

Genus	Vol. 19(3): 433-470	Wrocław, 30 X 2008
-------	---------------------	--------------------

Systematics, bionomics and zoogeography of high Andean pedalioidines;  
 Part 9: Notes on *Pedaliodes pammenes* (HEWITSON) and related species  
 with the descriptions of nine new taxa  
 (Lepidoptera: Nymphalidae: Satyrinae)

TOMASZ W. PYRCZ<sup>1</sup>, ANGEL L. VILORIA<sup>2</sup>, PIERRE BOYER<sup>3</sup> & GERARDO LAMAS<sup>4</sup>

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

<sup>2</sup>Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apartado 20632, Caracas 1020-A, Venezuela, e-mail:aviloria@ivic.ve

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

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

ABSTRACT. The systematics and taxonomy of high elevation species related to *Pedaliodes pammenes* (HEWITSON) is discussed. Four species and five subspecies are described. *P. illimania* STAUDINGER, *P. garleppi* THIEME and *P. uncus* THIEME are reinstated as valid species. Synapomorphic characters defining the so-called *P. pammenes* group are identified and discussed.

Key words: entomology, taxonomy, Satyrinae, Pronophilina, *Pedaliodes*, new taxa, redescription, aedeagus, Bolivia, cloud forest, Cuzco, Peru, Puno, Vilcabamba, Yungas de La Paz.

#### INTRODUCTION

The species of the diverse genus *Pedaliodes* BUTLER (Nymphalidae: Satyrinae: Satyrini) can be usually fairly easily assigned to monophyletic groups based on some discrete adult morphological traits, particularly the male genitalia and underside colour patterns, despite highly divergent conspicuous upperside colours. The example of such phenomenon are the species discussed below. They form an apparently monophyletic lineage, called herein the “*P. pammenes* group”, defined by several synapomorphies of colour pattern and male genitalia. The species of *P. pammenes* group also exhibit

some common ecological traits. They are all (except *P. uncus*) restricted to upper or uppermost Andean cloud forest (2500-3200 m). This feature, and the fact that they all occur in remote, little explored areas of the Andes of Peru and Bolivia make them one of the least studied taxa of *Pedaliodes sensu stricto* and, indeed, of all the entire neotropical satyrine subtribe Pronophilina (LAMAS *et. al.* 2004) (tribe Pronophilini *sensu* MILLER, 1968). From among 12 species assigned to the so-called *P. pammenes* group, four new are described herein as new to science.

#### MATERIALS AND METHODS

Type material was examined in BMNH, ZMHB, MUSM and MZUJ. Additional material was examined in other public and private collections. Male genitalia were dissected according to standard procedures, by soaking in hot 10% KOH solution, and 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 8. The following abbreviations and collection codes were used:

FW: forewing;

HW: hindwing;

V: ventral surface;

D: dorsal surface;

BMNH: Natural History Museum, London, UK (formerly British Museum (Natural History)), including: AB: Adams Bequest, Brit. Mus. 1986-344 [accession code]; G-S: Godman-Salvin collection, Brit. Mus. 1904-1 [accession code]; HC: Hewitson collection, Brit. Mus. 79-69 [accession code]; JB: Joicey Bequest, Brit. Mus. 1934-120 [accession code]; OC: ex Oberthür Collection, Brit. Mus. 1927-3 [accession code]; RB: Rothschild Bequest, Brit. Mus. 1939-1 [accession code];

MNHN: Museum National d'Histoire Naturelle, Paris, France ;

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 pammenes* (HEWITSON, 1874)

*Pedaliodes pammenes marca* PYRCZ et VILORIA n. ssp.

*Pedaliodes garleppi* THIEME, 1905 n. stat.

*Pedaliodes uncus* THIEME, 1905 stat. reinst.

- Pedaliodes perisades* (HEWITSON, 1874)  
*Pedaliodes illimania* STAUDINGER, 1897 stat. reinst.  
*Pedaliodes antulla* THIEME, 1905  
*Pedaliodes antulla bambulla* PYRCZ & BOYER n. ssp.  
*Pedaliodes ampulla* PYRCZ et BOYER n. sp.  
*Pedaliodes daulis* THIEME, 1905  
*Pedaliodes daulis vilca* PYRCZ et BOYER n. ssp.  
*Pedaliodes yuvinka* PYRCZ et BOYER n. sp.  
*Pedaliodes yuvinka pylasia* PYRCZ et BOYER n. ssp.  
*Pedaliodes amafania* THIEME, 1905  
*Pedaliodes dominicae* PYRCZ et BOYER n. sp.  
*Pedaliodes dominicae diademata* LAMAS et VILORIA n. ssp.  
*Pedaliodes phaeinomorpha* VILORIA, LAMAS et PYRCZ n. sp.

***Pedaliodes pammenes* (HEWITSON)**  
**(Figs. 1, 2, 33)**

- [*Pedaliodes brenda* STAUDINGER, in litt.; THIEME, 1905: 85 (synonymy given); GAEDE, 1931: 493; FORSTER, 1964: 168 (as a synonym)] *nomen nudum*.  
*Pronophila pammenes* HEWITSON, 1874: pl. 30, fig. 64, 66; HEWITSON, 1874a: 12; RILEY & GABRIEL, 1924: 42.  
*Pedaliodes pammenes* (HEWITSON); KIRBY, 1877: 709; THIEME, 1905: 85-86; WEYMER, 1912: 255, pl. 54, row b; FASSL, 1920: 18; GAEDE, 1931: 493; FORSTER, 1964: 166, 168, fig. 228 (male genitalia); LEWIS, 1973: 62, 234, fig. 2; D'ABRERA, 1988: 854, figs.; LAMAS et al., 2004: 212; GARECA et al., 2006: 48.

Type locality: Bolivia.

MATERIAL EXAMINED

**BOLIVIA:** LECTOTYPE [herein designated] ♂: white rectangular label: Bolivia, Hewitson coll., 79-69-2, *Pronophila pammenes* Hew.; white square label: BMNH type No. Rh. 6294, *Pronophila pammenes* female [sic!] Hew.; red rectangular label: *Pronophila pammenes*, Hewitson, 1874, Lectotype, male, designated by A. L. Viloria, 1997; rounded, red and white label: type; rounded blue and white label: lectotype; 1 ♂: Bolivia, Hewitson coll., 79-69-3, genit. prep. ALV173-96, BMNH vial number 5364; rounded, blue and white label: paralectotype; 1 ♀: Bolivia, Hewitson coll., 79-69-1, rounded blue and white label: paralectotype; 1 ♂: Bolivia, Hewitson coll., 79-69-3, rounded blue and white label: paralectotype; 1 ♂: Bolivia, Hewitson coll., 79-69-4, rounded blue and white label: paralectotype; 1 ♂: Bolivia, Hewitson coll., 79-69-6, rounded blue and white label: paralectotype [PARALECTOTYPES of *P. pammenes* Hew., herein designated]; 1 ♂: La Paz, E. Garlepp, (Staudinger 1895), OC; 1 ♂: Chaco, Garl.[epp], RB; 1 ♂, Boliv.[ia], Ex Grose Smith 1910, JB; 1 ♂: Tarinas, AB; 1 ♂, Bolivia, AB; 1 ♂: Prov. Yungas, Rio Songo, II/V.1896, Ex Staudinger, (genit. prep. ALV174-96), OC; 1 ♂: (La Paz?), Cillutincara, 3000 m, I.1896, Garlepp, Ex Grose Smith 1910, JB [BMNH]; 1 ♂, Unduavi, I.1896, Garlepp; 2 ♂♂ and 1 ♀: Cillat. von Garlepp; 1 ♂: Yungas, Rio Songo, 1200 m, 1896, Garlepp; 1 ♂: Yungas, San Antonio, 1800 m, 1895-6, Garlepp;

2 ♂♂: La Paz, Chaco, 2000-3000 m, 1893-4, Garlepp; 1 ♂: La Paz, Río Tanampaya, 1894, Garlepp; 1 ♂: Cillutincara, Sandillani, 3000 m, I.1896, Garlepp [ZMHB]; 1 ♂: Bolivia; 3 ♂♂: Tala-Mapiri, Barrancas, 2800 m, 29.VIII.1950, W. Forster, (1 präparat Nr. SA366) [ZSBS]; 1 ♂: Unduavi, Yungas de La Paz, 3100 m, 08.IX.2002, T. Pyrcz leg.; 2 ♂♂: Cillutincara, ex coll. Staudinger & Bang-Haas [TWP].

#### DIAGNOSIS

Differs from the most closely similar sympatric species, *P. garleppi*, in its larger size, lighter upperside in distal half, the presence of a reddish suffusion on the FWV and a lighter HWV ground colour; and from *P. pammenes marca* n. ssp. by the lighter upperside, lustrous chestnut in distal half, the presence of the FWV reddish dusting and smaller, faint HWV postdiscal dots.

#### REDESCRIPTION

MALE (Fig. 1): Head: eyes chocolate brown; labial palpi chocolate brown, covered with blackish brown hair; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally slightly lighter brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 28-29.5 mm (mean: 28.8 mm, n=3) apex subacute, outer margin slightly scalloped in the apical area. HW outer margin undulated. FWD blackish brown in median half, varying between chestnut and dull brown in distal half; androconial patch medium sized, compact, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD dark brown in median part, gradually turning chestnut with a delicate brick red sheen, lustrous, hairy in anal one-third; fringes grey, some apical yellow scales. FWD dark brown in median half, light brown in distal half, lustrous; a narrow, diffused light brown postiscal line from costa to M2-M3; three or four white subapical dots in R4-R5 to M2-M3; apical area dusted with lighter brown and grey scales; marginal area from apex to Cu1 chocolate brown; a reddish suffusion in postmedian to subapical area from vein M2 to Cu2. HWV medium brown in basal half, lighter brown in distal half; median line dusted distally with sandy yellow scales forming a diffused, narrow band; five minute, barely noticeable postmedian light dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 suffused distally with silver scales forming a diffuse patch. **Male genitalia** (Fig. 33): Aedeagus strongly contorted, laterally straight and flattened, numerous spiny, tiny processes grouped at distal extremity, proximal opening wide and oval, slightly longer than tegumen-uncus; uncus as long as tegumen, very slightly hooked; subunci well developed, three-fourths the length of uncus; saccus globular, approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly serrate dorsal surface and a short dorsal process pointing distally, distal extremity sharpened.

FEMALE (Fig. 2): Similar to the male, except that a shade lighter on both the upper and underside; FWV postmedian reddish suffusion larger and more prominent; HWV postmedian-submarginal ripple pattern more conspicuous; distal silver suffusion of subapical dot in Rs-M1 barely noticeable.

## REMARKS

*P. pammenes pammenes* occurs in Bolivia, and all reliable locality data are from localities situated in the Yungas de La Paz. The type locality, although not indicated explicitly is certainly Cillutincara, a classical collecting spot of Garlepp, actually a mountain ridge below Unduavi along the La Paz – Coroico road. Although some old specimen labels indicate collecting altitudes such as 1200-1800 m, *P. pammenes* is found actually at considerably higher elevations. Recently collected individuals come all from 2800-3200 m.

***Pedaliodes pammenes marca* PYRCZ et VILORIA, n. ssp.**

(Figs. 3, 4, 34)

Type locality: Quebrada Huayalloc, Marcapata, Cuzco, Peru.

## MATERIAL EXAMINED

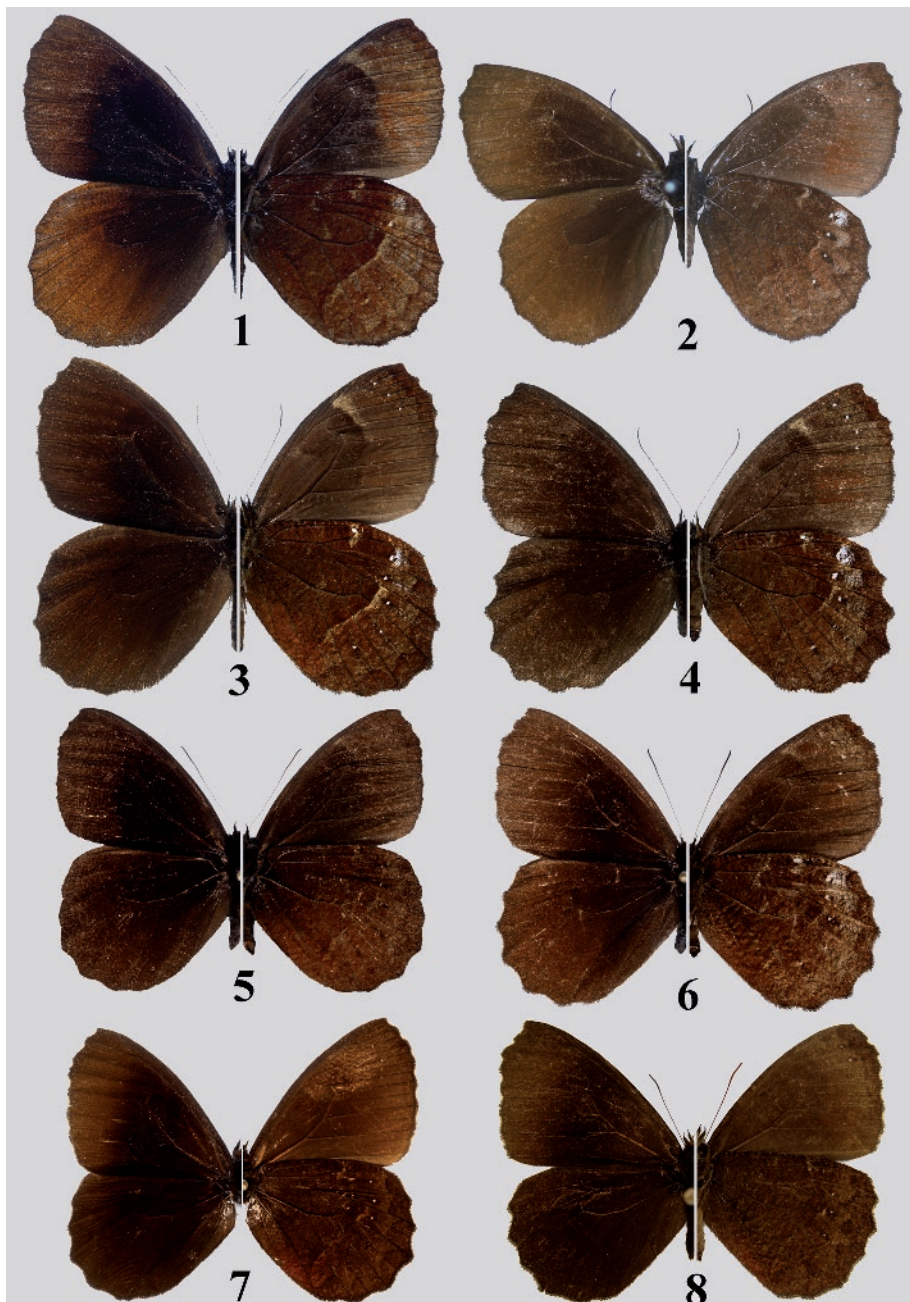
**PERU:** HOLOTYPE ♂: Cuzco, Ocongate – Marcapata, Qda. Huayalloc, 3100-3150 m, 14.II.2005, T. Pyrcz *leg.* [MUSM]; PARATYPES: 4 ♂♂ and 1 ♀: same data [TWP]; 3 ♂♂ and 2 ♀♀: Cuzco, Puente Huayalloc, Marcapata vers Ocongate km 4, 3100 m, 14.II.2005, P. Boyer *leg.* [PBF].

