temperature drop to 4°C and the larvae began diapause under the paper liner at the bottom of the plastic rearing box.

*Pseudolucia vera* BÁLINT et JOHNSON, 1993  
(Figs 21–24)

*Pseudolucia vera* – BÁLINT & JOHNSON 1993: 15, type locality: CHILE: Reg. La Araucanía, Malleco, Malacahuello (IMS holotype male, examined).

*Distribution* – Chile: regions Bio-Bio, de la Araucanía, Malleco.

*Larval host* – *Montiopsis gayana* (Portulacaceae) (BENYAMINI 1995: 13).

*Material examined* – CHILE: 2 males, 2 females: Reg. de la Araucanía, Volcano Longuimay, 1100 m, 3.II.1995, leg. D. Benyamini (plus see Appendix I). Genital dissections: Nos 582 (female), 586 (male), 934–936 (females).

*Pseudolucia scintilla* (BALLETO, 1993)  
(Figs 25–32)

*Cherchiella scintilla* – BALLETO 1993: 238; type locality: CHILE: Reg. Coquimbo, Hacienda Illapel, 2500–2900 m (MHNS holotype male, examined).

*Distribution* – Chile: Reg. Coquimbo.

*Larval Host* – Unknown.

*Material examined* – One male: “20 km N of Illapel, Caren, Chile, 7.I.'95, 2500 m, leg. Benyamini”, gen. prep. No. 762, Bálint (HNHM from coll. BENYAMINI). One female: “Cespedes, Illapel, Choapa, Chile, 13. Octubre, '94, leg. Peña”, gen. prep. No. 761, BÁLINT (HNHM from coll. BENYAMINI) (plus see Appendix I).

*Notes* – The taxon was described from one male and one female collected by L. PEÑA at “Hacienda Illapel”, elevation of 2500–2900 (BALLETO 1993: 238). No figures accompanied the original description, the latter which is very general and, in light of currently known *Pseudolucia* diversity, quite confusing. This confusion resulted in the taxon *Pseudolucia kinbote* BÁLINT et JOHNSON, 1993 being erroneously regarded as junior synonym (BÁLINT 1995: 3). Again, the type material of *P. scintilla* was located, borrowed by the junior author, and brought to Budapest in the autumn of 1998 where the specimens were examined jointly by the co-authors and documented (Figs 29–32). The following comments and conclusions are relevant:

1) The taxa *scintilla* and *kinbote* are not synonymous (consequently: *Pseudolucia kinbote* status revised, see BÁLINT & BENYAMINI, in prep.).

2) The taxon *scintilla* belongs to the *collina* species-group of *Pseudolucia* and not to the *andina* species-group as was suspected previously.

3) The holotype of *scintilla* was not dissected, contrary to the original description of *Cherchiella* (cf. BALLETO 1993: 236).

4) Genitalia of the paratype female of *scintilla* shows the typical membranous female ostium with sclerotized edge, but without bifurcation. This suggests a sister relationship with the Argentine look-alike *Pseudolucia shapiro* BÁLINT et JOHNSON, 1995 (TL: Argentina, Las Leñas).

*The type locality* – Directions to the type locality were given to the junior author by the late LUIS PEÑA (“Lucho”). LUCHO noted he used to hire horses and ride “about 20 km North of Caren, Illapel”. Venturing there in January, 1995 the junior

author soon found out that only few people knew the actual location of Cespedes. Following LUCHO's directions he left Caren, travelling northeast along upper Rio Illapel, first through tiny Santa Virginia village and then paying "entrance fee" at the gate to the private valley of Cespedes. It is an isolated valley along the Rio Illapel in the foothills of the Andes. The elevation near the river is 1300 m (GPS reading). The sandy slopes around it are dominated by several species of *Adesmia* bushes, mostly less than one meter high and "shaped" by the heavy overgrazing. Two abandoned old mines are situated to the north and northeast of the valley. The junior author surveyed the areas thoroughly, even ascending the sandy slopes to the west of Cespedes. Here, at "La Olla" (2600–2900 m); on a green "vega" he collected the first specimens of *Pseudolucia asafi* (BENYAMINI, BÁLINT et JOHNSON, 1995). However, *P. scintilla* was not to be found. Between 1995 and 2000 a terrible drought affected most of central Coquimbo and this may account for the initial failures to relocate *P. scintilla* at Cespedes. Other *Pseudolucia* spp. recorded from Cespedes and surrounding slopes, however, included *P. chilensis*, *P. dubi*, *P. asafi* and *P. annamaria*.

Six years passed after the initial "confirmed" records of *P. scintilla* from Cespedes (13.X.1994, leg. PEÑA) and led the junior author to believe that the extreme drought (including even the Rio Illapel itself) had led to extinction of the species. However, the winter of 2000 broke all previous weather records for precipitation in the region; ample rain and snow occurred, even in coastal Coquimbo, surpassing recorded "El Niño" years. The six year "absence" of the species may be explainable by either a) we did not come in the right time (our visits were in mid summer months, whereas the species flies earlier, in the spring) or b) the species can stay in diapause several years.

*The biology of P. scintilla* – Available confirmed records suggest a single brood from October–November. The junior author recorded *Chorizanthe* aff. *densa* as the host plant of *P. dubi* in Cespedes (BENYAMINI 1995: 5); the possibility that it may also be the host for *P. scintilla* should be investigated.

***Pseudolucia oraria* BÁLINT et BENYAMINI, sp. n.**  
(Figs 33–36)

*Types* – Holotype male, deposited in CUC: Pan de Azucar, Atacama Pacific coast, Chile, 28.I.1946, leg. Wagenknecht; gen. prep. No. 632, Zs. Bálint. Paratype ("Allotype") female, deposited in CUC, with the data of holotype but collecting date 26.I.1946 and gen. prep. No. 631, Zs. Bálint. Paratype male, deposited in MHNS, with the data of holotype but collecting date 8.I.1949 and gen. prep. No. 617, Zs. Bálint. Paratype female, deposited in MHNS, with the data of holotype but collecting date 25.III.1949 and gen. prep. No. 618, Zs. Bálint. Paratype male and female, in coll. PEDRO

VIDAL (Santiago, Chile): Freirina, Huasco, Atacama, IX. 1984, leg. Barriga; gen. prep. Nos. 635 (male), 611 (female) Zs. Bálint. Paratype male, in coll. BENYAMINI (Bet Arye, Israel): 29 km N. Huasco, Atacama coast, 31.XII.1998., leg. Benyamini. 11 male and one female paratypes, in coll. BENYAMINI, 3.4 km N Huasco, Atacama Pacific coastal dunes, I.I.1999., leg. Benyamini. Paratype male, in HNHM with data of previous paratypes. Six paratype males, in coll. BENYAMINI, 35 km N Huasco, Atacama Pacific coastal dunes, 11.XII.1999, leg. Benyamini. Two female paratypes, in coll. BENYAMINI: 3.7 km N. Huasco, Atacama Pacific coastal dunes, 11.XII.1999, leg. Benyamini. One female paratype, in coll. HNHM, with data of the previous paratypes. One male paratype, in coll. BENYAMINI: Ex Larva, 3.7. km N. Huasco, Atacame Pacific coastal dunes, 30.XII.,1998, leg. Benyamini.

*Diagnosis* – Differing from closest *P. dubi*, ventral hindwing “U”-shaped band lineal, comprised of less mottled blackish to dark brown spots contrasting mottled and/or grizzled tawny basal ground colours. “U”-shaped band extending only to the edge of postmedian area as in *P. dubi*, offset by two prominent black spots costad and/or marginad in cells Sc+R1 and /or RS. Male valvae elongate but stronger than in *P. dubi*, aedeagus strong with short suprazonal element. Female genital terminalia bifurcate but with simple anal lobe.

*Description* – Male. Dorsal forewing, dorsal hindwing ground pale violet blue with thin black marginal border, dorsal hindwing with barely notable black eyespot at cell CuA1. Ventral forewing ground orange framed by submarginal tan to brown borders and with emphatic postmedial band of five black spots, discoidal line pale; ventral hindwing ground beige with “U”-shaped band comprised of coalescent, emphatically blackish, elements occurring in near perfect lineality, “U”-shaped band beginning narrowly at medial anal edge and extending more broadly to edge of postmedian area, offset by two prominent black spost costal and/or maginal in cells Sc+R1 and/or RS; submargin of cell CuA1 with black eyespots, reflected somewhat on the dorsal hindwing. Forewing length: 8.5 mm (holotype and paratype).

Male tergal morphology and genitalia. Sipc lacking. Genitalia with valvae shape elongate but robust, undulate along surfaces; terminal rostellum mildly recurvate with a ventrally directed hook; height of recurvation equal to the highest point of valval costa; aedeagus with very short and pointed suprazonal element, sagum strongly sclerotized.

Female. Similar to male on ventral forewing, ventral hindwing but dorsal forewing, dorsal hindwing marked buff yellow within wide submarginal brown borders. Forewing length: 8.5 mm (paratypes).

Female tergal morphology and genitalia (Fig. 58). Sipc with eighth tergite laterally robust, showing short robust ventrally-directed apodeme of triangulate shape. Genitalia with sclerotized terminalia bifurcate, appearing “C”-shaped in lateral view with simple ventral lobe and dorsal lobe dominant (three times longer).

*Larval hosts* – *Chorizanthe frankenoides* and *C. ramosissima* (Polygonaceae).

*Distribution* – Known only from the Pan de Azucar, Freirina and Pacific coastal Atacama desert north of Huasco. Dates on type specimens range from September to January.

*Remarks* – This taxon is the northern sister of *P. dubi*; it is relatively widely distributed in central Chile but therein confined to mountainous and colline regions. *P. dubi* is replaced along the Pacific coast by *P. benyamini* (see BENYAMINI 1995).

*Etymology* – Noun, with the meaning “the one, who lives on the coast”; in contrast to the sister *P. collina* (collina = the one, who lives in collines).

