

**Descriptions of eight new *Pseudolucia* species from Argentina with an updated list of species distributed in the austral regions of South America (Lepidoptera, Lycaenidae: Polyommatinae)**

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**Abstract** – Eight species of *Pseudolucia* Nabokov, 1945 are described from Mendoza and San Juan regions of Argentina: *P. calingasta* sp. n. from San Juan (*P. andina* species group); *P. atutia* sp. n., *P. ofir* sp. n. and *P. ulibarrui* sp. n. from San Juan (*P. argentina* species group); *P. sosneada* sp. n. from Mendoza (*P. chilensis* species group); *P. kieslingi* sp. n. from Mendoza and *P. mercedaria* sp. n. from San Juan (*P. collina* species group) and *P. pilgrama* sp. n. from San Juan (*P. sibylla* species group). Identification keys for groups are given. Taxonomy, known distributions, larval hostplants of the species are recorded and the biology/ethology of the species are briefly discussed. The distribution of the genus *Pseudolucia* in austral South America is given. With 68 figures and one table.

**Key words** – Polyommatini, new species, Andes, Argentina, larval hostplants

## INTRODUCTION

The first overview of the Argentine *Pseudolucia* Nabokov, 1945 fauna was presented by BÁLINT & JOHNSON (1995) recording the occurrence of 11 species from the country. Subsequently, further taxa have been recorded or described from Argentina (BENYAMINI *et al.* 1995, BÁLINT & BENYAMINI 2001, BÁLINT *et al.* 2001). These findings have indicated that the exploration of the diversity of *Pseudolucia* in the Eastern side of the Andes requires special effort.

Between 1995 and 2000, the first author tried several times – either alone or with Alfredo Ugarte – to enter the territory of Argentina from Chile in search of Nabokov's Blues, representatives of the genus *Pseudolucia*. But overall his efforts were fruitless due to unforeseen circumstances; e.g. due to the collapse of old bridges; roads cut off by floods; or by finding that the large river Rio des los

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Patos could not be crossed by car. The failures forced him to seek the help of the Argentine army; first in meetings in the headquarters in San Juan capital, then at “Escuadrón #26 – Barreal” and finally with the commanders of the high altitude border patrols “Condor del Plata” and “Condor del Oro”. All the officers recommended the hire of horses or mules as the best means of transport in the Andes. The mining company Glencore Queensland Xstrata Copper Ltd at El Pachón and at Cordón Azules granted permission to cross its properties. The latter also hosted them for a warm overnight stay, when their car kept overheating and repeatedly needed cooling using glacier ice on their way to “Valle de los Patos Norte”. This was the “aviso” for the exploration of Nabokov’s Blues in Argentina.

Barreal, Calingasta, San Juan became the bases for the Andean expeditions between 2004 and 2011 where Bernd and Perla Imbragen at “El Alemán” and Maxi, Chantal Dupont and Judith of Cabañas Kummel provided the lodging, “Mauro” Don Lisandro Hospedaje and Excursiones supplied the 4×4 transportation to the starting points of the tracks; Señor Campusano “El Gordo” and Señor Umberto Contreras supplied the horses, mules and “baqueanos” (mountain guides) to the Andean expeditions. Umberto guided the first author in person to the first sortie to upper Rio Atutia and also managed to catch “Truchas” for ‘on-the-fire’ dinners in the evening. In the field, the first author also enjoyed the company and support of both his sons Avishai and Eran, who collected some type specimens with him during the December 2009 expeditions across the Calingasta basin and the first frightening expedition to upper Rio Atutia.

Since 2006 the effort has concentrated on the study of the genus along the Andes in Central West Argentina, especially in the provinces of Mendoza and San Juan. The first result of this harvest was the discovery of the species *Pseudolucia balinti* in the Precordillera de los Andes (BENYAMINI 2013). Based in the town of Barreal, close to the border of both aforementioned provinces, the first author paid annual visits to various habitats in Las Leñas, Termas de Sosneado, Manzano Historico and Paso Bermejo in Mendoza, to eastern vegas of Cerro Mercedario, Paso Picheraguas and Rio Bramadero, Cordillera de la Ramada, Cordillera de Ansilta (Seven Peaks), Rio la Totorá, Cordón de los Azules, Rio Calingasta, Rio Atutia and “Valle de los Patos Norte”, in San Juan. While the elevations of the habitats in Mendoza were between 2,000 and 3,000 metres above sea level, in San Juan the Patagonian steppe is higher in the slopes, and the lower level activity of *Pseudolucia* starts from 2,650 up to 3,900 metres. Most of these remote habitats have never previously been reported upon and are inaccessible by car, requiring major efforts each year to organise the mule/horse-back expeditions. Overnight stays in the cold high Andes have always been difficult and taxing for survival. However, when the chilly mornings developed into fine weather at noon and new species of *Pseudolucia* were flying around, all hardships disappeared and the dis-

comfort was well rewarded. The first author would not have succeeded without the support of the Argentinian army, Gendarmeria Nacional, the mining companies, the accompanying “baqueanos” and the hospitable “Argentinos”.

A checklist of *Pseudolucia* indicating the occurrence of 17 species in Argentina was presented by BENYAMINI & BÁLINT (2011), and most recently, one additional species has been described by BENYAMINI (2013). While preparing this manuscript and checking records two more Chilean species have been found flying in the western Argentine provinces, bringing the total number to 27, along with the eight new species described here from the species groups *andina*, *argentina*, *chilensis*, *collina* and *sibylla*.

Besides describing the new taxa, the two authors' aims are (1) to complete the taxonomic knowledge of the Argentine *Pseudolucia* fauna and (2) to provide more information about the diversity of the species groups we differentiate via presenting new data on their biology, behaviour and distribution. We believe that the data will result in improved knowledge and a better understanding of this interesting genus, which, according to our knowledge, harbours the southernmost species in the distribution of the family Lycaenidae.

## MATERIAL AND METHODS

The study is based on the *Pseudolucia* material deposited in the collection of the first author and in the Hungarian Natural History Museum ( $\approx$  2000 specimens in total). The paratype material of the new taxa consists of 112 specimens (see Appendix). In the descriptive part, taxa are listed according to species groups, defined via the keys presented. In the case of species groups represented in Argentina by more than one species, identification key is also given. After the key, taxa are listed in alphabetical order. The species are diagnosed in comparison with the most similar species, and only the characteristic traits are given.

Methods and terminologies are compatible with the previous papers published on the genus (BÁLINT & JOHNSON 1993, BÁLINT & BENYAMINI 2001, BENYAMINI & BÁLINT 2011). Label data are cited verbatim for the holotype specimens between quotation marks, the sign “[//]” indicates line break in the labels. Genital structures were measured by an OLYMPUS SZX12 stereo microscope with ocular accessory GSWH X/22 under magnification  $\times 50$  as AB = valval length line measured from valva base to lower projection terminus, C = point on valval length where the highest distance is measured on valval length line perpendicularly to lower costa, CD = highest valval width measured from C, E = point on valval length line where the highest distance is measured perpendicularly to upper costa, EF = highest valval width measured from E (all in mm) (see Fig. 28). According to the expertise of various specialists on the subtribe, one

of the most important species-specific characters of the male genitalia capsule is the valval shape (e.g. CHAPMAN 1916, STEMPFFER 1937, 1938, HIGGINS 1975, ZHDANKO 2004, COUTSIS 2010). Therefore, we record traits offered by the male valva with the intention that they will be useful in the monographic treatment of the genus.

*Abbreviations of depositories* – DBC = Dubi Benyamini Collection (Bet Arye, Israel), HNHM = Hungarian Natural History Museum (Budapest, Hungary). Holotypes will be deposited in Instituto Argentino de Investigaciones de las Zonas Áridas – Consejo Nacional de Investigaciones Científicas y Técnicas (= IADIZA-CONICET, Mendoza, Argentina).

#### KEY TO IDENTIFICATION OF *PSEUDOLUCIA* SPECIES GROUPS OCCURRING IN ARGENTINA BASED ON WING CHARACTERS

- 1 Ventral hindwing surface with median intercellular lunulation ..... 2
- Ventral hindwing surface without median intercellular lunulation but with large patches forming medial band ..... 3
- 2 Dorsal wing surfaces with blue scaling and white antemarginal line ..... *sibylla* species group
- Dorsal wing surfaces without blue scaling and white antemarginal line, but with brown scaling and orange or pale yellow submarginal spots ..... *chilensis* species group
- 3 Male dorsal forewing surface with silvery, bronze or brown scaling ..... *andina* species group
- Male dorsal forewing surface not silvery or bronze neither brown, but with blue scaling ..... 4
- 4 Male dorsal forewing surface bright and dark salvia blue with orange postmedian scaling ..... *charlotte* species group
- Male dorsal forewing surface pale and light salvia or cobalt blue without orange postmedian scaling ..... 5
- 5 Male dorsal forewing pale salvia blue, ventral hindwing median pattern distal border lineal .. *collina* species group
- Male dorsal forewing cobalt blue, ventral hindwing median pattern distal border zigzagged .. 6
- 6 Male dorsal forewing surface with darker cobalt blue scaling and wide black margin ..... *plumbea* species group
- Male dorsal forewing surface with light cobalt blue scaling and lighter blue margin ..... *argentina* species group

#### KEY TO IDENTIFICATION OF *PSEUDOLUCIA* SPECIES GROUPS OCCURRING IN ARGENTINA BASED ON GENITALIA CHARACTERS

- 1 Male genitalia uncus horseshoe-shaped with aedeagus suprazonal element very short (less than 0.3 subzonal length), female genitalia ostium membranous or less sclerotised and tubular in dorsoventral view ..... 2
- Male genitalia uncus pointed with aedeagus suprazonal element longer (more than 0.3 subzonal length), female genitalia ostium heavily sclerotised and capsular in dorsoventral view ..... 3
- 2 Male genitalia aedeagus with pointed suprazonal element, female genitalia ostium terminally pointed ..... *collina* species group

- Male genitalia aedeagus with stout suprazonal element, female genitalia ostium terminally rounded ..... *chilensis* species group
- 3 Male genitalia uncus with concave outer margin, sagum strongly sclerotised around aedeagus, female genitalia ostium sclerotised with narrow central tube but wide terminal opening .....  
..... *charlotte* species group
- Male genitalia uncus with convex outer margin, sagum sclerotised or membraneous around aedeagus, female genitalia ostium sclerotised with wide central tube but narrow terminal opening ..... 4
- 4 Male genitalia sagum with bristles and heavily sclerotised outer margins, valval costa highly convex, female genitalia ostium with central tube with necking sides ..... *andina* species group
- Male genitalia sagum membraneous or missing, valval costa slightly convex and broken in wide obtuse angle, female genitalia ostium with central tube with parallel edges ..... 5
- 5 Male genitalia valva with parallel but waved upper and lower costa, sagum membraneous and well visible; female genitalia ostium robust with equal length and width .....  
..... *plumbea* species group
- Male genitalia valva with concave upper and convex lower costa, sagum membraneous but hardly visible or missing; female genitalia ostium width more than three times shorter than long ..... 6
- 6 Male genitalia tegumen sclerotised and flat dorso-cephalad, aedeagus with membraneous sagum; female genitalia ostium strong and short, central area simple ..... *argentina* species group
- Male genitalia tegumen sclerotised with a pointed dorso-cephalic extension, aedeagus without sagum; female genitalia ostium slender and long, central area with a long plate narrowing cephalad ..... *sibylla* species group

## SPECIES DESCRIPTIONS

### *Pseudolucia andina* species group

- 1 Dorsal wing surfaces grey with silvery or lighter brown with bronze gloss ..... 2
- Dorsal wing surfaces darker brown with bronze gloss or orange colouration ..... 3
- 2 Male dorsal forewing grey with silvery gloss (San Juan: Calingasta) ..... ***P. calingasta*** sp. n.
- Dorsal forewing brown with bronze gloss (Mendoza: Paso Bermejo) ... *P. andina* (Calvert, 1893)
- 3 Dorsal forewing ground colour lighter brown with pale orange colouration in postmedial area between veins M1 and CuA2 (Mendoza: Las Leñas, Valle Hermoso) .....  
..... *P. barrigai* Benyamini et Bálint, 2011
- Dorsal forewing ground colour very dark brown with faint orange colouration in postmedial area between veins M1 and CuA2 (Neuquén) ..... *P. neuqueniensis* Bálint et Johnson, 1995