## DESCRIPTION

**MALE** (Fig. 3): Head, thorax and abdomen: not differing from those of the nomotypical. Wings: FW length: 28-29 mm (28.8 mm, n=5), apex subacute, outer margin slightly scalloped in the apical area. HW outer margin undulated. FWD uniform blackish brown, lustrous; androconial patch small, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD blackish brown, lustrous, hairy in median one-third; fringes alternately grey and brown. FWV dark brown, a shade lighter in distal half, lustrous; a narrow, diffused light brown postiscal line from costa to M2-M3; four white subapical dots in R4-R5 to M-2-M3; apical area dusted with lighter brown and grey scales; marginal area from apex to Cu1 chocolate brown. HWV chocolate brown, dusted with brick red towards inner margin and tornus; the area between postmedian and submarginal line slightly lighter, dusted with silver scales, particularly towards subapical area; five postmedian white dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 edged distally with denser silver scales forming a diffused patch. **Male genitalia** (Fig. 34): Aedeagus strongly contorted, laterally straight and flattened, numerous spiny, tiny processes grouped at distal extremity, proximal opening lengthened and constricted in the middle, considerably longer than tegumen-uncus; uncus as long as tegumen, slightly hooked; subunci well developed, three-fourths the length of uncus; saccus globular, approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a short, blunt dorsal process pointing upwards, distal extremity elongated, blunt.

**FEMALE** (Fig. 4): Differs from the male in the lighter and duller brown FWD, HWD and FWV; lighter HWV submarginal scaling is white instead of silver; there is a faint, diffused brick red patch in the postmedian area from vein M3 to Cu2. FW length: 28 mm.





1-8. Adults (left: dorsal, right: ventral): 1. *Pedaliodes pammenes pammenes* male (Unduavi); 2. *P. p. pammenes* female, Paralectotype (Bolivia); 3. *P. p. marca* male (Holotype); 4. *P. p. marca* female, Paratype (Huallayoc); 5. *P. garleppi* male (Unduavi); 6. *P. garleppi* female (Unduavi); 7. *P. uncus* male (La Caldera); 8. *P. uncus* female (La Caldera)



9-16. Adults (left: dorsal, right: ventral): 9. *Pedaliodes antulla antulla* male (Kosñipata); 10. *P. a. antulla* female (Kosñipata); 11. *P. a. bambulla* male, Holotype (Cochabamba); 12. *P. a. bambulla* female, Paratype (Cochabamba); 13. *P. ampulla* male, Holotype (Limbani); 14. *P. ampulla* female, Paratype (Limbani); 15. *P. perisades* male (Yungas de La Paz); 16. *P. illimania* male, Holotype (Bolivia)

## ETYMOLOGY

The epithet of this taxon is an abbreviated name of the valley of Marcapata, the type locality.

## REMARKS

This taxon is recognised from nominotypical *P. pammenes* by the considerably darker uniform blackish brown upperside, and richer silver white scaling in the submarginal area of the HWV. It has been recorded so far exclusively in the type locality, Quebrada Huayalloc in the upper valley of Marcapata in southern Cuzco. More intensive collecting in southern Cuzco and Puno should establish its geographic pattern in relation to *P. pammenes pammenes*.

***Pedaliodes garleppi* THIEME n. stat.**

(Figs. 5, 6, 35)

*Pedaliodes pammenes* (HEWITSON) var. *garleppi* THIEME, 1905: 85-86, synonymy established by LAMAS et al., 2004: 212

*Pedaliodes pammenes* (HEWITSON) form *garleppi* THIEME; WEYMER, 1912: 255.

*Pedaliodes pammenes* (HEWITSON) var. *garleppi* THIEME; GAEDE, 1931: 493; FORSTER, 1964: 168; LAMAS et al., 2004: 212.

Type locality: Cillutincara, Bolivia.

## MATERIAL EXAMINED

**BOLIVIA:** 1 ♂: (La Paz?), Cillutincara, 3000 m, I.I.1896, Garlepp [LECTOTYPE of *Pedaliodes pammenes* var. *garleppi* Thieme, herein designated] [BMNH]; 4 ♂♂: Cillutincara, ex coll. Staudinger & Bang-Haas; 3 ♂♂: Yungas de La Paz, Unduavi, 3100 m, 08.IX.2002 [TWP]; 2 ♂♂ and 1 ♀: La Paz, Coroico vers La Paz km 33, 3300 m, 25.XI.2001, P. Boyer leg. [PBF]; **PERU:** 4 ♂♂ and 2 ♀♀: Puno, Vallée du Río Sina, San Antonio de Putina, 2700-3100 m, 12.X.2004, P. Boyer leg. [TWP], 6 ♂♂ and 4 ♀♀: Puno, vallée du Río Sina, San Antonio de Putina, 2700-3100 m, 12.X.2004, P. Boyer leg. [PBF].

## DIAGNOSIS

Compared to the most similar nominate *P. pammenes*, it is consistently smaller, darker on both the upperside and underside, and without the reddish suffusion on the FWV postmedian area; compared to *P. pammenes marca* it is smaller and has no silver scaling in the submarginal area of the HWV.

## REDESCRIPTION

**MALE** (Fig. 5): Head: eyes chocolate brown; labial palpi black covered with blackish brown hair; antennae reaching 2/3 the length of costa, slender, dorsally blackish brown, ventrally medium brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown; legs medium brown. Wings: FW 25-28 mm



(mean: 26.4 mm, n=10), apex blunt, outer margin straight. HW outer margin slightly undulated. FWD blackish brown, very slightly lighter in distal one-third, lustrous; androconial patch medium sized, compact, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD blackish brown, lustrous, hairy in median one-third; fringes brown. FWD dark brown, a shade lighter in distal half, dull; a faint lighter brown postscalar line from costa to M2-M3; four minute, white subapical dots in R4-R5 to M-2-M3; marginal area from apex to M3 chocolate brown. HWV chocolate brown with a brick red shade, slightly lighter in distal half, distally from postmedian line, dusted with some sparse sandy yellow; five postmedian white dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 suffused distally with sparse silver scales. **Male genitalia** (Fig. 35): Aedeagus strongly contorted, laterally straight and flattened, slightly inflated at proximal extremity of contortion, with numerous spiny, tiny processes grouped at distal extremity, proximal opening narrow, one-fourth longer than tegumen-uncus; uncus as long as tegumen, very slightly hooked; subunci well developed, three-fourths the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly serrate dorsal surface and a short, blunt dorsal process pointing upwards, distal extremity elongated, blunt.

FEMALE (Fig. 6): FW length: 24-26 mm (mean: 24,9 mm, n=7), somewhat lighter and duller upperside than the male, with a reddish FWV suffusion in the postmedian to submarginal area.

#### REMARKS

*P. garleppi* was described as a form of *P. pammenes*, with which it was synonymised by LAMAS et. al. (2004). After reconsideration this proved incorrect. Although *P. garleppi* is indeed related to *P. pammenes*, it is a separate parapatric species. The original description is brief but correct as it stresses on some diagnostic features that allow to differentiate between the two, especially the small size of HWV white submarginal dots and the lack of whitish diffused subapical patches. It has to be added that *P. garleppi* is also considerably smaller than *P. pammenes*. Altitudinal ranges of *P. garleppi* and *P. pammenes* partly overlap but their respective elevational spans cannot be defined with exactitude due to insufficient data on *P. pammenes*. Most recent individuals of *P. garleppi* were collected at or slightly above 3000 m. It is known to occur in the Bolivian Yungas and also in several localities of Puno department in southern Peru.

#### *Pedaliodes uncus* THIEME stat. reinst.

(Figs. 7, 8, 36)

*Pedaliodes uncus* THIEME, 1905: 102.

*Pedaliodes ferratilis* BUTLER form *uncus* THIEME; WEYMER, 1912: 258; GAEDE, 1931: 490 (as var.); HAYWARD, 1967: 392-393, pl. 6, figs. 12 (male genitalia) & 24, fig. 14; 1973: 266.

*Pedaliodes ferratilis uncus* THIEME; KÖHLER, 1935: 217; HAYWARD, 1958a: 181; 1958b: 202, 283, 285, 288, fig. 81 (male genitalia), pl. 8, fig. 234 (as *ferratalis* [sic]).

[*Pedaliodes daulis* THIEME; HAYWARD, 1958b: 13 (misidentification)].

*Pedaliodes pheretias uncus* THIEME; D'ABRERA, 1988: 857.

*Pedaliodes pausia uncus* THIEME; LAMAS et. al., 2004: 212.

Type locality: Tucumán, Argentina.

## MATERIAL EXAMINED

**ARGENTINA:** 1 ♂: Tucumán, (Steinbach), RB [LECTOTYPE of *Pedaliodes uncus* Thieme, herein designated], RB; 3 ♂♂: same data, (1 genit. prep. ALV302-97) [PARALECTOTYPES of *P. uncus* Thieme, herein designated]; 1 ♂: Villa Nougés, b. Pueblo Tucumán, (genit. prep. ALV113-96), JB; 1 ♂ and 1 ♀: Villa Nougés, Tucumán, 26.IV.[19]21, JB; 1 ♂: Salta Province, Rio Quinsilla, on road to San Andies [*sic*], 5000-5500 ft., 13.VII.1935, S. P. de Verteuil, Brit. Mus. 1935-539; 1 ♀: Salta Province, San Andrés, Río Zenta, 3000-5000 ft., 14.VI.1935, S. P. de Verteuil, Brit. Mus. 1935-539 [BMNH]; 8 ♂♂: Argentina, Prov. Salta, La Caldera, Km 1645, 2200 m, II.2002, A. Varga leg. [TWP]; 3 ♂♂: Tucumán, Concepción-Las Estancias km 47-48, 1800 m, 20.I.2000, P. Boyer leg.; 1 ♂: Tucumán, Vallée de Tafi vers Tucumán, 1200-1600 m, 15.I.2000, P. Boyer leg.; 2 ♀♀: Tucumán, Concepción-Las Estancias km 30, Río Cochuna, 1200 m, 14.I.2000, P. Boyer leg.; 1 ♀: Jujuy, Valle de los Reyes, 1500 m, 13.III.1990, P. Boyer leg.; 1 ♂: Jujuy, Ojos del Agua, La Caldera-El Carmen, 1500 m, 19.I.2000, P. Boyer leg. [PBF].

## DIAGNOSIS

Closely similar in size, androconial patch size and shape, and colour pattern to *P. garleppi*, especially the small size of HWV submarginal dots, from which it differs most in less patterned HWV, most noticeably in the faint or absent submarginal whitish dots. Male genitalia more closely allied to *P. pammenes*, differing from *P. garleppi* in the wider proximal opening of the aedeagus, from both in smaller spiny apical area.