*Rediscovered habitats* – The holotype and paratype female (“allotype”), plus an other pair of paratypes, were collected in The National Cacti Coastal Park Pan de Azucar, Atacama 3rd region by the Chilean road engineer RUDOLFO WAGENKNECHT over fifty years ago. During numerous visits to the type locality, BENYAMINI could not find any trace of this species. Even in 1997, the last “El Niño” year when the Atacama Desert in Pan de Azucar was blooming the species was not found. Knowing that this *collina*-like species should be found on *Chorizanthe* (Polygonaceae) bushes was another reason for disappointment because no *Chorizanthe* was found in Pan de Azucar. During September of 1984 and 1987, JUAN E. BARRIGA, from Curico, Chile, collected single specimens in Freirina and Huasco along the southern Atacama Coast. BENYAMINI then visited this locality several times and also sought the advice of botanists. In a meeting with the Chilean botanist OTTO ZÖLLNER, the occurrence of a *Chorizanthe* species along the Atacama coast was confirmed as well. So, on December 31, 1998, BENYAMINI made a coastal survey from Huasco north some 50 kms to Carrizal Bajo. He crossed the Rio Vallenar and was going north when he first noticed yellowish-green *Chorizanthe* on a sand dune slope some 5 kms North of Huasco. These stands included three to ten plants each. However, no butterflies were found. Twenty-nine kms North of Huasco and about 250 meters from the coast line, some twenty stocks of *Chorizanthas* were observed along a roadside and, at 15:45 PM, a male *P. oraria* appeared, flying very low over the ground and around the foodplant. It landed on the ground with closed wings and was quickly collected.

Later, 35 kms North of Huasco, BENYAMINI located a flourishing habitat with hundreds of scattered *Chorizanthe* bushes on both sides of the access road. Cool western afternoon winds allowed collection of only two males of *P. oraria*. On January 1, 1999 an east-west coastal dune transect, 3.4 kms North of Rio Vallenar/Huasco, was explored. Here, the western slope of these sand dunes is about 1 km. from the Pacific Coast. Climbing up the first dune, BENYAMINI soon found hundreds of *Chorizanthe* bushes and a local colony of *P. oraria*. On this cool, partly cloudy day, a permanent westerly wind was blowing, becoming stronger towards the afternoon hours.

*Adult behaviour* – Adult activity was most pronounced inside shallow gullies and over the eastern slopes of the sand dunes. In these biotopes, which were partially protected from the wind, males were flying low, up to 10 cms over ground and vegetation. In the morning, they were seen patrolling relatively small territories of 3×3 meters, with this territory expanding during the warmer noon hours. In the early afternoon, with warm temperatures, the males were patrolling and “scanning” up and down the eastern slope of the sand dunes for some 25 meters. They would land on the edge of the foodplant and make a 270 degree turn, sitting head down with slightly opened or fully closed wings, rubbing their hind wings together rapidly. Only once was a male seen sitting with wings open at 45 degrees. Males were also landing quite often on dry branches of other plants adjacent *Chorizanthe* which were also common in the area, some of which reach up to 10 cm above the ground. These include large spiny cushions of *Adesmia littoralis* (Fabaceae), *Encelia oblongifolia* (Asteraceae) and the prostrate white flowering *Tiquilia* sp. (Boraginaceae). This last plant is also a preferred nectar source and frequented by *P. oraria* second only to the foodplant. Two patrolling males, which intercepted one another over the slope, started to fly in tight circles of some 40–50 mms in diameter, about 10–15 cms above the foodplants until one of them finally fled. Males were also seen basking in the morning, standing perpendicular to the sun with closed wings. In the hot early afternoon hours, however, they avoided the heat by sitting parallel to the sun rays.

Females were rarely seen and no mating or courtship behavior was observed.

At 10:45 am a female was observed flying very low over the ground. It landed on various plants and nectared on the white flowers of the foodplant. It opened its wings several times, some 45 degrees, to bask and was photographed in this pose. However, when it was disturbed by the camera and tried to escape, it was suddenly caught in air by a passing syrphid fly. A second female was collected over the foodplant and a final female was observed fluttering 1–2 cms over a foodplant. BENYAMINI quickly put his net over the entire plant but the female disappeared into it. The females are very cryptic and seldom fly; they usually sit motionless on the sand or on dry stems with closed wings.

*Early stages* – The known foodplants are *Chorizanthe frankenioides* (det. MELICA MUÑOZ) or *C. ramosissima*. They grow up to approximately 25cm high, and some 40 cm in diameter; the flowers are white in the southern part of the plant’s range and become more lilac northwards. Nine white, typical *collina*-like, eggs were found: eight empty ones with hatching holes, and one in tact. The eggs were laid mostly on the buds and calyx but one egg was found on the trunk about 3 mm under a bud.

A few buds had penetrating larval holes but no larvae were found.

On 11.XII.1999 the junior author returned to the coastal dunes 3.7 km North of Huasco. A second, continuously dry, winter did not help the condition of foodplants, which were green and blossoming only at their extremities with their bases black and dry. During this period, probably near the end of the second generation, more female of *P. oraria* were observed – usually sitting motionless with close wings on the sand or on dry fallen stems. One female was sipping nectar from a white flower of the dominant prostrate *Tiquila* plants. Sometimes, alighting females made a quarter turn and opened their wings slightly, or up to 45 degrees. Only once did a female moved its opened hind wings. All five females and three males observed were flying over the eastern (downwind) slope of the dunes.

North of Huasco 35 km, the foodplants were in far better condition but only seven males of *P. oraria* were observed. They were competing for perch sites with many wasps and flies and, proving quite inferior, could hardly get close to the *Chorizanthe* stems. On several occasions when the males succeeded in landing or began to hover over the foodplants, they were attacked by flies and disappeared rapidly, giving the flies and the entomologist no chance to catch or pursue them. This tactic of rapid disappearance possibly keeps their survival rate higher. When males landed, they did so with closed wings and always rubbing their hindwings together. During one and a half hour of wandering the dunes not a single female was observed.

At a dune area 3.7 km North of Huasco, 28 eggs were found, all laid on foodplant calyxes. The tiny white eggs are  $\pm 0.45$  mm in diameter. A young larva hatched five days after its egg was found and immediately entered the calyx from the side where it could feed protected from numerous small spiders which were also observed on the foodplants. An  $L_3$  larva was observed on a calyx sitting head down. It was smooth and cryptic, having the same light-green colour as the plant. This larva was 2.5 mm long, relatively flat but widening to the anterior and showed a Dorsal Nectar Organ (“DNO”). A somewhat larger, 3.0 mm long, larva was lighter green with a dorsal line of green, bordered by white trapezoidal markings. A fully grown, 5.5 mm, long larva was found feeding on the flowers. Its colour was light green with light lateral lines and a dorsal yellowish band; the head was light brown. The DNO was marked by a thin dark line in the shape of a parallelogram. Some mature larvae were red or pink with lateral white lines and subdorsal oblique dashes creating a zig-zag line on each side.

The prepupa, situated upside down, is 4.5 to 5.0 mm long, brown, with a dorsal reddish band bordered by light margins. The head appears to invaginate into the body. The fresh pupa had a light green head, brown thorax, greenish-brown wing cases and a dorsal red trapezoidal marking over its 4.0 mm long abdomen. From this pupa an adult male hatched after eleven days.

*Myrmecophily* – Only one ant species was found on a foodplant 29 km North of Huasco, possibly searching for larvae. It was determined by Dr. J. LATTKE to be *Camponotus morosus* (F. SMITH).

*Larval Protection* – Small webs observed amongst *Chorizante* flowers and calyxes suggest that larger larvae are not able to stay inside the plant calyxes, and instead, protect themselves against spiders and wasps by hiding inside protective weblike shelters. These webs are also possibly the places where autumnal larvae enter the diapause stage until spring.

*Enemies* – The most serious enemies of *P. oraria* appear to be numerous fast lizards, which were observed running beneath the foodplants. Other enemies are those listed above, the various species of flies and wasps, which are very active in the biotope.

*Conservation* – The species is presently rather local and rare, living in few disjunct localities along the Atacama Pacific coast north of Huasco. During one complete day at a biotope north of Huasco a total of only some 15 males and only three females were observed. The general condition of foodplants seems very poor. The on-going desiccation of the Chilean region is reflected in these tough succulent-like plants. Their trunks are black and carry dry leaves with only the plant canopy showing healthier yellowish-green leaves and flowers. The situation of other surrounding plants, including cacti, looks similar. More than anything else this may explain the retreat and disappearance of this species since RUDOLFO WAGENKNECHT collected his material fifty years ago.

### ***Pseudolucia ugartei* BÁLINT et BENYAMINI, sp. n.**

(Figs 37–40)

*Types* – Holotype male, deposited in HNHM: “Chile, Cuesta la Dormida, 1300 m, 17.X.1995, leg. Ugarte”. 1 male, 2 female paratypes, in coll. HNHM, with holotype data plus Bálint gen. prep. Nos 632 (male), 633 (female). 1 male paratype, in coll. HNHM: Chile, Cuesta la Dormida, 19.IX.1995, leg. Benyamini, Bálint gen. prep. No. 602. 2 male, 1 female paratypes, in coll. HNHM, with the same data as previous paratypes, but from 29.X.1995. 1 male, 1 female paratypes, in coll. HNHM: Chile, Tiltil, Cacabuco, X.1992, leg. Peña. 1 male, 1 female paratype, in coll. BENYAMINI: Chile, Cuesta la Dormida, 1350 m, 15.IX.1995, leg. A. Ugarte. 4 male paratypes, in coll. BENYAMINI, with the same data as previous paratypes, but from 1250 m, 19.IX.1995, leg. Benyamini. 2 male, 2 female paratypes, in coll. BENYAMINI, with the same data as previous paratypes, but from 1150 m, 8.X.1995. 3 male, 4 female paratypes, in coll. BENYAMINI, with the same data as previous paratypes, but from 1250 m, 29.X.1995 (1 male, 1 female will be deposited in MHNS and in BMNH, respectively). 1 male paratype, in coll. BENYAMINI, with the same data as previous paratypes, but from 1300 m. 3 male paratypes in coll. BENYAMINI, with the same data as previous paratype, but from 1350 m. 1 male paratype, in coll. BENYAMINI, with the same data as previous paratypes, but from 3.XI.1995, leg. A. Ugarte. 1 female paratype, in coll. BENYAMINI, with the same

data as previous paratype, but from 1200 m., 5.XI.1995, ex larva on *Montiopsis*, leg. D. Benyamini. 1 male, 1 female paratypes, in coll. UGARTE (Santiago): Chile, Cta. La Dormida, Chacabuco province, XII.1997, leg. Ugarte. 3 male, 9 female paratypes, in coll. UGARTE: Chile, Cerro El Roble, 1700 m, Chacabuco prov., 17.X.1992, leg. A. Ugarte (one female will be deposited in MHNS).