### ***Pseudolucia calingasta*** sp. n.

(Figs 1–4, 28–29, 41, 50, 53–54)

*Type material* – Holotype (DBC) (Figs 53–54), male, set dorsally, in perfect condition, labelled as “Argentina, San Juan, [//] Calingasta [//] Cordillera de La Ramada, [//] Manantiales 3350m [//] 19.12.2009 [//] Leg. Dubi Benyamini” (rectangular, white, printed); “DBC-3063” (rectangular, yellow, printed). Paratypes (9 males, 3 females); dissections: 3 males, 1 female, for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 1–4): in dorsal view superficially resembling *Pseudolucia luzmaria* but dorsal wing colouration somewhat lighter, especially in females (*luzmaria* somewhat less silvery and female apical area white); ventral forewing surface light grey with discoidal line and complete row of interveinal postmedian spots, submarginal area patterned faintly but apical arrowhead marking conspicuous; hindwing ventral surface showing typical “*andina*-like” pattern with conspicuous postmedian white arrowhead markings running from costa to inner margin (no white arrowhead marking above vein M1 in *P. luzmaria*). Genitalia (Figs 28–29): typical of *andina*, but compared with *P. luzmaria* in lateral view male organ with more deeply bent lower costa and more inwardly curved terminus, uncus angular; female organ with heavily sclerotised terminal henia possessing a central tube. Measurements – Male: forewing costal length = 10–12 mm (n = 4; holotype = 10 mm); genitalia valva AB = 2.28–3.00, C = 1.50, CD = 0.20–0.25, E = 1.85–2.00, EF = 0.80 (n = 3); female: forewing costal length = 11–12 mm (n = 2).

*Type locality* – At elevation 3300 m, Manantiales, Cordillera de la Ramada, Calingasta region, province San Juan; coordinates: 32°61’51”S, 69°53’05.51”W (Fig. 41).

*Distribution* – Known in the Calingasta region from the following localities (and altitudes): Rio la Totorá (3244 m), Rio Atutia (3200–3250 m), Manantiales (3000–3350 m), Refugio de la Laguna Blanca (3154 m) (Fig. 50).

*Biology and notes* – This member of the *andina* species group is found only at places with the hostplant *Astragalus* sp. Only at the type locality were the hostplants relatively common, while in all the other sites singleton plants were sufficient to attract the butterfly. This suggests that this blue has good dispersing capability. Recorded hostplants are *Astragalus* aff. *crucksbanksii* (Hook. & Arn.) Griesb., *A. arnottianus* (Gillies ex Hook. & Arn.) Reiche, *A. pehuenches* Niederl. and *A. nelidae* E. Gomez-Sosa.

*Etymology* – Named after the region Calingasta of province San Juan, where the type locality of the species is situated.

#### *Pseudolucia argentina* species group

- |   |  |   |
|---|--|---|
| 1 | Male dorsal forewing shiny silvery blue, submarginal area with narrow (< 2 mm) lighter blue scaling .....  | 2 |
| – | Male dorsal forewing darker silvery blue, submarginal area with wider (> 2 mm) lighter blue scaling .....  | 3 |
| 2 | Male dorsal forewing lighter blue, submarginal band extending towards apex, ventral hindwing median band distinctive and dark coloured (Mendoza: Aconcagua region) ..... |   |
|   | ..... <i>P. argentina</i> (Balletto, 1993)   |   |

- Male dorsal forewing lighter blue, submarginal band not extending towards apex running parallel to margin, ventral hindwing median band merged with other marking elements and light coloured (San Juan: Paso Pichereguas, Rio Bramadero) ..... **P. ofir** sp. n.
- 3 Male dorsal forewing darker azure blue with black submarginal area wider than 1.5 mm, (female unknown) (San Juan: Rio Atutia) ..... **P. atutia** sp. n.
- Male dorsal forewing lustrous azure blue with grey antemarginal area less than 1.5 mm wide, female also blue but with orange subapical area orange between costa and medial veins ..... 4
- 4 Male dorsal forewing shiny azure blue with light grey submarginal band wider than 1.0 mm and expanding in width towards apex, female dorsal forewing orange subapical colouration extending beyond medial veins to the cubitus, female hindwing veins covered by black scales (San Juan: Paso de Agua Negra) ..... *P. talia* Bálint, Benyamini et Johnson, 1995
- Male dorsal forewing shiny azure blue with dark grey submarginal band not wider than 1.0 mm and not extending in width towards apex, female orange subapical colouration restricted to the area between costa and medial veins, female hindwing veins covered by blue scales (San Juan: Mercedario, Cord. Ansilta, Rio la Totorá) ..... **P. ulibarrii** sp. n.

***Pseudolucia atutia* sp. n.**

(Figs 5–6, 30, 42, 49, 55–56)

*Type material* – Holotype (DBC) (Figs 55–56), male, set dorsally, left hindwing partially damaged, labelled as “Argentina, San Juan, [//] Calingasta, Rio Atutia, [//] 2900 m [//] 06.12.2010 [//] Leg. Dubi Benyamini” (white rectangular paper, printed); “DBC-2981” (yellow rectangular paper, printed). Paratypes (3 males); dissections: 2 males, for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 5–6): in dorsal view superficially resembling *Pseudolucia balinti* because of deeper male blue dorsal wing colouration and wide black submarginal area. The most closely related *argentina* group species (*P. ofir* sp. n. and *P. ulibarrii* sp. n.) having lighter blue male dorsal colouration and submarginal area not black. Ventral forewing orange with well-marked black postmedian line in each intercellular space (more faint in *P. ofir* sp. n. and *P. ulibarrii* sp. n., and often vestigial in area close to forewing apex), ventral hindwing complex “*plumbea*-like” pattern almost identical to congeners with notable difference that dark elements darker, not brown but grey and black, hence ventral hindwing ground colour in *P. atutia* ash grey and medial band black (ground colour in other *argentina* group species light brown or brownish grey and medial band light or dark brown). Genitalia (Fig. 30): typical of the *argentina* species group as male organ in lateral view with long but relatively wide valva, hook-shaped upper terminus sclerotised and pointed, lower terminus rounded and membranous; the most conspicuous character seems to be dented (or waved) lower valval edge which in congeners more or less straight. Measurements – Male forewing costal length = 9.3 mm (n = 2), genitalia valva AB = 2.2, C = 1.5 and 1.7, CD = 0.28, E = 1.4 and 1.6, EF = 0.42 (n = 2). Female unknown.

*Type locality* – At elevation 2900 m, north of Rio Atutia; coordinates: not given (Fig. 42).

*Distribution* – Only known from the type locality (Fig. 49).

*Biology and notes* – An extremely local species, only a few adults were observed by the first author and Ofir Tomer flying around its larval hostplant *Adesmia uspallatensis* Gillies ex Hook. et Arn. Interestingly, it seems that these fine-leaved shrubs serve as the local hostplant while the much more numerous *Adesmia horrida* is less attractive for the species. A possibly puddling male was disturbed by the mule of the first author. On 17 December 2009 during the first expedition to the type locality, a fresh specimen was observed and photographed. It was flying around *A. horrida* but was not collected. Later a worn male was collected; it was dissected and found to be identical to this species (DBC-2983).

*Etymology* – Named after the type locality north of Rio Atutia.

#### ***Pseudolucia ofir* sp. n.**

(Figs 7–8, 31, 43, 49, 57–58)

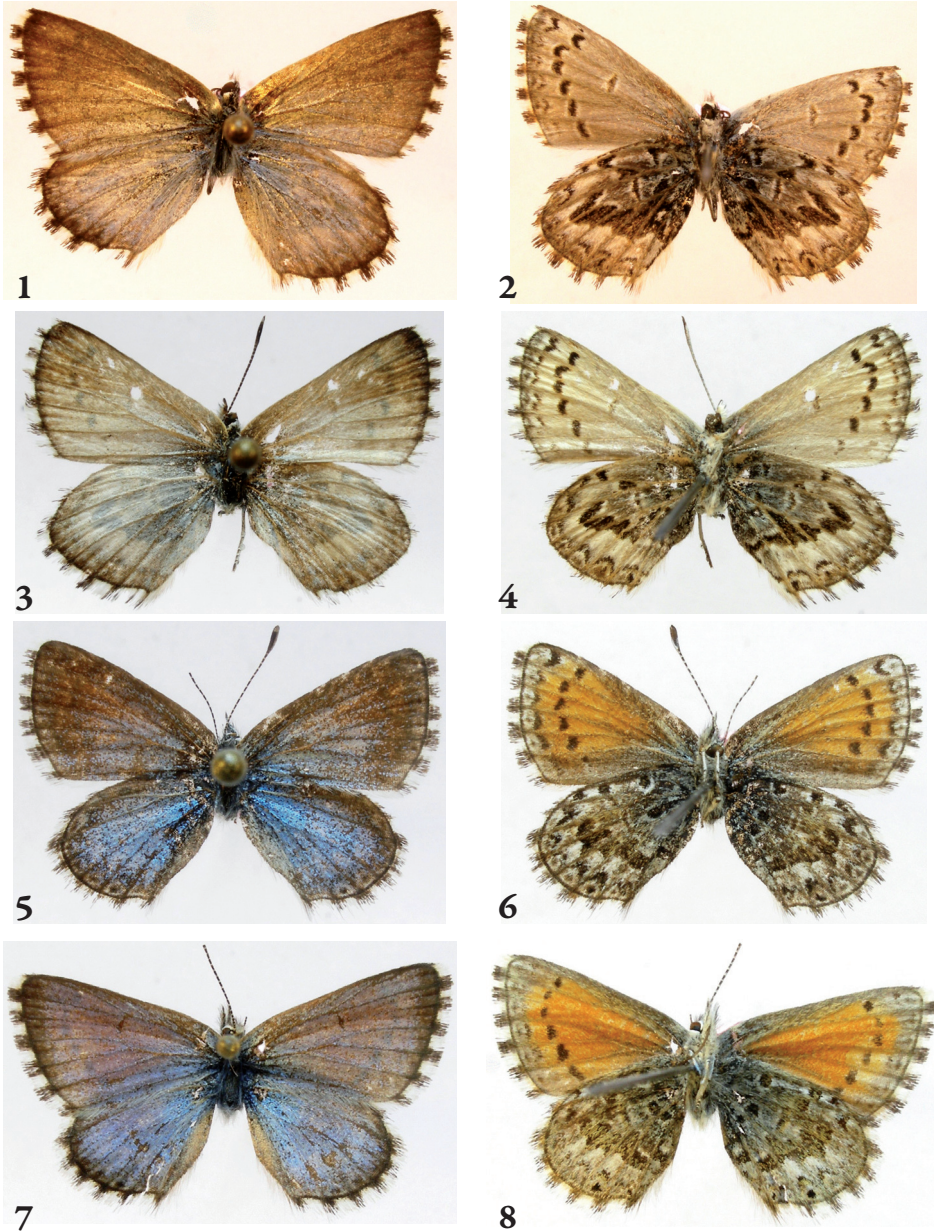
*Type material* – Holotype (DBC) (Figs 57–58), male, set dorsally, in perfect condition, labelled as “Argentina, San Juan, [//] Calingasta, [//] Rio Bramadero, [//] 3900 m [//] 01/12/2010 [//] Leg. Ofir Tomer” (white rectangular paper, printed); “DBC-4090” (yellow rectangular paper, printed). Paratypes (2 males); dissection: 1 male; for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 7–8): in dorsal view superficially resembling *Pseudolucia argentina* but male lighter blue submarginal band in dorsal wing surface remaining parallel to margin (*argentina* submarginal band extending to apex). Ventral hindwing “*plumbea*-like” pattern of the two species almost identical with notable difference that basal and costal spots and the median band very light brown coloured, white postmedian markings reduced hence less conspicuous (*argentina* spots and medial band dark, white postmedian markings conspicuous). Genitalia (Fig. 31): typical of the *argentina* species group as male organ in lateral view with long but relatively wide valva, hook-shaped upper terminus sclerotised and pointed, lower terminus rounded and membranous. Measurements – Male forewing costal length = 7–8 mm (n = 3, holotype = 8 mm), male genitalia valva AB = 2.0, C = 1.2, CD = 0.37, E = 1.4, EF = 0.28 (measured in HNHM paratype male). Female unknown.