## REDESCRIPTION

**MALE** (Fig. 7): Head: eyes chocolate brown; labial palpi black covered with coffee brown and sparse yellow hair; antennae reaching 2/3 the length of costa, slender, dorsally coffee brown, ventrally medium brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally brown, ventrally light brown; legs medium brown. Wings: FW 23-24.5 mm (mean: 23.8 mm, n=9), apex blunt, outer margin straight. HW outer margin slightly undulated. FWD dark brown, slightly lighter in distal one-third, lustrous; androconial patch medium sized, compact, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD dark brown, lustrous, hairy along anal margin; fringes sandy yellow from costa to M3, brown from M3 to tornus. FWV medium brown, dull, a shade lighter distally from a faint barely noticeable lighter brown postiscal line extending from costa to approximately M2-M3; two to four minute, white subapical dots in R4-R5 to M2-M3; a darker brown submarginal line; outer margin dark brown; some chocolate brown scaling in apical area. HWV chocolate brown with a brick red shade along anal margin and tornus; a faint, slightly lighter postmedian-submarginal band with a series of five, minute postmedian white dots in Rs-M1 to Cu1-Cu2, in some individuals not apparent. **Male genitalia** (Fig. 36): Aedeagus contorted, laterally straight and flattened, with some spiny, tiny processes grouped at distal extremity, proximal opening wide, one-fourth longer than tegumen-uncus; uncus slightly longer than tegumen, very slightly hooked; subunci well developed, two-thirds the length of

uncus; saccus sub-conical, approximately aligned to vinculum; valvae the length of tegumen-uncus, slender, with a slightly serrate dorsal surface between dorsal process and apex, dorsal process prominent pointing upwards.

FEMALE (Fig. 8): FW length: 24-26 mm; differing from the male only in the slightly lighter upper and underside ground colour.

#### REMARKS

*P. uncus* was described by THIEME (1905) as a species but later has been wrongly associated with a number of unrelated species. It was considered by WEYMER (1912) and HAYWARD (1958a, 1967) as a subspecies of *P. ferratilis* BULTER. PYRCZ (2004; 2008) discussed the identity of *P. ferratilis* and compared it with *P. proerna* (HEWITSON), both widely differing morphologically from *P. uncus*, in size, wing shape and colour pattern, and male genitalia. LAMAS et. al. (2004) on turn, considered *P. uncus* as a subspecies of *P. pausia*, which shows some similarity in the HWV colour pattern but is distinct enough in wing and androconial patch shape, as well as in male genitalia as to associate it closely with *P. uncus*. VILORIA (Ph.D.) correctly placed *P. uncus* as a separate species but did not discuss its affinities. As it appears from this study, *P. uncus* is very closely related to *P. garleppi* and if not some consistent differences in the male genitalia, could well be considered as its conspecific. *P. uncus* is one of the few species of the genus *Pedaliodes* occurring in northern Argentina. It is the only representative of the *P. pammenes* group found in low elevations cloud forest (below 2000 m).

#### *Pedaliodes daulis* THIEME

(Figs. 21, 22, 37)

*Pedaliodes daulis* THIEME, 1905: 85, 87-88, pl. 3, fig. 24; WEYMER, 1912: 256, pl. 54, row b; GAEDE, 1931: 498; HAYWARD, 1953: 51; 1958a: 181; LAMAS et. al., 2004: 211.

[*Pedaliodes daulis* THIEME; HAYWARD, 1958a: 13 (misidentification of *P. uncus* THIEME); D'ABRERA, 1988: 854, fig. (male figure erroneous, misidentification of *P. antulla* THIEME)].

Type locality: Callanga, Cuzco, Peru.

#### MATERIAL EXAMINED

**PERU:** 1 ♂: (Pr. Cuzco), Callanga, 1500 m, 1898, O. Garlepp, HOLOTYPE of *P. daulis* Thieme [examined] [ZMHB]; 1 ♂ and 1 ♀: P. N. Abiseo, Huicungo, Puerta del Monte, SM, 3190-3250 m, 19.VII.1990, M. Medina leg. [locality data erroneous]; 1 ♂: Río Santa María, 14 km E de Alfamayo, CU, 3000 m, 08.X.1981, G. Lamas et. al.; 1 ♀, Río Santa María, 7-14 km E. de Alfamayo, CU, 2700-3000 m, 06.X.1981, G. Lamas et. al. [MUSM]; 1 ♂: Sud Perou, Alfamayo, 2500 m, 18.VIII.1977, A. Crossondu-Cormier leg.; 28 ♂♂ and 5 ♀♀: Ollantaytambo-Alfamayo, Qda. San Luis, above Carrizales, 3200-3350 m, 19.V.2003, T. Pyrcz leg.; 15 ♂♂ and 5 ♀♀: same data but 13.V.2003; 3 ♂♂: same data but 14.V.2003; 6 ♂♂: same data but 20.V.2003; 3 ♂♂: Abra Málaga vers Quillabamba, 3300-3500 m, 13.V.2003, P. Boyer leg.; 6 ♂♂: same data but 14.V.2003; 1 ♂: same data but 18.V.2003 [TWP] 3 ♂♂ and 1 ♀: Cuzco, Abra Málaga vers Quillabamba, 3200-3400 m, 18.V.2003; 1 ♂ and 2 ♀♀: Cuzco, Abra

Málaga vers Quillabamba, 3300-3500 m, 13.V.2003; 1 ♂: Cuzco, Quebrada San Luis, vía a Quillabamba, 3000-3200 m, 14.V.2003; 1 ♂: Cuzco, Abra Málaga vers Quillabamba km 20, 3300 m, 26.II.2005; 2 ♀♀: Cuzco, Abra Málaga vers Quillabamba km 22, Urubamba, 3200 m, 26.II.2005; 1 ♀: Abra Málaga vers Quillabamba, 3400-3500 m, 14.V.2003, P. Boyer *leg.* [PBF].

#### DIAGNOSIS

A large species, similar in size to *P. pammenes*, from which it differs primarily by the consistently darker, coffee brown FWV and HWV without any reddish scaling. It is also closely related to *P. garleppi*, from which it differs first of all in considerably larger size and darker, more uniform underside pattern.

#### REDESCRIPTION

**MALE** (Figs. 21): Head: eyes chocolate brown; labial palpi beige, covered with blackish brown hair; antennae reaching 2/3 the length of costa, slender, dorsally blackish brown, ventrally medium brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs chocolate brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 27-29.5 mm (mean: 28.0 mm, n=63), apex subacute, outer margin slightly undulated in the apical area. HW outer margin scalloped. FWD uniform blackish brown, lustrous; androconial patch small, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD blackish brown, lustrous, hairy in median one-third; fringes grey brown, sandy yellow in apical area. FWV dark coffee brown, a shade lighter in distal half, lustrous; light brown scaling along distal edge of postmedian line from costa almost to anal margin; three white subapical dots in R4-R5 to M1-M2; an undulated blackish brown submarginal line from costa to Cu1-Cu2; apical area dusted with lighter brown and chocolate brown scales. HWV dark coffee brown, dusted liberally with light brown scales; the area between postmedian and submarginal line noticeably lighter, especially along distal edge of postmedian line; five postmedian white dots in Rs-M1 to Cu1-Cu2, the dot in Rs-M1 edged distally with denser silver scales forming a diffuse patch. **Male genitalia** (Fig. 37): Aedeagus contorted (but less than in *P. pammenes*), laterally straight and flattened, numerous spiny, tiny processes grouped at distal extremity, proximal opening lengthened, considerably longer than tegumen-uncus; uncus as long as tegumen, very slightly hooked; subunci well developed, two-thirds the length of uncus; saccus globular, approximately aligned to vinculum; valvae slightly shorter than tegumen-uncus, with a serrate dorsal surface and a very short, sharp dorsal process, distal extremity conical, sharpened.

**FEMALE** (Fig. 22): A shade lighter and duller on both the upper and underside; scalloping of HW margin more prominent; otherwise similar; FW length: 27-29.5 mm (mean: 28.5 mm, n=10).

#### REMARKS

*P. daulis* occurs in Peru in the department of Cuzco in the upper basin of Urubamba. The only record from Abiseo, San Martín department in north-central Peru is certain-

ly a mislabelling. In the Quebrada San Luis (below Abra Málaga) it is the dominant species in the *Pedaliodes* community at 3200-3400 m. Recent intensive sampling in the Lucumayo valley show that it does not fly below 3000 m, therefore some of the elevational data on the examined specimens are to be considered inaccurate. *P. daulis* occurs locally parapatrically above the allied *P. amafania*.

***Pedaliodes daulis vilca* PYRCZ et BOYER n. ssp.**

(Figs. 23, 24, 38)

Type locality: Vilcabamba, Cuzco, Peru.

MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Vilcabamba, 3300-3500 m, III.2005, J. Bottger *leg.*, [MUSM]; PARATYPES: 2 ♂♂ and 1 ♀, same data as the holotype [TWP]; 1 ♂: Cuzco, Vilcabamba, 3300 m, III.2005, J. Bottger *leg.* [PBF].

DESCRIPTION

**MALE** (Fig. 23): Head, thorax and abdomen not differing from those of the nominotypical. Wings: FW length: 26-27mm (mean: 26.3 mm, n=3), apex subacute, outer margin slightly undulated in the apical and subapical area. HW outer margin scalloped. FWD uniform blackish brown, lustrous, a shade lighter in outer half; androconial patch small, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD blackish brown, lustrous, hairy in median one-third; fringes grey brown, sandy yellow in apical area. FWV medium brown, a shade darker, coffee brown in median area; light brown scaling along distal edge of postmedian line from costa to vein M3; three white subapical dots in R4-R5 to M1-M2; an undulated dark brown submarginal line from costa to Cu1-Cu2; apical and marginal area dusted with lighter brown and chocolate brown scales. HWV dark brown suffused with reddish orange, somewhat more conspicuous towards anal margin and tornus; the area between postmedian and submarginal line noticeably lighter, especially along distal edge of postmedian line; five postmedian white dots in Rs-M1 to Cu1-Cu2, the dot in Rs-M1 edged distally with some silver scales forming a small diffuse patch. **Male genitalia** (Fig. 38): Aedeagus similar to nominotypical, spines at distal extremity fewer; uncus, subunci and saccus similar to nominotypical; valvae differing in the much more prominent, longer dorsal process, distal extremity conical, slightly less sharpened than in nominotypical.

**FEMALE** (Fig. 24): Similar to the male except for a orange-reddish suffusion in the outer half of the FWV and a whitish speckling on the entire HWV; FW length: 27 mm.

ETYMOLOGY

The epithet of this subspecies – *vilca* – means “sacred” in quechua, and is an allusion to the Cordillera de Vilcabamba.





17-24. Adults (left: dorsal, right: ventral): 17. *Pedaliodes yuvinka yuvinka* male, Paratype (Milpo); 18. *P. y. yuvinka* male, Holotype (Milpo); 19. *P. y. pylasia* male, Paratype (Huanacaure); 20. *P. y. pylasia* female, Paratype (Huanacaure); 21. *P. daulis daulis* male (Qda. San Luis); 22. *P. d. daulis* female (Qda. San Luis); 23. *P. d. vilca* male, Holotype (Vilcabamba); 24. *P. d. vilca* female, Paratype (Vilcabamba)



25-32. Adults (left: dorsal, right: ventral): 25. *Pedaliodes amafania* male (Qda. San Luis); 26. *P. amafania* female (Qda. San Luis); 27. *P. phaeinomorpha* male, Paratype (Acjanaco); 28. *P. phaeinomorpha* female, Paratype (Acjanaco); 29. *P. dominicae dominicae* male, Holotype (Concepción - Mariposa); 30. *P. d. dominicae* female, Paratype (Concepción - Mariposa); 31. *P. d. dominicae* male, Paratype (Concepción - Mariposa); 32. *P. d. diademata* male, Holotype (Vilcabamba)

## REMARKS

This subspecies differs from the nominotypical in the smaller size, similar to *P. garleppi*, and the orange reddish suffusion in the anal and tornal area of the HWV. *P. daulis vilca* is known from a few individuals collected in the Cordillera de Vilcabamba near the ancient Inca city of Vilcabamba. This mountainous range squeezed between the valleys of Apurimac and Urubamba has barely been sampled for butterflies. A few, sporadic sampling revealed that it possesses several endemic elements in its pronophiline fauna including several taxa of *Pedaliodes*; among them the highly distinctive *Pedaliodes phoenix* Lamas. Two taxa belonging to the *P. pammenes* group are apparently endemic of the Vilcabamba range, *P. daulis vilca* and *P. dominicae diademata* n. sp.

*Pedaliodes antulla* THIEME

(Figs. 9, 10, 39)

*Pedaliodes antulla* THIEME, 1905: 85, 86-87, pl. 3, fig. 28.*Pedaliodes antulla* THIEME; WEYMER, 1912: 256; GAEDE, 1931: 488; HAYWARD, 1958a: 68, 70, fig. 34 (male genitalia); FORSTER, 1964: 167, fig. 229, 168; D'ABRERA, 1988: 854, fig.; LAMAS et. al., 2004: 211.

Type locality: Limbani, Carabaya, Peru

## MATERIAL EXAMINED

1 ♂: Carabaya, Limbani, 10000', Nov-[19]01, wet, (Ockend.) [LECTOTYPE of *Pedaliodes antulla* Thieme, herein designated], RB; 4 ♂♂ and 1 ♀: Carabaya, Limbani, 9500 ft., April-[19]04, dry s., G. Ockenden, RB; 1 male: SE. Peru, R. Inambari to Limbani, Mar[19]04, (G. Ockenden); 1 ♂: Carabaya, Oconoque to Agualani, 6-9000 ft., Mar-[19]04, G. Ockenden, (genit. prep. ALV095-96), RB; 1 ♂ and 1 ♀: Carabaya, Oconoque, 7000 ft., July 1904, dry s., G. Ockenden; 1 ♂: Carabaya, Limbani, 9500 ft., May-'04, G. Ockenden, JB; 1 ♀: E. Peru, Marcapata, 4500 ft., RB; 1 ♂: Peru, 9000 ft., coll. by Whitely 73/47 [BMNH]; 1 ♂: Pillahuata, CU, 2500 m, 16.V.1984, G. Lamas; 2 ♂♂ and 1 ♀, same data, 17.V.1984; 1 ♂, CU, entre Qbda. Toccohuayco y Pillahuata, 2600-2800 m, 1311/7137, 14.VIII.2001, J. Grados [MUSM]; 1 ♂: SO. Peru, San Luis y Cuzco, 2800 m, Nov 1973, Baumann [ZSBS]; 5 ♂♂: Cuzco, Acjanaco-Pillcopata, Qda. Toccahuayco, 2800-2850 m, 26.V.2003, T. Pyrcz leg.; 5 ♂♂ and 1 ♀: same data but 26.V.2003; 1 ♂: same data but 25.V.2003; 6 ♂♂: same data but 24.V.2003; 1 ♂ and 2 ♀♀: same data but 23.V.2003, T. Pyrcz leg. [TWP]; 5 ♂♂ and 1 ♀: Cuzco, Acjanaco vers Boca Manu, 2600-2700 m, 22.V.2003, P. Boyer leg.; 1 ♂: Puno, Carcel Punco, Agualanes, 8km nord de Limbani, 2400-2700 m, 16.X.2004, P. Boyer leg.; 1 ♂: Puno, Aquele, vallée de Limbani, 2300 m, V.2006, J. Bottger leg. [PBF].

