

Genus	Vol. 19(3): 419-431	Wrocław, 30 X 2008
-------	---------------------	--------------------

Systematics, bionomics and zoogeography of high Andean pedalioidines;
 Part 8: *Pedaliodes niveonota* BUTLER and new related species from
 Central Peru
 (Lepidoptera: Nymphalidae: Satyrinae)

TOMASZ W. PYRCZ¹, ANGEL L. VILORIA², PIERRE BOYER³ & GERARDO LAMAS⁴

¹Zoological Museum of the Jagiellonian University, Ingardena 6, 30-060 Kraków, Poland,
 pyrcztomasz@hotmail.com

²Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apartado 20632,
 Caracas 1020-A, Venezuela, aviloria@ivic.ve

³Lotissement l'Horizon, 13610 Le Puy Sainte Réparate, France, pierdom@aliceadsl.fr

⁴Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos, Av. Arenales 1256, Lima,
 Peru, glamasm@unmsm.edu.pe

ABSTRACT. Two little known south Peruvian species, *Pedaliodes niveonota* BUTLER and *P. parma* THIEME, are redescribed. Two related species, *P. cendreate* n. sp. and *P. misericordiosa* n. sp., are described from central Peru. The "*P. niveonota*" group is identified by a series of synapomorphies in the external morphology and male genitalia.

Key words: entomology, taxonomy, new taxa, redescriptions, Satyrinae, *Pedaliodes*, Huánuco, Junín.

INTRODUCTION

Pedaliodes niveonota BUTLER (1873) is a little known species confined to the eastern slopes of the Cordillera de Vilcanota in Cuzco (Peru). It is related to another obscure, in systematic terms, but conspicuously marked species, *Pedaliodes parma* THIEME (1905) also found in the department of Cuzco, confused previously with the Colombian *P. pylas* (HEWITSON) (ADAMS 1986). The two species occur in the basins of the rivers Huallaga and Madre de Dios respectively. Their affinity with other members of the diverse genus *Pedaliodes* BUTLER becomes evident by comparing their male genitalia and the less conspicuous elements of their hindwing underside colour patterns. Field

research carried out by the authors of this paper revealed the existence of two more species closely related to *P. niveonota* and *P. parma* in the central Peruvian departments of Junín, Pasco and Huánuco. They are described herein.

MATERIALS AND METHODS

Type material was examined in BMNH, ZMHB, MUSM and MZUJ. Additional material was examined in BMNH and in other collections. Male genitalia were dissected according to standard procedures, preserved in glycerol, and examined, alongside other morphological microstructures, under an Olympus SZX9 stereomicroscope. Adults were photographed with an Olympus E-500 digital camera, and colour plates were composed using Adobe PhotoShop version 7 software. The following abbreviations and collection codens were used:

FW: forewing;

HW: hindwing;

V: ventral surface ;

D: dorsal surface ;

BMNH: Natural History Museum, London, UK (formerly British Museum (Natural History)) including: RB: Rothschild Bequest, Brit. Mus. 1939-1 [accession code];

HNHM: Hungarian Natural History Museum, Budapest, Hungary;

MUSM: Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos, Lima, Peru;

MZUJ: Muzeum Zoologiczne Uniwersytetu Jagiellońskiego, Kraków, Poland;

PBF: collection of Pierre BOYER, Le Puy Sainte Réparate, France ;

TWP: collection of Tomasz Wilhelm PYRCZ, Warsaw, Poland (to be integrated into MZUJ);

ZMHB: Zoologische Museum, Humboldt Universität, Berlin, Germany;

ZSBS: Zoologisches Staatssammlung München, Munich, Germany.

SYSTEMATIC OVERVIEW

Pedaliodes niveonota BUTLER, 1873

Pedaliodes parma THIEME, 1905

Pedaliodes misericordiosa PYRCZ & VILORIA n. sp.

Pedaliodes misericordiosa carpishana LAMAS & VILORIA n. ssp.

Pedaliodes cendreatea PYRCZ & BOYER n. sp.

***Pedaliodes niveonota* BUTLER, 1873**

(Figs. 8, 9)

Pedaliodes niveonota BUTLER, 1873: 221-222.

Pedaliodes niveonota BUTLER; KIRBY, 1877: 709; THIEME, 1905: 78, 85; WEYMER, 1912: 255; RILEY & GABRIEL, 1924: 39; GAEDE, 1931: 492; LAMAS et. al., 2004: 212.

Pedaliodes niveonotis [sic] BUTLER; D'ABRERA, 1988: 855, fig.

Type locality: [Huaisampillo], 9000 ft., Peru.

MATERIAL EXAMINED

PERU: 1 ♂: Peru, 9000 ft., coll. by Whitely, BMNH type No. Rh. 3985, (genit. prep. ALV397-98), [LECTOTYPE of *Pedaliodes niveonota* Butler, herein designated] [BMNH]; 3 ♂♂: Qda. Toccahuayco, Acjanaco – Pillcopata, Cuzco, 2700-2750 m, 26.V.2003, T. Pyrcz leg.; 1 ♂: same data but 23.V.2003; 1 ♂: same data but 29.V.2003 [TWP]; 5 ♂♂: Cuzco, Acjanaco vers Boca Manu, 2600-2800m, 22.V.2003, P. Boyer leg. [PBF]; 1 ♀: Cuzco, Qda. Toccahuayco, 2700 m, 10.IX.2008, T. Pyrcz leg. [TWP].