*Diagnosis* – Ventral hindwing with “U”-shaped band, contrasting congeners *dubi* and *oraria*, extending almost completely to wing margin and comprised of continuous elements angled from cell M1 to anal margin and offset by a single black spot in cell Sc+R1. Male superficially suggestive of *P. collina*, *P. benyamini* or *P. tamara*, but with dorsal forewing pale medial orange suffusion, resembling *P. charlotte*. Ventral hindwing marginal area without arrowhead-shaped intercellular patterns contrasting the immaculate ventral wing marginal area of *P. charlotte*. Male resembling congeners *collina* or *vera* but with aedeagus showing an even shorter suprazonal element than these latter; female *sipc* apodeme short, genital terminalia winged in but with very short and wide central element compared to *collina* or *vera*, and bifurcated from lateral view possessing minute ventral lobe.

*Description* – Male. Dorsal forewing, dorsal hindwing ground violet blue with thin dark marginal border; DFW with pale “burst” of orange medial suffusion; dorsal hindwing with black eyespot at cell CuA1 barely notable; ventral forewing ground pale orange, framed by prominent postmedial band of five black spots; distally with costa and submarginal areas emphatically bordered with grey; antimarginal area with inconspicuous polyommata pattern; ventral hindwing ground dark ash grey with outstanding “V”-shaped band comprised of continuously aligned black spots contrasting ground colour and extending to costa; submargin of cell CuA1 with prominent elongate black pattern; submargins and antimarginal area with vestigial markings or with no pattern. Forewing length: 7.00 mm (holotype), 6.5–7.5 mm (paratypes, n = 4).

Male tergal morphology and genitalia. Terminal tergite lacking *sipc*. Genitalia with valval shape very similar to that of *P. benyamini* or *P. collina*: hemielliptical and deeply sloped at the anterior after extreme production at Baird’s angulation; height of curvate terminal rostellum somewhat less than height of Baird’s angulation; uncus small, compressed and with strong apical sclerotization; gnathos less elongate and curved, barely extending the height of uncus; aedeagus slender with suprazonal element extremely short (1/5 aedeagus length); sagum somewhat shorter than aedeagus (4/5 aedeagus length) oviform, strong and serrate.

Female. Similar to male on ventral forewing, ventral hindwing but dorsal forewing, dorsal hindwing marked pale orange within wide brownish black submarginal borders. Forewing length: 6.8–7.5 mm (paratypes, n = 3).

Female tergal morphology and genitalia (Fig. 59). Eighth tergite modified to laterally robust *sipc* with short apodeme, apex rounded; genital terminalia weakly sclerotized, comprised of a very short tube, laterally with graded edge, dorsally with widely open terminus and in overall lateral view slightly declined and bifurcated with minute ventral lobe (dorsal lobe dominant, five times longer).

*Distribution* – Currently known from some colline habitats in central Chile in the heights of 1150–1700 m. The species was exclusively recorded from September to November.

*Larval hosts* – *Chorizanthe virgata* (Polygonaceae), *Montiopsis capitata* (Portulacaceae).

*Etymology* – The name is a patronym of Señor ALFREDO UGARTE (Santiago de Chile), who continues LUIS PEÑA's work in publications, descriptions of Chilean insects and supplying entomological material for institutes, museums and universities.

*Historical Background* – A male of an unidentifiable *Pseudolucia* was collected in "Tilttil/Cuesta la Dormida" by a Chilean University expedition in "1970–1972" and located in the national collection at Santiago by the junior author. It was then sent to Budapest where the senior author preliminarily suggested it might represent "*Pseudolucia charlotte*" BÁLINT et JOHNSON, 1993. Subsequently, the junior author began visiting Cuesta la Dormida frequently, beginning in mid-September 1995 and thereafter often in the company of ALFREDO UGARTE. Quite surprisingly, the entity collected at Cuesta la Dormida proved to be a new *P. benyamini*-like species.

*The type locality* – Cuesta la Dormida is a mountain pass through the coastal mountain chain ("Cordillera de la Costa"). An unpaved road connects Tilttil in Chacabuco Province of Santiago Metropolitan Region in the east to Olemu, Quillota Province of Valparaíso V. Region in the west. The top of the pass is at 1350 m on the southern slopes of the Cerro El Roble. From the top of the mountain one can usually view the endless low "carpet" clouds of the Pacific reaching the coastal mountain chain from the west. These "crawling" clouds ("camanchaga" in Mapuche Indian local language) cross the Cuesta la Dormida pass eastwards, the resulting humidity contributing to rich plant life. Zoogeographically, the area belongs to the Central Mediterranean Isolate (BENYAMINI 1995), which has the richest lycaenid fauna in Chile. Together with the presently described taxa this totals nine species. This high lycaenid diversity is paralleled in other groups of animals and plants from this unique zone (e.g. many ants and over 140 species of beetles are known from this locality and the Cerro El Roble [UGARTE, pers. comm.]). Cuesta la Dormida is already known to be the type locality of two other butterflies belonging to the family Lycaenidae: *Heoda shapiro* JOHNSON, 1992 and *Eiseliana probabila* JOHNSON, MILLER et HERRERA, 1992. Moreover it is actually now the only known place in Chile where "*Pseudolucia andina form horsti*" still survives. Unlike *P. ugartei* which lives on the western side of the pass (V. Region of Valparaíso), this species occurs on its eastern side near the top of the pass.

*Biology* – The first specimens of *P. ugartei* were collected between 15–19.IX. 1995 on the western part of the pass at Cuesta la Dormida between 1200 m and 1400 m near *Chorizanthe virgata* (det. OTTO ZÖLLNER). At this early time of spring *Chorizanth*es had green leaves but did not have buds or flowers. A female

was observed on 19.IX.95 at 1200 m walking on the stems of a *Chorizanthe* to lay eggs. This plant had a fresh bud stem with no buds, and the "frustrated" female searched several times along the stems but did not lay any eggs. On 8.X.1995 a search by the junior author for alternate foodplant was successful; eggs and larvae were found on *Montiopsis capitata* (Portulacaceae). Thus, like *P. collina* and *P. dubi*, this species uses two different plants at different time periods. The first generation, which emerges in August after winter larval diapause, will lay its eggs on *M. capitata*. This plant, which grows upwards to about 1250 m is replaced in the second generation by *C. virgata*, which grows from 1250 m to the top of the pass and starts to blossom later in the season. So, the second generation, emerging in October will switch to *Chorizanthe* when, at lower altitudes, the *Montiopsis* are already too dry and without flowers. Like coastal *P. benyamini* this species possibly has three full broods before December and then a partial fourth brood in January/February. The adults fly low, up to ten cms. above the ground, flying higher only upon reaching taller vegetation. Adults have been observed landing on bare ground, fallen dry branches and dry stalks as well as foodplants. They usually sit with closed wings, rubbing their hind wings slowly. The males are territorial with regard to other *Pseudolucia*. In midday they are intensively active and difficult to approach. On one occasion, when attempting close-up photography, a male "attacked" the camera, flying directly into it and avoiding collision only at the last second, "breaking" sideways and then disappearing.

Preferred nectar sources at a collection site at 1200 m elevation were the yellow-white flowered *Pectocarya linearis* (Boraginaceae) and the yellow flowered *Gayophyton* sp. (Onagraceae) (det. Prof. LUIS FAUNDEZ). Eggs, white as in other *Pseudolucia*, were found among the hirsute flower buds of *Montiopsis capitata*. The foodplant and location of eggs matches precisely that of the congener *Pseudolucia collina* as recorded at San José de Maipo, Southern Santiago (BENYAMINI 1995). The larvae of *P. ugartei* grow up to 8.5 mm; the L<sub>4</sub> & L<sub>5</sub> instars are pinkish-white with tiny white spots over the entire body. The middorsal stripe is reddish-pink; three oblique pink dashes with white margins appear on each body segment along the sub-dorsal flanks. The lower lateral stripes are white or pinkish-white with wide pinkish dorsal margins and narrow reddish basal margins. White "hairs" occurs on both sides of the dorsal stripe and along its basal margins. The prolegs are transparent pinkish-white with the true legs pink. The head is black with the first segment dorsum showing a brown deltoid mark. A prepupa measured 7 mm long and was coloured faded pink. Pupation was upside down under the paper covering the bottom of the rearing box. The pupa was 6.5 mm in length. The head was light brown, the thorax and wing cases greenish-brown; there was a mid-dorsal reddish-brown abdominal stripe and subdorsal abdominal reddish-brown spots. A few scattered white, and very short, "hairs" were observable

along the wing margins and on the head and thorax. Two thin silky girdles occurred on each side of the thorax. Five days before eclosion the thorax was brown and the eyes black; one day before eclosion the reddish wings could be seen inside the pupal shell.

*Myrmecophily* – The DNO was visible on the last instar as an elliptic light-brown element and the TO's as whitish spots. No ant attendance was observed but the following ants were collected around the foodplants: *Camponotus chilensis* (SPINOLA) and *Dorymyrmex hypocritus* (SNELLING), (det. Dr. DAVID R. SMITH). Smaller ants have been collected east of the pass by A. UGARTE and were determined as: *Lasiophanes valdivienseis* (FOREL), *L. hoffmani* (FOREL), *Linepithema humile* (MAYR), *Amblyopone monrosi* BROWN and *Amblyopone* n. sp. (det. JOHN E. LATTKE). All these ants are suspected to be associated to *Pseudolucia*.

*Pseudolucia benyamini* BÁLINT et JOHNSON, 1995

(Figs 41–44)

*Pseudolucia benyamini* – BÁLINT & JOHNSON 1995b: 2; type locality: CHILE: Reg. Pichicuy, sea level (HNHM holotype male, examined).

*Distribution* – Chile: region Valparaíso (coastal region only).

*Larval host* – *Chorizanthe vaginata* (Polygonaceae) (BENYAMINI 1995: 6)

*Material examined* – HNHM – 5 males, 4 females: Pichichuy, sea level, 150 km NW of Santiago, 17.IX.1993, leg. D.B. (HNHM paratypes). 1 male, from the same locality, 7.XI.1993, leg. D. B. (HNHM paratype). 1 female: from the same locality, 23.XI.1993, leg. D. B., ex larva (HNHM paratype). 1 male, from the same locality, 9.I.1994, leg. D. B., ex larva (HNHM paratype). 2 females: Reg. Valparaíso, Concon, 100 m, 23.XI.1994., leg. D. B. 1 male, 4 females: Coquimbo, s.l., 20 km N. of Los Vilos, 4.XII.1994, leg. D. B. (plus see Appendix I). Genital dissections: Nos 427 (male); 391, 428, 437, 492, 551, 583, 584 (females).

*Pseudolucia dubi* BÁLINT, sp. n.