## DIAGNOSIS

*P. antulla* is most closely allied to *P. ampulla* n. sp. The most immediate character which allows their discrimination is the size of the FWD androconial patch, small in *P. antulla* and very small, half the size, in *P. ampulla* n. sp. Another distinctive character is the shape of HWV costal white patch, lunular in *P. antulla*, rather rectangular in *P. ampulla* n. sp.



## REDESCRIPTION

**MALE** (Fig. 9): Head: eyes chocolate brown; labial palpi grey brown, covered with dark brown hair; antennae reaching  $2/3$  the length of costa, slender, dorsally dark brown, ventrally orange brown, club formed gradually slightly thicker than shaft, blackish brown. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 26-27 mm (26.7 mm,  $n=3$ ), subacute, outer margin slightly undulated in the apical area. HW outer margin undulated. FWD uniform dark brown in basal, lighter brown in distal half, lustrous; androconial patch rather large, extending along outer edge of discal cell, but not entering it, triangular; fringes alternately sandy yellow and grey. HWD blackish brown, slightly darker and hairy in basal area, lustrous; fringes grey brown turning sandy yellow in apical area. FWV grayish brown, a shade lighter in distal half, lustrous; inner margin under submedian vein light yellow-brown; a postdiscal light yellow-brown streak from costa to M2-M3, faint or barely noticeable in some individuals; four subapical white dots in R4-R5 to M2-M3; marginal area from apex to M3 chocolate brown. HWV chocolate brown, dusted gradually with orange scales towards inner margin and tornus; the area between postmedian and submarginal line very slightly lighter, particularly distally towards submarginal line; a light yellow-brown line running from M1 to submedian vein along distal edge of postmedian line; five postmedian-submarginal silver-white dots in Sc-Rs to Cu1-Cu2, the one in Sc-Rs large and lunular with a few additional silver-white scales towards apex, the two following dots in M1-M2, M2-M3, smaller, with a dark chocolate brown shade surrounding them, the two last ones barely visible, without shade, and a sixth near costa in Sc-Rs; marginal area chocolate brown. **Male genitalia** (Fig. 39): Aedeagus contorted (but less than in *P. pammenes*), laterally straight and flattened, thicker than in *P. pammenes* (a third of total length), numerous spiny, processes grouped at distal extremity (fewer than in *P. pammenes* and other related species), proximal opening wide, slightly longer than tegumen-uncus; uncus approximately the length of tegumen, very slightly hooked; subunci well developed, two-thirds the length of uncus; saccus globular (wider than in other related species), approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a sharp dorsal process pointing distally (slightly longer than in *P. pammenes*), distal extremity considerably elongated and sharpened.

**FEMALE** (Fig. 10): Differs from the male only in the slightly lighter upperside and underside ground colour.

## REMARKS

The correct identification of *P. antulla* is extremely important because there are two closely related, parapatric and partly sympatric species occurring in Limbani, the type locality. The FWD androconial patch is small in *P. antulla* and very small, half the size, in *P. ampulla* n. sp. described below. There are no intergrades between the two species in the shape and size of androconial patches. Thieme's mention on this character is not particularly revealing as he says that it is "narrow, not entering discal cell". This could refer to either species. As far as HWV costal white patch, fortunately Thieme (1905) is more specific, and points out that in *P. antulla* it is lunular, whereas in the

second species *P. ampulla* it is rather rectangular. The original illustration in Thieme (*op. cit.*) shows a verso of a little patterned specimen, which could be either species. All Thieme's specimens examined in the BMNH (including the selected Lectotype) belong to *P. antulla antulla* as characterised herein. *P. antulla* is found in Peru, in the Madre de Dios basin in the departments of Puno and Cuzco and in Bolivia. The only record of *P. antulla* from the basin of Urubamba in Cuzco, a male labeled San Luis (Qda. San Luis below Abra Málaga pass in the valley of Lucumayo) from the Baumann collection, has not been confirmed by recent intensive collecting carried out by the authors in that area. *P. antulla* is a mid to high elevation species found commonly at 2500-2800 m. In Acjanaco it is therefore replaced at higher altitudes by its closest local ally, *P. phaeinomorpha* n. sp.

***Pedaliodes antulla bambulla* PYRCZ et BOYER n. ssp.**

(Figs. 11, 12, 40)

Type locality: vía Cochabamba, Bolivia.

MATERIAL EXAMINED

**BOLIVIA:** HOLOTYPE ♂: Cochabamba, Cochabamba vers Villa Tunari km 66 à 70, 2900-3000 m, 19.XI.2001, P. Boyer *leg.* [MZUJ]; PARATYPES: 2 ♂♂ and 1 ♀: same data, P. Boyer *leg.* [PBF].

DESCRIPTION

**MALE** (Fig. 11): Head, thorax and abdomen not differing from those of the nominotypical. Wings: FW length: 26-27mm (26.7mm, n=3), subacute, outer margin slightly undulated in the apical area. HW outer margin undulated. FWD uniform dark brown in basal, lighter brown in distal half, lustrous; androconial patch rather large, extending along outer edge of discal cell, but not entering it, triangular; fringes alternately sandy yellow and grey. HWD blackish brown, slightly darker and hairy in basal area, lustrous; fringes grey brown turning sandy yellow in apical area. FWV grayish brown, a shade lighter in distal half, lustrous; inner margin under submedian vein light yellow-brown; a postdiscal light yellow-brown streak from costa to M2-M3; four subapical white dots in R4-R5 to M2-M3; marginal area from apex to M3 chocolate brown. HWV chocolate brown, dusted gradually with orange scales towards inner margin and tornus; the area between postmedian and submarginal line very slightly lighter, particularly distally towards submarginal line; a light yellow-brown line running from M1 to submedian vein along distal edge of postmedian line; five postmedian-submarginal silver-white dots in Sc-Rs to Cu1-Cu2, the one in Sc-Rs large and lunular with a few additional silver-white scales towards apex, the two following dots in M1-M2, M2-M3, smaller, with a dark chocolate brown shade surrounding them, the two last ones barely visible, without shade, and a sixth near costa in Sc-Rs; marginal area chocolate brown. **Male genitalia** (Fig. 40): Aedeagus contorted, laterally straight and flattened (less thick than in *P. antulla antulla*), numerous spiny processes grouped at distal extremity (fewer than in *P. pammenes* and other related species), proximal opening wide and elongated, the



length of tegumen-uncus; uncus approximately the length of tegumen, very slightly hooked (thicker than in other related species); subunci well developed, stout, three-fourths the length of uncus; saccus sub-conical (shallower than in nominate *P. antulla*), approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a short, sharpened dorsal process (shorter than in other related species), distal extremity considerably elongated and sharpened.

FEMALE (Fig. 12): FW length: 28 mm (n=1), the female differs mostly in the lighter and duller brown colour of the upperside. FWV with reddish lustrous patches in distal area.

#### ETYMOLOGY

The name of this taxon is composed of *bamba*, a Kechua word meaning “place”, whereas the second part of the specific epithet of the related species *antulla*.

#### REMARKS

This subspecies differs from nominate subspecies by the larger FWD androconial patch; less reddish HWV suffusion, a smaller silver-white costal dot. It is known at present only from the upper valley of Río Espiritu Santo in the Yungas de Cochabamba.

### *Pedaliodes ampulla* PYRCZ et BOYER n. sp.

(Figs. 13, 14, 41, 42)

Type locality: 8 km N Limbani, Carcel Punco, Puno, Peru.

#### MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Puno, Carcel Punco, Agualanes, 8 km nord de Limbani, 3400-3700 m, 16.X.2004, P. Boyer leg. [MUSM]; PARATYPES (9 ♂♂ and 2 ♀♀): 2 ♂♂: Puno, Carcel Punco, 2700-2800 m, IV.2005, J. Bottger leg.; 2 ♂♂: same data but III.2006, J. Bottger leg.; 1 ♂: Cuzco, Acjanaco-Pillcopata, Qda. Toccahuayco, 2800-2850 m, 26.V.2003, T. Pyrcz leg. [TWP]; 2 ♂♂ and 2 ♀♀: Puno, Carcel Punco, Agualanes, 8 km nord de Limbani, 3400-3700 m, 16.X.2004, P. Boyer leg.; 2 ♂♂: Pacchani, Quebrada Aquele, Vallée de Limbani, 2200-2500 m, XI.2004, J. Bottger leg. [PBF].

#### DIAGNOSIS

Externally very similar to *P. antulla*, from which it differs by the much smaller FW androconial patch and, generally, by the rectangular instead of lunular HWV white costal patch. Compared to *P. perisades* it is slightly smaller, FWV brown instead of red, HWV silver white spots smaller, particularly those in M3-Cu1 and Cu1-Cu2.

#### DESCRIPTION

MALE (Figs. 13): Head: eyes chocolate brown; labial palpi grey brown, covered with dark brown hair; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally orange brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally

and laterally black, ventrally lighter, dull brown. Wings: FW length: 26-28 mm (27.0 mm, n=9), apex subacute, outer margin slightly undulated in the apical area. HW outer margin undulated. FWD uniform dark brown, a shade lighter in distal one-third, lustrous; androconial patch small, not entering discal cell; fringes alternately sandy yellow and grey. HWD blackish brown, lustrous, hairy in basal area and along anal margin; fringes grey brown turning sandy yellow towards apex. FWV dark brown, a shade lighter in distal half, lustrous in distal half; a short, diffused light brown postiscal streak from costa to M1-M2; four white subapical dots in R4-R5 to M-2-M3; marginal area from apex to M2 chocolate brown. HWV chocolate brown, dusted with brick red turning gradually lighter and orangey towards inner margin and tornus; the area between postmedian and submarginal line very slightly lighter, particularly along distal edge of postmedian line; five postmedian – submarginal silver white dots in Sc-Rs to Cu1-Cu2, and a sixth white patch near costa in Sc-Rs, variable in size and shape, but generally well marked, rather rectangular than lunular (see: *P. antulla*), invariably the patch in Rs-M1 considerably larger than the remaining. **Male genitalia** (Figs. 41, 42): Aedeagus contorted, laterally straight and flattened (less thick than in *P. antulla*), numerous spiny, processes grouped at distal extremity (fewer than in *P. pammenes* and other related species), proximal opening wide and elongated, the length of tegumen-uncus; uncus approximately the length of tegumen, very slightly hooked (thicker than in other related species); subunci well developed, stout, three-fourths the length of uncus; saccus sub-conical (shallower than in *P. antulla antulla*), approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a short, sharpened dorsal process (shorter than in other related species), distal extremity considerably elongated and sharpened.

FEMALE (Figs. 14): FW length: 28 mm (n=2), the female differs mostly in the lighter and duller brown colour of the upperside.

#### REMARKS

This species has apparently a more limited geographic range than the allied *P. antulla*. It is known to occur only in Peru, in the departments of Puno and Cuzco.

### *Pedaliodes yuvinka* PYRCZ et BOYER n. sp.

(Fig. 17, 18, 43)

Type locality: Milpo, Pasco, Peru.

#### MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Ichco, au dessus de Milpo, Cueva Blanca, Huancabamba, Pasco, 3200 m, 30.X.2006, P. Boyer leg. [MUSM]; PARATYPES: 1 ♂: Milpo-Ichco, Huancabamba, Pasco, 3100-3200 m, IV.2006, J. Bottger leg. [TWP]; 2 ♂♂: Milpo, au dessus de Cueva Blanca, Huancabamba, Pasco, 2900 m, 8.XI.2003; 1 ♂: same data but 3.XI.2004; 2 ♂♂: same data but 30.X.2006 P. Boyer leg.; 1 ♂: Pasco, Ichco, au dessus de Milpo, Cueva Blanca, Huancabamba, 3200 m, 30.X.2006, P. Boyer leg. [PBF].

## DIAGNOSIS

Differs from other species belonging to the *P. pammenes* group by the wide white transverse FW band extending from costa to tornus. This pattern is strongly reminiscent of a sympatric species *P. franzi* PYRCZ, which however has a completely different HWV characterised by a wide median grey patch, no reddish suffusion and no characteristic Rs-M1 whitish lunular patch.