DIAGNOSIS

The all brown upperside is similar to many sympatric congeners. FWV has a large reddish suffusion also found in *P. hewitsoni* Staudinger which occurs parapatrically at lower elevations. The best diagnostic feature is the heavy magenta suffusion of the HWV, and in this respect *P. niveonota* is reminiscent of *P. parma*, which is however immediately recognized by the large FWD white patch.

REDESCRIPTION

MALE (Fig. 8): Head: Eyes chocolate brown; antennae slender reaching two-fifths length of the costa, dorsally blackish brown, ventrally brown, club slightly wider than shaft, formed gradually; labial palpi twice the length of head, light brown, covered with brown hair. Thorax: blackish, legs light brown. Abdomen: dorsally and laterally blackish brown, ventrally light brown. Wings: FW length 27 - 30 (mean: 28.3 mm, n=10), outer margin slightly truncate below apex. HW oval, outer margin scalloped. FWD uniform dark chocolate brown, lustrous; androconial patch very small, centred along outer margin of discal cell and a separate patch along 1A; fringes alternately blackish-brown and pale yellow. HWD uniform dark chocolate brown, lustrous, hairy along anal margin; fringes blackish brown with some pale yellow scales from apex to vein M3. FWV mostly covered with a brick-red suffusion spreading from base to submarginal area, where gradually turning red-brown and dark brown along outer margin; a diffused, faint darker red-brown postdiscal patch; subapical area suffused with magenta forming a roughly triangular patch extending from costa to vein M2. HWV ground colour dark brown with a conspicuous magenta “ripple-pattern”, forming a distinct postmedian band gradually narrowing from anal margin, where approximately 5-6 mm wide, to vein M2, where less than 2 mm wide merges with a wider subapical magenta shapeless suffusion; marginal area dark brown, magenta free; a row of five postmedian – submarginal minute white dots, the one in M1-M2 displaced basally in relation to the remainder, the one in Rs-M1 not apparent in some specimens. **Male genitalia** (Fig. 9): Uncus the length of tegumen, gently arched; subunci stout and nearly as long as uncus; saccus wide and deep, aligned to vinculum; valvae slender, dorsally slightly irregular from base to a sharp process pointing apically, apical part of valvae elongated, tip blunt; aedeagus the length of valva+saccus, slightly contorted and flattened dorso-ventrally with a wide but short, one-fourth the length of aedeagus, proximal opening, and a prominent apical crest.

FEMALE: Sexual dimorphism slightly expressed in the lighter brown upperside, lighter reddish FWV basal suffusion and duller and lighter HWV colour pattern.



1-8. Adults (left: dorsum, right: venter): 1 – *Pedaliodes misericordiosa misericordiosa* male, Holotype (Los Cedros); 2 – *P. m. misericordiosa* female, Paratype (La Antena de Oxapampa); 3 – *P. m. carpishana* male, Paratype (Carpish); 4 – *P. m. carpishana* female, Paratype (Carpish); 5 – *P. cendreatea* male, Holotype (Satipo – Concepción km 77); 6 – *P. cendreatea* female, Paratype (vía Mariposa); 7 – *P. parma* male (Qda. San Luis); 8 – *P. niveonota* male (Qda. Toccahuayco)

REMARKS

P. niveonota was known for over one hundred years from only one specimen, the male collected by Whitley, which was used by BUTLER for the description of this large and striking species. Our sampling in the upper Kosñipata valley resulted in the discovery of a local population of this species along the borderline of the Manu National Park. The two share almost identical male genitalia with diagnostic, stout subunci as long as uncus, and several synapomorphic characters of external morphology, especially the same HWV colour pattern with an unusual subapical magenta suffusion, and a small androconial patch centred along the outer edge of discal cell.

***Pedaliodes parma* THIEME, 1905**

(Figs. 7, 10)

Type locality: Vilcanota, Cuzco, Peru.

Pedaliodes parma THIEME, 1905: 115, pl. 1, fig. 2.

Pedaliodes pylas (HEWITSON) form *parma* THIEME; WEYMER, 1912: 260; ADAMS, 1986: 301-302. *Pedaliodes parma* THIEME; LAMAS, 2003: 65, 141 (fig. 249); LAMAS et. al., 2004: 212.