*Type locality* – At elevation 3900 m, Paso Pichereguas (Rio Bramadero), region Calingasta, province San Juan; coordinates: 31°52'26.88”S, 70°02'16.32”W (Fig. 43).

*Distribution* – Known only from the type locality (Fig. 49).





Figs 1–8. *Pseudolucia* HNHM paratypes. 1–4: *Pseudolucia calingasta* sp. n., 1 = paratype no. 10, male, recto, 2 = ditto, verso, 3 = paratype no. 9, female, recto, 4 = ditto, verso. 5–6: *Pseudolucia atuttia* sp. n., 5 = paratype no. 2., male, recto, 6 = ditto, verso. 7–8: *Pseudolucia ofir* sp. n., 7 = paratype no. 2, male, recto, 8 = ditto, verso (in same magnification, *P. calingasta* male forewing costa length = 10.0 mm) (photos Hungarian Natural History Museum)

*Biology and notes* – This highly energetic species flies in the mountain pass of Pichereguas at nearly 4000 metres between Refugio de la Laguna Blanca and El Pachón copper mine, which is one of the windiest habitats known for *Pseudolucia* species. The collected males demonstrated an ability to withstand high winds by flying out of our collecting nets against the strong chilly winds. Their females demonstrated an escape tactic, i.e. crawling under the net frame after capture, hence not even one female was collected.

The habitat is a steep slope in the upper part of Rio Bramadero going down to Rio Blanco, with cushions of *Adesmia* hostplants. Two species were available: *A. aegiceras* Phil. and *A. echinus* C. Presl.

*Etymology* – Named after Ofir Tomer (Israel), the collector of the type series, the secretary of the Israeli Lepidopterists' Society and a field companion of the first author on some expeditions to remote places in the Andes.

***Pseudolucia ulibarrii* sp. n.**  
(Figs 9–12, 32–33, 44, 51, 59–60)

*Type material* – Holotype (DBC) (Figs 59–60), male, set dorsally, in perfect condition, labelled as “Argentina, San Juan, [//] Cordillera Ansilta, [//] 2650–3030 m [//] 13/12/2009 [//] Leg. Dubi Benyamini” (white rectangular paper, printed); “DBC-2978” (yellow rectangular paper, printed). Paratypes (12 males, 8 females); dissections: 2 males, 6 females; for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 9–12): in dorsal view superficially resembling *Pseudolucia talia* but male blue dorsal wing colouration with darker grey submarginal band not wider than 1.0 mm and female dorsal forewing with reduced orange scaling (compared with *P. talia*), hindwing dorsal surface uniform blue (*P. talia* male dorsal forewing submarginal band wider extending towards apex and female dorsal hindwing multicoloured with veins suffused with black scales and submarginal markings). Ventral forewing colouration vivid orange (*talia* colouration pale). Ventral hindwing “*plumbea*-like” pattern of the two species almost identical, with notable difference that white arrowhead-shaped markings between median spots and submarginal pattern forming almost continuous band (*argentina* white arrowhead markings spots separated). Genitalia (Figs 32–33): typical of the *argentina* species group as male organ in lateral view with long but relatively wide valva, hook-shaped upper terminus sclerotised and pointed, lower terminus rounded and membranous. Measurements – Male: forewing costal length = 7.5–10.2 mm, average 8.95 mm (n = 8), male genitalia valva AB = 2.10–2.37, C = 1.26–1.68, CD = 0.42–0.47, E = 1.42–1.57, EF = 0.16–0.40 (n = 3); female: forewing costal length = 8.0–10.2 mm, average 9.4 mm (n = 6).

*Type locality* – At elevation 2650–3030 m, Cordillera de Ansilta, region Calingasta, province San Juan; coordinates: 31°42'30.84"S, 69°44'5.58"W (Fig. 49).

*Distribution* – It is known from three main regions: (1) In the Cerro Mercedario region, known from the following localities (and altitudes): between El Molles and la Laguna Blanca (3000 m), Refugio de la Laguna Blanca (3154 m), Vega de Guanacito (3560 m), Cordillera de La Ramada: Manantiales (2850–3400 m); (2) In the Cordillera de Ansilta region, known from its western slopes; (3) in upper western Rio Calingasta region, from Rio la Totorá (3250–3450 m) (Fig. 51).

*Biology and notes* – This member of the *argentina* species group with its unique female appearance flies usually around medium to large *Adesmia* host-plants. The preferred species was *Adesmia pinifolia* Gill., but *A. aegiceris* Phill. was also recorded. We found it in deep or flat valleys and in east-facing slopes. Males are territorial on twigs of the hostplants and females less conspicuous but found also around the hostplants, sitting quite often head down with wings slightly open for basking. Males were observed on wet and grassy meadows, possibly for puddling.

*Etymology* – Named after Professor Emilio Ulibarri ex Instituto de Botánica Darwinion, San Isidro, Buenos Aires (Argentina), a well-known botanist and expert of *Adesmia* and other Fabaceae plants. During more than twenty years, he identified hundreds of *Adesmia* samples for us.

#### *Pseudolucia chilensis* species group

- |   |   |  |
|---|---|--|
| 1 | Ventral hindwing medial intercellular black spots large (Chile: Pacific coast and Mountains up to 2000 m) ..... | <i>P. chilensis</i> (Blanchard, 1952)                |
| – | Ventral hindwing medial intercellular black spots reduced or absent .....                                       | 2  |
| 2 | Ventral forewing basal and medial area grey (Argentina: Jujuy) .....  | <i>P. jujuyensis</i> Bálint, Eisele et Johnson, 2000 |
| – | Ventral forewing basal and medial area pale orange (Argentina: Mendoza) .....                                   | <b>P. sosneada</b> sp. n.                            |

#### ***Pseudolucia sosneada* sp. n.**

(Figs 13–16, 34–35, 45, 49, 61–62)

*Type material* – Holotype (DBC) (Figs 61–62), male, set dorsally, in perfect condition, labelled as “Ex larva on [//] *Cuscuta* [//] Termas del [//] Sosneado 2270 m” and “Pupa: 29.1.2005. [//] Adult: 6.3.2005. [//] leg. Benyamini” (both rectangular, white, handwritten letters by D. Benyamini); “DBC-0201” (yellow rectangular paper, printed). Paratypes (5 males, 2 females); dissections: 1 male, 1 female; for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 13–16): small species with warm shiny bronze-brown wing surfaces and pale butter coloured submarginal spots,

resembling *P. chilensis* but in comparison forewing shape narrower having shorter outer margin; male dorsal forewing surface orange scaling exclusively restricted to discal spot (*chilensis* orange scaling more extensive penetrating discal and postdiscal areas); female dorsal forewing surface resembling multicoloured *chilensis* male (having far less orange scaling than *chilensis* female); ventral forewing surface orange colouration pale (*chilensis* colouration more vivid); ventral wing surfaces almost identical with that of *chilensis* with notable difference that in hindwing black basal and medial spots extremely reduced in size or missing (basal and medial spots always fully present in *chilensis* even if spots strongly reduced in size). Genitalia (Figs 34–35): as other members of the group with male genitalia aedeagus with stout and short suprazonal element, female genitalia ostium terminally rounded. Measurements – Male: forewing costal length = 8–10 mm (n = 3); genitalia valva AB = 2.34, C = 1.25, CD = 0.68, E = 1.65, EF = 0.2 (n = 1, measured in holotype); female: forewing costa length = 10 mm (n = 1).

*Type locality* – At elevation 2250 m, Termas el Sosneado, Mendoza, Argentina; coordinates: 34°50'27.62"S, 69°55'03.77"W (Fig. 45).

*Distribution* – Known only from the type locality and its close vicinity (Fig. 49).

*Biology and notes* – The habitat is the south-western slope above the ruined hotel Termas el Sosneado where the plant *Cuscuta* was observed as yellow patches over *Adesmia* and *Glandularia* (Verbenaceae) bushes. This hotel is remembered as the summer house of the late presidential couple Juan & Eva Peron. They used to host famous people there, amongst them Albert Einstein. Today, cattle are the only visitors. The ruins of the hotel in this beautiful environment are long awaited to be refurbished and reopened to the public. The species was first collected by Professor Arthur M. Shapiro (Davis, California) near the hotel, but he also recorded it at 3000 m on April 2004 on his way to Volcan Overo.

The butterflies were observed by the first author flying around the larval hostplant *Cuscuta indecora* Choisy (det. Prof. Eduardo Méndez, IADIZA-CONICET, Mendoza), where caterpillars were also taken and reared. This parasitic plant is extremely local in West Argentina and this habitat gives the most flourishing population observed by the first author in the western part of Argentina. The host of *Cuscuta* is mostly *Adesmia trijuga*. Gilles ex Hook & Arn.), but also two *Senecio* spp. (Asteraceae) and *Glandularia origenes* (Phil.) Schnack et Covas (Verbenaceae).

According to A. M. Shapiro (pers. comm.) “*Cuscuta indecora*, it turns out, is a species complex probably containing more than one entity. Nominate *indecora* is a common parasite of cultivated alfalfa in both North and South America”. In Argentina, 19 *Cuscuta* species have been recorded (YUNCKLER 1939), most of them from the north. The taxon *C. indecora* var. *integriuscula* (Engelmann)



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Figs 9–16. *Pseudolucia* HNHM paratypes. 9–12: *Pseudolucia ulibarii* sp. n., 9 = paratype no. 1, male, recto, 10 = ditto, verso, 11 = paratype no. 2, female, recto, 12 = ditto, verso. 13–16: *Pseudolucia sosneada* sp. n., 13 = paratype no. 4, male, recto, 14 = ditto, verso, 15 = paratype no. 7, female, recto, 16 = ditto, verso (in same magnification, *P. ulibarii* male forewing costa length = 8.0 mm) (photos Hungarian Natural History Museum)

Yunckler, has been cited from province Mendoza. Probably this is the larval host plant of *P. sosneada*.

*Etymology* – Named after the type locality.

*Pseudolucia collina* species group

- |   |  |   |
|---|--|---|
| 1 | Ventral hindwing surface median marking distal edge lineal .....   | 2   |
| – | Ventral hindwing surface median marking distal edge zigzagged .....  | 5   |
| 2 | Ventral hind median line interrupted, tornal spot in cell CuA2 less prominent or absent (Neuquén: Lago Tromen, Paso Córdoba) ..... | <i>P. tamara</i> Bálint et Johnson, 1995      |
| – | Ventral hindwing median line generally continuous and tornal spot in cell CuA2 conspicuous .....                                   | 3   |
| 3 | Tornal spot in cell CuA2 rounded (Argentina: Lago Aluminé and Neuquén) .....   | <i>P. collina</i> (Philippi, 1859)            |
| – | Tornal spot in CuA2 not rounded, but lineal or triangular .....  | 4   |
| 4 | Tornal spot in cell CuA2 lineal (Argentina: Mendoza) .....   | <i>P. shapiro</i> i Bálint et Johnson, 1995   |
| – | Tornal spot in cell CuA2 triangular (Argentina: Mendoza) .....   | <i>P. zoellneri</i> Benyamini et Bálint, 2011 |
| 5 | Male dorsal wing surface pale salvia blue (Argentina: Mendoza) .....   | <b><i>P. kieslingi</i></b> sp. n.             |
| – | Male dorsal wing surface dark salvia blue (Argentina: San Juan) .....  | <b><i>P. mercedaria</i></b> sp. n.            |

*Pseudolucia kieslingi* sp. n.