## DESCRIPTION

MALE (Fig. 17, 18): Head: eyes chocolate brown; labial palpi light brown covered with blackish brown hair; antennae reaching 2/3 the length of costa, slender, dorsally blackish brown, ventrally medium brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs grey brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 28-30 mm (28.5 mm, n=7), apex blunt, outer margin very slightly undulated in the apical area, otherwise straight. HW outer margin slightly undulated. FWD blackish brown; a white postmedian transverse band extending from costa to near tornus approximately 3-4 mm wide with a sharp, roughly straight inner edge, except for a distal postdiscal incision, and diffused outer edge; androconial patch medium sized, marginally entering discal cell; fringes grey brown turning alternately dark brown and white towards apex. HWD blackish brown, hairy in basal area and along anal margin; fringes grey brown turning white towards apex. FWV dull medium brown; a faint, barely noticeable whitish mid-costal streak; white postmedian band reflected from the upperside; subapical area dusted with light brown and coffee brown scales, a sinuate, faint blackish brown submarginal line from costa to M2-M3. HWV coffee brown, suffused with red and orange somewhat more conspicuous in distal half towards tornus; a short whitish mid-costal streak; the area between postmedian and submarginal line slightly lighter, where dusted with whitish scales somewhat denser in the subapical area; five postmedian white dots in Rs-M1 to Cu1-Cu2, the dot in Rs-M1 edged distally with denser whitish scales forming a diffuse patch. **Male genitalia** (Fig. 43): Aedeagus contorted (but less than in *P. pammenes*), laterally straight and flattened, numerous spiny, processes grouped at distal extremity (more prominent than in *P. pammenes* and other related species), proximal opening narrow and elongated, considerably longer than tegumen-uncus; uncus slightly shorter than tegumen, very slightly hooked; subunci well developed, two-thirds the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a prominent dorsal process pointing distally, distal extremity elongated and sharpened.

FEMALE: So far unknown.

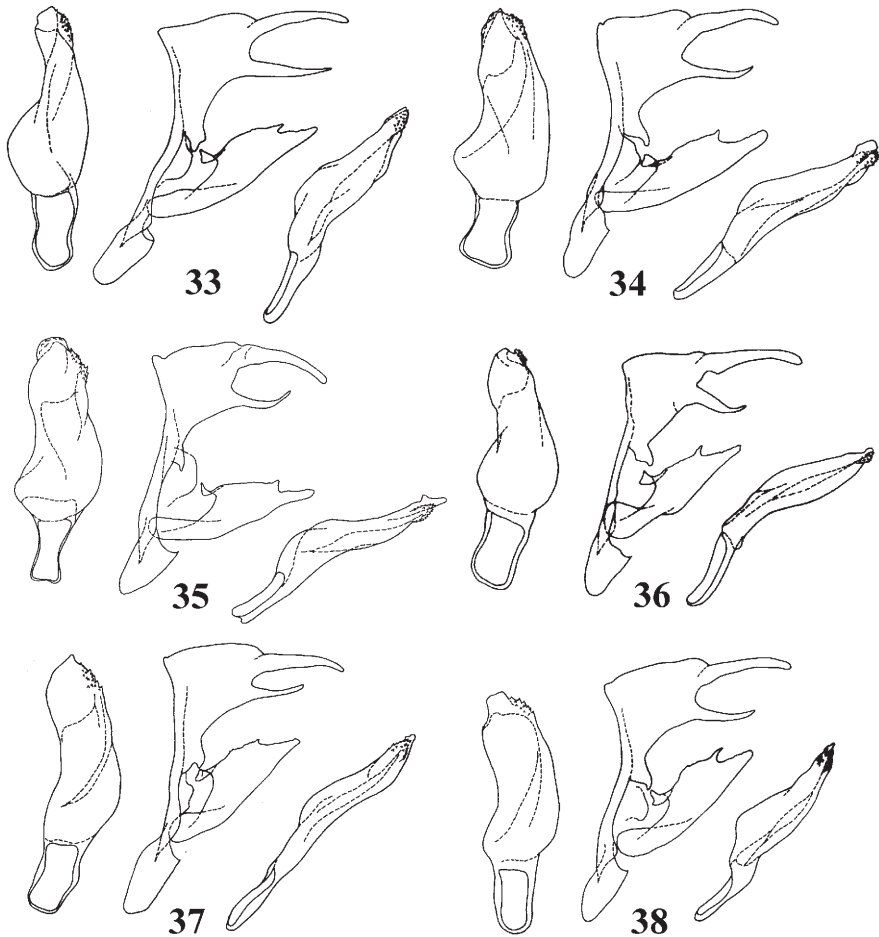
## ETYMOLOGY

This species is dedicated to Yuvinka GARECA, a Bolivian lepidopterist from Santa Cruz de La Sierra, author of several publications on Bolivian butterflies.

## REMARKS

The nominate race of this species is known so far only from its type locality, Milpo, NE of Oxapampa in Pasco, central Peru. It was found locally at 2900 m in an isolated

remnant of elfin forest. *P. yuvinka* is apparently confined to a very narrow altitudinal band, although a single individual has been collected recently in a larger portion of cloud forest slightly above, at 3200 m, but none below 2900 m. It is apparently involved in a mimetic relationship with two other pedalioidines, the similarly patterned *P. franzi*, which is the dominant species of the *Pedaliodes* community in the uppermost cloud forest in Pasco, and *Panyapedaliodes* n. sp. (PYRCZ, MS), restricted to the same area, and also flying in the paramo. Above 3100 m, where only one specimen of *P. yuvinka* was found, it is interesting to note that many hundreds of *P. franzi* have been observed. Therefore, the occurrence ratio of *P. yuvinka* to *P. franzi*, although not rigorously measured, appears very low. The three species share a nearly identical colour pattern but are not closely related.



33-38. Male genitalia (aedeagus removed, in lateral and dorsal view): 33. *Pedaliodes pammenes pammenes* (Unduavi); 34. *P. p. marca* Paratype (Huayalloc); 35. *P. garleppi* (Unduavi); 36. *P. uncus* (La Caldera); 37. *P. daulis daulis* (Qda. San Luis); 38. *P. d. vilca* Paratype (Vilcabamba)

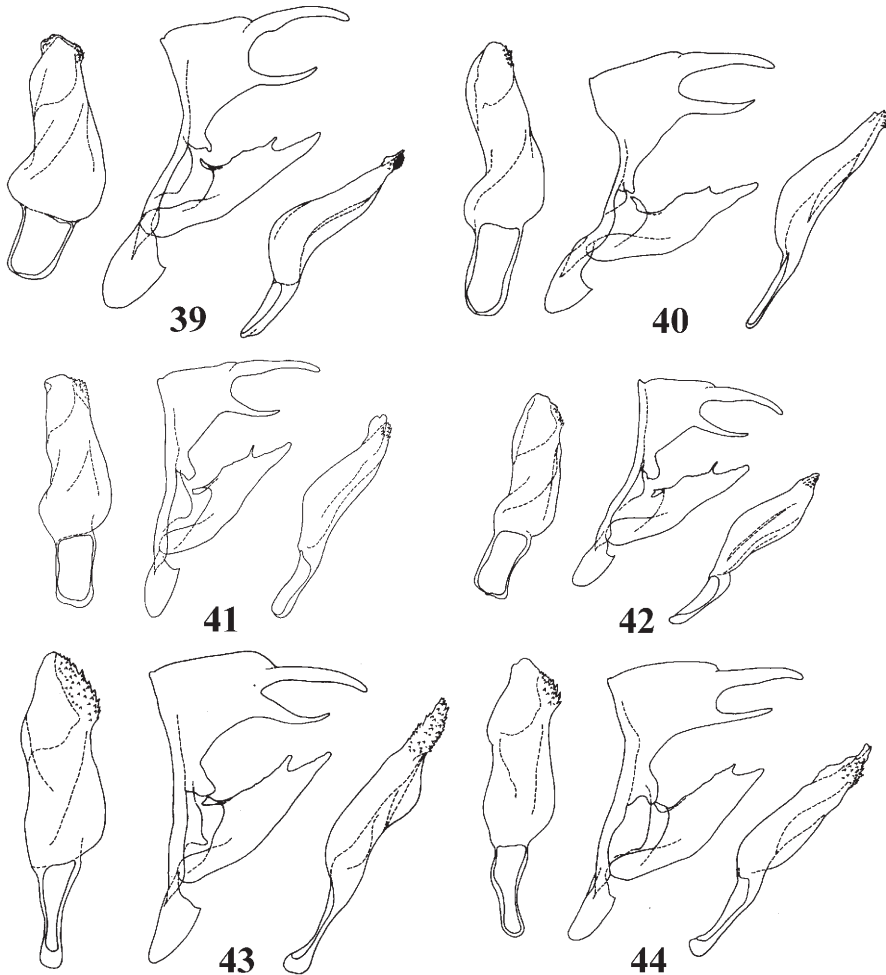
***Pedaliodes yuvinka pylasia* PYRCZ et BOYER n. ssp.**

(Figs. 19, 20, 44)

Type locality: Huanacaure, Huánuco, Peru.

MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Huánuco, Huanacaure, Km 43 de Pachachupan, est de Acomayo, 3000-3100 m, 23.X.2006, prep. genit. 02/18.12.2006/Pyrzcz, P. Boyer leg. [MUSM]; PARATYPES (4 ♂♂ and 2 ♀♀): 1 ♂ and 1 ♀: same data, 22.X.2006 [TWP];



39-44. Male genitalia (aedeagus removed, in lateral and dorsal view): 39. *Pedaliodes antulla antulla* (Acjanaco); 40. *P. a. bambulla* Paratype (Cochabamba); 41. *P. ampulla* Paratype (Qda. Toccahuayco); 42. *P. a.* Paratype (Carcel Punco); 43. *P. yuvinka yuvinka* Paratype (Milpo); 44. *P. yuvinka pylasia* Paratype (Huanacaure)



3 ♂♂ and 1 ♀: Huánuco, Huanacaure, km 43 de Pachachupan, est de Acomayo, 3000-3100 m, 23.X.2006, P. Boyer leg. [PBF].

#### DESCRIPTION

**MALE** (Fig. 19): Head: eyes chocolate brown; labial palpi light brown covered with blackish brown hair; antennae reaching  $2/3$  the length of costa, slender, dorsally blackish brown, ventrally medium brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs grey brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 25.5 mm-28mm (26.9mm, n=4) apex blunt, outer margin very slightly undulated in the apical area, otherwise straight. HW outer margin slightly undulated. FWD blackish brown, a shade lighter in distal one third; a white oval postmedian patch extending from M3 towards tornus without reaching the outer margin, with a sharp inner and diffused outer edge, in some individuals extending as a narrow postdiscal streak to costal margin; androconial patch small, marginally entering discal cell; fringes alternately white and grey brown. HWD blackish brown, hairy in basal area and along anal margin; whitish scaling along costal margin; fringes alternately white and grey brown. FWV dull medium brown; a faint, barely noticeable whitish mid-costal streak; white postmedian pattern reflected from the upperside; subapical area dusted with light brown and coffee brown scales, a sinuate, faint blackish brown submarginal line from costa to M2-M3. HWV coffee brown, suffused with red somewhat more conspicuous towards anal margin and tornus; a small whitish mid-costal patch; the area between postmedian and submarginal line slightly lighter, where dusted with whitish scales somewhat denser in the subapical and costal area; five postmedian white dots in Rs-M1 to Cu1-Cu2, the dot in Rs-M1 edged distally with denser whitish scales forming a diffuse patch. **Male genitalia** (Fig. 44): Aedeagus contorted (but less than in *P. pammenes*), laterally straight and flattened, numerous spiny, processes grouped at distal extremity (not as prominent as in nominate *P. yuvinka*), proximal opening narrow and elongated, considerably longer than tegumen-uncus; uncus slightly shorter than tegumen, very slightly hooked; subunci well developed, two-thirds the length of uncus; saccus globular, approximately aligned to vinculum; valvae the length of tegumen-uncus, with a slightly undulated dorsal surface and a sharp dorsal process pointing distally (shorter than in nominate *P. yuvinka*), distal extremity sharpened (shorter than in nominate *P. yuvinka*).

**FEMALE** (Fig. 20): Compared to the male, FW and HWD ground colour a shade lighter, FW white patch larger in cells M3-Cu1 to Cu2-1A, and extending as a narrow band to costal margin, forewing length: 26.5-29 mm (mean: 27.8 mm, n=2).

#### ETYMOLOGY

The epithet of this taxon is an allusion to its resemblance to the Colombian species *Pedaliodes pylas* (HEWITSON).

#### REMARKS

*P. yuvinka pylasia* differs from nominate subspecies primarily in the considerably shorter and wider FW white patch, extending from M3 to near tornus. The upperside

pattern is reminiscent of a loosely related species occurring in Colombia, *P. pylas* (HEWITSON). It was discovered near Huanacaure, North of Huánuco. It is interesting to point out that it has never been found in the nearby Carpish, which is a classical collecting locality regularly sampled for more than three decades. The reason is perhaps because the elevational band sampled in Carpish is 2700-3000 m, whereas *pylasia* is apparently confined to slightly higher altitudes. All individuals were collected at 3050 m. It is the local, northern replacement of the nominate *P. yuvinka* from which it differs in the smaller FW white patch, not extending into postdiscal area. It should be noted that *P. yuvinka pylasia* is the northernmost representative of the *P. pammenes* group, and the only one penetrating on the eastern bank of the Río Huallaga.

***Pedaliodes perisades* (HEWITSON)**

(Figs. 15, 45)

*Pronophila perisades* HEWITSON, 1874: pl. 30, fig. 63.

*Pronophila perisades* HEWITSON; HEWITSON, 1874: 12; KIRBY, 1879: 115; RILEY & GABRIEL, 1924: 45.