(Figs 45–50)

*Pseudolucia collina* – BÁLINT & JOHNSON 1993: 5; BÁLINT 1993:18, figs. 35–37 [nec *collina*]

*Pseudolucia collina* – BÁLINT & JOHNSON 1995b: Figs 1c, 2c, 3c, Pl. VI 5L, 5M; [nec *collina*]

*Pseudolucia collina* – BENYAMINI 1995: 5; [nec *collina*]

*Pseudolucia collina* – PEÑA & UGARTE 1997: 234. [nec *collina*]

*Types* – Holotype female, deposited in HNHM: “Batuco, 55km S. of Salamanca, Choapa, Coquimbo, Chile, 31.X.1993, 1600–1850 m, leg. D. Benyamini”; “gen. prep. No. 754, Zs. Bálint”. 1 male, 1 female paratype, in coll. BENYAMINI, with the data of holotype. 4 male, 2 female paratype, in coll. BENYAMINI: Cerro la Virgen, 75 km SE Salamanca, 2200 m, Choapa, Coquimbo, Chile,

10.I.1998, leg. D. Benyamini. 1 male, 1 female paratypes, deposited in the BMNH, with the data of previous paratypes. 1 male, 1 female paratypes, deposited in the MHNS, with the data of previous paratypes. 2 male, 1 female paratypes, in coll. BENYAMINI, with the data of previous paratypes but from elevation 2800 m. 2 male, 2 female paratypes, in coll. BENYAMINI: El Chacay, Rio Cuncumen (Los Pelambres), 1800 m, Choapa, Coquimbo, Chile, 24.I.1994, leg. Benyamini. 1 female paratype, in coll. BENYAMINI, with the data of previous paratypes but from 14.I.1995. 1 female paratype, in coll. BENYAMINI, with the data of previous paratypes but from 15.I.1995. 3 male paratypes, in coll. BENYAMINI, Cuesta los Cristales, 10 km SE Illapel, 500 m, Choapa, Coquimbo, Chile, 2.IX.1995, leg. Benyamini. 1 male paratype, in coll. BENYAMINI, with the data of previous paratypes, but from 8.IX.1995. 3 males, 1 female paratypes, in coll. BENYAMINI, with the data of previous paratype, but from 23.IX.1995. 1 male, 1 female paratypes, in coll. BENYAMINI: 16 km North Caren (Cespedes), 1900 m, Illapel, Choapa, Coquimbo, Chile, 25.XII.1994, leg. Benyamini. 1 female paratype, in coll. BENYAMINI, with the data of previous paratypes but from elevation 2200 m. 1 male paratype, in coll. BENYAMINI, with the data of previous paratype but from elevation 2300 m.

HNHM paratypes: 25 males 10 females: Vicuña, Elqui, XI.1991., leg. Castillo. 1 male, 1 female: with the same data but leg. Peña. 1 male: Coquimbo, 150 km east of La Serena, Intos, 1500 m, 18.IX.1993, leg. Benyamini. 1 male, 1 female: with the data of holotype. 8 males, 2 females: Cerro la Virgen, 2200 m, 10.I.1998, leg. D. Benyamini.

AMNH paratypes: 20 males 9 females: Vicuña, Elqui, XI.1991., leg. Castillo.

Genital dissections: 318 (male); 319 (female); 490 (female); 491, 750–753 (males); 754 (female).

*Diagnosis* – Differing from all *collina*-like taxa in hindwing underside “U”-shaped medial band being less lineal, comprised of mottled blackish to dark brown spots contrasting mottled and/or tawny basal ground colour; “U”-shaped band extending only to the edge of postmedian area; female genital ostium with bifurcate shape in lateral view, ventral lobe possess a smaller dorsal and a larger ventral pointed anal terminus.

*Description* – BÁLINT & JOHNSON 1993: 5–6.

*Type locality* – Chile, 55 km southeast of Salamanca, Batuco, 1600 m.

*Larval hosts* – *Chorizanthe dasyantha*, *Ch. frankenioides*, *Ch. glabrescens*, *Ch. paniculata*, *Ch. rosea*, *Ch. umbellata*, *Ch. vaginata*, *Ch. viridis* and *Ch. aff. densa* (*Polygonaceae*), *Montiopsis capitata*, *M. discolor*, *M. trifida*, *M. parviflora*, *M. ramosissima* and *M. umbellata* (*Portulacaceae*) (BENYAMINI 1995: 5–6).

*Etymology* – A noun, patronym of DUBI BENYAMINI.

*Dedication* – This paper is dedicated to the late LUIS PEÑA GUZMAN, the most important Chilean entomologist of the 20th century and his close collaborate Agr. Ing. ALFREDO UGARTE.

\* \* \*

*Acknowledgements* – Dr. JORGE N. ARTIGAS and Dr. ANDREAS O. ANGULO of Universidad de Concepción, Facultad de Ciencias Naturales y Oceanograficas helped the junior author to look for new taxa in their ex-Wagenknecht collection. Prof. JAIME SOLERVICENS of Universidad Metropo-

litana de Ciencias de la Educación Santiago, always welcomed such a survey in the University Collection where the late Prof. JOSÉ HERRERA used to work.

The best experts of botany for austra South America are continuously helping with plants identifications: Agr. Ing. MELICA MUÑOZ SCHICK, curator of Botany at Museo Nacional de Historia Natural, Quinta Normal, Santiago de Chile, Dra EDITH GOMEZ-SOSA (*Astragalus*) and Prof. EMILIO ULIBARRI (*Adesmia*) of Instituto de Botanica Darwinion, San Isidro, Buenos Aires, Argentina. Agr. Ing. IRIS PERALTA (*Calandrinia /Montiopsis*) and Agr. Ing. Eduardo Méndez UID Botánica y Fitosociología, Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina. Prof. LUIS FAUNDEZ and Prof. PIERFELICE RAVENA of Universidad de Chile, Facultad de Ciencias Agrarias y Forestales, Santiago de Chile. Prof. OTTO ZÖLLNER (*Chorizanthe*), Catholic University of Valparaiso, Chile. Dr. GWILYM LEWIS of Kew Botanic Gardens, United Kingdom. The ants have been identified by Dr. DAVID R. SMITH of the United States Department of Agriculture and by Dr JOHN E. LATTKE, University of California, Davis.

Mr. ANDRÁS KUN (HNHM, Budapest) was our photographer.

Dr. KURT JOHNSON (New York) led us to the vast unexplored territory of Neotropical lycaenids. He thoroughly reviewed the present paper, commented and edited linguistically.

To all these people we give our sincere thanks for their help and support.

## REFERENCES

- BÁLINT, ZS. (1995): A review of recent literature and taxonomic synonymy in the Neotropical Polyommatae (Lycanidae). – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **49**: ii + 10 pp.
- BÁLINT, ZS. & JOHNSON, K. (1993): New species of *Pseudolucia* Nabokov from Chile and Patagonia (Lepidoptera: Lycanidae, Polyommatae). – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **29**: ii + 42 pp, 10 figs, figs 6, [4 pls], photoplate V.
- BÁLINT, ZS. & JOHNSON, K. (1995a): The Argentine Fauna of *Pseudolucia* Nabokov (Lepidoptera, Lycanidae). – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **45**: (ii) + 23 pp, figs 3, photoplates V., VI.
- BÁLINT, ZS. & JOHNSON, K. (1995b): A New Species of *Pseudolucia* Nabokov from the Coastal Region of Chile (Lepidoptera, Lycanidae). – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **46**: (ii) + 7 pp, figs 23, photoplate IV.
- BÁLINT, ZS. & JOHNSON, K. (1995c): Neotropical Polyommatae diversity and affinities. I. Relationships of the higher taxa (Lepidoptera: Lycanidae). – *Acta Zoologica Academiae Scientiarum Hungaricae* **41** (3): 211–235.
- BÁLINT, ZS. & JOHNSON, K. (1997): Reformation of the *Polyommatus* Section with a Taxonomic and Biogeographic Overview (Lepidoptera, Lycanidae, Polyommatae). – *Neue entomologische Nachrichten* **40**: 1–68 pp, 4 pls 23 figs.
- BÁLINT, ZS., JOHNSON, K. & EISELE, R. (2000): Description of the northern sister species of *Pseudolucia chilensis* (Blanchard, 1852) (Lepidoptera: Lycanidae). – *Folia entomologica hungarica* **61**: 165–175, 11 figs.
- BALLETTO, E. (1993): On some new genus-group and species-group names of Andean Polyommatae (Lepidoptera). – *Bolletino della Società entomologica italiana* **124**: 231–243, 5 figs.
- BENYAMINI, D. (1995): Synopsis of Biological Studies of the Chilean Polyommatae (Lepidoptera, Lycanidae). – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **52**: (ii) + 51 pp, pls 7–18, figs A–K, 10 tpls.

- BENYAMINI, D., BÁLINT, Zs. & JOHNSON, K. (1995): Recently Discovered New Species of *Pseudolucia* Nabokov (Lepidoptera, Lycaenidae) from Austral South America. – *Reports of the Museum of Natural History, University of Wisconsin* (Stevens Point) **53**: (ii) + 5 pp, 8 figs, photoplate VI.
- BLANCHARD, CH. É. (1852): Orden VI. Lepidópterus. – In: GAY, C. (ed.): *Historia física y política de Chile según documentos adquiridos en esta república durante doce años de residencia en ella y publicada bajo los auspicios del Supremo Gobierno. Zoológia*. – Paris, C. Gay **7**: 1–112.
- DESCIMON, H. (1986): Origins of lepidopteran faunas in the high tropical Andes, pp. 500–532, 6 figs., 3 tabs. – In: VUILLEUMIER, F. & MONASTERIO, M. (eds): *High altitude tropical biogeography*. – New York, Oxford University Press.
- DRAUDT, M. (1929–21): Familie: Lycaenidae. – In: SEITZ, A. (ed.): *Die Gross-Schmetterlinge der Erde, Band 5*. – Stuttgart, Alfred Kernen Verlag, pp. 817–831.
- ELIOT, J. N. (1973): The higher classification of the Lycaenidae (Lepidoptera): a tentative arrangement. – *Bulletin of the British Museum (Natural History), Entomology* **28** (6): 373–505, 162 figs, 6 pls.
- ETSCHVEERRY, M. (1989): Chile y sus mariposas. – *Shilap* **17**: 71–75.
- HEWITSON, W. CH. (1874): Descriptions of new species of Lycaenidae from South America. – *Entomologist's monthly Magazine* **11** (124): 104–107.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (1999): *International code of zoological nomenclature. Fourth Edition, adopted by the International Union of Biological Sciences*. – International Trust for Zoological Nomenclature, c/o The Natural History Museum, London, xxx+306 pp.
- NABOKOV, V. (1945): Notes on neotropical Plebejinae (Lycaenidae, Lepidoptera). – *Psyche* **52**: 1–61, 8 pls, 1 fig.
- PEÑA, L. & UGARTE, A. J. (1997): *Las mariposas de Chile. The butterflies of Chile*. – Santiago de Chile, Editorial Universitaria, 359 pp, figs, maps.
- PHILIPPI, R. A. (1859): Descripción de algunas nuevas especies de mariposas chilenas, principalmente de la Provincia de Valdivia. – *Anales de la Universidad de Chile* **16** (12): 1088–1114.
- PHILIPPI, R. A. (1860): Beschreibung einiger neuer chilenischer Schmetterlinge. – *Linnea entomologica* **14**: 265–297.
- SCHAUS, W. (1902): Descriptions of new American butterflies. – *Proceedings of the United States National Museum* **24** (1262): 383–460.
- SHAPIRO, A. M. (1991): The zoogeography and systematics of the Argentine Andean and Patagonian pierid fauna. – *Journal Research on the Lepidoptera* **28**: 137–238, 4 pls, 24 figs, 4 tabs.
- WALLENGREN, H. D. J. (1860): Lepidopterologische Mittheilungen. – *Wiener entomologische Monatschrift* **4**(2): 33–46.