(Figs 17–20, 36–37, 46, 49, 63–64)

*Type material* – Holotype (DBC) (Figs 63–64), female, set dorsally, in perfect condition, labelled as “Paso Bermejo, 09.12.2006. [//] Penitentes, 2660m [//] Mendoza, Argentina [//] Leg. D. Benyamini” (rectangular, white, printed); “DBC-1994” (rectangular, yellow, printed). Paratypes (1 male, 4 females); dissections: 1 male, 1 female; for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 17–20): very small species resembling *P. mercedaria* (see next species described) with light violet male dorsal forewing colouration and chequered fringes and characteristic female with blue basal area, orange ventral forewing colouration, black postmedian spots in intercellular spaces and grey submarginal area, but ventral hindwing surface characteristic having *collina*-like pattern with light grey basal and submedian area with identically coloured discal region, median brown band reduced and without black distal scaling (*mercedaria* basal and postmedian areas dark with lighter discal region, median band with black distal elements). Genitalia (Figs 36–37): as other members of the species group with male genitalia uncus horseshoe-shaped, aedeagus suprazonal element very short and stout, large and sclerotized sagum; female genitalia ostium bifurcated as in *P. mercedaria* but lower furcation as long as upper one creating U-shaped structure in lateral view (lower furcation shorter in *P. mercedaria*). Measurements – Male: forewing costal length = 9 mm

(holotype), genitalia valva AB = 3.28, C = 1.14, CD = 0.28, E = 1.42, EF = 0.28 (n = 1, measured in holotype); female: forewing costal length = 7–8 mm (n = 3).

*Type locality* – Situated at 2668 m elevation, 4 km W of Penitentes, Mendoza. Coordinates: 32°49'41"S, 69°52'47"W (Fig. 46).

*Distribution* – Known only from the type locality. Patches of hostplants were also observed at Horcones 2743 m, near the entrance to the mountain track to Aconcagua peak (Fig. 49).

*Biology and notes* – This species is extremely local as it was found only 4 km W of the ski resort of Penitentes at elevation 2260 metres. It is located along the international mountain pass from Argentina to Chile between the road and the mountain slope. Altogether, only five specimens were collected during three day-long intensive searches. It reflects the distribution of the hostplant, which was also extremely local. The hostplant is the prostrate *Montiopsis gilliesii* (Hook. & Arn.) Ford with lilac-violet flowers. Eggs and caterpillars were found and reared by the first author on this plant. Males are fast flyers, very difficult to follow in flight, while females tend to remain motionless on the soil and are hard to detect.

*Etymology* – The butterfly is named for Professor Roberto Kiesling (former curator of Instituto de Botánica Darwinion, San Isidro, Buenos Aires, scientific collaborator of IADIZA-CONICET, Mendoza), one of the leading botanists of the region. He joined the first author for an expedition leading to Cerro Mercedario, Paso Pichereguas and the Precordillera de los Andes at San Juan.

***Pseudolucia mercedaria* sp. n.**

(Figs 21–24, 38–39, 47, 52, 65–66)

*Type material* – Holotype (DBC) (Figs 65–66), male, set dorsally, in good condition (half of left antenna missing), labelled as “Argentina, San Juan, [//] Cerro Mercedario [//] Vega de Guanacito 3623 m [//], 21/12/ 2007 [//] Leg. Dubi Benyamini” (rectangular, white, printed); “DBC-1903” (rectangular, yellow, printed). Paratypes (32 males, 16 females); dissections: 5 males, 5 females; for detailed data see Appendix.

*Diagnosis and description* – Habitus (Figs 21–24): very small species resembling *P. shapiro* with light violet male dorsal forewing colouration and chequered fringes as other congeners of the species group (*shapiro* blue somewhat darker), but female characteristic with blue basal area, black postdiscal spots and bluish grey submarginal band in dorsal forewing and entirely blue dorsal hindwing surface (*shapiro* black postdiscal spots reduced). Ventral forewing colouration and pattern also typical for the species group with orange colouration, black postmedian spots in intercellular spaces and grey submarginal area, but ventral hindwing surface characteristic having *collina*-like pattern with very dark submedian

area with lighter (grey) discal region, median band comprised by black ruptive elements distally merging into ground colour, postmedian area almost entirely coloured ash grey (*shapiro* basal, submedian and submarginal area light brown, black ruptive medial band elements well visible). Genitalia (Figs 38–39): as other members of species group with male genitalia uncus horseshoe-shaped, aedeagus suprazonal element very short and stout, and large and sclerotized sagum, female genitalia ostium bifurcated as in some Chilean congeners, but lower terminus projecting perpendicularly creating an L-shaped structure in lateral view. Measurements – Male: forewing costal length = 7.0–9.0 mm, average 7.68 mm (n = 8; holotype male = 7 mm); male genitalia valva AB = 1.89–1.91, C = 1.25–1.36, CD = 0.25–0.48, E = 0.71–1.15, EF = 0.20–0.42 (n = 3); female: forewing length = 7.0–8.3 mm, average 7.71 mm (n = 6).

*Type locality* – At elevation 3623 m, Vega de Guanacito, Cerro Mercedario, region Calingasta, province San Juan; coordinates: 31°55'32"S, 70°01'02"W (Fig. 47).

*Distribution* – The species is confined to province San Juan from upper valleys east of Paso Cortez, upper valleys of Rio Calingasta (e.g. Rio La Tatora), eastern valleys of Cerro Mercedario going down to Rio Blanco and upper Rio de los Patos at Manantiales, Cordillera de la Ramada between 2850–3750 metres. The adjacent regions in Mendoza were not sampled, the species may occur there at similar altitudes (Fig. 52).

*Biology and notes* – This distinctive species is confined to the high altitude eastern slopes of the Andes in San Juan province around the prostrate patches of *Montiopsis* hostplants, especially *M. potentilloides* (Barn.) Ford, a carpet-forming, whitish-green plant with large flowers ranging from white to lilac and violet. Other recorded hostplants are *Montiopsis gilliesii* (Hook. et Arn.) Ford and *M. andicola* (Gillies) D. I. Ford. The preferred habitats are moderate slopes and elevated banks of small rivulets with gravel, the butterflies are low flyers around the hostplants, landing with closed wings on small stones, bare soil and the host-plant, before opening their wings from 30–120° for basking. Males are attracted to wet soil.

*Etymology* – The butterfly is named after Cerro Mercedario, the highest mountain in San Juan province, where it was first collected.

#### *Pseudolucia sibylla* species group

We have already presented an identification key for the members of the group represented by four species in Chile (BÁLINT & BENYAMINI 2013). The species below is the only known member of this assemblage recorded in Argentina.





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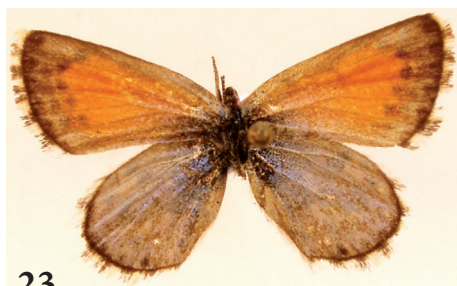
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Figs 17–24. *Pseudolucia* HNHM paratypes. 17–20: *Pseudolucia kieslingi* sp. n., 17 = paratype no. 3, male, recto, 18 = ditto, verso, 19 = paratype no. 4, female, recto, 20 = ditto, verso. 21–24: *Pseudolucia mercedaria* sp. n., 21 = paratype no. 47, male, recto, 22 = ditto, verso, 23 = paratype no. 48, female, recto, 24 = ditto, verso (in same magnification, *P. kieslingi* male forewing costa length = 8.0 mm) (photos Hungarian Natural History Museum)

***Pseudolucia pilgrama* sp. n.**  
(Figs 25–27, 40, 48, 49, 67–68)

*Type material* – Holotype (DBC) (Figs 67–68), male, set dorsally, in perfect condition, labelled as “Argentina, San Juan, [//] Calingasta, [//] Between Valle Hermoso & [//] Valle de Los Patos sur, [//] Patillo 3505 m [//] 09/12/2010 [//] Leg. Ofir Tomer” (rectangular, white paper, printed); “DBC-4903” (rectangular, yellow paper, printed). Paratypes (3 males), dissection: 1 male; for detailed data see Appendix.

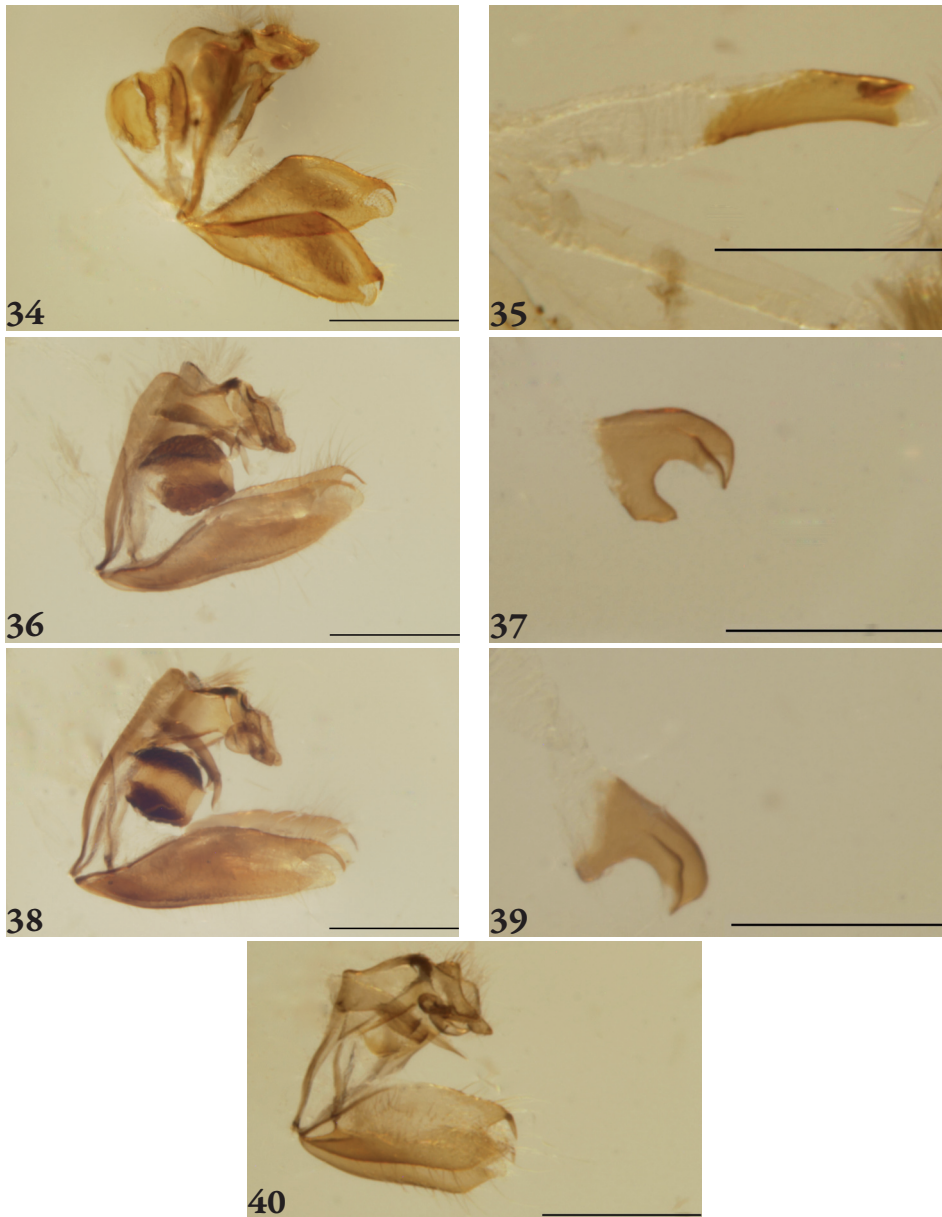


**Figs 25–27.** *Pseudolucia pilgrama* sp. n., 25 = paratype no. 2 (HNHM), male, recto, 26 = ditto, verso (forewing costa length = 7.0 mm) (photos: Hungarian Natural History Museum), 27 = female in nature (photo D. Benyamini)

*Diagnosis and description* – Habitus (Figs 25–27): small species with azure blue wing surfaces with delicate white submarginal area patterned by grey interveinal spots, ventral surfaces are grey with commonplace polyommata pattern. Resembles Chilean congeners *P. aureliana* and *P. sibylla* but male dorsal