MATERIAL EXAMINED

PERU: 4 ♂♂: Río Santa María, 7-14 km E. de Alfamayo, CU, 2700-3000 m, 06.10.1981, G. Lamas et. al.; 2 ♂♂: Río Santa María, San Luis, CU, 3000 m, 08.10.1981, G. Lamas [MUSM]; 1 ♂: Sud Pérou, Alfamayo, 2500 m, 23.VIII.[19]77, (genit. prep. ALV403-98) [TWP]; 1 ♂: (Pr. Cuzco), Vilcanota, 3000 m, 1898, O. Garlepp, HOLOTYPE of *Pedaliodes parma* Thieme [ZMHB]; 1 ♂: N. Perú, 80 km Östl. Cuzco, 2800 m, XII.1973, Baumann [ZSBS]; 6 ♂♂ and 1 ♀: Qda. San Luis, Ollantaytambo-Alfamayo, 3000-3100 m, 13.V.2003, T. Pyrcz leg.; 3 ♂♂: Qda. San Luis, Ollantaytambo-Alfamayo, 3000-3100 m, 14.V.2003, T. Pyrcz leg.; 2 ♂♂: Qda. San Luis, Ollantaytambo-Alfamayo, 3050-3200 m, 17.V.2003, T. Pyrcz leg.; 1 ♂: Qda. San Luis, Ollantaytambo-Alfamayo, 3200-3250 m, 18.V.2003, T. Pyrcz leg.; 1 ♂: Qda. San Luis, Ollantaytambo-Alfamayo, 2700-2750 m, 20.V.2003, T. Pyrcz leg.; 7 ♂♂ and 1 ♀: Qda. San Luis, Ollantaytambo-Alfamayo, 3200-3250 m, 22.II.2005, J. Bottger leg.; 10 ♂♂ and 1 ♀: Qda. San Luis, Ollantaytambo-Alfamayo, 3200-3250 m, IV.2005, J. Bottger leg.; 4 ♂♂ and 1 ♀: Qda. San Luis, Ollantaytambo-Alfamayo, 2900-3000 m, III.2006, J. Bottger leg.; 2 ♂♂: Carrizales, Ollantaytambo-Alfamayo, J. Bottger leg.; 1 ♂: Abra Málaga vers Quillabamba, km 20 (Urubamba, Cuzco), 3300 m, 26.II.2005, P. Boyer leg.; 1 ♂: Abra Málaga vers Quillabamba, km 22 (Urubamba, Cuzco), 3200 m, 26.II.2005, P. Boyer leg.; 1 ♂: Abra Málaga vers Quillabamba, km 27 (Urubamba, Cuzco), 2900 m, 26.II.2005, P. Boyer leg.; 4 ♂♂: Abra Málaga vers Quillabamba, (Urubamba, Cuzco), 2700-3000 m, 22.II.2005, P. Boyer leg.; 1 ♂: Ollantaytambo vers Quillabamba, km 70 (Urubamba, Cuzco), 2900-3000 m, 16.V.2005, P. Boyer leg. [TWP]; 2 ♂♂: Cuzco, Quebrada San Luis, vía a Quillabamba, 2600-2800m, 14.V.2003, P. Boyer leg.; 2 ♂♂: Cuzco, Quebrada San Luis, vía a Quillabamba, 3000-

3200m, 14.V.2003, P. Boyer *leg.*; 1 ♂: Cuzco, Quebrada San Luis, vía a Quillabamba, 3200-3400m, 18.V.2003, P. Boyer *leg.*; 1 ♂: Cuzco, Abra Málaga vers Quillabamba, 3100-3200m, 13.V.2003, P. Boyer *leg.*; 1 ♀: Cuzco, Route Abra Málaga vers Quillabamba, 2700-3000m, 22.II.2005, P. Boyer *leg.* [PBF].

DIAGNOSIS

This species is immediately recognized from other Peruvian congeners by the large, median, oval whitish patch on the FW.

