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Source: Florida Entomologist, 98(3) : 916-920

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.098.0316>

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# A new subspecies of *Pierella lena* (Lepidoptera: Nymphalidae: Satyrinae) in northeastern Brazil

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## Abstract

*Pierella lena atlantica* Paluch, Zacca & Siewert **ssp. nov.** (Lepidoptera: Nymphalidae: Satyrinae) is described from the Atlantic Forest of Bahia (Itanagra, Una, and Cachoeira), Brazil. A discussion about this new taxon and its relationship with the other subspecies of *P. lena* (Linnaeus, 1767) are provided, as are the first illustrations of the female genitalia and an identification key to adults of *Pierella hyalinus* (Gmelin, [1790]) and *P. lena* from South America.

Key Words: Haeterini; Neotropical Region; Amazonian Region; Atlantic Forest

## Resumo

*Pierella lena atlantica* Paluch, Zacca & Siewert **ssp. nov.** (Lepidoptera: Nymphalidae: Satyrinae) é descrita da Mata Atlântica da Bahia (Itanagra, Una e Cachoeira). Uma discussão sobre o relacionamento deste táxon com as outras subespécies de *P. lena* (Linnaeus, 1767) é fornecida, assim como a genitália feminina da espécie é ilustrada pela primeira vez. Ainda, uma chave de identificação dos adultos de *Pierella hyalinus* (Gmelin, [1790]) e *P. lena* da América do Sul é apresentada.

Palavras Chave: Haeterini; Região Neotropical; Região Amazônica; Mata Atlântica

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The Neotropical genus *Pierella* Westwood, 1851 is the most diverse within the tribe Haeterini (Nymphalidae: Satyrinae), and its distribution includes Central and South America (Constantino 1995; Lamas 2004). So far, 4 species of this genus have been reported in northeastern Brazil, and all are restricted to the Atlantic Forest: *Pierella lamia* (Sulzer, 1776) ("*Pierella lamia*" species group in revision by Zacca et al. [in press]) in Paraíba, Alagoas, Pernambuco, and Bahia (Cardoso 1949; Kesselring & Ebert 1982; Zacca 2009; Paluch et al. 2011; Zacca et al. 2011); *Pierella nereis* (Drury, 1782) in Alagoas and Bahia (Cardoso 1949; Zacca et al. 2011); *Pierella lena* (Linnaeus, 1767) in Bahia (Zacca 2009); and *Pierella hyalinus* (Gmelin, [1790]) in north coastal Bahia. Together, *P. lena* and *P. hyalinus* are recognized by their purple bluish hind wings. *Pierella lena* comprises 3 subspecies, *P. lena lena* (Linnaeus, 1767) on the plains of the lower Amazon River in Guyana, Suriname, French Guiana, and Brazil; *P. lena brasiliensis* (C. Felder & R. Felder, 1862) from the upper Amazon River in Colombia, Peru, Ecuador, and Brazil; and *P. lena salma* Constantino, 2007 known in Colombia, on the eastern slope of the Andes, in Putumayo and Caquetá, in northeastern Ecuador, and in the upper Napo River (Lamas 2004; Salazar & Constantino 2007). This study provides a description of a new subspecies of *P. lena* in the northeastern region of Brazil, with illustrations of the female genitalia for the first time, and an identification key to adults of *P. hyalinus* and *P. lena* from South America.

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## Materials and Methods

For the dissection of the genitalia of the studied specimens, their abdomens were detached and soaked in a heated test tube with 10% potassium hydroxide solution (KOH) for about 5 min. Illustrations were performed from images obtained in cellSens Imaging Software with the aid of a video camera SC30 Olympus attached to a stereoscopic microscope trinocular SZX7 Olympus. Full lines represent sclerotized structures; thin lines, membranous structures; and dashed lines, structures visible through transparency. Taxonomic classification follows Lamas (2004) with modifications proposed by Salazar & Constantino (2007) and hereby. Nomenclature for the wings areas follows Neild (1996).

Distributional data of all subspecies of *P. lena* (see list of examined material in Supplementary Material for this article in Florida Entomologist 98[3] [Sep 2015] online at <http://purl.fcla.edu/fcla/entomologist/browse>) were obtained from specimens deposited in the following collections, and their respective abbreviations used throughout the text are as follows.

**DZUP** – Collection Padre Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.

**MZFS** – Entomological Collection Johann Becker, Universidade Estadual de Feira de Santana, Feira de Santana, Bahia, Brazil.

