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New taxa of pronophiline butterflies of the genus *Lymanopoda*
WESTWOOD from central Peru
(Lepidoptera: Nymphalidae: Satyrinae)

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ABSTRACT. Two new species, *Lymanopoda hockingiana* n. sp. and *L. mariposa* n. sp., and one new subspecies, *L. rana marrana* n. ssp. are described from central Peru.

Key words: entomology, taxonomy, Lepidoptera, Pronophilina, Andes, cloud forest, male genitalia.

INTRODUCTION

The genus *Lymanopoda* WESTWOOD is an entirely montane representative of the neotropical tribe Pronophilini (Nymphalidae, Satyrinae) (MILLER 1968), considered by some authors as the subtribe Pronophilina (LAMAS et al. 2004, VILORIA 2007). The genus was the subject of a number of articles recently. The number of known species nearly doubled over the last decade (PYRCZ et al. 1999, PYRCZ 2005; PYRCZ & RODRIGUEZ 2006, 2007; PYRCZ & VILORIA 2007). There are currently 65 recognized, described and undescribed species (LAMAS et al. 2004, PYRCZ 2010). They are found within the entire altitudinal range of cloud forests, from 800 – 3200 m, and some even successfully colonized the páramo above timberline. The species reported at the highest elevations, at around 4000 m, are *L. huilana* WEYMER and *L. mirabilis* STAUDINGER in Colombia (ADAMS 1986), *L. inde* PYRCZ and *L. ingasayana* PYRCZ in Peru (PYRCZ 2004). Only two species are found in Central America. All others occur in the tropical Andes and their peripheral ranges of northern Colombia (Sierra Nevada de Santa Marta) and Venezuela (Cordillera de la Costa, Turimiquire) (ADAMS & BERNARD 1977, VILORIA et al. 2010). Until now,

none was found in other South American mountain, such as the Guyana Shield or the Brazilian Serra do Mar. Currently, 12 species are reported in Venezuela (VILORIA et al. 2010), 16 in Colombia (PYRCZ & RODRIGUEZ 2007), 16 in Ecuador (PYRCZ, in prep.), 14 in Bolivia (GARECA et al. 2008), and 22 in Peru (PYRCZ & BOYER 2010).

The highest local diversity of the genus *Lymanopoda* was reported from central Peruvian Andes (Oxapampa) where 14 sympatric and parapatric species occur along a potential elevational transect (PYRCZ & BOYER 2010). One of them, until now undescribed, is the subject of this paper. Central Peru is also an area of endemism. Two species and two subspecies are known from the Oxapampa area in Pasco only (PYRCZ & BOYER 2010). More endemic *Lymanopoda* were discovered in the neighbouring Junín department in the upper valley of Río Mantaro (PYRCZ & BOYER, op. cit.). Two of them are described in this paper.

MATERIAL AND METHODS

Collecting was carried out with entomological nets and Van-Someren Rydon baited traps. Type and comparative material was examined in BMNH, MZUJ and in other major European public and private collections. Male genitalia were dissected according to standard procedures by soaking in a warm 10% KOH solution, 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 PhotoShop7.0. The following abbreviations and collection acronyms were used:

BMNH: Natural History Museum (formerly British Museum, Natural History), London, UK;

MUSM: Museo de Historia Natural, 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);

FW: forewing;

HW: hindwing;

V: ventral surface;

D: dorsal surface.

SYSTEMATIC OVERVIEW

Lymanopoda hockingiana PYRCZ, n. sp.

(Figs. 1, 2, 9)

[*Lymanopoda hockingi*; CASNER & PYRCZ 2010: 5; PYRCZ 2010: 174, 176 *nomen nudum*]