## APPENDIX I

### Additional material examined

#### Abbreviations:

- leg. A.U. = collected by ALFREDO UGARTE (Santiago, Chile)  
leg. D.B. = collected by DUBI BENYAMINI  
leg. L.P. = collected by LUIS PEÑA  
leg. R.W. = collected by RUDOLFO WAGENKNECHT  
coll. D. B. = in the collection of DUBI BENYAMINI (Bet Arye, Israel)

S.L. = Sea Level

Vn. = Volcan (Volcano)

Hda. = Hacienda (farm)

Qda. = Quebrada (gorge)

Cta. = Caleta (bay)

Cord. = Cordillera (Mountain range)

(X) = collected in October (sample)

sp. = specimen or specimens, sex recorded previously or sex not given

CUWC = Concepción University, Chile, WAGENKNECHT Collection

LPC = LUIS PEÑA collection (now in the possession of Dr. PEDRO VIDAL, Santiago de Chile)

### *Pseudolucia chilensis*

*Collection* BENYAMINI – 2 males and 1 female, Fray Jorge, Coquimbo, Chile, 18.9.92, 50 m, leg. D.B.; 3 males, 30 km E of La Serena, Coquimbo, Chile, 19.9.92, 300 m leg. D.B.; 1 male, Cabildo, Valparaíso, Chile, 26.9.92, 300 m, leg. D.B.; 2 males and 1 female, Llanos de Guanta (E of Vicuña), Coquimbo, Chile, 7.11.92, 1670 m leg. D.B.; 2 males and 2 females, Near Vicuña, Coquimbo, Chile, 7.11.92, 750 m, leg. D.B.; 1 male, Ovalle, Coquimbo, Chile, 8.11.92, 220 m, leg. D.B.; 5 males, Baños Morales (climbing towards Mirador Morales), Metropolitan reg., Chile, 22.11.92, 2200 m, leg. D.B.; 7 males and 2 females, El Colorado / Farellones, Metropolitan reg., Chile, 6.12.92, 2900 m, leg. D.B.; 1 male, on the road to Farellones, Metropolitan reg., Chile, 6.12.92, 2000 m, leg. D.B.; 1 male and 1 female, Santiago, Río Mapocho, Metropolitan reg., Chile, 12.12.92, 1100 m, leg. D.B.; 11 males and 4 females, Baños Morales, Metropolitan reg., Chile, 20.12.92, 1950 m, leg. D.B.; 1 female, Río Blanco, Portillo, Valparaíso, Chile, 31.12.92, 1900 m, leg. D.B.; 1 male, Pichicuy, Valparaíso, Chile, 23.10.93, 20 m, leg. D.B.; 2 males, Batuco, Coquimbo, Chile, 31.10.93, 1600 – 1850 m, leg. D.B.; 1 male, Pichicuy, Valparaíso, Chile, 7.11.93, S.L., leg. D.B.; 1 male, Pichicuy, Valparaíso, Chile, 27.11.93, 20 m, leg. D.B.; 1 female, Cta. Totoralillo, N. La Serena, Coquimbo, Chile, 13.8.94, S.L., leg. D.B.; 5 males, Batuco, Coquimbo, Chile, 2.9.95, 1900 m, leg. D.B.; 1 male and 2 females, Batuco, Coquimbo, Chile, 2.9.95, 1800 m, leg. D.B.; 5 males and 1 female, Batuco, Coquimbo, Chile, 2.9.95, 1900 m, leg. D.B.; 3 males, Cuesta la Dormida, Valparaíso / Metropolitan reg., Chile, 19.9.95, 1250 – 1350 m, leg. D.B.; 1 male and 1 female, Collina, Metropolitan reg., Chile, 19.9.95, 500 m, leg. D.B.; 2 males, Cerro del Roble, Valparaíso / Metropolitan reg., Chile, 1.11.95, 1400 m, leg. D.B.; 2 males and 1 female, Cerro del Roble, Valparaíso / Metropolitan reg., Chile, 1800 m, leg. D.B.; 1 male and 1 female, 13 m N. Paipote, Atacama, Chile, 27.12.97, 200 m, leg. D.B.; 1 female, Copiapo, Atacama, 27.12.97, 200 m, leg. D.B.; 1 male and 1 female, Qda. de San Andres, Lago Maricunga, 103 km E. Copiapo, Atacama, Chile, 27.12.97, 2100 m, leg. D.B.; 3 males, 40 km S. Copiapo, Atacama, Chile, 28.12.97, 200 m, leg. D.B.; 2 males, Batuco, Coquimbo, Chile, 9.1.98, 1500 m, leg. D.B.; 2 males and 2 females, Cespedes, Hda. Illapel, Coquimbo, Chile, 31.12.99, 1800 m, leg. D.B.; 2 males and 1 female, Cespedes, Hda. Illapel, Coquimbo, Chile, 18.10.00, 1300 m, leg. Cespina; 3 females, Cespedes, Hda. Illapel, Coquimbo, Chile, 23.11.00, 1500 m, leg. A.U.; 1 male and 3 females, Cespedes, Hda. Illapel, Coquimbo, Chile, 23.11.00, 1800 m, leg. A.U.; 3 males, 37 km W. Domeyco, Huasco, Atacama, Chile, 11.11.00, leg. A.U.

*Institutional depositors* – CUWC – 1 sp., Illapel, Coquimbo, Chile, 18.12.33, leg. Wagenknecht; 2 sp., Tome alta, Concepción, Bio Bio, Chile, 26.2.44, leg. Wagenknecht; 1 sp., Cardels, 28.10.44 leg. Wagenknecht; 1 sp., Alhué, Valparaíso, Chile, 7.1.47; 3 sp., Alhué,

Valparaíso, Chile, 7.1.47, leg. Peña; 2 sp., Alhué, Valparaíso, Chile, 10.1.47; 1 sp., Talca, Chile, 24.9.47; 3 sp., Alhué, Valparaíso, Chile, 8.12.47; 3 sp., Alhué, Valparaíso, Chile, 9.12.47; 1 sp., El Manzanito, Chile, 24.10.48; 1 sp., Tobalaba, Chile, 27.10.48, leg. Peña; 1 sp., El Canelo, Metropolitan reg., Chile, 1.11.48; 2 sp., Pilay, Rancagua, Chile, 12.12.48; 1 sp., Guayacán, Metropolitan reg., Chile, 23.2.49, leg. Wagenknecht; 1 sp., Aculeo, Metropolitan reg., Chile, 7.3.49; 1 sp., Linares, Talca, Chile, 11.3.49; 1 sp., J. Sold, Chile, 24.9.49, leg. Wagenknecht; 1 sp., Chile, 1.10.49, leg. J. Artigas; 1 sp., Río Choros, Coquimbo, Chile, 21.10.49, leg. Wagenknecht; 1 sp., Dichato, Concepción, Chile, 17.1.50; 1 sp., Dichato, Concepción, Chile, 19.1.50; 1 sp., Las Breas, Coquimbo, Chile, 24.3.51, leg. Peña – Barros; 2 sp., Córretones, Metropolitan reg., Chile, 30.12.50; 1 sp., Valle Piuquenea, Piscicultura, Aconcagua, Valparaíso, Chile, 24–25.11.58, leg. G. Barria; 1 sp., El Canelo, Metropolitan reg., Chile, 8.10.51; 1 sp., San Felipe, Metropolitan reg., Chile, 9.52, leg. J. Herrera; 1 sp., El Canelo, Metropolitan reg., Chile, 9.51; 1 sp., La Serena, Coquimbo, Chile, 10.3.52, leg. Wagenknecht; 1 sp., Poquí, Coltauco, Rancagua, Chile, 27.3.52; 1 sp., Córdón, 12.2.53, leg. Wagenknecht; 1 sp., Santiago, Metropolitan reg., Chile, 15.10.54; 1 sp., Copiapo, Atacama, Chile, 20.1.57, leg. J. Herrera; 1 sp., Quilicura, Metropolitan reg., Chile, 31.1.57, det. J. Herrera; 3 sp., Malcho, Parral, Talca, Chile, 12.57; 1 sp., Las Cruces, Cord. Parral, Talca, Chile, 10.58, leg. M. Rivera; 2 sp., El Calabazo, Had. Illapel, Coquimbo, Chile, 18.10.58, leg. Peña; 1 sp., S. José de Maipo, Chile, det. J. Herrera; 1 sp., Copiapo, Atacama, Chile, leg. Gallizia, det. J. Herrera; 1 sp., Chigualoco, Coquimbo, Chile, 27–28.11.64, leg. Montes, det. J. Herrera; 1 sp., Chigualoco, Coquimbo, Chile, 27–28.11.64, leg. Zapata, det. J. Herrera; 1 sp., Manquehue, Metropolitan reg., Chile, 12.1.71, leg. Echeverry; 1 sp., Baños Morales, Metropolitan reg., Chile, 13.2.75, leg. J. Herrera; 1 sp., El Principal, Metropolitan reg., Chile, 25.11.75, leg. J. Herrera; 1 sp., Copiapo, Atacama, Chile, det. J. Herrera; 1 sp., Valparaíso, Chile, 17.1.77; 1 sp., Copiapo, Atacama, Chile, leg. Pino, det. J. Herrera; 1 sp., Clarillo, Metropolitan reg., Chile, 11.1.90; 1 sp., El Clarillo, Metropolitan reg., Chile, 11.1.90, leg. J. Herrera.