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Supplementary material for this article in Florida Entomologist 98(3) (Sep 2015) is online at <http://purl.fcla.edu/fcla/entomologist/browse>

The type material of the new subspecies was deposited at DZUP and MZFS. The following abbreviations were used: FW – forewing; HW – hind wing; D – dorsal wing surface; V – ventral wing surface.

## Results

*Pierella lena atlantica* Paluch, Zacca & Siewert **ssp. nov.** (Figs. 1A–D, 2A–I)

*Pierella lena*; Zacca, 2009, p. 170, 173.

## DIAGNOSIS

Among the recognized subspecies of *Pierella lena*, *P. lena atlantica* **ssp. nov.** (Fig. 1A–D) shares several characters with the nominal subspecies, such as a rounded androconial patch on the anal margin on DHW of males and a larger black spot in  $M_1$ – $M_2$  on DFW of females, but can be distinguished by the smaller androconial patch and smaller purple bluish spots in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$ , whereas in *P. lena lena* (Fig. 1E–H), the androconial patch is larger and the spots are larger and white, with a few purple bluish scales.

## DESCRIPTION

Sexes are similar in their general appearance.

**Forewing length:** In male 34–35 mm ( $n = 4$ ), in female 37–38 mm ( $n = 3$ ).

**Head:** Front and vertex brown; post-gena white; eye glabrous, brown; antenna light brown with sensilla along the flagellomeres; labial palpus with elongated white scales dorsally, creamy ventrally, totally white internally, with distal portions of 2nd and 3rd articles mixed with a few brown scales.

**Thorax:** Dorsally brown, ventrally white; prothoracic leg creamy; meso- and metathoracic legs with femur brown dorsally and white ventrally, the other segments light brown.

**Forewing:** Dorsal surface brown with a light brown greyish post-discal band (approx. 1 mm) included by straight parallel dark lines, a small black spot in  $M_1$ – $M_2$ ; fringes mixed with brown and light brown. VFW brown, base to proximal line of the post-discal band lighter, with a sub-basal lighter curved line and 3 spotted lines from costal margin to the anal margin, area between the 2 lines with smooth ripple pattern; submarginal region, distal of the post-discal band, darker proximally, mixed with ochre centrally and bluish with ripple pattern marginally, and with 3 small creamy spots in  $R_5$ – $M_1$ ,  $M_1$ – $M_2$ , and  $M_2$ – $M_3$  in the central area.

**Hind wing:** Dorsal surface with basal half similar to FW base, marginal half dark brown with a purple iridescent color; the post-discal band near the base of the marginal half, continued from FW until  $CuA_2$ –2A, but interrupted at  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$ ; with 2 small white spots below the post-discal band in  $CuA_2$ –2A and upper half of 2A–3A; the purple bluish white spots in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  smaller than in *P. lena lena*; androconial patch rounded and creamy, smaller than in *P. lena lena*; fringes mixed brown with light brown. VHW brown with ripple pattern covering almost all surface; basal area as in FW; marginal area with the proximal half darker, central area mixed with ochre, and distal half bluish; 2 or 3 black small spots in basal region; convex dark and fine basal line between 3A and inner margin; sub-basal darker curved line from costal margin to the anal margin, as the same line of the FW; post-discal band similar to

VFW with proximal line convex from  $CuA_1$  to anal margin, where it is enlarged; 2 ocelli in  $Rs$ – $M_1$  and  $M_1$ – $M_2$  with a small white pupil in each one; 3 creamy spots in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  and 2 smaller similar in  $CuA_2$ .

**Abdomen:** Dorsally brown and ventrally creamy.

**Male genitalia** (Fig. 2A–G): Similar to *P. lena lena*. Tegumen laterally triangular, with half length of uncus; subuncus absent; anterior projection of saccus elongated, straight, and cylindrical; valvae approx. 2 times the length of uncus with elongated bristles distally and ventrally, apex curved internally, dorso-distally serrated; fultura inferior trapezoidal; aedeagus straight, same length of valvae, distal opening dorso-laterally, serrated at right side. Constantino (1995) illustrated the male genitalia of *P. lena brasiliensis* in lateral view, and it differs from *Pierella lena atlantica* **ssp. nov.** mainly by the shape of valvae, narrowing in middle portion, and apex with a well-projected thorn.

**Female genitalia** (Fig. 2H–I): Tergum VIII trapezoidal; sternum VIII fused with tergum VIII; lamella antevaginalis present; papilla analis approx. 2 times higher than long, sclerotized at the basal half, and setae distally; ductus bursae sclerotized close to ostium, almost the same length of corpus bursae; paired signa dorsally in the corpus bursae.