MATERIAL EXAMINED

HOLOTYPE (male): PERU, Huánuco, Carpish, 2700-2800 m, 23.IX.1996, J. Grados leg. [MUSM]; PARATYPES (46 males and 4 females): 1 male: Huánuco, Carpish, 08.VI.1995, G. Lamas leg.; 1 male: Huánuco, Carpish, 23.IX.1996, F. Chang leg.; 1 male: Huánuco, Carpish, 21.X.1964, P. Hocking leg.; 1 male: Huánuco, Carpish, 27.XI.1965; 1 male: Huánuco, Carpish, 16.VI.1966 [MUSM]; 1 male: Junín, Chanchamayo, Qda. Malambo, 2600-2650 m, 01.II.2003, T. Pyrcz leg.; 3 males: same data but 05.X.2002; 1 male: same data but 26.I.2003; 2 males: Junín, Sigsha – Ocopata, Ilich, 3000-3050 m, 05.X.2002, T. Pyrcz leg.; 1 male: same data but 18.VIII.2002; 1 male: Pasco, Huancabamba, Ichco, au dessus de Milpo, 3100-3300 m, 03.XI.2004, P. Boyer leg.; 1 male: Pasco, Oxapampa, Cueva Blanca, 2300-2600 m, 06.XII.2003, P. Boyer leg.; 12 males: Junín, Huancabamba, Milpo – Iccho, 2800-2850 m, J. Bottger leg.; 1 male: same data but IV.2006; 2 males: same data but IV.2006; 1 male: Huánuco, Umuari – Pano, Qda. Ramospampa, 2850-3000 m, 30.VIII.2002, T. Pyrcz leg.; 1 male: Huánuco, Carpish, P. Hocking leg., prep. genit. 1010/87 T. Pyrcz [TWP]; 4 males: Huánuco, Paso Carpish, 2800-3000 m, 26.X.2004, P. Boyer leg.; 2 males: same data but 19.II.2003, P. Boyer leg.; 1 male: Huánuco, route Pachachupan vers Huanacaure km 38, est de Acomayo 2600 m, S09°45'41", W075°54'84", 23.X.2006, P. Boyer leg.; 1 male: Huánuco, Huánuco vers La Union km 27, 2600 m, 27.X.2004, P. Boyer leg.; 1 female: Pasco, Ichco, au dessus de Milpo, Huancabamba, 3100-3300 m, 03.XI.2004, P. Boyer leg.; 1 female: Pasco, Shuyhua, Ichco, au dessus de Milpo, S10°22'96", W075°38'02", 3100-3300m, 27.V.2005, P. Boyer leg.; 3 males : Pasco, Milpo, au dessus de Cueva Blanca, Huancabamba, 2700-2800 m, 08.XII.2003, P. Boyer leg.; 1 male: Pasco, Cueva Blanca, Huancabamba, 2300-2600 m, 08.XII.2003, P. Boyer leg.; 2 males: Pasco, Ichco, au dessus de Milpo, Huancabamba, 3100-3300 m, 03.XI.2004, P. Boyer leg.; 1 female: Huánuco, 2 km de Huanacaure, Pachachupan-Huanacaure km 42, 3000 m, 22.X.2009, P. Boyer leg. [PBF].

DIAGNOSIS

This species differs from its nearest relative, *L. araneola* PYRCZ (Figs. 3, 4), in the presence of a FWV brick red patch covering the outer half of the wing from vein M3 to anal margin, in the HWV densely speckled with dark scales on a rusty red ground colour, usually lighter and less patterned in *L. araneola*. Also, in *L. araneola* the HWV ground colour is highly variable between sandy yellow and reddish brown.