LPC – 1 male, Tobalaba, Santiago, Chile, 17.4.47; 1 female, Copiapo, Atacama, Chile, 2.65, leg. Pino; 1 male and 1 female, Peñuelas, Coquimbo, Chile, 24.9.65, leg. Montes & Zapata; 1 male, El Canelo, Santiago, Chile, 8.10.70, leg. G. Barriga; 1 female, El Canelillo, Valparaíso, Chile, 23.1.74, leg. Echeverry; 1 male and 1 female, El Principal, P. Alto, Santiago, Chile, 25.11.75, leg. J. Herrera; 1 female, Concon, Valparaíso, Chile, 2.2.77, leg. J. Herrera; 2 males, La Parva, Santiago, Chile, 1.12.83, 2300 m, leg. J. Herrera; 1 female, Baños de Collina, Santiago, Chile, 30.12.86, leg. J. Herrera; 1 male, Qda. Honda, Huasco, Atacama, Chile, 11.87, leg. Barriga; 1 male and 1 female, Río Clario, Metropolitan reg., 11–12.1.90, leg. Herrera / Inst. Pedag.; 1 male and 1 female, La Parva / Farellones, 29.12.90, leg. J. Herrera; 2 males, 15 km N. Huasco, Atacama, Chile, 18.9.91, leg. L.P.; 2 males, El Portezuelo, Collina, Santiago, Chile, 1.1.92, leg. L.P. & A.U.; 2 male, El Portezuelo, Collina, Santiago, Chile, 7.1.92, leg. A.U.; 1 female, Cta. Pajonales, Atacama, Chile, 15.1.92, leg. L.P.; 2 males, Vallenar, Atacama, Chile, 15.1.92, leg. L.P.; 6 males and 9 females, Cañarcillo, Copiapo, Atacama, Chile, 15.1.92, leg. L.P.; 1 male, El Portezuelo, Collina, Santiago, Chile, 12.9.92, leg. L.P. & A.U.; 1 male, Malcho, Parral, Talca, Chile, 24.1.93, leg. L.P. & A.U.; 4 males, 30 km S. Copiapo, Atacama, Chile, 10–19.10.93, leg. L.P. & A.U.; 1 male, El Yeso, Metropolitan reg., Chile, 12.93, leg. L.P.; 1 female, Farellones, Metropolitan reg., Chile, 12.93, leg. M. Wood.

FMC – 1 male, Hda. Illapel, Coquimbo, Chile, 11.11.1954, 2500–2900 m, leg. L.P.; 1 female, El Canelo, Santiago, Metropolitan reg., Chile, 8.1.1957; 1 female, Las Breas, Coquimbo, Chile, 24.3.57; Vs. del Flaco, cord. Talca, Maule, Chile, 29.11.57, leg. L.P.; 2 males and 1 female, Aculeo, Santiago, Metropolitan reg., Chile, 20.10.64; 1 male, Hwy 5 & Frey Jorge entrance, Coquimbo, Chile, 23.10.67; 1 male, Copiapo, Atacama, Chile, 26.10.83, leg. L.P.; 1 female, Tongoy, Coquimbo, Chile, 4.2.84; 1 female, Elqui, Coquimbo, Chile, 11.89, leg. Castillo; 1 male, Vicuña, Coquimbo, Chile, 11.91, leg. L.P.; 1 male, La Higuera, Coquimbo, Chile, 11.91, leg. L.P. & A.U.; 1 male and 1

female, 60 km S. Copiapo, Atacama, Chile, 11.91, leg. L.P.; 3 males and 2 females, Qda. El Tigre, Zapallar, Valparaíso, Chile, 14.12.91, leg. L.P. & A.U.; 2 males, Chañarcillo, Copiapo, Atacama, Chile, 15.1.92, leg. L.P.; 2 males, Portezuelo, Collina, Santiago, Metropolitan reg., Chile, 29.11.95, leg. L.P.; 1 male and 1 female, Bahía Inglesia, Caldera, Atacama, Chile, leg. J. E. Barriga & L.P.

MHNS – 1 sp. El Volcan, Maipo, Metropolitan reg., Chile (VIII); 5 sp., El Pangue, Elqui, Coquimbo, Chile (II); 1 sp., Santiago, Metropolitan reg., Chile (II); 1 sp., El Canelo, Santiago, Metropolitan reg., Chile (XII); 1 sp., El Principal, Metropolitan reg., Chile (XI); 1 sp., Copiapo, Atacama, Chile; 1 sp., Ovalle, Coquimbo, Chile (I); 3 sp., Cuesta la Dormida, Valparaíso/Metropolitan reg. Chile; 1 sp., Papudo/Zapallar, Valparaíso, Chile; 1 sp., Tobalaba, Metropolitan reg., Chile.

### *Pseudolucia benyamini*

*Collection* BENYAMINI – Paratypes, all specimens from Pichicuy, Valparaíso, Chile, Sea Level (S.L.) leg. Dubi Benyamini. Males: 4 sp., 17.9.93; 1 sp., 23.10.93; 1 sp., 9.11.93; 1 sp., ex larva 18.11.93; 1 sp., 14.1.94; 1 sp., 1.12.93; 1 sp., 28.12.93. Females: 2 sp., 17.9.93; 1 sp., 23.10.93; 1 sp., 7.11.93; 1 sp., ex larva, 12.11.93; 1 sp., ex larva 22.2.94; 1 sp. 27.8.94.

Further material: 8 males, Pichicuy, Valparaíso, Chile, 17.9.93, S.L., leg. D.B.; 4 females, Pichicuy, Valparaíso, Chile, 25.9.93, S.L., leg. D.B.; 3 males and 3 females, Pichicuy, Valparaíso, Chile, 9.10.93, S.L., leg. D.B.; 2 males, Pichicuy, Valparaíso, Chile, 23.10.93, S.L., leg. D.B.; 2 males and 1 female, Pichicuy, Valparaíso, Chile, 1.11.93, S.L., leg. D.B.; 1 male, Pichicuy, Valparaíso, Chile, 7.11.93, S.L. leg. D.B.; 1 male ex larva, Pichicuy, Valparaíso, Chile, 14.11.93, S.L. leg. D.B.; 1 male Ex Larva, Pichicuy, Valparaíso, Chile, 18.11.93, S.L., leg. D.B.; 4 males and 3 females, Pichicuy, Valparaíso, Chile, 27.11.93, S.L. leg. D.B.; 1 male, ex larva, Pichicuy, Valparaíso, Chile, 18.1.94, S.L., leg. D.B.; 1 male and 1 female, Pichicuy, Valparaíso, Chile, 3.4.94, S.L., leg. D.B.; 4 males and 2 females, Pichicuy, Valparaíso, Chile, S.L., leg. D.B.; 7 males, Concon, Valparaíso, Chile, 23.10.94, 50 m, leg. D.B.; 1 male and 1 female, Concon, Valparaíso, Chile, 23.11.94, 50 m, leg. D.B.; 1 male, Pichicuy, Valparaíso, Chile, 27.8.94, S.L., leg. D.B.; 2 males, Concon, Valparaíso, Chile, 23.10.94, 50 m, leg. D.B.; 2 males ex larva, Concon, Valparaíso, Chile, 9.12.94, 50 m, leg. D.B.; 1 male, Choros Bajos, Coquimbo, Chile, 20.10.92, m leg. Ugarte; 2 females, Concon, Valparaíso, Chile, 23.10.94, 50 m, leg. D.B.; 1 female, ex larva, Concon, Valparaíso, Chile, 13.12.94, 50 m, leg. D.B.; 1 female, Pto Manso Choapa, Coquimbo, Chile, 2–3.10.94, leg. Peña; 1 male, Tunquen, Algarobo, Valparaíso, Chile, 21.10.00, S.L., leg. S. Rothmann.

*Institutional depositors* – CUWC – 1 male and 1 female, Concon, Valparaíso, Chile, 23.10.94, leg. D.B.

LPC – 1 male, San Antonio, Valparaíso, Chile, 8.12.15, Inst. Pedag.; 1 female, Longotoma (6km S. Pichicuy), Valparaíso, Chile, 26.11.64, leg. Etchevery; 1 female, San Antonio, Valparaíso, Chile, 8.12.75, Inst. Pedag.; 1 female, Qda. De Cordova, Valparaíso, Chile, leg. Herrera; 1 male and 1 female, Pichicuy, Valparaíso, Chile, 17.9.93, S.L., leg. D.B.; 3 males and 2 females, Pto. Manso (12km S. Los Vilos), Valparaíso, Chile, 20.10.94, S.L., leg. L.P.

MHNS – 1 male, San Antonio, Valparaíso, Chile, 8.12.75, leg. L.P.; 20 sp., Reñaca, Valparaíso, Chile, (XI); 4 sp., Algarobo, Valparaíso, Chile, (XI); 1 sp., Papudo / Zapallar, Valparaíso, Chile.

*Pseudolucia collina*

*Collection* BENYAMINI – 1 male and 1 female, Las Trancas, Bio Bio, Chile, 16.1.87, leg. Barriga; 2 males and 3 females, San José de Maipo, Metropolitan reg., Chile, 27.9.92, 800 m, leg. D.B.; 1 male, Las Trancas, Ñuble, Bio Bio, Chile, 12.93, leg. Peña / Ugarte; 2 males, S. José de Maipo, Metropolitan reg., Chile, 30.9.94, 800 m, leg. D.B.; 1 male, ex larva, S. José de Maipo, Metropolitan reg., Chile, 13.11.94, 800 m, leg. D.B.; 1 male, ex larva, S. José de Maipo, Metropolitan reg., Chile, 14.11.94, 800 m, leg. D.B.; 1 female, Rio Clario, Metropolitan reg., Chile, 24.11.94, 800 m, leg. D.B.; 3 males and 2 females, Las Trancas, Bio Bio, Chile, 26.11.94, leg. A.U.; 1 female, P.N. El Morado, Metropolitan reg., Chile, 26.11.94, 1850 m, leg. D.B.; 2 males, P.N. El Morado, Metropolitan reg., Chile, 26.11.94, 1850 m, leg. D.B.; 6 males and 2 females, Las Trancas, Bio Bio, Chile, 26–28.11.94, leg. A.U.; 2 male, ex larva, Alhué, Valparaíso, Chile, 9.11.95, 200 m, leg. D.B.; 40 males and 21 females, Lisboa, Alhué, Cachaporal, Rancagua, Chile, 27.12.97, leg. A.U.; 1 male and 1 female, Shangrila, Ñuble, Bio Bio, Chile, 7.12.98, 1530 m, leg. S. Rothmann; 3 males and 4 females, Lago Alumíné, Neuquén, Argentina, 20.12.99, 1250 m, leg. D.B.