## REMARKS ON VARIATION

The size of the black spot in DFW can vary between the sexes and individuals, but it is always developed in females.

## DISTRIBUTION AND HABITAT

So far, *Pierella lena atlantica* **ssp. nov.** seems to be restricted to the Atlantic Forest of Bahia, Brazil (Fig. 3), and it is the only subspecies of the *P. lena* group that presents a non-Amazonian distribution. The type locality is in the RPPN “Fazenda Lontra/Saudade” (FLS), Itanagra at the northern coast of Bahia (12°15.00’S, 38°0.00’W). FLS has 1,377.33 ha and represents the largest area of particularly protected Atlantic Forest, located between the Paraguaçu (BA) and São Francisco (SE) Rivers. Additionally, Zacca (2009) recorded the occurrence of *P. lena atlantica* (as *P. lena*) in the “Recôncavo” and southern coast of Bahia, in Cachoeira and Una, respectively.

## ETYMOLOGY

The subspecific epithet refers to the biome where this taxon is endemic, the Atlantic Forest of Bahia, Brazil.

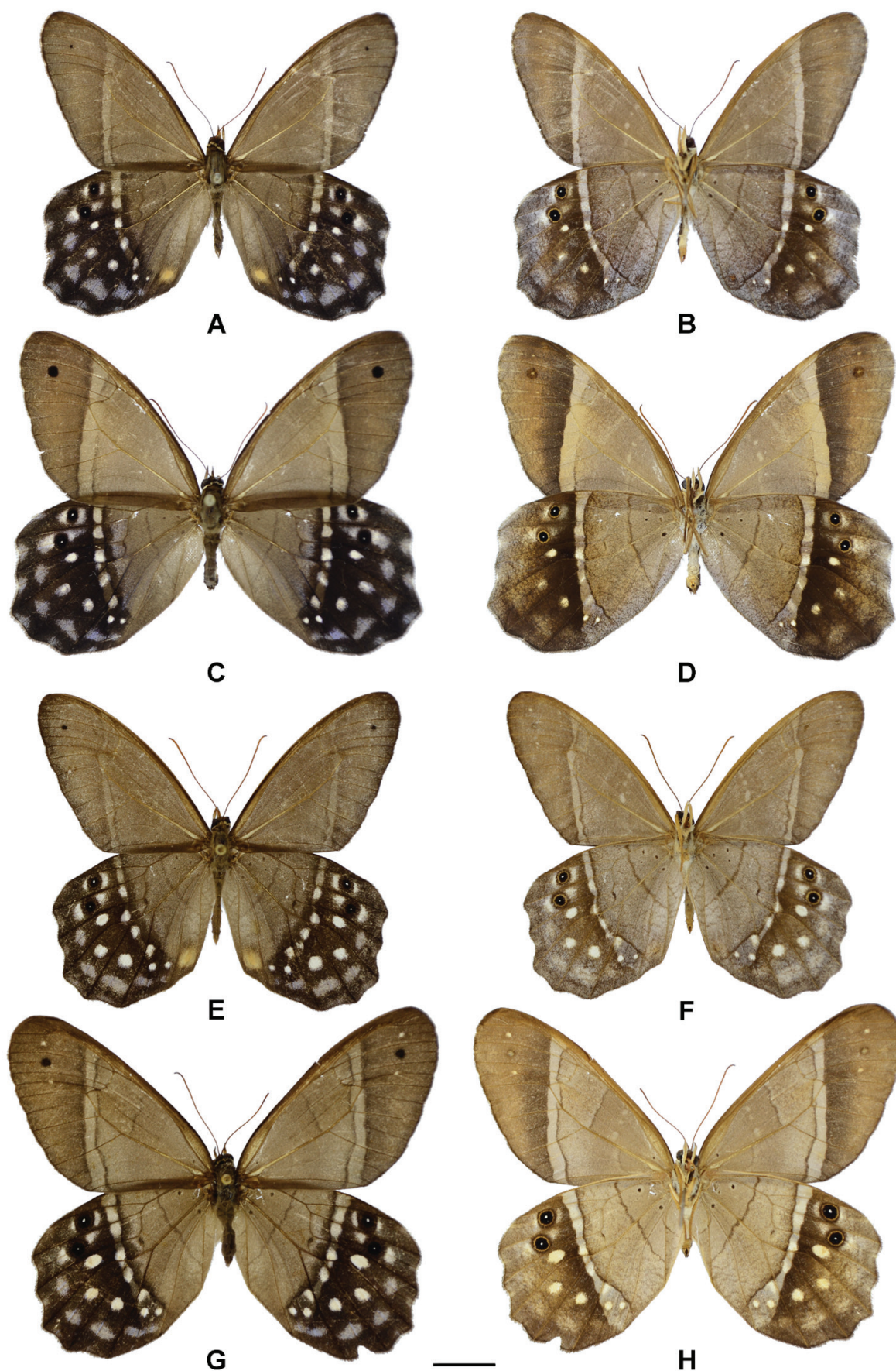
## Type material

**HOLOTYPE.** Male, BRAZIL: Bahia, Itanagra, RPPN Lontra/Saudade, 21-VIII-2012, L. M. Linhares & M. Paluch *leg.*, DZ 31.479 (DZUP).

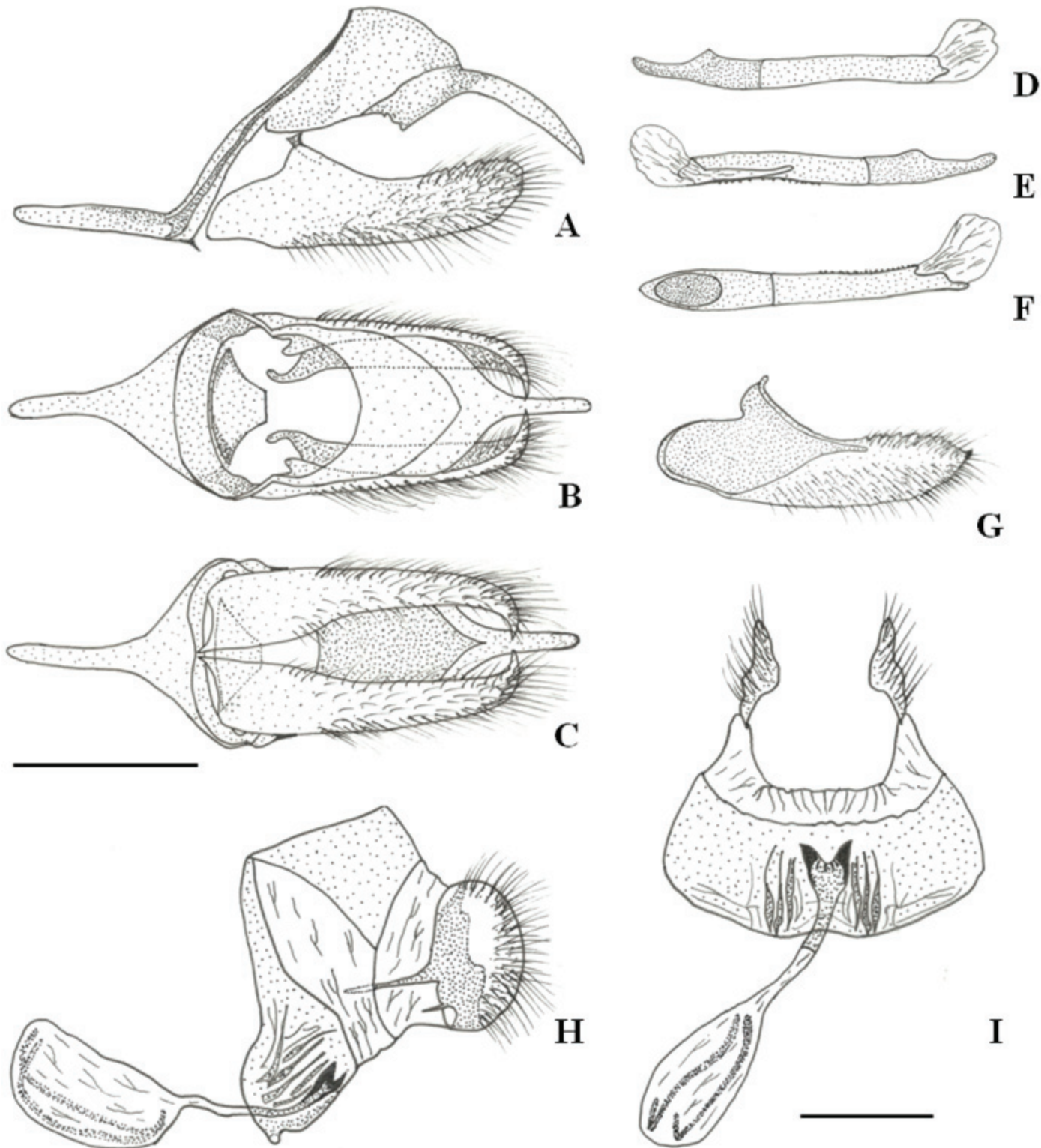
**ALLOTYPE.** Female BRAZIL: Bahia, Itanagra, RPPN Lontra/Saudade, 1-IX-2012, M. Paluch & L. M. Linhares *leg.*, DZ 31.489 (DZUP).