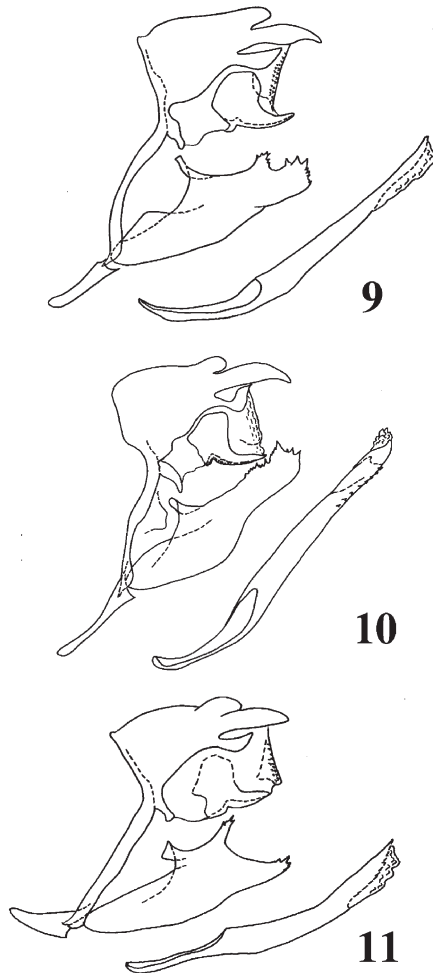
DESCRIPTION

Male (Figs. 1, 2): Head: eyes dark-brown, covered with short, sparse setae; labial palpi twice the length of head, grey, covered with short and rather sparse hair, ventrally light grey, laterally and dorsally brown; antennae 2/5 the length of costa, brown, covered with white scales at base of each segment, club flattened and concave, dark-brown, slightly curved at the tip. Thorax: dorsally blackish-brown, densely hairy, ventrally light brown, legs grey, tarsus brown. Abdomen: dorsally and laterally blackish-brown, ventrally pale yellow. Wings: FW (length: 19-22 mm; mean: 21.5 mm; n= 26) triangular, costa slightly arched, apex rather acute, outer margin convex below apex; HW oval,



1-7. Adults (left: dorsal surface; right : ventral surface); 1, 2. *Lymanopoda hockingiana*: 1 – paratype male, 2 – paratype female, Cueva Blanca; 3, 4. *Lymanopoda araenola*: 3 – paratype male form 1, Molinopampa, 4 – paratype male form 2, Molinopampa; 5. *Lymanopoda mariposa* paratype male; 6. *Lymanopoda shefteli* male, Qda. San Luis; 7. *Lymanopoda rana marrana* paratype male; 8. *Lymanopoda rana rana* male, Abra Pardo Miguel

outer margin concave between veins M_2 and M_3 ; FWD and HWD uniform chocolate-brown; FWV brown with a brick-red overcast in the basal area and postbasal within discal cell and also around black postmedian ocelli with white pupils in cells $M3-Cu1$ and $Cu1-Cu2$; three white subapical dots on a rusty ground colour; HWV rusty-red with lighter rusty-yellow patches in the basal area, from discal cell to $2/3$ of costa and along $2/3$ outer margin on tornus and outer margin; a darker wavy submarginal band apparent between veins $M2$ and $Cu2$; all surface of wing sprinkled liberally with a darker ripple-like pattern; black spots forming an arched line curved basally in cells $M1-M2$, $M2-M3$, $M3-Cu1$, $Cu1-Cu2$ and $Cu2-1A$, the spot in cell $M3-Cu1$ being the most basal. Male genitalia (Fig. 9): both the dorsal and the apical process on the valva



9-11. Male genitalia (in lateral view, aedeagus extracted): 9 – *Lymanopoda hockingiana* paratype, 10 – *Lymanopoda mariposa* paratype, 11 – *Lymanopoda rana marrana* paratype

short but wide and covered with a series of sharp, short teeth; saccus long and thin; aedeagus straight, without noticeable spines.

Female (Fig. 2): Sexual dimorphism is slight. The female differs from the male only in the slightly duller colours on both the upper and underside, and the more uniform HWV colour pattern.

ETYMOLOGY

This species is named after Pedro Hocking, an American missionary and lepidopterist who contributed significantly to the knowledge of Peruvian butterflies.

REMARKS

L. hockingiana occurs in the Peruvian departments of Huánuco, Pasco and Junín in the upper valleys of Huallaga and Chanchamayo. It is closely related to *L. araneola* which is its sister-species in the departments of Amazonas and San Martín, and to *L. mariposa* n. sp. which replaces it allopatrically in southern Junín. It flies in the upper cloud forest to timberline, being most frequently found at 2800-3100 m. It is the most common species of *Lymanopoda* in the upper cloud forests of central Peru.

Lymanopoda mariposa PYRCZ et BOYER, n. sp.

(Figs.5, 10)

MATERIAL EXAMINED

HOLOTYPE (male): Junín, route Satipo vers Concepción vía Mariposa km 68 à 70, 2700-2800m, 12.XI.2006, P. Boyer leg., to be deposited in [MUSM]; PARATYPES (7 males): 1 male: Junín, route Satipo – Mariposa, vers Concepción Km 62, 2500-2700 m, 15.X.2009, P. Boyer leg., prep. genit. 01/16.03.2011 J. Lorenc [MZUJ]; 1 male: Junín, route Satipo vers Concepción vía Mariposa km 68 à 70, 2700-2800 m, 12.XI.2006, P. Boyer leg.; 1 male: Junín, route Satipo vers Concepción vía Mariposa km 68, 2700 m, 2-12.XI.2006, P. Boyer leg.; 4 males: Junín, Calabaza, 2000 m (unreliable), VII.1976, ex coll. Galic [PBF].