**Figs 28–33.** *Pseudolucia* imaginal structures (with indication of genitalia preparation number of Zsolt Bálint), 28 = *P. calingasta* sp. n. male genitalia in lateral view (no. 1494); 29 = *P. calingasta* female genital terminalia in ventral view (no. 1521), 30 = *P. atutia* sp. male genitalia in lateral view (no. 1406), 31 = *P. ofir* sp. n. male genitalia dorsolateral view (no. 1409), 32 = *P. ulibarrii* male genitalia in lateral view (no. 1408), 33 = *P. ulibarrii* female genital terminalia in lateral view (no. 1418) (scale bars = 0.9 mm) (photos Hungarian Natural History Museum)



**Figs 34–40.** *Pseudolucia* imaginal structures in lateral view (with indication of genitalia preparation number of Zsolt Bálint), 34 = *P. sosneada* sp. n. male genitalia (no. 1373); 35 = *P. sosneada* female genitalia (no. 1374), 36 = *P. kieslingi* sp. male genitalia (no. 1386), 37 = *P. kieslingi* sp. n. female genital terminalia (no. 1387), 38 = *P. mercedaria* sp. n. male genitalia (no. 1388), 39 = *P. mercedaria* sp. n. female genital terminalia (no. 1389) 40 = *P. pilgrama* sp. n. male genitalia (no. 1438) (all scale bars = 0.9 mm; except Fig. 34 where scale bar 0.63 mm) (photos Hungarian Natural History Museum)



Fig. 41. *Pseudolucia calingasta* sp. n. type locality: at elevation 3300 m, Manantiales, Cordillera de la Ramada, San Juan, Argentina; showing the larval hostplant *Astragalus* sp. patches in violet blossom (photo O. Tomer)



Fig. 42. *Pseudolucia atutia* sp. n. type locality: at elevation 2900 m, Quebrada, north of Rio Atutia, San Juan, Argentina (photo O. Tomer)



**Fig. 43.** *Pseudolucia ofir* sp. n. type locality: at elevation 3900 m, Paso Pichereguas (Rio Bramadero), region Calingasta, San Juan, Argentina; the steep slope exposed to strong winds (photo D. Benyamini)



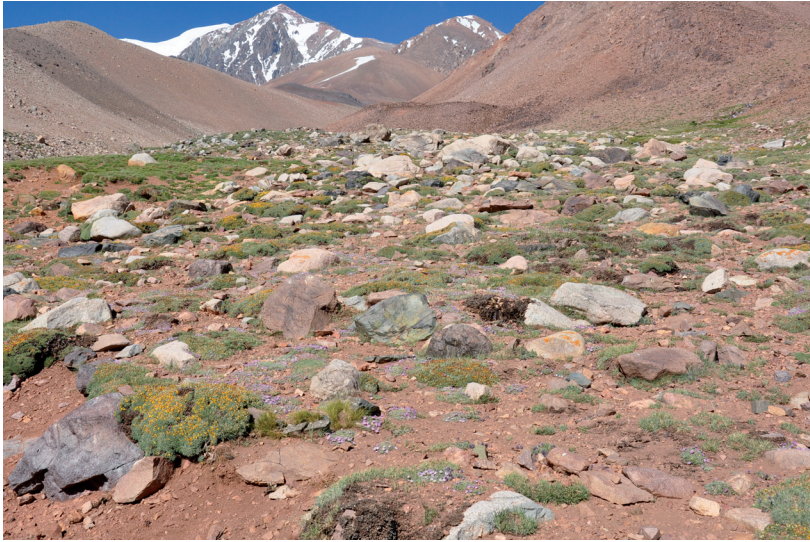
**Fig. 44.** *Pseudolucia ulibarrii* sp. n. type locality: at elevation 2650–3030 m, Cordillera de Ansilta, region Calingasta, San Juan, Argentina; shrubbery of high-growing *Adesmia* (photo D. Benyamini)



Fig. 45. *Pseudolucia sosneada* sp. n. type locality: at elevation 2250 m, Termas el Sosneado, Mendoza, Argentina; hillside vegetation parasitised by *Cuscuta* (yellow patches) where males perched and females oviposited (photo D. Benyamini)



Fig. 46. *Pseudolucia kieslingi* sp. n. type locality: at elevation 2668 m, 4 km W of Penitentes, Mendoza, Argentina; habitat with *Montiopsis* patches in the foreground along the international road to Chile in the Aconcagua region (photo D. Benyamini)



**Fig. 47.** *Pseudolucia mercedaria* sp. n. type locality: at elevation 3623 m, Vega de Guanacito, Cerro Mercedario, region Calingasta, San Juan, Argentina; upper valley of Rio Calingasta with cerro Mercedario (6720 m) behind, in front cushions of blossoming larval hostplant *Montiopsis potentilloides* (photo D. Benyamini)



**Fig. 48.** *Pseudolucia pilgrama* sp. n. type locality: at elevation 3505 m, Patillo, between Valle Hermoso and Valle de Los Patos sur, region Calingasta, San Juan, Argentina; the north-east facing barren slope sparsely vegetated where the type material was collected (photo O. Tomer)



wing surface azure blue (darker violet both in *P. aureliana* and *P. sibylla*), and submarginal area patterned by delicate intervenial grey-coloured spots well visible from shallow angle (no such markings in *P. aureliana* and *P. sibylla*), ventral hindwing and colouration almost identical with congeners with notable difference that forewing discoidal line always present (generally missing or rarely marked in other species). Female: see notes. Genitalia (Fig. 40): male genitalia as other congeners with sclerotized tegumen and a dorso-cephalic pointed extension, no sagum. Measurements – Male: forewing costal lengths = 7 mm (n = 4), genitalia valva AB = 1.22, C = 0.82, CD = 0.37, E = 1.11, EF = 0.14 (n = 1, HNHM paratype).

Type locality – At elevation 3505 m, Patillo, between Valle Hermoso and Valle de Los Patos sur, region Calingasta, province San Juan, Argentina; coordinates: 30°48'37.35"S, 70°12'50.63"W (Fig. 48).

*Distribution* – Only known from the type locality (Fig. 49).

*Biology and notes* – This pretty species was captured on 9 December 2010 by Ofir Tomer, who was collecting while the first author was photographing the adults and preparing the botanical samples. The type locality at Patillo is the lower part of a north-east facing slope at the southern part of Valle de los Patos sur. It is 20.5 km south of Laguna de los Patos Norte and the deserted station of the Gendarmerie Nacional there. It is also 6.5 km east of the Chilean border at the top of the continental divide, 72 km E of Monte Patria (Coquimbo, Chile) and 95 km NW of Calingasta (San Juan, Argentina). At the “vega” below, the pierid butterflies *Colias flaveola* and *Phulia nymphula* were uncommon.

The butterflies started to fly at 10:18 and were observed until 11:45 when the site had to be left (12 hours were necessary to drive the 4×4 car back to the base camp at Barreal, Calingasta). During the one and a half hour period of butterfly activity, only about a dozen specimens were observed. Their very low and fast flight, rapid descent to the ground and a brown underside made it very difficult to follow the individuals and collect them. Eventually, four males were captured and one female was recorded by digital camera (Fig. 27), all in perfect condition. The bare, leafless, thorny hostplants clearly indicated that it was the beginning of the flight period.

The hostplant (Dubi Benyamini herbarium sample no. 1167) is the cushion-like thorny *Adesmia* cfr. *aegiceras* (Fabaceae) (det. by Prof. Emilio Ulibarri of Instituto de Botánica Darwinion at San Isidro, Buenos Aires). At the time of collecting, most of the plants on the slopes were leafless and only in a more sheltered, warmer area above the vega had some plants started to grow their first leaves. The northern “goose valley” (as it is called by the Argentineans) is an extremely overgrazed area where approximately one and a half million Chilean goats cross the border annually to feed during the summer. It is a big threat to the



Fig. 49. Type localities of *Pseudolucia* species hitherto known from a single site in Argentina, indicated by red flags: *P. atutia* sp. n., *P. jujuyensis* Bálint, Eisele et Johnson, 2000, *P. kieslingi* sp. n., *P. ofir* sp. n., *P. pilgrama* sp. n. and *P. sosneada* sp. n. (courtesy O. Tomer)



Fig. 50. Known distribution of *Pseudolucia calingasta* sp. n., type locality indicated by red flag, the other records by blue ones (courtesy O. Tomer)

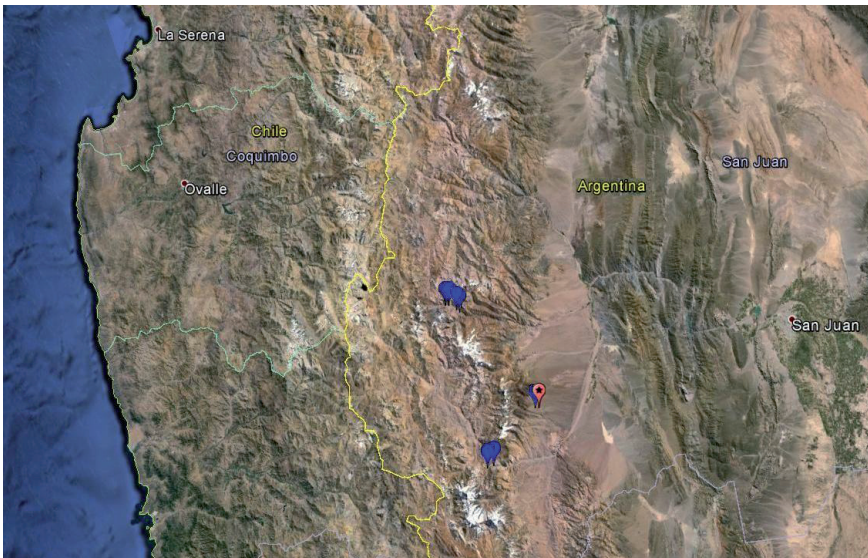
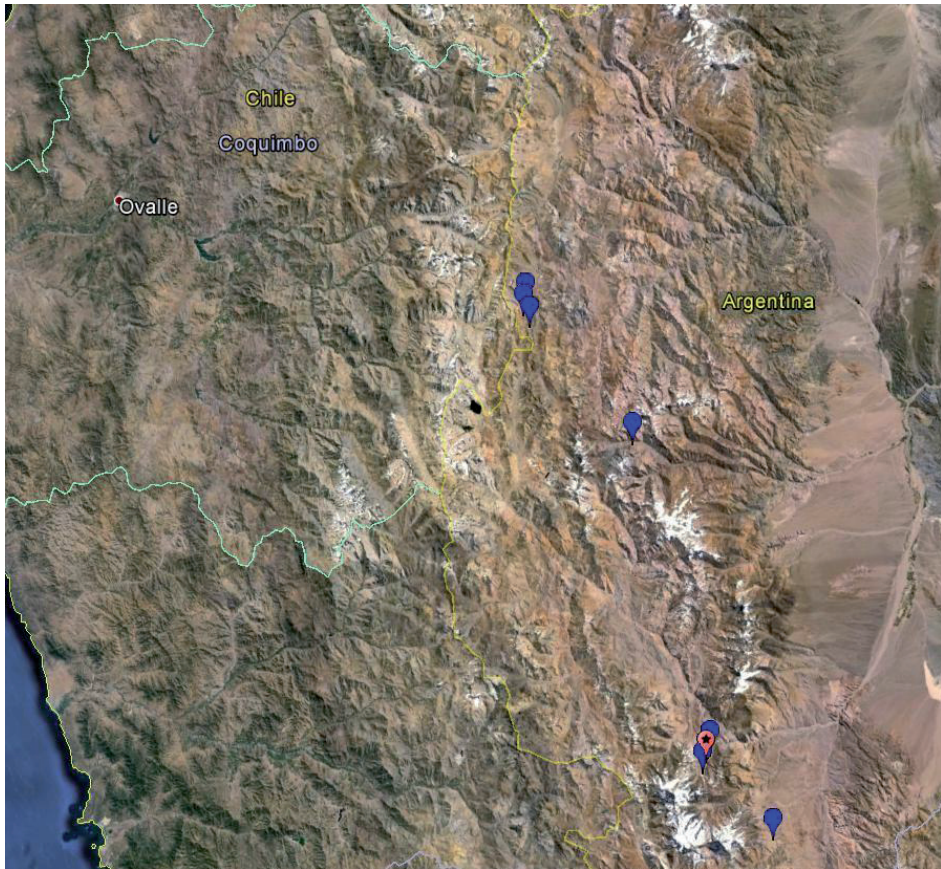


Fig. 51. Known distribution of *Pseudolucia ulibarrii* sp. n., type locality indicated by red flag, the other records by blue ones (courtesy O. Tomer)

butterfly. *Adesmia echinus*, which has stronger spines than *A. aegiceras*, might be a candidate hostplant offering even greater protection from browsing. One specimen, which was followed by Ofir Tomer, flew into a hostplant bush where it was photographed as it feigned death.