REDESCRIPTION

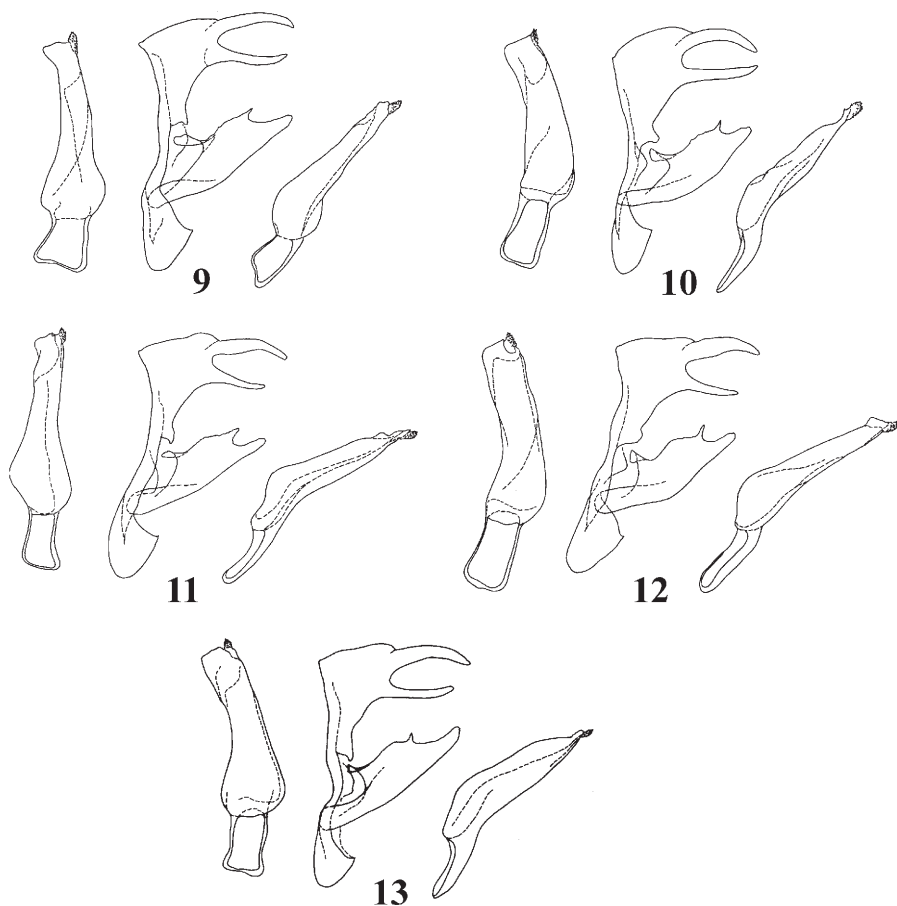
MALE (Fig. 7): Head: Eyes chocolate brown; antennae slender reaching two-fifths length of the costa, dorsally blackish brown, ventrally brown, club slightly wider than shaft, formed gradually; labial palpi twice the length of head, light brown, covered with blackish hair. Thorax: blackish, legs light brown. Abdomen: dorsally and laterally blackish, ventrally light brown. Wings: FW length 27 - 28 (mean: 27.3 mm, n=6), outer margin truncate below apex. HW oval, outer margin scalloped. FWD blackish brown; a large oval, white median patch extending along outer edge of discal cell from base of M2 to Cu1 and into cell Cu2-1A; androconial patch small, aligned along inner edge of white patch, marginally entering discal cell, a separate patch along vein 1A; fringes alternately blackish brown and dirty white. HWD uniform blackish brown; fringes blackish brown, dirty white in the apical area. FWV medium brown; large white patch as on the upperside except that with slightly diffused edges; a faint, whitish postdiscal streak from costa to vein M2; subapical, apical and outer margin to vein Cu1 densely speckled with light brown and magenta scales; three minute, whitish subapical dots in R4-R5, R5-M1 and M1-M2; outer margin dark brown. HWV medium brown with a light chocolate sheen, covered liberally with lighter brown and whitish scales forming a “ripple-like” pattern; a whitish magenta postmedian band, heavily suffused with chocolate-brown, to such an extent that in some individuals it is only slightly lighter than the background, approximately 4 mm wide at anal margin, gradually narrowing to root of vein M2, where merging with a lighter brown – magenta subapical area, some lighter brown and magenta suffusion throughout submarginal area; a row of five postmedian – submarginal minute, whitish dots, of which the one in M1-M2 displaced basally in relation to the remainder.

Male genitalia (Fig. 10): Uncus the length of tegumen, slender towards apex and gently arched; subunci stout and as long as uncus; saccus wide and deep, aligned to vinculum; valvae slender, dorsally slightly irregular from base to a sharp, prominent process pointing apically, apical part of valvae blunt; aedeagus the length of valva+saccus, slightly contorted and strongly flattened dorso-ventrally with a wide but short, two-fifths the length of aedeagus, proximal opening, and a prominent apical crest.

FEMALE (not illustrated): Sexual dimorphism slight, expressed in the slightly larger size of the female, FW length 30-30.5 mm (mean: 30.2 mm, n=4); the somewhat lighter brown colour on the upperside, and considerably lighter and paler on the underside.

REMARKS

There was some confusion related to *Pedaliodes parma* due to a mistake in the designating of the type locality by THIEME (1905), who stated that it was collected in Colombia by Kalbreyer. This error was perpetuated by WEYMER (1912) and ADAMS (1986), who considered *parma* as possibly an individual form or a subspecies of the Colombian *P. pylas* (HEWITSON). The original illustration of *P. parma* however, leaves no doubt as to its true identity. This issue was elucidated by LAMAS (2003) who illustrated a male from the Sanctuary of Machu Micchu. *P. parma* is an endemic species of the upper Urubamba basin and was so far collected only in Machu Picchu and in the upper Río Lucumayo valley.



10-13. Male genitalia (aedeagus extracted in lateral and dorsal view): 9 – *Pedaliodes niveonota* (Qda. Toccahuayco); 10 – *P. parma* (Qda. San Luis); 11 – *P. misericordiosa misericordiosa* (La Antena, Paratype); 12 – *Pedaliodes m. carpishana* (Carpish, Paratype); 13 – *P. cendreatea* (Satipo – Concepción km 77, Paratype)

***Pedaliodes misericordiosa* PYRCZ et VILORIA n. sp.**

(Figs. 1, 2, 11)

[*Pedaliodes* [n. sp.] LAMAS & VILORIA, MS; LAMAS et. al., 2004: 213; partly misidentification of *P. misericordiosa carpishana*].