DIAGNOSIS

This species resembles most closely another mostly white congener, *L. shefteli* (Fig. 6) which however has no truncate outer margin, a white FWD postdiscal patch, and a noticeably patterned HWV with chestnut bands.

DESCRIPTION

Male (Fig. 5): Head: coffee brown, covered with short, sparse hair; labial palpi twice the length of head, covered dorsally with longer chestnut and shorter black hair, ventrally with longer, sparse black and short, dense white hair; antennae 2/5 the length of costa, medium brown, covered with white scales at base of each segment, club formed gradually flattened and concave, dark-brown. Thorax: black, dorsally covered with sparse hair of different colours, ventrally covered with dense, white scales, whitish,

milky light white and medium brown hair, same for legs tibiae and femore, tarsi medium brown covered with whitish and golden brown scales. Abdomen: black, covered with whitish and steely gray scales, denser on venter. Wings: FW (length: 21-22 mm; mean: 21.8; n=8) triangular, apex acute, outer margin concave, truncate below apex; HW oval, outer margin smooth. FWD snow white in basal half, except a grayish basal suffusion, black along costa, from postdiscal and submarginal area to outer margin, plus an irregular black patch along outer margin of discal cell and a black rounded dot in M3-Cu1, and a slightly smaller rounded black dot in tornus; a series of three tiny whitish subapical dots. HWD snow white except for a grayish basal suffusion extending along anal margin to tornus, progressively turning brown, a black rounded spot near outer margin in M1-M2 and black outer margin. FWV pattern reflected from the upperside except that the black area is smaller and forming a diffuse oblique band extending from postdiscal area to tornus, along costa and distally becoming sandy yellow; outer edge discal cell patch chestnut, M1M3-Cu1 black spot smaller and two tiny black spots in Cu1-Cu2 and Cu2-1A, three subapical whitish dots same as on the upperside. HWV white dusted on the entire surface with sandy yellow scales, slightly denser in postbasal and discal area and along outer edge of discal cell from anal margin to vein M3, and along costa in apical area where forming diffuse patches.

ETYMOLOGY

This species is named after the village of La Mariposa located near its type locality, a word which incidentally means “butterfly” in Spanish.

REMARKS

This is one of the numerous predominantly white species of the genus *Lymanopoda*. The white colouration of the wings does not necessarily indicate any closer relations between the allopatric taxa. In fact, in several species, there is considerable individual variation in the dominant colours of the wings and there are white forms along brown and intermediate forms. Such polymorphism is found in *L. umbratilis* ROSENERG et TALBOT in southern Peru, *L. lactea* HEWITSON in Colombia and to some extent in *L. labineta* HEWITSON in Ecuador. In these species white forms constitute an important percentage of local populations. White morphs are usually more common at higher elevations, a fact to which already ROSENERG & ROSENBERG (1914) drew the attention on. In other species either white or brown forms dominate in the population and other occurs sporadically. For example, *L. shefteli* is predominantly white however rare brown or grayish morphs were detected. In the predominantly white *L. mariposa* brown morphs have not been collected so far, their existence cannot be ruled out considered that few specimens of this species are known so far. The white *L. shefteli* which is apparently the southern allopatric ally of *L. mariposa* is however not its closest relative. Male genitalia similarity and in particular the truncate outer margin of FW below apex strongly indicate that the closest relative of *L. mariposa* is the brown *L. hockingiana*.

Lymanopoda rana marrana PYRCZ et BOYER, n. ssp.

(Figs. 7, 11)

MATERIAL EXAMINED

HOLOTYPE (male): PERU: Junín, route Satipo vers Concepción km 62, 2500-2700 m, 15.X.2009, P. Boyer leg., to be deposited in [MUSM]; 1 male: Junín, route Satipo vers Concepción km 62, 2500-2700 m, 15.X.2009, P. Boyer leg.; 1 male: Junín, route Satipo vers Concepción via Mariposa km 68 à 70, 2700-2800m, 12.XI.2006, P. Boyer leg.; 1 male: Junín, route Satipo vers Concepción via Mariposa km 64, 2600 m, 2-12.XI.2006, P. Boyer leg. prep. genit. 01/16.03.2011 J. Lorenc [PBF]; 1 male: Junín, route Satipo vers Concepcion km 62, 2500-2700 m, 15.X.2009, P. Boyer leg. [MZUJ].