*Pedaliodes perisades* (HEWITSON); KIRBY, 1877: 710; WEEKS, 1905: 17; THIEME, 1905: 52, 56; WEYMER, 1912: 251, pl. 53, fig. b; GAEDE, 1931: 495; HAYWARD, 1958c: 71, 72, fig. 38 (male genitalia); FORSTER, 1964: 159, 160-161, fig. 202 (male genitalia); D'ABRERA, 1988: 848, figs.; LAMAS et. al., 2004: 212; GARECA et. al., 2006: 48.

Type locality: Bolivia.

MATERIAL EXAMINED

**BOLIVIA:** 1 ♂: Bolivia, HC, BMNH type No. Rh. 3956 [LECTOTYPE of *Pronophila perisades* Hewitson, herein designated]; 3 ♂♂: Bolivia, HC [PARALECTOTYPES of *P. perisades* Hewitson, herein designated]; 1 ♂: Bolivia, RB; 1 ♂: Bolivia, JB; 1 ♂: Bolivia, CB; 2 ♂: Bolivia, Garlepp, RB; 1 ♂: Bolivia, Buckley, G-S; 2 ♂♂: Bolivia, C. Buckley, Druce Coll., (1 genit. prep. ALV182-96), G-S; 1 ♂, R. Tanampayo, Garlepp, RB; 1 ♂: San Jacinto, 6-8000 ft., Garlepp, G-S [BMNH]; 1 ♂: Dep. La Paz, km 34 Coroico-Caranavi, 2500 m, 16.VII.1994; 5 ♂♂: Cillutincara, ex coll. Staudinger & Bang-Haas [TWP]; 2 ♂♂, Locotal, 2600 m, 1891, Garlepp; 1 ♂: (La Paz), Chaco, 2-3000 m, 1893-4, Garlepp; 1 male, (La Paz?), Cillutincara, 3000 m, I.1896, Garlepp [ZMHB]; 1 ♂: Cillat., Garlepp; 1 ♂: Songotal, Santa Rosa, 2600 m, 23.VIII.1953, W. Forster; 2 ♂♂: Coroico, 1200 m, Fassl; 2 ♂♂: Yungas de Arepucho, Sihuenkas, 2200-2500 m, 21.XI.1953, W. Forster; 2 ♂♂: same data, 25.IX.1953, (präparat Nr. SA333); 1 ♂: same data, 2000 m, R. Schönfelder [ZSBS]; 4 ♂♂: Cochabamba, Cochabamba vers Villa Tunari km 77, 2600 m, P. Boyer leg. [PBF].

DIAGNOSIS

*P. perisades* is a large and striking species readily recognised from other related congeners by the brick red FWV. In the most similar *P. illimania* the reddish FWV suffusion does not extend into submarginal area, and it has a conspicuous silver white pattern on the HWV.

## REDESCRIPTION

MALE (Fig. 15): Head: eyes chocolate brown; labial palpi grey brown, covered with chocolate brown hair; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally orange brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 28-31 mm (mean: 29.5 mm, n=6). apex subacute, outer margin slightly undulated. HW outer margin scalloped. FWD uniform blackish brown, lustrous; androconial patch very small, not entering discal cell; fringes alternately sandy yellow and grey brown. HWD blackish brown, lustrous, hairy in median half; fringes grey brown, alternately sandy yellow towards apex. FWV brick red, medium brown in marginal area; a faint, diffused lighter postiscal line from costa to M2-M3, barely noticeable in some individuals; subapical area dusted with grey; apex reddish brown; three white subapical dots in R4-R5 to M1-M2. HWV coffee brown, liberally dusted with fine, lighter brown scaling, and white towards anal margin near tornus; the area between postmedian and submarginal line a shade lighter; marginal area dusted with sparse red scales from apex to vein Cu1; six postmedian white dots in Rs-M1 to Cu2-1A, and a sixth near costa in Sc-Rs, three of them in Rs-M1, M3-Cu1 and Cu1-Cu2 lunular, the one in Rs-M1 invariably larger than the remaining. **Male genitalia** (Fig. 45): Aedeagus slightly contorted, laterally straight and flattened (less than *P. pammenes* and other related species), numerous tiny spiny, processes grouped at distal extremity, proximal opening wide and elongated, considerably longer than tegumen-uncus; uncus longer than tegumen, arched; subunci well developed, two-thirds the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae slightly shorter than the length of tegumen-uncus, with a slightly undulated dorsal surface and a prominent dorsal process pointing upwards-distally, distal extremity sharpened.

FEMALE: So far unknown.

## REMARKS

*P. perisades* has been reported from Bolivia only. Most specimens come from the Yungas de La Paz, but it is also known to occur in the southern Yungas de Cochabamba. Reliable altitudinal data are few but it seems to be a mid-elevation species occurring parapatrically below *P. pammenes* and *P. garleppi*, most commonly at around 2500-2700 m, similarly to *P. antulla*.

***Pedaliodes illimania* STAUDINGER stat. reinst.**

(Figs. 16, 46)

*Pedaliodes illimania* STAUDINGER, 1897: 129-130; THIEME, 1905: 52, 56; WEYMER, 1912: 251, pl. 53, row c; GAEDE, 1931: 491; FORSTER, 1964: 160-161; LAMAS et. al., 2004: 212 (synonymy proposed); GARECA et. al., 2006: 48.

Type locality: Illimani, Bolivia.

## MATERIAL EXAMINED

**BOLIVIA:** HOLOTYPE ♂: Illimani, 3000-4500 m, [18]95, Garlepp, (genit. vial No. 9141 male, L. D. Miller) [ZMHB].

## DIAGNOSIS

*P. illimania* is recognised immediately from the most similar *P. perisades* by the restricted FWV reddish suffusion not extending into submarginal area, and the HWV colour pattern characterised by the conspicuous silver grey pattern.

## REDESCRIPTION

**MALE** (Fig. 16): Head: eyes chocolate brown; labial palpi grey brown, covered with dark brown hair; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally russet brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally light brown. Wings: FW (length: 30 mm) apex subacute, outer margin slightly undulated, from apex to M1 slightly truncate. HW outer margin slightly undulated. FWD uniform blackish brown, lustrous; androconial patch very small, not entering discal cell; fringes grey brown. HWD blackish brown, lustrous, hairy in median half; fringes grey brown. FWV brick red in basal two-thirds, gradually turning brown towards outer and anal margins; a faint, diffused lighter postiscal line from costa to M2-M3; subapical and outer margin suffused with silver grey gradually denser towards apex; three faint silver white subapical dots in R4-R5 to M1-M2. HWV ground colour coffee brown, heavily dusted with silver grey ripple scaling, forming a diffused median streak and a postmedian band; six postmedian white dots in Rs-M1 to Cu2-1A, and a sixth near costa in Sc-Rs, the one in Rs-M1 larger than the remaining and forming a diffused lunular patch. **Male genitalia** (Fig. 46): Aedeagus approximately the length of tegumen-uncus, slightly contorted, laterally straight and flattened, with numerous (but less conspicuous than in *P. perisades*) spines grouped at distal extremity, proximal opening wide, about the width of aedeagus, about one-fourth the length of aedeagus (much shorter than in *P. perisades*); uncus the length of tegumen, slightly curving downwards; subunci well developed, two-thirds the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae slightly shorter than the length of tegumen-uncus, with a smooth dorsal surface and a prominent dorsal process pointing upwards-distally, distal extremity sharpened.

**FEMALE:** So far unknown.

## REMARKS

*P. illimania* was described by STAUDINGER (1897) as a species. Its status has not been questioned by the subsequent authors (THIEME 1905; WEYMER 1912; FORSTER 1964), until it was sunk as a synonym of *P. perisades* by LAMAS et. al. (2004). After reexamination of the case, this decision proved unjustified. Although *P. illimania* is undoubtedly related to *P. perisades*, both sharing the same size, wing shape and all dark brown upperside, it is clearly a separate species. The differences between the two taxa exclude the hypothesis that *P. illimania* is merely an individual form of *P.*

*perisades*. *P. illimania* is known so far only from the unique type specimen collected by GARLEPP. The type locality is rather unlikely to be accurate. Illimani is an extinct volcano (6420 m) rising SE of La Paz. The elevation given, 4000 m, corresponds to dry puna altiplano, an altitude at which the only pronophiline species known to occur is *Punapedaliodes flavopunctata* (STAUDINGER).

***Pedaliodes amafania* THIEME**

(Figs. 25, 26, 47)

*Pedaliodes amafania* THIEME, 1905: 122, pl. 1, fig. 4.

[*Pedaliodes amafania* THIEME; FASSL, 1910: 118 (misidentification of *P. thiemei* STAUDINGER)].

*Pedaliodes phaea* (HEWITSON) form *amafania* THIEME; WEYMER, 1912: 261.

*Pedaliodes phaea* (HEWITSON) var. *amaphania* [sic] THIEME; GAEDE, 1931: 496.

*Pedaliodes amafania* THIEME; LAMAS et. al., 1999: 6; LAMAS, 2003: 63, 141 (fig. 241); LAMAS et. al., 2004: 211; PYRCZ & VILORIA, 1999: 130.

Type locality: Callanga, Cuzco, Peru.

MATERIAL EXAMINED

**PERU:** 1 ♂: (Pr. Cuzco), Callanga, 1500 m, 1898, O. Garlepp, LECTOTYPE of *Pedaliodes amafania* Thieme, determined by G. Lamas 1994 [?]; 1 ♂: same data [PARALECTOTYPE of *P. amafania* Thieme, herein designated] [ZMHB]; 1 ♂ and 1 ♀, Río Santa María, 7-14 km E. de Alfamayo, CU, 2700-3000 m, 05.X.1981, G. Lamas et. al.; 1 ♂: same data, 06.X.1981 [MUSM]; 1 ♂, Sud Pérou, Alfamayo, 2500 m, 23.VIII.[19]77, (genit. prep. ALV405-98); 13 ♂♂ and 1 ♀: Ollantaytambo-Acomayo, above Qda. San Luis, 3200-3250 m, 22.II.2005, J. Bottger leg.; 3 ♂♂ and 2 ♀♀: Ollantaytambo-Acomayo, above Carrizales, 3200-3250 m, IV.2005, J. Bottger leg.; 4 ♂♂: same data but III.2006; 6 ♂♂ and 6 ♀♀: Ollantaytambo-Acomayo, above Qda. San Luis, 3200-3250 m, 13.II.2005, T. Pyrcz leg.; 2 ♂♂ and 1 ♀: same data but 14.II.2005; 1 ♀: same data but 17.II.2005; 1 ♂: same data but 18.V.2005; 1 ♂: same data but 19.V.2005; 7 ♂♂: same data but 20.V.2005; 3 ♂♂ and 1 ♀: same data but 22.V.2005 [TWP], 1 ♂ and 3 ♀♀: Cuzco, Quebrada San Luis, vía a Quillabamba, 3000-3200 m, 14.V.2003, P. Boyer leg.; 2 ♂♂: Cuzco, Abra Málaga vers Quillabamba, 3000-3300 m, 13.V.2003, P. Boyer leg.; 2 ♂♂: Cuzco, Abra Málaga vers Quillabamba, 3200-3400 m, 18.V.2003, P. Boyer leg.; 1 ♂ and 3 ♀♀: Cuzco, Abra Málaga vers Quillabamba km 22, 3200 m, 26.II.2005, P. Boyer leg.; 2 ♀♀: Cuzco, Abra Málaga vers Quillabamba, 2700-3000 m, 22.II.2005, P. Boyer leg. [PBF].

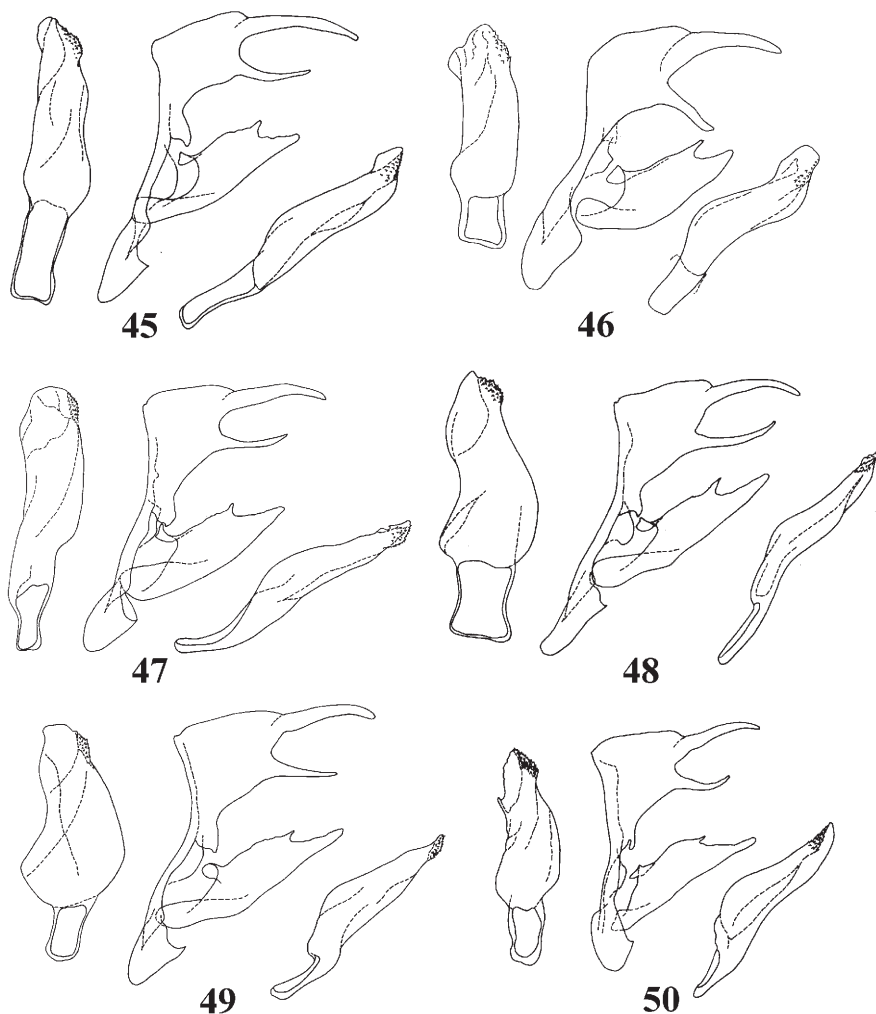
DIAGNOSIS

*P. amafania* differs from other orange banded species of the *P. pammenes* group in the darker orange of the submarginal band, similar only to the north Peruvian *P. arturi* PYRCZ et VILORIA.