Type locality: Los Cedros, Parque Nacional Yanachaga-Chemillén, Pasco, Peru

MATERIAL EXAMINED

HOLOTYPE ♂: Peru, Pasco, Parque Nacional Yanachaga-Chemillén, Los Cedros, 11.II.2003, J. Wojtusiak *leg.* [MUSM]; PARATYPES (65 ♂♂ and 11 ♀♀): 1 ♂ & 1 ♀: Prov. Huánuco, Rio Palcazu, (W. Hoffmanns), RB [BMNH]; 1 ♂: PA, Oxapampa, P. N. Yanachaga-Chemillén, Q. Herradura, 2500 m, 10 32' 27" S, 75 21' 23" W, 25-May-2001, J. Santisteban [MUSM]; 4 ♂♂ and 4 ♀♀: Pasco, Suiza, W. Oxapampa, 1950-2270 m, 20.VII.2003, Olivier Duviols *leg.*; 3 ♂♂ and 2 ♀♀: Pasco, Cueva Blanca, Milpo and above, 2600-3300m, X-XI.2005, J. Bottger *leg.*; 1 ♂: Pasco, La Antena, près de Oxapampa, 2600-2800m, 11.XII.2003, P. Boyer *leg.*; 1 ♂: Pasco, La Antena, 2500 m, 11.XII.2003, P. Boyer *leg.*; 1 ♀: Pasco, La Suiza, 2200-2500 m, 20.VII.2003, Olivier Duviols *leg.*; 1 ♀: Pasco, Cueva Blanca, Huancabamba, 2300-2600 m, 6.XII.2003, P. Boyer *leg.*; 1 ♂: Pasco, Ichco, au dessus de Milpo, Huancabamba, 3100-3300 m, 3.XI.2004, P. Boyer *leg.* [PBF]; 52 ♂♂ and 1 ♀: Pasco, Oxapampa, La Antena, 2300-2700 m, V.2003, J. Bottger *leg.*; 1 ♂ and 1 ♀: Pasco, Huancabamba, Milpo, 3000-3200 m, IV.2006, J. Bottger *leg.* [TWP].

DIAGNOSIS

The only conspicuous colour pattern element is the wide yellow postmedian band, and in this respect *P. misericordiosa* is similar to several sympatric species, including an individual form of *P. sophismata* Pyrcz and *P. demathani* Pyrcz (a local subspecies), but most of all to *P. paneis* (Hewitson), found in northern Peru, which is almost identical except that its HWV postmedian – submarginal whitish dots are elongated, rounded in *P. misericordiosa*.

DESCRIPTION

MALE (Fig. 1): Head: Eyes chocolate brown; antennae reaching two-fifths the length of the costa, slender, dorsally dark brown, ventrally red-brown, club slightly thicker than shaft; labial palpi twice the length of the head, medium brown, covered with chocolate brown hair. Thorax: blackish brown, legs lighter, pale brown. Abdomen: dorsally and laterally blackish brown, ventrally medium brown. Wings: FW length 24 - 26 (mean: 25.3 mm, n=9), outer margin slightly truncate below apex. HW outer margin undulated. FWD uniform dark brown, lustrous; androconial patch small, along outer edge of discal cell and along vein 1A; fringes dirty white, dark brown at vein ends. HWD uniform dark brown, lustrous; basal one-third hairy; fringes dark brown with some dirty white scales, denser from apex to vein M2. FWV medium brown, slightly lighter in distal one-third, especially distally from a faint, lighter postdiscal streak extending

from costa to vein M2 or M3; subapical area suffused with sparse magenta scales, and with three minute, white dots in R4-R5, R5-M1 and M1-M2; marginal area from apex to cell M3-Cu1 chocolate brown. HWV ground colour chocolate brown; a conspicuous orange yellow postmedian band, dusted with brown “ripple-like” pattern, approximately 5 mm at anal margin, gradually narrowing towards wing median area, reaching to vein M2; a row of five, minute postmedian – submarginal white dots in Rs-M1 to Cu1-C2, in some individuals the subapical dot missing; submarginal area dusted with magenta, somewhat denser towards subapical area; the area between a zigzagging submarginal line and outer margin chocolate brown, magenta free.

Male genitalia (Fig. 11): Uncus the length of tegumen, slightly curved downwards; subunci stout, almost as wide and long as uncus; saccus wide and deep, aligned to vinculum; valvae slender, dorsally slightly irregular from base to the tip of a sharp process pointing apically, apical part of valvae elongated, tip blunt; aedeagus the length of valva+saccus, slightly contorted and flattened dorso-ventrally with a wide but short, one-fourth the length of aedeagus, proximal opening, and a prominent apical crest.

FEMALE (Fig. 2): Sexual dimorphism slight, expressed in the lighter brown colour of wings upper and underside; HWV yellow patch considerably lighter and paler; submarginal area dusted with pale yellow instead of magenta; FW length 26 - 27 mm (mean: 26.4 mm, n=8).