DIAGNOSIS

Differs from the nominate subspecies (Fig. 8) in the darker, blackish brown upperside, black instead of dark brown FWV, and the smaller size.

DESCRIPTION

Male (Fig. 7): Head: eyes chocolate brown, hairy; antennae to two-fifths the length of costa, slender, dorsally brown, ventrally orange brown with white scales at base of each segment, club composed of 10 segments, flattened and concave, dark brown; labial palpi two times the length of head, covered dorsally with short, brown, ventrally with long, white and gray hair. Thorax: black, dorsally covered with sparse brown hair, ventrally covered with thick, whitish and gray hair. Abdomen: black, ventrally covered with brown and gray scales denser towards terminal segments. Wings: FW (length: 18-19 mm; mean: 18.2; n=5) triangular, apex subacute, outer margin straight. FWD uniform blackish brown. HWD uniform blackish brown. FWV ground colour black, faint reddish brown covering most of discal cell, and basal half of cells M3-Cu1 and Cu1-Cu2, costa, apex and outer margin golden brown, subapical area suffused with some white scales, three minute white subapical dots in R5-M1, M1-M2 and M2-M3, and two larger postdiscal black ocelli with white pupils in M3-Cu1 and Cu1-Cu2. HWV ground colour golden brown, a series of darker brown, diffused postbasal, median, postmedian and submarginal bands, an elongated milky white patch covering the lower one-third of discal cell, a row of six small black dots with white pupils in cells M1-M2 to Cu2-1A, two in the latter one, forming a row arched basally with the spot in M3-Cu1 closer to wing base than the remainder. Male genitalia (Fig. 11): Not differing from the nominate subspecies illustrated by PYRCZ, 2004: 151, fig. 126.

Female: unknown.

ETYMOLOGY

The subspecific epithet means “pig” in Spanish and is a free allusion to the specific name, *rana*.

REMARKS

Nominate *L. rana* is found in northern (San Martín and Amazonas) and central (Pasco, Huánuco) Peru (PYRCZ 2004). The new subspecies was discovered in southern Junín in the region of the Andes confined from the north by the valleys of Río Chanchamayo and from the south by Río Mantaro. It is an area of high endemism of montane satyrines, as documented recently (PYRCZ et al. 2008a-f, 2010). This species was not reported from southern Peru so far. *L. rana* occurs in low to mid elevation cloud forests at 1800-2400 generally. It is apparently an ecological vicariant of *L. ferruginosa* BUTLER which replaces it immediately at lower elevations. The two species are similarly patterned and can be confused but *L. ferruginosa* is consistently smaller. Their male genitalia are however markedly different. *L. ferruginosa* presents slender valvae without dorsal process whereas *L. rana* has a massive, spiny dorsal process (PYRCZ 2004). *L. rana marrana* was found at somewhat higher elevations than the nominate subspecies. *L. rana marrana* is also very closely similar in wing shape and colour patterns to *L. hyagnis* WEYMER described from Bolivia. However, the two differ considerably in male genitalia. Although both have a prominent dorsal process in *L. rana* it is much longer and slender and well apart from the apical process. In *L. hyagnis* the dorsal process is short, massive and situated close to the apical process. Based on these genital characters, the two species can be placed in separate groups of *Lymanopoda*. *L. rana* is associated with *L. lebbaea* C. FELDER et R. FELDER, *L. labda* HEWITSON and *L. nadia* PYRCZ, whereas *L. hyagnis* with *L. umbratilis*, *L. shefteli*, *L. araneola* and *L. mariposa* n. sp. It has to be pointed out that morphological data are only partly congruent with the results of the study of the phylogeny of *Lymanopoda* based on molecular data which situates *L. rana* in the *L. araneola* clade comprising all the above mentioned species, including *L. ferruginosa* (CASNER et PYRCZ, 2010).

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