A single basking female was photographed by the first author showing the dorsal wing surfaces (Fig. 27), but was not captured. Therefore, the female description cannot be included in the formal diagnosis as there is no voucher specimen. The female is a typical representative of the species group: it is similar to the male (sexual dimorphism is limited) but with a more extensive dorsal wing surface, white antimarginal border, which is especially broadened in the forewing apical area.



**Fig. 52.** Known distribution of *Pseudolucia mercedaria* sp. n., type locality indicated by red flag, the other records by blue ones (courtesy O. Tomer)

*Etymology* – Named for the character Pilgram (a butterfly shop owner who dreamed of traveling the world) from Nabokov’s story “The Aurelian”, because of the superficial similarity to *P. aureliana*, which also belongs to the *sibylla* species group.

## DISCUSSION

In our previous overview of the genus we indicated the existence of five species groups in the genus *Pseudolucia* (BENYAMINI & BÁLINT 2011), but we suggested that one of them is in need of splitting, based on data traits indicated by their morphology and biology (BÁLINT & BENYAMINI 2013, BENYAMINI 2013). Indeed, in the present paper we accomplished this task and discriminated not five but seven species groups within *Pseudolucia* (see the key). The close relationships (“monophylies”) of the species placed in the same species groups are supported not only by the characters we have chosen but also by their biology, including larval hostplant selection and adult behaviour. There are altogether four groups harbouring fewer than ten species, and the remaining three groups have more numerous species (> 10). All the groups are represented on both sides of the Andes – the Pacific and the continental ones, respectively (see Checklist below). When we compare the *Pseudolucia* diversity of Argentina and Chile, we observe the patchwork picture we describe in the following paragraphs.

The *charlotte* species group is represented by two distinct species; both occur in Chile and Argentina with continuous and overlapping distributions. They inhabit the Andes around latitude 40° where they occupy habitats above the timberline of the Valdivian forest belt. Their relationships are not yet fully understood, but most probably they are sisters and their group is closely related to the *andina* species group based on structural grounds, or to *Adesmia* (Fabaceae) consumers of the *plumbea* species group, based on larval hosts (see the hostplant family tree in BENYAMINI 2013). Their known distribution is most probably partly influenced by relatively recent events indicated by intensive human land use, e.g. logging, forest clearings for ski-tracks and lifts and extensive pasturing of livestock.

The *chilensis* species group is represented by two taxa in Argentina and they seem to be endemic to the continental side of the Andes. Collected only once, more than two decades ago *Pseudolucia jujuyensis* remained an enigma. The first author failed to find it in spite of much effort over several visits to the type locality over Coraya (where no *Cuscuta* occurs according to our present knowledge), following directions from earlier collectors. This easily separable species supposedly inhabits a peculiar biotope of the province Jujuy, lying in the most northerly fringes of distribution of the genus. The *jujuyensis* caterpillar must live on a

*Cuscuta* species, as do all the other members of the group, including the newly discovered *P. sosneada* and the southeast-Brazilian *P. parana* (BENYAMINI *et al.*, in prep.).

*P. sosneada* described in this paper is certainly in a sister-relationship with *P. chilensis*. The latter species is widely distributed on the Pacific side of the Andes, north from the Atacama region south to region de la Araucania (Southern Volcanic Zone) where human activities cleared the coastal zone (see BENYAMINI 1995: 38), but has never been recorded over 3000 m, because the larval hostplant cannot thrive in the conditions found at such heights. Therefore, it can be excluded that *P. chilensis* could cross one of the high Andean passes of VI region de O'Higgins and colonise Rio Atuel, the valley of thermal springs El Sosneado, where the hot springs guarantee a climate untypical for the region.

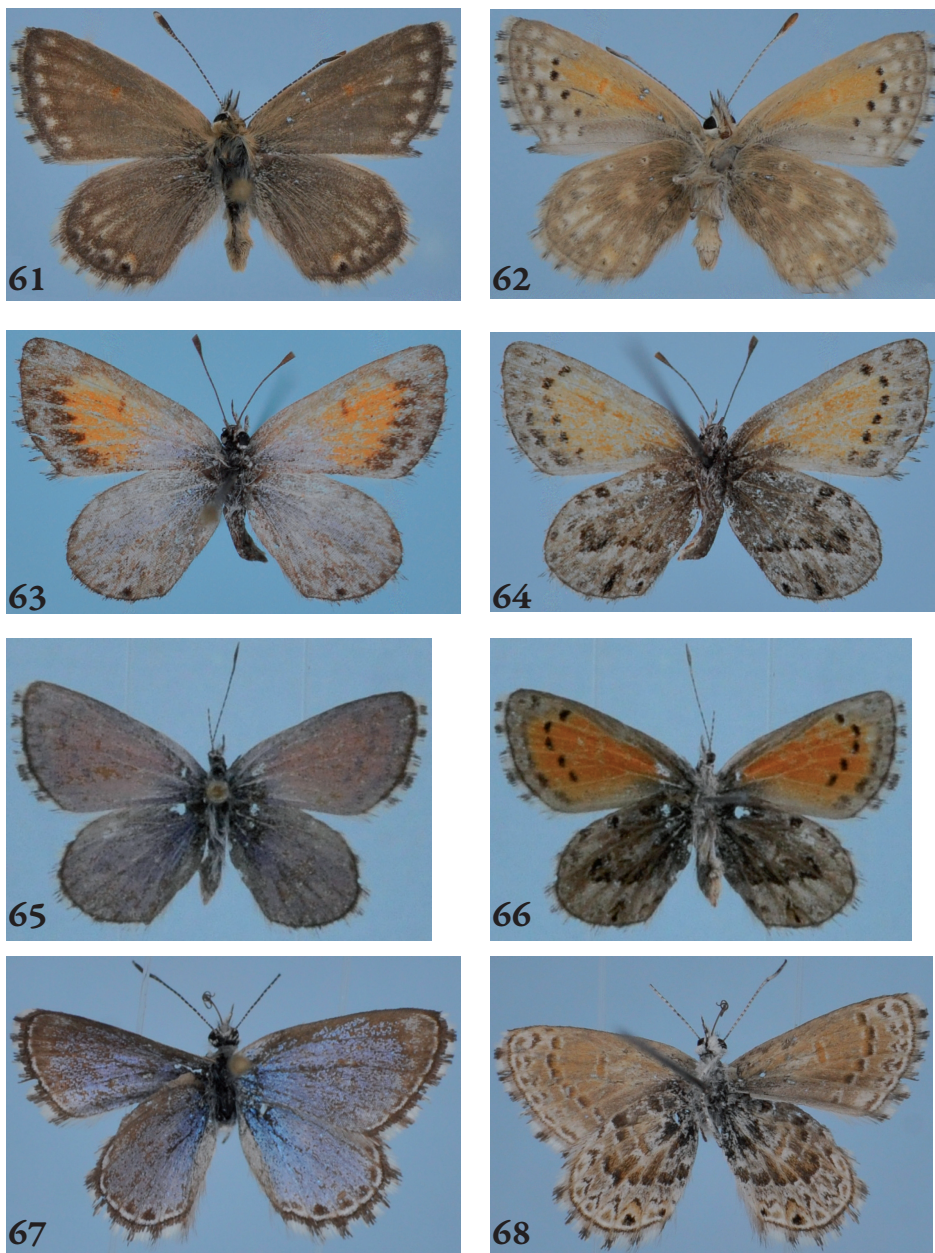
Thus, the presence of *P. sosneada* in the province Mendoza could be explained by two hypotheses: (1) *P. sosneada* is a relict species, a remnant of a formerly much wider distribution or (2) it is a relatively recent colonizer. Although hypothesis (1) seems to be more plausible, the observation contradicts that the *chilensis-sosneada* imaginal phenotypes do not differ drastically as we could expect in the case of a long-term isolation causing the rapid diversification testified by the genus. Hypothesis (2) is also difficult to accept as an accidental dispersal of the imagines via an agent (wind, animal, human) cannot answer the presence of *Cuscuta* in the Sosneado valley because as the plant is parasitic. Therefore, the dispersal of the hostplants and their parasites is certainly complex, as we supposed. It is plausible that *Cuscuta* is more widespread in the region and *P. sosneada* will be recorded at further sites with more intensive research. In summary, we need to collect further data and have a clearer understanding of this unusual biota of Rio Atuel and the presence therein of *P. sosneada*.

The ***andina* and *plumbea* species groups** show somewhat similar phenomena regarding their taxonomic diversity and distribution. There are a few species inhabiting both sides of the Andes at high altitudes and there are also some widely distributed Patagonian taxa in both of the groups occurring even south to latitude 50° in Santa Cruz (Argentina) and Magallanes (Chile). The diversity of these two species groups is the highest on the Pacific side, namely in the Coquimbo and Metropolitan regions of Chile. Nevertheless, the discovery of the *plumbea* group member *P. balinti* inhabiting the continental Precordillera, and the *andina* group member *P. calingasta* typifying the high altitude fauna of the Mercedario region, poses interesting zoogeographical questions (see BENYAMINI 2013).

The diversity of the ***collina* species group**, whose representatives inhabit extreme biotopes from sea-level coastal dunes via intermediate elevational shrublands to high altitude or latitude mountain steppes, is still poorly understood. Based on female genitalia morphology, structurally two groups can be discrimi-



Figs 53–60. *Pseudolucia* holotype specimens (with indication for forewing length). 53–54: *Pseudolucia calingasta* sp. n. (10 mm), 53 = recto, 54 = ditto, verso, 55–56: *Pseudolucia atutia* sp. n. (9.3 mm), 55 = recto, 56 = ditto, verso, 57–58: *Pseudolucia ofir* sp. n. (8 mm), 57 = recto, 58 = ditto, verso, 59–60: *Pseudolucia ulibarrii* sp. n. (8 mm), 59 = recto, 60 = ditto, verso (photos O. Tomer)



**Figs 61–68.** *Pseudolucia* holotype specimens (with indication for forewing length). 61–62: *Pseudolucia sosneada* sp. n. (9 mm), 61 = recto, 62 = ditto, verso, 63–64: *Pseudolucia kieslingi* sp. n. (8 mm), 63 = recto, 64 = ditto, verso, 65–66: *Pseudolucia mercedaria* sp. n. (7 mm), 65 = recto, 66 = ditto, verso, 67–68: *Pseudolucia pilrama* sp. n. (7 mm), 67 = recto, 68 = ditto, verso (photos O. Tomer)



nated, but this diversity needs to be further evaluated, as both of them occur on both sides of the Andes. At this moment, there is no satisfactory answer to explain how the members of these groups are interrelated and what are the field mechanisms in place that maintain their diversity with such wide spatial and geographical distribution in the Pacific and continental Andean slopes.

What is interesting, and probably suggests the direction for future explorations (in turn forming new working hypotheses), is that the group on the Pacific side does not penetrate the habitats above 3000 m, whilst on the continental side we often find populations close to 4000 m. In contrast, lower regions, not to mention habitats close to sea level, remained unoccupied in Argentina. This observation certainly points out the importance of larval hostplant distribution; the genus *Chorizanthe* (Polygonaceae) which is the permanent coastal hostplant on the Pacific side practically does not occur on the Argentine continental side, while the genus of perennial *Montiopsis* (Montiaceae) occurs on both sides and is found up to 4000 m. In addition, the availability of certain environmental factors are crucial for the members of the group to build up viable populations, i.e. adequate quantities of hostplants, nectar sources and shelter for the imagines and diapausing larvae.