REDESCRIPTION

MALE (Fig. 25): Head: eyes chocolate brown; labial palpi grey brown, covered with chocolate brown hair; antennae reaching 2/3 the length of costa, slender, dorsal-

ly dark brown, ventrally orangey, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 25-29 mm (mean: 26.3 mm, n=41) apex subacute, outer margin slightly undulated in the apical area. HW outer margin slightly undulated. FWD blackish brown, a shade lighter brown along outer margin; a 3-4 mm wide dark orange submarginal band extending from costa to anal margin near tornus with a sharp, slightly undulated or straight inner margin and a



45-50. Male genitalia (aedeagus removed, in lateral and dorsal view): 45. *Pedaliodes perisades* (Yungas de La Paz); 46. *P. illimania* Holotype (Bolivia); 47. *P. amafania* (Qda. San Luis); 48. *P. phaeinomorpha* Paratype (Acjanaco); 49. *P. dominicae dominicae* Paratype (Concepción – Mariposa); 50. *P. d. diademata* Holotype (Vilcabamba)



diffused outer margin; androconial patch medium sized, not entering discal cell; fringes alternately sandy yellow and dark brown. HWD blackish brown, a shade lighter brown along outer margin; a dark orange submarginal band, slightly wider than on the FW, 4-5 mm, with a diffused inner edge from costa to M2, where sharply bent and following as a nearly straight line to anal margin near tornus, and a sharp, undulated outer margin. FWD blackish brown from base to postmedian area; an orange postmedian - submarginal band lighter than the upperside and wider basally, 5-6 mm wide; the area distally from orange band medium brown with a diffused purple submarginal band; three or four minute white subapical dots in R4-R5 to M-2-M3; subapical and apical area dusted with sparse lighter brown, whitish and magenta scales. HWV chocolate brown from base to postmedian band speckled with lighter scales forming a fine ripple pattern; postmedian - submarginal whitish band 3-6 mm wide, inner edge bent vein M2, from vein M2 to anal margin nearly straight, distal edge indented, heavily dusted with chocolate brown scales, particularly towards costa, to a lesser degree along its inner edge; five minute, barely noticeable postmedian light dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 suffused distally with whitish scales forming a diffuse patch; marginal area chocolate brown, a shade lighter than in median area, speckled with a fine slightly lighter ripple pattern. **Male genitalia** (Fig. 47): Aedeagus contorted, laterally straight and flattened (narrower than in other related species), numerous spiny processes grouped at distal extremity (similar to *P. pammenes*), proximal opening moderately elongated and constricted in the middle, considerably longer than the length of tegumen-uncus; uncus slightly longer than tegumen, very slightly hooked; subunci well developed, two-thirds the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae the length of tegumen-uncus (wider than in other related species, particularly *P. phaeinomorpha*) with a slightly undulated dorsal surface and a moderately prominent dorsal process pointing upwards, distal extremity elongated and sharpened.

**FEMALE** (Fig. 26): Marginally larger than the male. FW length: 27-28 mm (mean: 27.2 mm, n=11), upperside orange band on both the FW and HW noticeably wider than in the male and a shade lighter, dirty orange, underside brown ground colour consistently lighter and duller.

#### REMARKS

*P. amafania* is one of four known orange-banded representatives of the *P. pammenes* group. It occurs only in the upper basin of the Urubamba. Most recently collected individuals were found in the valley of Lucumayo, but the types come from the parallel valley of Paucartambo. It was also found in the Machu Picchu Sanctuary, on the left bank of the Urubamba by LAMAS (2003). In the valley of Lucumayo *P. amafania* occurs at 2800-3100 m, and is most abundant at around 3000 m. At this elevation it is common, one of the co-dominant species of the *Pedaliodes* community alongside *P. parma* Thieme. It is on the wing throughout the year but the peak abundance period corresponds with the rainy season (November-March). *P. amafania* is replaced allopatrically in the Vilcabamba massif, in northern Cuzco, by the closely related *P. dominicae diademata* n. ssp.

***Pedaliodes phaeinomorpha* VILORIA, LAMAS & PYRCZ n. sp.**

(Figs. 27, 28, 48)

[*Pedaliodes* [n. sp.], LAMAS & VILORIA MS; LAMAS et. al., 2004: 213].

Type locality: Acjanaco, Cuzco, Peru.

## MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Cuzco, Urcos, VIII.1900, (Garlepp), (1 genit. prep. ALV195-96), RB [BMNH]; PARATYPES (6 ♂, 1 ♀): 1 ♂: Cuzco [MNHN]; 1 ♂: P. N. Manu, Acjanaco, CU, 3200-3450 m, 05.VII.1991, M. Medina leg., 1 ♀: same data; 1 ♂, same data, 06.VII.1991 [MUSM]; 1 ♂: Cuzco, vallée de Kosñipata, Acjanaco vers Boca Manu km12, 2900 m, IV.2005, Jose Böttger leg. [PBF]; 1 ♂: Cuzco, Acjanaco vers Pillcopata, 3050 m, 09.IX.2008, P. Boyer leg. [PBF]; 1 ♂: Acjanaco, 3050 m, 10.IX.2008, T. Pyrcz leg. [TWP].

## DIAGNOSIS

In opposition to other orange-banded species of the *P. pammenes* group occurring in southern and central Peru, in *P. phaeinomorpha* yellowish-orange markings are not apparent on the FWD. The HWD band is wider than in *P. amafania* or *P. dominicae* and pale orange, most similar in shade to *P. dominicae diademata*.

## DESCRIPTION

**MALE** (Fig. 27): Head: eyes chocolate brown; labial palpi grey brown, covered with dark brown hair, beige internally; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally orange brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs light brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 27mm, apex subacute, outer margin slightly undulated in the apical area. FWD dark brown, a shade lighter and duller in distal one-third; androconial patch medium size, extending along outer edge of discal cell, but not entering it, triangular; fringes light brown. HWD dark brown from base to postmedian area; a pale orange postmedian - submarginal band, 6-8 mm wide, fading away before reaching anal margin, with a diffused inner edge from costa to M2, where sharply bent and following as a nearly straight line to anal margin near tornus, and a slightly diffused, undulated outer margin; submarginal area pale brown, lighter than in median area. FWV dark brown from base to postmedian area; a lighter brown postmedian - submarginal band suffused with dirty orange from M2-M3 to tornus forming a diffused 4-6 mm wide band gradually giving way to dull brown in the subapical and submarginal area; marginal area slightly darker brown, dusted with purple from apex to M3; three or four minute white subapical dots in R4-R5 to M-2-M3; subapical and apical area dusted with lighter brown, beige scales. HWV chocolate brown from base to postmedian band, speckled with lighter, sandy yellow scales towards anal margin forming a fine ripple pattern; postmedian - submarginal milky white band 3-5 mm wide, inner edge bent at vein M2, from vein M2 to near anal margin nearly straight, distal edge indented, dusted with chocolate brown scales, denser and in Cu2-1A; five minute, barely noticeable postmedian light dots in Rs-M1

to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 suffused distally with whitish scales forming a diffuse patch; marginal area medium brown, a shade lighter than in median area. **Male genitalia** (Fig. 48): Aedeagus contorted, laterally straight and flattened (more than in other related species), numerous spiny processes grouped at distal extremity (slightly more prominent than in *P. pammenes*), proximal opening very wide and constricted in the middle, considerably longer than the length of tegumen-uncus; uncus the length of tegumen, slightly hooked; subunci well developed, three-fourths the length of uncus; saccus tubular, approximately aligned to vinculum; valvae slightly longer than the length of tegumen-uncus (narrower than in *P. amafania*) with a few tiny teeth and a prominent, sharpened dorsal process pointing distally, distal extremity very elongated and sub-acute.

**FEMALE** (Fig. 28): Differs from the male in the slightly lighter brown ground colour on both the upper and underside, slightly wider HWD dirty orange band, better marked FWV postmedian orange band, and the presence of a faint whitish mid-costal streak.

#### ETYMOLOGY

The specific epithet is an allusion to the striking superficial similarity with *P. phaeina* STAUDINGER, endemic in the Colombian Eastern Cordillera.

#### REMARKS

*P. phaeinomorpha* is apparently endemic in Cuzco and was collected recently only in the upper valley of Kosñipata. The holotype, although labeled as from Urcos, a locality situated in the dry Sacred Valley, almost certainly comes from the valley of Marcapata on the Urcos – Quincemil road, a well known collecting area at the time of GARLEPP. Recently, *P. phaeinomorpha* was collected at 2900-3050 m. We consider, based on our thorough field experience in Kosñipata, that the elevation stated on the types in MUSM are slightly inaccurate. The forests in the valley of Marcapata were not sampled recently at the elevations possibly harbouring *P. phaeinomorpha*, that is 2800-3100 m. In the valley of Marcapata at higher elevations, at 3200-3400 m occurs the allied *P. pammenes marca*, whereas in the valley of Kosñipata no upper parapatric ally was located so far. Below 2800 m *P. phaeinomorpha* is replaced parapatrically by *P. antulla*.

### *Pedaliodes dominicae* PYRCZ et BOYER n. sp.

(Figs. 29, 30, 31, 49)

Type locality: Km 64 Concepción – Mariposa, Junín, Peru.

#### MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: Junín, route Satipo vers Concepción vía Mariposa, Km 64, 2600 m, 02.XII.2006, P. Boyer leg. [MUSM]; PARATYPES: 12 ♂♂ and 3 ♀♀: same data as the holotype; 2 ♂♂: route Satipo vers La Concepción vía Mariposa, Km 70, 2700-2900 m, 12.XI.2006 [TWP], 2 ♂♂ and 2 ♀♀: Junín, route Satipo vers Concepción vía Mariposa Km 64, 2600 m, 2-12.XI.2006, P. Boyer leg.; 3 ♂♂ and 2 ♀♀:

Junín, route Satipo vers Concepción vía Mariposa Km 68, 2700 m, 2-12.XI.2006, P. Boyer *leg.*; 1 ♂: Junín, route Satipo vers Concepción vía Mariposa Km 70, 2900 m, 2-12.XI.2006, P. Boyer *leg.*; 2 ♀♀: Junín, route Satipo vers Concepción vía Mariposa Km 68 à 70, 2700/2900 m, 12.XI.2006, P. Boyer *leg.* [PBF].

#### DIAGNOSIS

Recognised from other orange-banded related *Pedaliodes*, in particular from *P. amafania*, by the lighter and duller, yellow orange, most similar in shade, only slightly lighter, as *P. maruda* PYRCZ (PYRCZ 2004) from which it differs immediately by the considerably narrower FW band and the HW band margin parallel to outer margin, bearing a distinctive notch near tornus in *P. maruda*.

#### DESCRIPTION

MALE (Figs. 29, 31): Head: eyes chocolate brown; labial palpi grey brown, covered with blackish brown hair; antennae reaching 2/3 the length of costa, slender, dorsally dark brown, ventrally brown, club formed gradually slightly thicker than shaft. Thorax: dorsally black, hairy; ventrally black, legs dark brown. Abdomen: dorsally and laterally black, ventrally lighter, dull brown. Wings: FW length: 25-27 mm (mean: 26.0 mm, n=15); apex subacute, outer margin slightly undulated in the apical area. HW outer margin slightly undulated. FWD blackish brown from base to postmedian area; a sulphur yellow postmedian – submarginal band, gradually widening from 2 mm at Sc to 5 mm at tornus, gently bent basally in the postdiscal area, with a sharp inner and a diffused distal edge; submarginal area grey brown, dusted with yellow scales basally, gradually darkening, turning dark brown in the marginal area. HWD blackish brown from base to postmedian area; a 4-7 mm wide, rich yellow postmedian – submarginal band, roughly parallel to outer margin, sharply edged basally with a shallow distal incision in M2-M3, and a sinuate distal edge running closer to outer margin from M3 to tornus; marginal area blackish brown suffused with yellow from M2-Cu1 to tornus. FWV blackish brown from base to postmedian area; postmedian - submarginal band similarly coloured and shaped basally as on the upperside but considerably wider extending distally to submarginal area from R5 to Cu2 and reaching outer and anal margin at tornus, with distal half a shade darker, suffused with fine brown scaling; subapical area dusted with beige; three minute white subapical dots in R4-R5 to M1-M2; marginal area from apex to M2 chocolate brown. HWV dark chocolate brown from base to postmedian band speckled with lighter scales along anal margin; postmedian – submarginal shaped as on the upperside, sandy yellow, sparsely dusted with brown scales, denser towards costa and tornus; five minute, barely noticeable postmedian light dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dot in Rs-M1 suffused distally with whitish scales forming a diffuse patch; marginal area chocolate brown, suffused with yellow scales, sparsely from apex to M3, densely from M3 to tornus. **Male genitalia** (Fig. 49): Aedeagus contorted, laterally straight and flattened, numerous spiny processes grouped at distal extremity (slightly less than in *P. pammenes*), proximal opening very short and narrowed, about the length of tegumen-uncus; uncus the length of tegumen, slightly hooked; subunci well developed, two-thirds the length of uncus; saccus sub-conical,

approximately aligned to vinculum; valvae approximately the length of tegumen-uncus with a slightly undulated dorsal surface a moderately prominent, sharpened dorsal process pointing distally, distal extremity very elongated and sharp.