**PARATYPES.** BRAZIL: Bahia, Itanagra, RPPN Lontra/Saudade, 1 male and 2 females 25-II-2012, 1 male 4-X-2012, L. M. Linhares & M. Paluch *leg.*, DZ 31.519, DZ 31.529, DZ 31.539, DZ 31.509 (DZUP). BRAZIL: Bahia, Itanagra, RPPN Lontra/Saudade, 1 male 25-III-2012, 1 male 22-VII-2012, 1 male 16-XII-2012, M. Paluch & L. M. Linhares *leg.*, DZ 31.549, DZ 31.499, DZ 31.409 (DZUP). BRAZIL: Bahia, Una, Reserva Biológica, 1 male 5-X-1987, 1 male and 1 female 8-X-1987, J. Becker *leg.*, #39117, #42477, #39118 (MZFS). BRAZIL: Bahia, Cachoeira, Fazenda Villa Rial, 1 male 14-VI-2007, 1 male 27-VI-2007, Equipe Lasis *leg.*, #39116, #39119 (MZFS).





**Fig. 1.** *Pierella lina atlantica* ssp. nov.: A–B, Male holotype, dorsal and ventral; C–D, female allotype, dorsal and ventral. *Pierella lina lina*: E–F, male, dorsal and ventral; G–H, female, dorsal and ventral. Scale = 10 mm.



**Fig. 2.** *Pierella lena atlantica* ssp. nov.: Male genitalia. A, Lateral; B, dorsal; C, ventral; D–F, aedeagus lateral left, lateral right, and dorsal; G, valva inner view. Female genitalia. H–I, Lateral and ventral. Scales = 1 mm.

Identification key to adults of *Pierella hyalinus* and *Pierella lena* in South America

- 1.— DHW without a sickle projection in  $M_3$  outer margin. Marginal region darker with steely blue and purple reflections, and several white spots. Female might present a subapical dark spot in  $M_1$ – $M_2$  in DFW with variable size ..... 2 (subspecies of *P. lena*)
- 1'.— DHW with  $M_3$  prolonged forming a sickle projection in outer margin. Marginal region with bluish scales ..... *P. hyalinus*





Fig. 3. Geographical distribution of the subspecies of *Pierella lena* based only on collection specimens

- 2.— DHW Androconial patch very conspicuous with golden yellow scales ..... 3
- 2'.— DHW Androconial patch inconspicuous with golden yellow scales surrounded by black scales ..... 4
- 3.— DHW marginal region with 3 conspicuous white spots in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  with a few purple bluish scales. ....  
..... *P. lena lena* (PERU; BRAZIL, Roraima, Amazonas, Acre, Rondônia, and Pará)
- 3'.— DHW marginal region with 3 small white spots surrounded by purple scales in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  .....  
..... *P. lena atlantica* ssp. nov. (BRAZIL, Bahia)
- 4.— DHW marginal region with 3 conspicuous blue spots with white scales in central area in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  .....  
..... *P. lena brasiliensis* (ECUADOR; PERU; BRAZIL, Amazonas)
- 4'.— DHW marginal region with 3 small blue spots in  $M_2$ – $M_3$ ,  $M_3$ – $CuA_1$ , and  $CuA_1$ – $CuA_2$  ..... *P. lena salma* (COLOMBIA)

## Acknowledgments

T. Z (140225/2013-7), R. R. S (140223/2013-4), O. H. H. M (302662/2009-0), and M. M. C (308247/2013-21) extend their sincere thanks to the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for support; and to Copener Forestal LTDA, Alagoinhas, Bahia, for permission to collect butterflies in the RPPN Fazenda Lontra/Saudade. This publication is part of the RedeLep “Rede Nacional de Pesquisa e Conservação de Lepidópteros” SISBIOTA-Brasil/CNPq (563332/2010-7).

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