ETYMOLOGY

The specific epithet means merciful, and is an allusion to the fine, “merciful” weather its first collectors experienced in the Yanachaga-Chemillén National Park during the first Polish-Hungarian entomological expedition to Peru in 2003.

REMARKS

P. misericordiosa is one of the co-dominant species of the *Pedaliodes* assemblage in mid to high elevation cloud forests of central Peruvian departments of Pasco, Junín and Huánuco. It is particularly common around Oxapampa at 2500-2800 m.

***Pedaliodes misericordiosa carpishana* LAMAS et VILORIA n. ssp.**

(Figs. 3, 4, 12)

[*Pedaliodes* [n. sp.] LAMAS & VILORIA, MS; Lamas et. al., 2004: 213; partly misidentification of *P. misericordiosa misericordiosa*]

Type locality: Carpish, Huánuco, Peru.

MATERIAL EXAMINED

PERU: HOLOTYPE ♂: Huánuco, Carpish, 27-Nov-1965, P. Hocking [MUSM]; PARATYPES (41 ♂♂ and 5 ♀♀): 1 ♂: Carpish, HU, 2700 m, 02-May-1978, G. Lamas; 1 ♂: Carpish, 2700-2800 m, 7-June-1995, 0943/7606, G. Lamas; 1 ♀: same data; 2 ♂♂: same data, 08.VI.1995; 1 ♂ and 1 ♀: same data, 23.IX.1996, J. Grados leg.; 1 ♂: same data, G. Lamas leg.; 1 ♂: same data, 24.IX.1996; 1 ♂: same data, J. Grados leg.; 5 ♂♂

and 1 ♀: same data, 26.IX.1996 (1 genit. prep. ALV---2001); 1 ♂: same data, G. Lamas *leg.*; 2 ♂♂: 5 km N Carpish, 0942/7605, 2500 m, 24.IX.1996, J. Grados *leg.* [**MUSM**]; 7 ♂♂: Carpish, Acomayo – Tingo María, 2700-2800 m, 25.I.2003, J. Wojtusiak *leg.* [**MZUJ**]; 2 ♂♂: Carpish, Acomayo – Tingo María, 2700-2800 m, 25-27.VII.2002, T. & C. Pyrcz *leg.*; 1 ♂: Carpish, Acomayo – Tingo María, 2600-2700 m, 31.I.2003, P. Boyer *leg.* [**TWP**]; 1 ♂ and 1 ♀: Huánuco, Paso Carpish, 2800-3000m, 19.I.2003, P. Boyer *leg.*; 3 ♂♂ and 1 ♀: Huánuco, Paso Carpish, 2500-2700 m, 26.X.2004, P. Boyer *leg.*; 7 ♂♂: Huánuco, au dessus de Huanacaure, km 43 de Pachachupan, est de Acomayo, 3000-3100 m, 23.X.2006, P. Boyer *leg.* [**PBF**]; 3 ♂♂: Huánuco, Carpish, S9°43.562 W76°06.197, 2781 m, 25.I.2003, A. Kun & B. Benedek *leg.*, expedition no. 42 [**HNHM**]; 1 ♂: Huánuco, Carpish, S9°43.562 W76°06.197, 2781 m, 26.I.2003, A. Kun & B. Benedek *leg.*, expedition, no. 44 [**HNHM**].

DESCRIPTION

MALE (Fig. 3): Head, thorax and abdomen similar to those of the nominotypical subspecies. Differs from the nominotypical in its slightly larger size (FW length 27 - 28 mm, mean: 27.5 mm, n=11), especially in the wider HW with more scalloped outer margin; the narrower, particularly towards anal margin, and brighter, more intensely yellow HWV postmedian band, with less brown suffusion; and somewhat larger HWV postmedian – submarginal white dots. **Male genitalia** (Fig. 12): Uncus even more robust than in the nominotypical; dorsal process on the valvae thinner and pointing upwards, not distally; proximal opening of aedeagus slightly longer.

FEMALE (Fig. 4): Lighter and paler, medium brown on the upperside and underside, particularly on the HWV; magenta suffusion on the FWV subapical area and the HWV submarginal area replaced by pale gray and dirty yellow; HWV postmedian band lighter and paler yellow with more prominent suffusion of brown “ripple-like” pattern; slightly larger than the male, FW length: 27-29 mm (mean: 27.7 mm, n=5).

ETYMOLOGY

The epithet of this taxon is derived from the type locality, Carpish, a tunnel on the road leading from the central highlands to the valley of the Río Huallaga.

REMARKS

This subspecies is known so far exclusively from a restricted area around Carpish and Huanacaure. It replaces the nominotypical *P. misericordiosa* on the left bank of the Río Huallaga. The role of the upper valley of Huallaga in shaping geographic distributions of Peruvian butterflies was suggested by LAMAS (1982). It apparently is also the case for central Peruvian Pronophilina, and for the genus *Pedaliodes* in particular (see PYRCZ et. al., in press). To the North, the range limit of *P. misericordiosa* is not known, but it has to be stressed that the cloud forests of northern Huánuco have not been sampled for butterflies, due to their inaccessibility and notorious security problems.