The *argentina* and *sibylla* species groups are both structurally very close to *plumbea* species group members (see BÁLINT & BENYAMINI 2011, 2013). They share the peculiarity that they occur in relatively high or high elevations, but their diversity reflects an opposite picture. The *sibylla* species group is distributed in the Pacific side of the Andes in the prepuna and puna belts and represented by several species (BÁLINT & BENYAMINI 2013, BENYAMINI *et al.* in prep.) but has been recorded only very recently from Argentina, as this present paper reports with the discovery of *P. pilgrama*. The *argentina* species group reveals a remarkable taxonomic diversification on the continental side of the Calingasta-Mercedario-Aconcagua region and can be found in Chile only at the highest mountain passes, having populations thriving at considerable heights. This taxonomic diversity is probably the result of the remarkable changes in aridity taking place in the region since several millennia (LUEBERT & WEIGEND 2014). The highly isolated and specialised communities are surviving in vegas, deeply hidden and separated amongst several mountain ridges towering over 6000 m, and large arid territories, therefore it is almost certain that they will remain in their recent isolation for as long as can be foreseen. These remote, and for humans highly inaccessible, places provide the last refuges for the formerly much more widely distributed biota occupying the continental side of the Andes. These communities are highly threatened not only because of the accelerating desiccation, but also because of the more intensive human land use, including heavy livestock grazing, growing pressure from trekking and tourism and the opening of new open-pit

mines. In combination, such pressures are completely destroying the region and affecting the biota, as happened with the type locality of *Pseudolucia avishai* in Chile (BENYAMINI *et al.* 2014).

We hope that this paper provides a positive contribution for a better understanding of the taxonomic diversity, the geographical, spatial and temporal distribution, and the biology of the genus *Pseudolucia*. We also hope that when we monograph the thecline lycaenids of austral South America and we will be able to mirror and compare our Lycaenidae results with the insights of Dr Shapiro who extensively worked on austral Pieridae and posed important questions (SHAPIRO 1991, 1992). Moreover, we trust that via the results we published here, local people will be aware of the beauty, great richness and uniqueness of the flora and fauna in the Argentine provinces Mendoza and San Juan, and will take responsibility to save and maintain it for the benefit of future generations.

#### A REVISED CHECKLIST OF *PSEUDOLUCIA*

Here, we present a revised checklist of the genus *Pseudolucia* (see BENYAMINI & BÁLINT 2011), incorporating the data based on our new findings and insights. Taxa are listed in alphabetical order. Taxa marked with “AC” occur on both sides of the Andes in Argentina and Chile. “A” indicates Argentina, while “C” concerns Chile alone, “B” is given only in the case of *P. parana* indicating its unique existence in Southeast Brazil. The summary of this list is given in Table 1. At the end of the list, we provide some notes that discuss the status of certain nominal taxa in need of clarification or recorded as new for Argentina (indicated by an asterisk).

**Table 1.** Number of species in *Pseudolucia* species groups occurring in Argentina, Brazil and Chile

Species group		Argentina	Chile	Brazil	Total	
<i>andina</i>	<i>andina</i>	4	9	0	10	13
	<i>neuqueniensis</i>	1	2	0	3	
<i>argentina</i>		5	2	0	6	
<i>charlotte</i>		2	2	0	2	
<i>chilensis</i>		2	1	1	4	
<i>collina</i>	<i>collina</i>	1	6	0	6	13
	<i>scintilla</i>	6	2	0	7	
<i>plumbea</i>		6	8	0	10	
<i>sibylla</i>		1	6	0	7	
Total		28	38	1	55	

***Pseudolucia andina*** species group (n = 13)

- andina* subgroup (n = 10)
- andina* (Calvert, 1893): AC
- asafi* Benyamini, Bálint et Johnson, 1995: C
- avishai* Benyamini, Bálint et Johnson, 1995: C
- barrigai* Benyamini et Bálint, 2011: AC
- calingasta* Benyamini et Bálint, sp. n.: A
- faundezi* Benyamini et Bálint, 2011: C
- johnsoni* Benyamini et Bálint, 2011: C
- kechico* Bálint, Benyamini et Johnson, 2001: C
- luzmaria* Benyamini et Bálint, 2011: C
- magellana* Bálint, Benyamini et Johnson, 2001: AC
- neuqueniensis* subgroup (n = 3)
- henyah* Bálint, Benyamini et Johnson, 2001: C
- munozae* Benyamini et Bálint, 2011: C
- neuqueniensis* Bálint et Johnson, 1995: A

***Pseudolucia argentina*** species group (n = 6)

- argentina* (Balletto, 1992): AC
- atutia* Benyamini et Bálint, sp. n.: A
- ofir* Benyamini et Bálint, sp. n.: A
- sigal* Benyamini et Bálint, 2011: C
- talía* Bálint, Benyamini et Johnson, 1995: A
- ulibarrii* Benyamini et Bálint, sp. n.: A

***Pseudolucia charlotte*** species group (n = 2)

- charlotte* Bálint et Johnson, 1993: AC
- lanin* Bálint et Johnson, 1993: AC

***Pseudolucia chilensis*** species group (n = 4)

- chilensis* (Blanchard, 1852): C
- jujuyensis* Bálint, Eisele et Johnson, 2000: A
- parana* Bálint, 1993: B
- sosneada* Benyamini et Bálint, sp. n.: A

***Pseudolucia collina*** species group (n = 13)

- collina* subgroup (n = 6)
- benyamini* Bálint et Johnson, 1995: C (\*)
- collina* (Philippi, 1859): AC
- dubi* Bálint, 2001: C

*oraria* Bálint et Benyamini, 2001: C  
*ugartei* Bálint et Benyamini, 2001: C  
*vera* Bálint et Johnson, 1993: C  
*scintilla* subgroup (n = 7)  
*humbert* Bálint et Johnson, 1995: A (\*)  
*kieslingi* Benyamini et Bálint, sp. n.: A  
*mercedaria* Benyamini et Bálint, sp. n.: A  
*scintilla* (Balletto, 1993): C  
*shapiro* Bálint et Johnson, 1995: A  
*tamara* Bálint et Johnson, 1995: A  
*zoellneri* Benyamini et Bálint, 2011: AC

***Pseudolucia plumbea* species group (n = 10)**

*annamaria* Bálint et Johnson, 1993: C  
*arauco* Bálint, Benyamini et Johnson, 2001: C  
*balinti* Benyamini, 2013: A  
*grata* (Köhler, 1934): AC  
*hazeorum* Bálint et Johnson, 1993: AC (\*)  
*patago* (Mabille, 1899): AC  
*plumbea* (Butler, 1881): AC (\*)  
*valentina* Benyamini et Bálint, 2011: C  
*whitakeri* Bálint et Johnson, 1995: A  
*zina* Benyamini, Bálint et Johnson, 1995: C

***Pseudolucia sibylla* species group (n = 7)**

*aureliana* Bálint et Johnson, 1993: C  
*maricunga* Bálint et Benyamini, 2013: C (\*)  
*oligocyanea* (Ureta, 1956): C  
*pilgrama* Benyamini et Bálint, sp. n.: A  
*sibylla* (Kirby, 1871): C  
 sp. n.: C (\*)  
 sp. n.: C (\*)

NOTES

*Pseudolucia magellana* – The first author recorded the species near Calafate (province San Juan).

*Pseudolucia argentina* species group – *P. argentina*, described from the Aconcagua region, also penetrates Chile (see BÁLINT & JOHNSON 1993, described as *P. aconcagua*).

*Pseudolucia benyamini* – It was erroneously indicated as occurring in Argentina (see BENYAMINI & BÁLINT 2011). The species is endemic for the Pacific side of the Andes.

*Pseudolucia humbert* – The holotype was collected at Rosario de la Frontera, Los Baños, southern Salta province in North Argentina by the Danish expedition to Patagonia (MADSEN *et al.* 1980). The species was described from the single collected female. The first author made intensive efforts to find *P. humbert*, paying visits to the type locality, checking possible habitats along the Danish expedition track across Argentina. As it belongs to the *collina* species group, which feed on *Chorizanthe*-*Montiopsis* hostplant genera, these possible hosts were looked for in the IADIZA-CONICET herbarium, but only one specimen of *Chorizanthe commissuralis* Remy exists there, collected at Punta Negra (2250 m) upper Rio Atutia. Trying to find the plant was the primary aim of visiting the aforementioned area, while also looking for continental “low level” alternatives of the Chilean *Chorizanthe*. The interesting *Cistanthe cabreræ* (Añon) Peralta (Portulacaceae) were also checked carefully along Rio Castaño and Rio Atutia, for signs of larval activity. This 40–60 cm tall, perennial, succulent-like, violet-flowered bush belongs to the family used as a larval host, but nothing was found on the plants. Unlike *Chorizanthe* – *Montiopsis* hostplants, which typically have an “unlimited” supply of dense flower buds, the *Cistanthe* has much fewer flower buds and is usually uncommon, not forming dense concentrations of plants that could support a permanent *Pseudolucia* population. So, along Rio Atutia instead of *P. humbert*, the species *Pseudolucia atutia* was discovered.

Then the first author was looking for the hostplants on the Argentine side of Paso Bermejo resulting in the discovery of *Pseudolucia kieslingi*. In his field notebooks, the preliminary names given to these newly discovered species were *P. humbert* 1, then *P. humbert* 2 etc., as it was considered *in situ* that *P. humbert* had been indeed found. However, later in the laboratory it turned out that the taxon found, based on female morphology, belongs to another group, not that represented by the *P. humbert* holotype.

So, to summarize the state of knowledge at the beginning of 2015:

a) Rosario de la Frontera cannot be the correct *P. humbert* collecting site – as it is an arboreal habitat by nature without adequate hostplants, so it is impossible that it can support any *Pseudolucia* populations; b) indeed, *P. humbert* was not observed there; c) we can finally admit that we did not find any trace of it wherever we were looking for it during some 15 years; and d) suspecting that it is possibly mislabelled we are now searching for other evidence to establish its identity. Until such time, it remains a „lost” *Pseudolucia* species and a challenge for future work on the genus.

*Pseudolucia plumbea* species group – Based on material collected by the first author, two species representing the group (and hitherto known only from Chile) have been recorded also from Argentina; these are *P. hazeorum* (type locality: Chile: Region Maule, Province Talca, Cordillera Parral, Malleco) and *P. plumbea* (type locality: Chile: Region Biobío, Province Ñuble, Cordillera Chillán, Las Cabras; see BÁLINT 1993: 19). The taxonomic revision of the whole group is under review.

*Pseudolucia sibylla* species group – In the latest expeditions by the first author, two further undescribed species of the group were discovered in 2014 and 2015, in areas leading up to the high Atacama region of Chile (BENYAMINI *et al.* in prep.)

\*

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## APPENDIX: LIST OF PARATYPES

Taxa are listed alphabetically. Specimens are listed in numerical sequence according to their DBC inventory number, then sex, collecting site (province is indicated in the opening entry), altitude, data and collector; in certain cases there are supplementary data indicating that the sample was collected in the early stage and/or had been dissected. All the specimens are deposited in DBC, except those marked as HNHM.

*Abbreviations* – BGP = Zsolt Bálint genitalia preparation number in the Hungarian Natural History Museum, Budapest; DB = collected by Dubi Benyamini; DBC = Dubi Benyamini Collection; HNHM = Hungarian Natural History Museum; HT = holotype; PT## = paratype with serial number; OT = collected by Ofir Tomer.

*Pseudolucia atutia* paratypes, all from San Juan province

- DBC-2980, male: Calingasta, Rio Atutia, 2900 m, 6.XII.2010, OT. PT01.  
 DBC-2982, male: Calingasta, Rio Atutia, 2900 m, 6.XII.2010, OT, BGP 1406. PT02. HNHM.  
 DBC-2983, male: Calingasta, Rio Atutia, 3250 m, 17.XII.2009, Avishai Benyamini, BGP 1407. PT03.