*Institutional depositors* – CUWC – 2 sp., Q. Trancas, Bio Bio, Chile, 17.8.40, leg. Wagenknecht; 1 sp., Q. Trancas, Bio Bio, Chile, 18.8.40, leg. Wagenknecht; 1 sp., Trancas, Bio Bio, Chile, 24.8.40, leg. Wagenknecht; 2 sp., Las Trancas, Chile, 22.10.40, leg. Wagenknecht; 1 sp., El Abanico, Peñalolen, Metropolitan reg., Chile, 19.11.45, leg. L.E. Peña; 1 sp., Alhué, Valparaíso, Chile, 8.12.47, leg. Barros; 2 sp., Santiago, Metropolitan reg., Chile, 1.48; 1 sp., Campanario, Chile, 7.1.49; 1 sp., El Canelo, Metropolitan reg., Chile, 20.2.49; 1 sp., Aculeo, Chile, 7.11.49; 3 sp., El Quíscio, Metropolitan reg., Chile, 12.11.50; 8 sp., Purgatorio, Metropolitan reg., Chile, 22.12.50; 3 sp., Purgatorio Cord., Metropolitan reg., Chile, 23.12.50, leg. Peña – Barros; 26 sp., Calletones, Metropolitan reg., Chile, 31.12.50, leg. Mendez; 1 sp. Guayacan, Metropolitan reg., Chile, 2.51; 1 sp., Lagunillas, Metropolitan reg., Chile, 11.11.51, leg. Wagenknecht; 1 sp., Calcu, Metropolitan reg., Chile, 6.12.51; 1 sp., Lagunillas, Metropolitan reg., Chile, 5.2.52, leg. Wagenknecht; 1 sp., Estero de Leiva, Chile, 8. & 12.1.53, leg. Barros – Peña; 1 sp., Las Cabras, Bio Bio, Chile, 15.12.54, 1100–1450 m, leg. Peña; 1 sp., Manquimavida, Chile, 11.3.1962.

LPC – 1 male, El Rayan, Santiago, Metropolitan reg., Chile, 3.11.51, leg. Etcheverry; 1 female, E. Recinto, Ñuble, Bio Bio, Chile, 22.1.70, leg. Ocare; 1 male, Lagunillas, Maipo, Santiago, Chile, 13.12.80, leg. J. Herrera; 2 males, Las Trancas, Bio Bio, Chile, 26.10.94, 1200 m, leg. L.P.

FMC – 1 male and 2 females, 8 km N. Las Trancas, Bio Bio, Chile, 15.1.67, leg. L. Stange; 2 males, Las Trancas, Bio Bio, Chile, 12.81, leg. Ocare.

MHNS – 3 sp., Termas de Chillan, Bio Bio, Chile (I & II); 2 sp., Las Trancas, Bio Bio, Chile (XI); 3 sp., Las Cabras, Bio Bio, Chile (XII); 3 sp., El Melocoton, Maipo, Metropolitan reg., Chile (XI).

*Pseudolucia dubi*

*Collection* BENYAMINI – 1 female, Elqui, Coquimbo, Chile, 9.92, leg. Peña – Ugarte; 1 male, Altovalsol, 14 km E. La Serena, Coquimbo, Chile, 9.93, leg. Peña; 1 male, Elqui, Coquimbo, Chile, 9.93, leg. A.U.; 1 female, Altovalsol, Coquimbo, Chile, 9.93, leg. A.U.; 1 male and 1 female in copula, Elqui, Coquimbo, Chile, 15.9.93, leg. A.U.; 1 female, Batuco, 55 km S. Salamanca, Coquimbo, Chile, 31.10.93, 1600–1850 m, leg. D.B.; 2 males, Alcohuaz, Coquimbo, Chile, 12.93, leg. A.U.; 1 female, Cepo, Cord. de Cochiuy, Coquimbo, Chile, 9.1.94, leg. A.U.; 1 female, Pan American Norte 423 km Tongoy, Coquimbo, Chile, 13.8.94, S.L., leg. D.B.; 1 male, Los Vilos, Coquimbo, Chile,

4.11.94, S.L., leg. Barriga; 3 males and 1 female, 20 km N. Los Vilos, Coquimbo, Chile, 13.11.94, S.L., leg. D.B.; 3 males, 7 km N. Los Vilos, Coquimbo, Chile, 13.11.94, S.L., leg. D.B.; 2 females, 20 km N. Los Vilos, Coquimbo, Chile, 4.12.94, S.L., leg. D.B.; 1 female, Río de la Laguna, Nueva Elqui, Coquimbo, 4.12.94, 2650 m, leg. D.B.; 1 male and 1 female ex larva, Río de la Laguna, Elqui, Coquimbo, Chile, 20.12.94, 2400m leg. D.B.; 1 female ex larva, Río de la Laguna, Elqui, Coquimbo, Chile, 22.12.94, 2400 m, leg. D.B.; 2 males and 2 females, El Chacay, Los Pelambres, Illapel, Coquimbo, Chile 24.12.94, 1800 m, leg. D.B.; 1 male, 16 km N. Caren, Hda. Illapel, Coquimbo, Chile, 25.12.94, 2300 m, leg. D.B.; 2 females, 16 Km N. Caren, Hda. Illapel, Coquimbo, Chile, 25.12.94, 2200 m, leg. D.B.; 2 females ex larva, El Chacay, Los Pelambres, Illapel, Coquimbo, Chile, 5.1.95, leg. D.B.; 3 males, Cuesta los Cristales, Coquimbo, Chile, 2.9.95, 450 m, leg. D.B.; 1 male, Cuesta Los Cristales, 10 Km S. Illapel, Coquimbo, Chile, 8.9.95, 500 m, leg. D.B.; 3 males and 1 female, Cuesta Los Cristales, 10 km S. Illapel, Coquimbo, Chile, 23.9.95, 450 m, leg. D.B.; 1 male, El Colorado, Elqui, Coquimbo, Chile, 11.95, leg. A.U.; 2 males and 1 female, El Cepo, Elqui, Coquimbo, 1.96, leg. A.U.; 11 males and 3 females, Cerro la Virgen, 75 km S. Salamanca, Coquimbo, Chile, 10.1.98, 2200 m, leg. D.B.; 2 males and 1 female, Cerro la Virgen, 75 km S. Salamanca, Coquimbo, Chile, 10.1.98, 2800 m, leg. D.B.; 1 male, Alicahue, Petorca, Valparaíso, Chile, 21.11.98, 1780 m, leg. S. Rothmann; 6 males, P.N. Fray Jorge, Coquimbo, Chile, 25.10.00, leg. A.U.; 3 males and 1 female, 6 km Vicuña, Elqui, Coquimbo, Chile, 30.10.00, leg. A.U.; 2 males, Alicahue, Petorca, Valparaíso, Chile, 25.11.00, 1700 m, leg. A.U.

*Institutional depositors* – CUWC – 1 sp., Lomas Compañía, Coquimbo, Chile, 29.9.40, leg. Wagenknecht; 1 sp., Vicuña, Coquimbo, Chile, 29.11.40, leg. Wagenknecht; 1 sp., J. Soldado, Chile, 17.12.43, leg. Wagenknecht; 1 sp., Talinay, Coquimbo, Chile, 20.9.47; 1 sp., Talinay, Coquimbo, Chile, 22.9.47; 1 sp., Teatinos, Coquimbo, Chile, 8.1.49, leg. Wagenknecht; 1 sp., Peñuelas, Coquimbo, Chile, 20.10.54, leg. Wagenknecht; 1 sp., Totoralillo, Coquimbo, Chile, 11.11.51, leg. Wagenknecht; 2 sp., Fray Jorge, Coquimbo, Chile, 4–5.11.57, leg. Peña.

LPC – 1 male, Chile, S.A., leg. Reed; 1 male, Paihuano, Coquimbo, Chile, leg. Herrera; 1 female, Chigualoco, 20 km N. los Vilos, Coquimbo, Chile, 27–28.11.64; 1 male, Noque, Los Vilos, Coquimbo, Chile, 20.9.69, leg. Peña; 1 male, El Calabaze, Had. Illapel, Coquimbo, Chile, 10.78, leg. Peña; 1 female, Vicuña, Elqui, Coquimbo, Chile, 10.87; 1 male, Elqui, Coquimbo, 10.89, leg. Castillo; 3 males, El Noque, Chigualoco, Coquimbo, Chile, 28.10.89, leg. Mallodo; 1 male and 1 female, Elqui, Elqui, Coquimbo, Chile, 11.89 leg. Peña – Ugarte; 1 female, El Panque, Vicuña, Elqui, Coquimbo, Chile, 11.89, leg. Peña – Ugarte; 3 males, Guanagueros, Coquimbo, Chile, 16.11.89, leg. Peña; 1 male Alcohuaz, Elqui, Coquimbo, Chile, 10.90, leg. Castillo; 6 males, Alcohuaz, Coquimbo, Chile, 10.90, leg. Castillo; 1 male, Elqui, Elqui, Coquimbo, Chile, 11.90, leg. Peña – Ugarte; 1 male, Vicuña, Elqui, Coquimbo, Chile, 10.91, leg. Castillo; 6 males, Alcohuaz, Elqui, Coquimbo, 17.10.91, leg. Castillo; 8 males and 4 females, 6 km S. Vicuña, Elqui, Coquimbo, Chile, 20.10.91, leg. Peña; 11 males and 4 females, Elqui, Elqui, Coquimbo, Chile, 11.91, leg. Castillo; 1 male, Vicuña, Elqui, Coquimbo, Chile, 11.91, leg. Castillo; 1 female, Vicuña, Elqui, Coquimbo, Chile, 11.91 leg. Peña; 2 males, Vicuña, Elqui, Coquimbo, Chile, 11.91, leg. Castillo; 8 males, Elqui, Elqui, Coquimbo, Chile, 2.11.91, leg. Castillo; 2 males, Alcohuaz, Elqui, Coquimbo, Chile, 24.11.91; 3 males and 1 female, Cuesta Pajonales, Atacama, Chile, 10.10.92, leg. Peña – Ugarte; 1 female, Los Pajaritos, Las Cruces, Coquimbo, Chile, 20.10.92, leg. Peña – Ugarte; 3 females, La Higuera, Coquimbo, Chile, 17.11.92, leg. Peña; 3 males and 1 female, Tongoy, Coquimbo, Chile, 1.93; 1 male, Cochiguas, Elqui, Coquimbo, Chile, 8.1.94, leg. Castillo; 2 males, Pre Andes, Elqui, Coquimbo, Chile, 10.94, leg. Barriga; 3 males and 2 females, Guanagueros, Coquimbo, Chile, 19.10.94, leg. Peña.