Pedaliodes cendrata PYRCZ et BOYER n. sp.

(Figs. 5, 6, 13)

Type locality: Satipo – Concepción km 58, Junín, Peru.

MATERIAL EXAMINED

PERU: HOLOTYPE ♂: Route Satipo – Concepción vía Mariposa km 64, Junín, 2600 m, 02-12.XI.2006, P. Boyer *leg.* [MUSM]; PARATYPES (17 ♂♂ and 6 ♀♀): 2 ♂♂: same data as the holotype; 2 ♂♂: same data but km 68 a 70, 2700-2800 m; 2 ♂♂: same data but km 70, 2900 m; 2 ♂♂: same data but km 77, 3350 m [TWP]; 2 ♂♂: route Satipo vers Concepcion, vía Mariposa, km 68 à 70, Junín, 2700-2900 m, 2-12.XI.2006, P. Boyer *leg.*; 4 ♂♂ and 5 ♀♀: same data but km 68, 2700 m, 2-12.XI.2006, P. Boyer *leg.*; 3 ♂♂ and 1 ♀: same data but km 64, 2600 m, 02-12.XI.2006, P. Boyer *leg.* [PBF].

DIAGNOSIS

This almost all blackish brown species can be confused with several sympatric congeners, including *P. demathani chaneli* PYRCZ & BOYER and *P. brea* PYRCZ & BOYER, from which it can be recognised immediately by the magenta suffusion on the HWV submarginal area, a feature exclusive of the *P. niveonota* group. It is the only species of this group devoid of any conspicuous colour pattern elements.

DESCRIPTION

MALE (Fig. 5): Head: Eyes chocolate brown; antennae reaching two-fifths the length of costa, slender, dorsally dark brown, ventrally orange-brown, club slightly thicker than shaft; labial palpi twice the length of head, light brown, covered with gray-brown and chocolate-brown hair. Thorax: dorsally and ventrally blackish brown; legs medium gray-brown. Abdomen: dorsally and laterally blackish brown, ventrally pale brown. FW length: 25-27 mm, (mean: 25.9 mm, n=10). FW apex acute, very slightly truncate below, outer margin straight. HW somewhat square, outer margin slightly undulated. FWD uniform blackish-brown; androconial patch small, aligned along outer margin of discal cell with a separate patch along 1A; fringes gray-brown with some dirty white scales in the interspaces. HWD uniform blackish-brown; hairy along anal margin; fringes blackish-brown, with some sparse dirty white scales towards apex. FWV gray-brown, lighter and lustrous in basal one-third; a faint, barely noticeable whitish postdiscal streak extending from costa to cell M2-M3; subapical, apical and marginal areas to Cu1 suffused with magenta; three minute, white subapical dots in R4-R5, R5-M1 and M1-M2; outer margin chocolate brown. HWV chocolate brown liberally dusted with fine gray and magenta scaling, denser distally from the postmedian line; the latter runs straight from anal margin to vein M2, then bends at 45° to costa; a row of minute, white sub marginal dots, always noticeable in R5-M1, M1-M2 and M2-M3, occasionally not apparent in M3-Cu1 and Cu1-Cu2. **Male genitalia** (Fig. 13): Uncus the length of tegumen, stout, gently arched; subunci stout and nearly as long as uncus; saccus wide and deep, aligned to vinculum; valvae slender, dorsally smooth or very slightly irregular with a short, sharp process pointing upwards, apical part of valvae elongated, tip blunt; aedeagus the length of valva+saccus, slightly contorted and flattened dorso-ventrally with a short, one-fourth the length of aedeagus, proximal opening, and a prominent apical crest.

FEMALE (Fig. 6): dimorphism slight, expressed in the larger size of the female, a shade lighter blackish brown on both the upper and underside; a faint, barely noticeable reddish shade from postmedian to submarginal line on FWV; length: 27-28 mm, (mean: 27.3 mm, $n=6$).

ETYMOLOGY

The epithet of this species, *cendreata*, means ashy, indicating the characteristic HWV gray and magenta suffusion.

REMARKS

P. cendreata is apparently restricted to southern Junín, where it occurs in high elevation cloud forests, to timberline. It is apparently involved in mimetic relationship with the microsympatric subspecies of *P. demathani*, *P. tyro* and *P. sophismata*, an issue which will be discussed in more detail by PYRCZ et. al. (in prep.).