FEMALE (Fig. 30): Similar to the male except that slightly larger, FW length: 25-28 mm (mean: 26.7 mm, n=9), lighter brown on both the upper and underside, and with a wider and slightly duller yellow band on the HW.

#### ETYMOLOGY

This taxon is dedicated to Dominique VICENTE, wife of Pierre BOYER and the first collector of this species.

#### REMARKS

*P. dominicae dominicae* is known so far only from the upper Mariposa valley in southern Junín, on the southern/right bank of the Río Chanchamayo. Considered the scale and the intensity of sampling on the left bank of the same river its presence in northern Junín and Pasco has to be considered extremely unlikely. On the other hand, the southern distribution limit, south to the Mantaro valley, remains open to debate. The valley of Jano in Ayacucho was sampled superficially so far within the elevation band susceptible to harbour *P. dominicae* or other related taxa. In the Vicabamba massif, on the right bank of Apurímac *P. dominicae* is replaced by the subspecies *diademata* n. ssp. In the type locality *P. dominicae* is one of the co-dominant species of the *Pedaliodes* community at 2600-2800 m.

#### *Pedaliodes dominicae diademata* LAMAS et VILORIA n. ssp.

(Figs. 32, 50)

[*Pedaliodes* [n. sp.]; LAMAS & GRADOS, 2001: 148]

[*Pedaliodes* [n. sp.] LAMAS & VILORIA, MS; LAMAS et. al., 2004: 213].

Type locality: Cordillera de Vilcabamba, Cuzco, Peru.

#### MATERIAL EXAMINED

**PERU:** HOLOTYPE ♂: CU, Cordillera de Vilcabamba, 3350 m, 1140/7340, 20.VI.1997, G. Lamas, (genit. prep. ALV375-97) [MUSM].

#### DESCRIPTION

MALE (Fig. 32): Head, thorax and abdomen not differing from those of the nomenclotypical. Wings: FW (length: 26.5 mm); apex subacute, outer margin slightly undulated in the apical area. HW outer margin slightly undulated. FWD blackish brown from base to postmedian area; a pale orange postmedian band, gently curved basally at M3, gradually widening from M1 towards anal margin, reaching a maximum width of 3 mm between Cu1 and 1A, with a sharp, slightly undulated basal edge, and a diffused outer edge, gradually giving way to medium brown area extending to outer margin. HWD blackish brown from base to postmedian area; a 4-5 mm wide, pale orange postmedian



– submarginal band, roughly parallel to outer margin, with an irregular, zigzagging, slightly diffused basal edge, and a diffused distal edge gradually giving place to medium brown extending distally, except at tornus where orange scales reach outer margin. FWV dark brown from base to postmedian area; postmedian - submarginal band similarly coloured and shaped basally as on the upperside but considerably wider, spreading towards outer margin, reaching submarginal area M2 to tornus, gradually darkening, turning brick red distally; subapical area dusted with beige and whitish scales; three minute white subapical dots in R4-R5 to M1-M2; marginal area from apex to M2 chocolate brown. HWV dark chocolate brown from base to postmedian band speckled with lighter scales, particularly along anal margin; postmedian – submarginal shaped as on the upperside but basal edge sharply defined, milky white, dusted with brown scales, denser towards costa; five minute, barely noticeable postmedian light dots in Rs-M1 to Cu1-Cu2, and a sixth near costa in Sc-Rs, the dots in Rs-M1 and M1-M2 elongated, the former suffused distally with sparse whitish scales; marginal area chocolate brown, gradually turning lighter towards tornus, suffused with milky white scales, somewhat heavier at tornus. **Male genitalia** (Fig. 50): Aedeagus contorted, laterally straight and flattened, however less so than the nominotypical, numerous spiny processes grouped at distal extremity (slightly fewer than in *P. pammenes*) with a short, but noticeably longer than in the nominotypical, proximal opening, about the length of tegumen-uncus; uncus the length of tegumen, slightly hooked; subunci well developed, two-thirds the length of uncus; saccus sub-conical, approximately aligned to vinculum; valvae approximately the length of tegumen-uncus with a slightly undulated dorsal surface a moderately prominent, a short, sharp dorsal process pointing distally, distal extremity very elongated and sharpened.

FEMALE: Unknown.

#### ETYMOLOGY

The word *diademata* means crowned, an epithet derived from the wing colour pattern of this butterfly, which shows postdiscal bands of brownish orange on both wings, giving the impression of a ring or crown around its body.

#### REMARKS

*P. dominicae diademata* differs from the nominate subspecies mostly in the diffused distal edge of the HWD orange band. This subspecies is known so far only from a single male collected by Gerardo LAMAS during a multidisciplinary expedition to the highlands of the Vilcabamba massif. During the same expedition a number of other new species were discovered, including *Pedaliodes phoenix* LAMAS (1999) and *Corades* sp. (LAMAS, in prep.). The holotype was collected on the edge of a marshy paramo just above the upper limit of cloud forest.

#### DISCUSSION

As stated in the introduction, dorsal colour patterns prove of little relevance in the phylogeny of the genus *Pedaliodes* due to their extreme plasticity and responsiveness

to natural selection (VILORIA 2007). Distinctively patterned species belonging to the “*P. pammenes*” group are an example of this phenomenon. *P. perisades*, *P. antulla*, *P. pammenes*, *P. daulis* and *P. garleppi* are all brown. *P. yuvinka* has large FW white patches. Its nominotypical subspecies is clearly involved in a mimetic relationship with a loosely related sympatric *P. franzi* PYRCZ, which is the most common representative of the genus *Pedaliodes* in the uppermost forest in the department of Pasco. *P. amafania*, *P. phaeinomorpha*, and *P. dominicae* have wide orange or yellow median bands. *P. dominicae* and allied curiously share similar colour patterns, orange markings, with several, distantly related north Andean species belonging to the *P. phaea* group. Actually, *P. amafania* was considered a local form of *P. phaea* whereas *P. phaeinomorpha* is an exact replica of *P. phaeina* STAUDINGER.

On the other hand, the “*P. pammenes*” group is defined by some synapomorphies of discrete colour pattern elements, in particular the HWV submarginal white dot in Rs-M1 larger than the remaining, forming a diffused lunular patch (marginally in some species that have faint HWV markings and particularly small submarginal dots). Another synapomorphy is found in male genitalia, namely the wide and strongly dorso-ventrally flattened aedeagus, with a characteristic prominent spiny crest on a side in apical area. Other morphological features, although cannot be designated as synapomorphies, as they are found in other sections of the genus, are found in all the species of this group, especially: elongate valvae with a short or medium-long dorsal process usually pointing apically; wide and rather shallow saccus; long subunci, two-thirds the length of uncus.

The species of “*P. pammenes*” group are allied to “*P. peruda*” group, which comprises *P. peruda* (HEWITSON), *P. maruda* PYRCZ and *P. uaniuna* PYRCZ et VILORIA. These three species have similar HWV colour patterns, although without the diagnostic whitish lunular subcostal patch, and male genitalia, except for the considerably narrower and longer aedeagus (PYRCZ, 2004).

#### 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. Special thanks for Jackie MILLER for co-operation and Deborah Matthews Lott for dissecting and drawing the genitalia of *P. illimania*. 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. Pronophiline butterflies (Satyridae) of the three Andean Cordilleras of Colombia. Zool. Journ. Linn. Soc., **87**: 235-320.
- BUTLER, A. G., 1867. Revision of the group of lepidopterous insects hitherto included in the genus *Pronophila* of Westwood. Ann. Mag. Nat. Hist., (3) **20** (118): 266-268.
- D'ABRERA, B., 1988. Butterflies of the Neotropical Region. Part V. Nymphalidae (Conc.) & Satyridae. Victoria, Black Rock, Hill House, [viii] + 679-877.
- FASSL, A. H., 1910. Tropische Reisen. II. Ueber den Quindiupass. Entomol. Zeitschr., **24**(21): 113-114; (22): 118; (23): 127-128; (24): 132-133; (25): 137-138; (26): 142-144; (27): 149-150.
- , 1920. Meine Bolivia-Reise. Entomol. Rundsch., **37**(3): 10-11; (4): 15-16; (5): 17-18; (6): 22-23; (7): 25-27; (8): 29-30; (9): 34-35; (11): 41-43; (12): 45-48.
- FORSTER, W., 1964. Beiträge zur Kenntnis der Insektenfauna Boliviens, XIX. Lepidoptera III. Satyridae. Veröffentl. Zool. Staatssamml. München, **8**: 51-188, pls. 27-35.
- GAEDE, M., 1931. Satyridae. II. In: STRAND, E. (Ed.): Lepidopterorum Catalogus, 29(46): 321-544.
- GARECA, Y., FORNO, E., PYRCZ, T. W., WILLMOTT, K., REICHLÉ, S., 2006. Lista preliminar de mariposas diurnas de Bolivia. En: Y. GARECA & S. REICHLÉ ed., Mariposas diurnas de Bolivia. Prometa, Tarija, pp. 1-65.
- HAYWARD, K. J., 1953. Satíridos argentinos (Lep. Rhop. Satyridae), I. Los géneros (excluidos *Euptychia* y *Neomaniola*). Acta Zool. Lilloana, **13**: 5-66.
- , 1958a. Satíridos argentinos (Lep. Rhop. Satyridae) II. Los Géneros (continuación). Acta Zool. Lilloana, **15**: 161-181.
- , 1958b. Catálogo sinonímico de ropalóceros argentinos excluyendo Hesperidae (segundo suplemento). Acta Zool. Lilloana, **16**: 13-21.
- , 1958c. Dibujos de los genitales masculinos de algunos satíridos Neotropicales (Lep. Rhop. Satyridae). Acta Zool. Lilloana, **16**: 61-81.
- , 1967. Insecta, Lepidoptera (Rhopalocera). Familiae Papilionidarum et Satyridarum. In: DESCOLE, H. R. (Ed.): Genera et species animalium argentinorum. Buenos Aires: Guillermo Kraft 4, [16] + 447 + [4] p., 25 pls.
- HEWITSON, W. C., 1862. On *Pronophila*, a genus of diurnal Lepidoptera; with figures on the new species, and reference to all those which have been previously figured or described. Trans. Entomol. Soc. London, **1**(3): 1-17, pls. 1-6.
- , 1874. Satyridae. *Pronophila* VIII and IX. In: Illustrations of new species of exotic butterflies, 5. London: John van Voorst, pp. [53-56], pls. [29-30]
- KIRBY, W. F., 1877. A synonymic catalogue of diurnal Lepidoptera. Supplement. London: John van Voorst, pp. i-viii + 691-883.
- KIRBY, W. F., 1879. Catalogue of the collection of diurnal Lepidoptera formed by the late William Chapman HEWITSON, of Oatlands, Walton-on-Thames; and bequeathed by him to the British Museum. London: John van Voorst, iv + 246 p.
- LAMAS, G., 1999. A remarkable new species of *Pedaliodes* (Lepidoptera: Nymphalidae, Satyrinae) from the Cordillera de Vilcabamba, Cuzco, Peru. Rev. peruana de Entomol., **41**: 28-30.
- , 2003. Las Mariposas de Machu Picchu. PROFONANPE Lima. 221 pp., 34 colour plates.
- LAMAS, G., GRADOS, J., 2001. Lepidoptera of two sites in the Northern Cordillera de Vilcabamba, Peru, pp. 147-148, 276-278. In: ALONSO, L. E., ALONSO, A., SCHULENBERG, T. S. & F. DALLMEIER (Eds.), Biological and Social assessments of the Cordillera de Vilcabamba, Peru. RAP Working Papers 12.
- LAMAS, G., GRADOS, J., VALENCIA, G., 1999. Las mariposas de Machu Picchu, Cuzco, Perú: Un inventario preliminar (Lepidoptera: Rhopalocera). Rev. peruana Entomol., **41**: 1-8.
- 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.
- LEWIS, H. L., 1973. Butterflies of the world. London: Follet, xvi + 312 p. [208 pls.].
- MILLER, L. D., 1968. The higher classification, phylogeny and zoogeography of the Satyridae (Lepidoptera). Mem. Amer. Entomol. Soc., **24**: 1-174.

- 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., 1999. Mariposas de la Pronophilini de la Reserva Forestal Tambito, Cordillera Occidental, Colombia, Primera parte. Convergencia de los patrones de coloración en mariposas andinas: siete nuevas especies del género *Pedaliodes* BUTLER. SHILAP, **27**(106): 173-287.
- 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. Zeitsch., **50**(1/2): 43-141, pls. 1-3.
- VILORIA, A. L., 2007. The Pronophilina: Synopsis of their Biology and Systematics (Lepidoptera: Nymphalidae: Satyrinae). Tropical Lepidoptera, **15**(1/2): 1-17.
- WEEKS, A. G., 1905. Illustrations of diurnal Lepidoptera with descriptions. Boston: The University Press, 1: [1] + xii + 117 p., 45 pls.
- 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.