FMC – 1 male, Guanaqueros, Coquimbo, Chile, 11.1989, S.L., leg. L.P.; 3 males and 1 female, La Higuera, Coquimbo, Chile, 11.1989, leg. L.P.; 1 male, Elqui, Coquimbo, Chile, 2.1990, leg. Castillo; 1 male, Vicuña, Elqui, Coquimbo, Chile, 11.1991, leg. L.P.; 1 male, Los Vilos, Coquimbo, Chile, 2.11.1991, leg. L.P.

MHNS – 1 sp., Fray Jorge, Coquimbo, Chile (XI); 1 sp., Las Cardas, Coquimbo, Chile (XII); 1 sp., Vicuña, Coquimbo, Chile (IX); 4 sp., El Pangue, Chile (X); 2 females, La Higuera, Coquimbo, Chile, 17.11.92, Leg. L.P.

### *Pseudolucia oraria*

Collection BENYAMINI – 4 males, 35 km N. Huasco, Atacama Coast, Chile, 11.12.99, S.L., leg. D.B.; 3 females, 3.7 km N. Huasco Pacific Coastal dunes, Atacama, Chile, 11.12.99, S.L., leg. D.B. 1 male Alcohuaz, Elqui, Coquimbo, Chile, 2.11.00, 1800 m, leg. A.U.; 3 males, Las Breas, Limari, Coquimbo, Chile, 4.11.00, leg. A.U.; 1 male, 4 km N. Domeycó, Huasco, Atacama, Chile, 10.11.00, leg. A.U.; 11 males and 9 females, 37 km W. Domeycó, Huasco, Atacama, Chile, 11.11.00, leg. A.U.

Institutional depositors – CUWC – 1 sp., Pan de Azúcar, Chile, 28.1.46; 1 sp., Pan de Azúcar, Chile, 30.1.46; 1 sp., Pan de Azúcar, Chile, 10.11.48, leg. Wagenknecht; 1 sp., Pan de Azúcar, Chile, 25.2.49, leg. Wagenknecht.

LPC – 1 male, Freirina, Huasco, Chile, 9.84, leg. Barriga; 1 male, Huasco, Atacama, Chile, 11.87, leg. Barriga.

### *Pseudolucia scintilla*

Collection BENYAMINI – 1 female, Reg. Coquimbo, Cespedes, Illapel, Choape, 13.X.1994, leg. Peña (Peña coll.). 1 male, 20 km N. of Illapel, 2500 m, Caren, 7.I.1995, leg. D.B.

Institutional depositors – MNC – Holotype male: "Hacienda Illapel, 2500–2900 m, 9.xi.1954, L. Peña", gen. prep. No. 726, Bálint. Paratype female, with data of holotype, gen. prep. No. 727, Bálint.

### *Pseudolucia shapiro*

Collection BENYAMINI – 1 female, Reg. Coquimbo, Tongoy, 4.I.1992, leg. P. Mazry (ex coll. Peña).

### *Pseudolucia tamara*

Collection BENYAMINI – 2 males, Río Traful, 13 km W. Confluencia, Neuquén, Argentina, 21.12.99, 836 m, leg. D.B.; 3 males and 3 females, Río Limay, Confluencia, Neuquén, Argentina, 21.12.99, 665 m, leg. D.B.; 3 males, Contraco, Malleco, Temuco, Chile, 12.93, leg. H. Navarret.

*Pseudolucia ugartei*

*Collection* BENYAMINI – 1 male and 1 female, Cuesta la Dormida, Valparaíso / Metropolitan reg., Chile, 15.9.95, 1350 m, leg. D.B.; 3 males and 4 females, Cuesta la Dormida, Valparaíso / Metropolitan reg., Chile, 29.10.95, 1250 m, leg. D.B.; 4 males, Cuesta la Dormida, Valparaíso / Metropolitan reg., Chile, 29.10.95, 1350 m, leg. D.B.; 1 male, Cuesta la Dormida, Valparaíso / Metropolitan reg., Chile, 3.11.95, 1300 m, leg. D.B.

*Institutional depositors* – CUWC – 1 sp., Piscicultura, Aconcagua, Valparaíso, Chile, 11.58.

LPC – 1 male and 2 females, Tiltil, Chacabuco, Metropolitan reg., Chile, 10.92, leg. L.P.; 2 males, San Felipe, Chacabuco, Metropolitan reg., Chile, 5.10.93, leg. L. P. & A. U.

*Pseudolucia vera*

*Collection* BENYAMINI – 1 male, Pemehue, Araucanía, Chile, 1.1896, 1 female, P.N. Nahuelbuta, Araucanía, Chile, 12.93, leg. Peña / Ugarte; 3 males, Vn. Lonquimay, Araucanía, Chile, 20.12.94, 1400 m, leg. Peña – Ugarte; 1 male ex larva, Vn. Lonquimay, Araucanía, Chile, 25.2.95, 1100 m, leg. D.B.; 1 female, Vn. Lonquimay, Araucanía, Chile, 28.2.95, 1100 m, leg. D.B.; 1 male, P.N. Tolhuaca Ca. Temuco, Araucanía, Chile, 1.96, 1000 m, leg. A.U.; 6 males and 5 females, Vn. Llaïma, Araucanía, Chile, 3.1.98, 1200–1400 m, leg. D.B.; 2 males, Vn. Llaïma, Araucanía, Chile, 4.1.98, 1500 m, leg. D.B.; 2 females, S. Lorenzo, P.N. Lago del Laja, Chile, 30.1.99, leg. A.U.; 3 males and 6 females, Vn. Villarica, Araucanía, Chile, 28.12.99, 1407 m, leg. D.B.

*Institutional depositors* – CUWC – 1 sp., Curacautin, Araucanía, Chile, 15.12.50.

LPC – 1 male, Malalchuello, Araucanía, Chile, 20.11.90, 1200 m, leg. L.P.; 1 female, Vn. Lonquimay, Araucanía, Chile, 22.11.90, leg. L.P.; 4 males and 1 female, Ladera Sur, Vn. Lonquimay, Araucanía, Chile, 23.11.90, leg. L.P.; 1 male and 1 female, Vn. Lonquimay, Araucanía, Chile, 27.11.90, leg. L.P.; 1 female, Las Raíces, Lonquimay, leg. L.P.

FMC – 1 female, Malalcahué, Araucanía, Chile, 27.11.1990, 1200 m, leg. L.P.; 1 female, Vn. Lonquimay, Malleco, Araucanía, Chile, 26.1.1991, leg. L. P.

MNHN – 1 male: Pemehue, IX–XII.1890.

## APPENDIX II

## Larval host plants

of the *chilensis* et *collina* species-groups of *Pseudolucia*

## Cuscutaceae

*Cuscuta micrantha* CHOSY, 1841 – *P. chilensis*

*C. racemosa* MART., 1823 – *P. chilensis*

## Polygonaceae

*Chorizanthe dasyantha* PHIL., 1864 – *P. dubi*

*C. aff. densa* PHIL., 1895 – *P. dubi*

- C. frankenioides* REMY, 1851 – *P. dubi*, *P. oraria*  
*C. glabrescens* BENTH., 1836 – *P. dubi*  
*C. paniculata* BENTH., 1836 – *P. dubi*  
*C. ramosissima* BENTH., 1836 – *P. oraria*  
*C. rosea* PHIL., 1864 – *P. dubi*  
*C. umbellata* PHIL., 1864 – *P. dubi*  
*C. vaginata* BENTH., 1836 – *P. benyamini*, *P. collina*, *P. dubi*  
*C. virgata* BENTH., 1836 – *P. ugartei*  
*C. viridis* PHIL., 1895 – *P. dubi*

## Portulacaceae

- Montiopsis (Calandrinia) capitata* (H. & A.) FORD, 1993 – *P. collina*, *P. dubi*, *P. ugartei*  
*M. cistiflora* (GILL. ex ARN.) FORD, 1993 – *P. shapiro* (?)  
*M. conferta* (GILL. ex ARN.) FORD, 1993 – *P. tamara*  
*M. discolor* SCHRAUD., 1833 – *P. collina*, *P. dubi*  
*M. gayana* (BARN.) FORD, 1993 – *P. vera*  
*M. gilliesii* (H. & A.) FORD, 1993 – *P. collina*, *P. shapiro* (?)  
*M. parviflora* (PHIL.) FORD, 1993 – *P. dubi*  
*M. ramosissima* (H. & A.) FORD, 1993 – *P. dubi*  
*M. sericea* (H. & A.) FORD, 1993 – *P. collina*  
*M. trifida* (H. & A.) FORD, 1993 – *P. collina*, *P. dubi*  
*M. umbellata* (R. et P.) FORD, 1993 – *P. tamara*, *P. dubi*

# *Contributions to a Manual of Palaeartic Diptera*

edited by L. PAPP and B. DARVAS

*Volume 2. Nematocera and Lower Brachycera*

In the bulky volumes of the "Contributions to a Manual of Palaeartic Diptera" morphological, physiological, genetical, ecological and economic up-to-date knowledge of dipterous species (midges and flies), which have significant importance in genetics as model organisms, in plant cultivation as pests or beneficial parasitoids, in animal husbandry and human health as vectors of serious illnesses and which are important for ecosystem function, are treated. Morphological keys (with excellent figures) for adults and larvae, which help readers with identification of dipterous pests and parasitoids are provided, while readers in field of applied dipterology will find suitable environmentally friendly methods against pests or biological control methods, among others.

The 2nd volume contains 38 dipterous family chapters by 23 specialists from 12 countries. with 1895 figures on 258 plates.

November 30, 1997. 592 pages

ISBN 963 04 8836 1 (Series)

ISBN 963 04 8837 x (Vol. 2)

Foundation for the Publicity of the Hungarian Science

Publisher: Science Herald, Budapest

## **Order should be sent to**

E. W. Classey Ltd.

Natural History Publisher & Bookseller

Oxford House, 6 Marlborough Street, Faringdon

Oxon SN7 7JP, UK

Facsimile: (44)-1367 244800

E-mail: bugbooks@classey.demon.co.uk