DISCUSSION

The species discussed in this paper present highly divergent colour patterns. One bears a large, oval white FW patch; one has a predominantly red FWV; one has a wide yellow HWV patch; and one is nearly all blackish brown. Despite these differences, a number of synapomorphies can be identified, which suggest they belong to a monophyletic group. In the colour pattern, it is the magenta suffusion of the HWV, particularly conspicuous in the submarginal area. Such an unusual colouration has not been recorded in any other group of *Pedaliodes*. Another one is the shape of the HWV postmedian band. Although this element of colour pattern can be observed, to a variable degree, in many congeners, in the *P. niveonota* group it is recognised by its considerable width on the anal margin and the regular shape of its basal and distal margins. This pattern is also present in *P. paneis*, which however is immediately recognised by the elongated HWV postmedian – submarginal dots. Androconial patch in all the species of *P. niveonota* group is very small and centred along the outer margin of discal cell, and spreads very little distally. Male genitalia offer several strong synapomorphies, in particular the stout and long subunci, the length of uncus; a little contorted aedeagus with a wide but short, approximately one-fourth its length, proximal opening, and a conspicuous spiny apical tip; and a very wide saccus. The *P. niveonota* group is known, so far, from central (Huánuco, Junín) and southern (Cuzco) Peru. Intensive sampling in the northern Peruvian department of Amazonas did not reveal the presence of any close allopatric relative of *P. misericordiosa* (PYRCZ 2004). The externally similar *P. paneis* (HEWITSON) belongs in another section of *Pedaliodes*. To the South, the department of Puno and the northern Yungas in Bolivia have certainly not been sufficiently sampled and the existence of a, hitherto unknown, representative of the *P. niveonota* group is highly probable, given the general distribution patterns of high elevation *Pedaliodes* in this part of the Andes.

ACKNOWLEDGEMENTS

The authors wish to thank, INRENA (Peruvian Institute of National Resources), for issuing a research – collecting permit (029-2003-INRENA-IFFS-DCB), which enabled them to sample in the valley of Kosñipata. Field work of T. W. Pyrcz in Peru (Cuzco) in 2005 was supported by the Polish Committee for Scientific Research KBN Grant 0446/PO4/2003/24. Three visits of A. L. VILORIA to the MUSM in Lima were sponsored by La Universidad del Zulia, Fundacite-Zulia (1995), the Venezuelan Ministry of Environment and Natural Resources (MINABM, formerly MARNR, March 2001), the IVIC and FONACIT (September 2001). A. L. VILORIA's work in the BMNH, ZHMB, ZSBS and MZUJ was supported by the British Council, CONICIT. The Linnean Society of London, The Natural History Museum, the Jagiellonian University and IVIC.

REFERENCES

- ADAMS, M. J., 1986. Pronophilinae butterflies (Satyridae) of the three Andean Cordilleras of Colombia. Zool. Journ. Linn. Soc., **87**: 235-320.
- BUTLER, A. G., 1873. List of Lepidoptera in a small collection sent from Peru by Mr. WHITELY, with descriptions of the new species. Ann. Mag. Nat. Hist., (4) **12** (69): 218-230.
- D'ABRERA, B., 1988. Butterflies of the Neotropical Region. Part V. Nymphalidae (Conc.) & Satyridae. Victoria, Black Rock, Hill House, [viii] + 679-877.
- GAEDE, M., 1931. Satyridae. II. In: STRAND, E. (Ed.): Lepidopterorum Catalogus, 29(46): 321-544.
- KIRBY, W., F. 1877. A synonymic catalogue of diurnal Lepidoptera. Supplement. London: John van Voorst, pp. i-viii + 691-883.
- LAMAS, G., 1982. A preliminary zoogeographical division of Peru, based on butterfly distributions (Lepidoptera, Papilionoidea), pp. 336-357. In G. T. PRANCE (Ed.). Biological diversification in the Tropics. Columbia University Press, New York.
- , 2003. Las Mariposas de Machu Picchu. PROFONANPE Lima. 221 pp., 34 colour plates.
- LAMAS, G., VILORIA, A. L., PYRCZ, T. W., 2004. Subtribe Pronophilina, in: E. LAMAS (Ed.), Atlas of Neotropical Lepidoptera, Checklist: Part 4A, Hesperoidea – Papilionoidea. Association for Tropical Lepidoptera, Gainesville, pp. 206-215.
- PYRCZ, T. W., 2004. Pronophilinae butterflies of the highlands of Chachapoyas in northern Peru: faunal survey, diversity and distribution patterns (Lepidoptera, Nymphalidae, Satyrinae), Genus, Wrocław, **15**: 455-622.
- PYRCZ, T. W., VILORIA, A. L., LAMAS, G., 2008. Systematics, bionomics and zoogeography of high Andean pedaliodines, Part 9: A sister species of *Pedaliodes paneis* from Central Peru. Genus, Wrocław, **19**: 409-417.
- RILEY, N. D., GABRIEL, A. G., 1924. Catalogue of the type specimens of Lepidoptera Rhopalocera in the British Museum Part I. Satyridae. London: The Trustees of the British Museum/Oxford University Press, 62 p.
- THIEME, O., 1905. Monographie der gattung *Pedaliodes* BUTL. (Lepidoptera. Rhopalocera. Satyridae). Berl. Entomol. Zeitschr., **50**(1/2): 43-141, pls. 1-3.
- WEYMER, G., 1912. 4 Familie: Satyridae. In: SEITZ, A. (ed.): Die Gross-Schmetterlinge der Erde, 2; Exotische Fauna, 5. Stuttgart: A. Kernen, pp. 173-283.