*Pseudolucia calingasta* paratypes, all from San Juan province

- DBC-3060, female: Refugio de La Laguna Blanca, 3154 m, 12.XII.2009, DB. BGP 1494. PT01. HNHM.  
 DBC-3061, male: Refugio de La Laguna Blanca, 3154 m, 12.XII.2009, DB. PT02.  
 DBC-3062, female: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB. BGP 1521. PT03.  
 DBC-3064, male: Calingasta, Cordillera de La Ramada, Manantiales, 3000 m, 30.XI.2000, DB. PT04.  
 DBC-3065, female: Rio Atutia 3250 m, larva on *Astragalus pebuenches* 17.XII.2009, pupa: 1.I.2010, hatched: 4.I.2010. DB. PT05.  
 DBC-3066, male: Rio Atutia, 3200 m, 17.XII.2009, DB. PT06.  
 DBC-3067, male: Rio La Totorá (Cordon Azules), 3244 m, 14.XII.2009, DB. PT07  
 DBC-3068, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB. PT08.  
 DBC-3069, female: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 10.XII.2009, DB, BGP 1378. PT09. HNHM.  
 DBC-3070, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB, BGP 1377. PT10. HNHM.  
 DBC-3071, male: Calingasta, Rio La Totorá, La Sianega de Pendorin, 3270 m, 7.XII.2010, OT, BGP 1451. PT11. HNHM.  
 DBC-3072, male: Calingasta, Rio Atutia, 3270 m, 6.XII.2010, OT, BGP 1375. PT12. HNHM.

*Pseudolucia kieslingi* paratypes, all from Mendoza province

- DBC-1991, female: Paso Bermejo, Penitentes, 2665 m, larva on *Montiopsis gilliesii* 12.XII.2006, pupa: 20.XII.2006, female: 12.I.2007. DB. PT01.



DBC-1993, female: 4km N of Penitentes, 2668 m, 11.XII.2006, DB. PT02.

DBC-1994, male : Paso Bermejo, Penitentes, 2660 m, 9.XII.2006, DB, BGP 1386. PT03. HNHM.

DBC-1995, female: Paso Bermejo, Penitentes, 2660 m, 10.XII.2006, DB, BGP 1387. PT04. HNHM.

*Pseudolucia mercedaria* paratypes, all from San Juan province

DBC-1900–1902, males: Cerro Mercedario, Vega de Guanacito, 3623 m, 21.XII.2007, DB. PT01–03.

DBC-1904, male: Cerro Mercedario, Arroyo de Guanacito, 3539 m, Larva L5 in the soil under *Montiopsis potentilloides* 21.I.2009, pupa: early XII. 2009, hatched: late XII. 2009, DB. PT04.

DBC-1905, 1908, males: Cerro Mercedario, Vega de Guanacito, 3623 m, 21.XII.2007, DB. PT05, PT08.

DBC-1906, 1907, 1909, females: Cerro Mercedario, Vega de Guanacito, 3623 m, 21.XII.2007, DB. PT06, PT07, PT09.

DBC-1930, male: Calingasta, Cordillera de La Ramada, Manantiales, 2850 m, 30.XI.2010, OT. PT10.

DBC-1931–1933, males: Calingasta, Cordillera de La Ramada, Manantiales, 2850 m, 30.XI.2010, OT. PT11–13.

DBC-1934–1935, males: Calingasta, Cordillera de La Ramada, Manantiales, 3000 m, 30.XI.2010, OT. PT14–15.

DBC-1936–1937, males: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB. PT16–17.

DBC-1938–1942, males: Calingasta, Cordillera de La Ramada, Manantiales, 3400 m, 31.XI.2010, DB. PT18–22.

DBC-1943, female: Calingasta, Cordillera de La Ramada, Manantiales, 3400 m, 30.XI.2010, DB. PT23.

DBC-1944, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB. PT24.

DBC-1945, female: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB. PT25.

DBC-1950, male: Calingasta, Rio La Totorá, 3450 m, 14.XII.2009, DB. PT26.

DBC-1951, male: Calingasta, Rio La Totorá, 3450 m, 14.XII.2009, DB. PT27.

DBC-1952, male: Calingasta, Rio La Totorá, 3450 m, 14.XII.2009, DB. PT 28.

DBC-1954, female: Calingasta, Rio La Totorá, 3450 m, 14.XII.2009, DB. PT29.

DBC-1955, female: Calingasta, Rio La Totorá, 3450 m, 14.XII.2009, DB. PT30.

DBC-1960, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT31.

DBC-1961, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT32.

DBC-1962, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT33.

DBC-1963, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT34.

DBC-1964, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, OT. PT35.

DBC-1965, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT36.

DBC-1966, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, DB. PT37.

- DBC-1967, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3750 m, 8.XII.2010, OT. PT38.
- DBC-1968, female: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Las Azules, 3750 m, 8.XII.2010, DB. PT39.
- DBC-1969, female: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Las Azules, 3750 m, 8.XII.2010, DB. PT40.
- DBC-1970, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo de Los Azules, 3470 m, 8.XII.2010, DB. PT41.
- DBC-1971, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo Cortez, 3470 m, 8.XII.2010, OT. PT42.
- DBC-1972, female: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo Cortez, 3470 m, 8.XII.2010, DB. PT43.
- DBC-1973, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo Cortez, 3470 m, 8.XII.2010, OT. PT44.
- DBC-1974, female: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo Cortez, 3470 m, 8.XII.2010, DB. PT45.
- DBC-1975, male: Calingasta, Cordon de Los Azules, Paso Cortez, Arroyo Cortez, 3470 m, 8.XII.2010, DB. PT46.
- DBC-1976, male: Cerro Mercedario, Vega de Guanacito, 3623 m, 12.XII.2007, DB. PT47. HNHM.
- DBC-1977, male: Cerro Mercedario, Vega de Guanacito, 3623 m, 12.XII.2007, DB, BGP 1388. PT48. HNHM.
- DBC-1978, female: Cerro Mercedario, Vega de Guanacito, 3623 m, 21.XII.2007, DB, BGP 1389. PT49. HNHM.
- DBC-1979, male: Rio La Tatora, 3450 m, 14.XII.2009, DB, BGP 1392. PT50. HNHM.
- DBC-1980, female: Rio La Tatora, 3450 m, 14.XII.2009, DB, BGP 1393. PT51. HNHM.
- DBC-1981, male: Calingasta, Cordillera de La Ramada, Manantiales, 2850 m, 30.XI.2010, OT. PT52.
- DBC-1982, male: Calingasta, Cordillera de La Ramada, Manantiales, 3000 m, 30.XI.2010, OT, BGP1390. PT53. HNHM.
- DBC-1983, female: Manantiales, 3350 m, 19.XII.2009, DB, BGP 1446. PT54. HNHM.
- DBC-1984, female: Calingasta, Cordillera de la Ramada, Manantiales, 2850 m, 30.XI.2010, OT, BGP1391. PT55. HNHM.
- DBC-1985, male: Calingasta, Cordon de Los Azules, Aroyo de Los Azules, 3475 m, 8.XII.2010, OT, BGP 1394. PT56. HNHM.
- DBC-1986, male: Calingasta, Cordon de Los Azules, Aroyo de Los Azules, 3475 m, 8.XII.2010, OT, BGP 1447. PT57. HNHM.
- DBC-1987, female: Calingasta, Cordon de Los Azules, Aroyo de Los Azules, 3475 m, 8.XII.2010, OT, BGP 1395. PT58. HNHM.

*Pseudolucia ofir* paratypes, all from province San Juan

- DBC-4091, male: Calingasta, Paso Pichereguas (Rio Bramadero), 3900 m, 1.XII.2010, OT. PT01.
- DBC-4092, male: Calingasta, Paso Pichereguas (Rio Bramadero), 3900 m, 1.XII.2010, OT, BGP 1409. PT02. HNHM.

*Pseudolucia pilgrama* paratypes, all from province San Juan

- DBC-4900, male: Calingasta, between Valle Hermoso & Valle de Los Patos sur, Patillo, 3505 m, 9.XII.2010, OT. PT01.  
DBC-4901(male): Calingasta, between Valle Hermoso & Valle de Los Patos sur, Patillo, 3505 m, 9.XII.2010, OT. PT02.  
DBC-4902, male: Calingasta, between Valle Hermoso & Valle de Los Patos sur, Patillo, 3505 m, 9.XII.2010, OT. PT03.  
DBC-4904, male: Calingasta, between Valle Hermoso & Valle de Los Patos sur, Patillo, 3505 m, 9.XII.2010, OT, BGP 1438. PT04. HNHM.

*Pseudolucia sosneada* paratypes, all from Mendoza province

- DBC-0200, male: Termas del Sosneado, diapausing larva 21.I.2005, pupa: 28.V.2005, hatched: 6.VI.2005, DB. PT01.  
DBC-0202, female: Sosneado–Overo, 3000 m, 19.I.2004, A. M. Shapiro. PT02.  
DBC-0203, male: Sosneado–Overo, 3000 m, 19.I.2004, A. M. Shapiro. PT03.  
DBC-0205, male: Sosneado–Overo, 3000 m, 19.I.2004, A. M. Shapiro. PT04. HNHM.  
DBC-0206, male: Sosneado–Overo, 3000 m, 19.I.2004, A. M. Shapiro, BGP 1373. PT05. HNHM.  
DBC-0207, female: Sosneado–Overo, 3000 m, 19.I.2004, A. M. Shapiro. PT06.  
DBC-0208, female: Termas del Sosneado, 2270 m, 21.I.2005, DB, BGP 1374. PT07. HNHM.

*Pseudolucia ulibarrii* paratypes, all from San Juan province

- DBC-2900, male: Cordillera de Ansilta, 2650–3030 m, 13.XII.2009, Dubi Benyamin PT01.  
DBC-2900-01, female: Cordillera de Ansilta, 2650–3030 m, 13.XII.2009, DB, BGP 1414. PT02. HNHM.  
DBC-2900-02, female: Cordillera de Ansilta, 2650–3030 m, 13.XII.2009, DB. PT03.  
DBC-2900-03, male: M, Cordon Azules, 3244 m, 14.XII.2009, DB. PT04.  
DBC-2900-04, male: Rio La Totor, Cordon Azules, 3244 m, 14.XII.2009, Avishai Benyamini, BGP 1412. PT05. HNHM.  
DBC-2900-05, male, Rio La Totor, Cordon Azules, 3244 m, 14.XII.2009, Avishai Benyamini, BGP 1410. PT06. HNHM.  
DBC-2901, Cordillera de Ansilta, 3417 m, 14.XII.2009, Avishai Benyamini. PT07.  
DBC-2902, female: Cordillera de Ansilta, 2650–3030 m, 13.XII.2009, DB. PT08.  
DBC-2903, male: Calingasta, Cerro Mercedario, Vega de Guanacito, 3566 m, 21.XII.2007, DB. PT09. HNHM.  
DBC-2904, male: Calingasta, Cerro Mercedario, Vega de Guanacito, 3566 m, 21.XII.2007, DB. PT10.  
DBC-2905, male: Calingasta, Cerro Mercedario, Vega de Guanacito, 3566 m, 21.XII.2007, DB. PT11.  
DBC-2910, male: Calingasta, Cerro Mercedario, between El Molles & La Laguna Blanca, 3000 m, 1.XII.2010, OT. PT12.  
DBC-2911, female: Refugio de La Laguna Blanca, 3154 m, 12.XII.2009, DB. PT13.  
DBC-2930, female: Calingasta, Rio La Totor, Dependista, 3390 m, 7.XII.2010, OT. PT14.

- DBC-2965, male: Calingasta, Cordillera de La Ramada, Manantiales, 3000 m, 30.XI.2010, OT. PT15.
- DBC-2973, female: Calingasta, Cordillera de La Ramada, Manantiales, 2850 m, 30.XI.2010, OT. PT16.
- DBC-2974, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB, BGP 1452. PT17.
- DBC-2975, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 21.XII.2007, DB, BGP 1408. PT18. HNHM.
- DBC-2976, male: Calingasta, Cordillera de La Ramada, Manantiales, 3350 m, 19.XII.2009, DB, BGP 1417. PT19. HNHM.
- DBC-2977, female: Cordillera de La Ramada, Manantiales, 3350 m, 10.XII.2009, DB, BGP 1418. PT20. HNHM.
- DBC-2979, male: Cordillea de Ansilta, 2650–3030 m, 13.XII.2009, DB. PT21. HNHM.