

A remarkable new *Euptychia* Hübner, 1818 (Lepidoptera: Nymphalidae: Satyrinae) from the Amazon basin of Peru and Colombia

SHINICHI NAKAHARA^{1*}, JEAN-FRANÇOIS LE CROM² AND GERARDO LAMAS³

¹McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, FL 32611, USA.

²Calle 61 N° 37-31 Bogotá, Colombia.

³Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Apartado 14-0434, Lima-14, Peru.

snakahara@ufl.edu, jflecrom@hotmail.com, glamasm@unmsm.edu.pe

Abstract. A new species of *Euptychia* Hübner, 1818, from the Amazon basin of Peru and Colombia, *E. juanjoii* sp. nov., is described. This new species has a unique wing pattern compared to other members of the genus, but is placed in *Euptychia* due to the presence of a projection of the tegumen over the uncus in the male genitalia.

Resumen. Se describe una nueva especie de *Euptychia* Hübner, 1818, de la cuenca del Amazonas de Perú y Colombia, *E. juanjoii* sp. nov. Esta nueva especie muestra un patrón alar único comparado con los otros miembros del género, pero se incluye en el género *Euptychia* por la proyección del tegumen sobre el uncus en la genitalia del macho.

Key words: Euptychiina, new species, taxonomy, white-sand forest.

INTRODUCTION

Euptychia Hübner, 1818 is a speciose genus within the poorly known nymphalid subtribe Euptychiina and represents the oldest generic name for the subtribe (Lamas & Nakahara, 2015). After its description, *Euptychia* was treated by some authors (e.g. Butler, 1867; Weymer, 1910-1911) in a broad sense to include many other euptychiine species which are now no longer placed in *Euptychia* (Lamas, 2004). The catalogue by Lamas (2004), which has been considered as the basis of current Neotropical butterfly classification, listed 13 valid and 16 undescribed species in *Euptychia*. Some of these latter species have been described in the meantime such that currently this genus includes 18 valid species

(Brévignon, 2005; Freitas *et al.*, 2012; 2013; Neild *et al.*, 2014; Nakahara *et al.*, 2014), although it appears that there are more taxa awaiting description than it has been previously thought.

This article is part of a series in which the first author, together with various colleagues, intends to describe *Euptychia* species from the Amazon basin and the Guianas. General information about the genus, including distribution and diagnostic characters, can be found in the first paper of the series (Neild *et al.*, 2014). During the preparation of this particular paper, the first author (SN) noticed a unique euptychiine species illustrated in Pinzón (2009), which seemed to be a member of *Euptychia* based on its wing pattern. The first author subsequently dissected two male specimens of this taxon and confirmed that it was an undescribed species, as had been previously recognized by Lamas *et al.* (2003) and Lamas (2004). This species is described herein and placed in the genus *Euptychia*.

* Corresponding author.

Received: 16 June 2015

Accepted: 17 July 2015

MATERIAL AND METHODS

We examined the morphology of *Euptychia* specimens from the following three collections:

JFLC — Jean François Le Crom collection, Bogotá, Colombia

MGCL — McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Florida, USA



Figure 1. *Euptychia juanjoi* sp. nov. Top row (dorsal view on left, ventral view on right): male holotype with labels; bottom row (dorsal view on left, ventral view right): female allotype with label. Scale bar = 10 mm.

MUSM — Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru

The abdomens of two Peruvian males in MUSM were dissected to observe genitalic structures. Female genitalia could not be examined because the abdomen of the only female specimen was damaged. Abdomens were prepared using standard techniques, being soaked in hot 10% KOH for 5-10 minutes before dissection and stored in glycerol after dissection. External morphology and dissections were studied using a stereomicroscope and photographed using digital cameras. Terminology for genital and abdominal structures follows Klots (1956), except for the term 'aedeagus', where we follow Peña & Lamas (2005). Nomenclature for wing venation follows the Comstock-Needham system described by Miller (1970), and areas and elements of the wing pattern follow Peña & Lamas (2005) and Neild (2008).

Taxonomy

Euptychia juanjoi Le Crom, Nakahara & Lamas, sp. nov.
(Figs. 1, 2)

Euptychia sp. n. 4: Lamas *et al.*, 2003: 12.

Euptychia [n. sp.] Lamas, MS: Lamas, 2004: 219 [# 1319].

Euptychiina sp.: Pinzón, 2009: 4.

ZooBank LSID: urn:lsid:zoobank.org:act:6F950E4B-7D24-4F57-B31D-E91EA81708FC

Wing venation: Most of forewing subcostal vein swollen; base of cubitus barely so; forewing recurrent vein present in discal cell; hindwing humeral vein not discernible. **Wing shape:** Forewing subtriangular, costal margin convex, outer margin almost straight, inner margin straight, but rounded towards thorax near base; hindwing slightly elongate, rounded, outer margin slightly rounded, inner margin slightly concave near tornus, anal lobe convex, slightly round.

Dorsal surface: Ground colour light lilac-brown, distally darker, translucent, thus subtly revealing ventral dark bands and

ocelli (Fig. 1). **Ventral surface:** ground colour pale greyish-brown, slightly darker on hind wing; both wings with several dark-brown transverse bands with subtle orange overtones.

Ventral forewing: Dark-brown band extends basally along swollen subcostal vein from radius to wing base; dark-brown, straight discal band extends from radial vein, crossing discal cell in a slightly inward diagonal direction, running in a slightly outward diagonal direction below cubital vein, and fading away before touching vein 2A; dark-brown postdiscal band almost parallel to discal band, relatively broad except between radial vein and recurrent vein in discal cell, extending from radial vein towards inner margin until reaching vein 2A; narrow disjunct band along discocellular veins m_1-m_2 and m_2-m_3 ; postmedial band dark-brown, somewhat broad, faint, extending along postmedian; thin, dark grey submarginal band sinuate; marginal band undulating, same color as, but slightly thinner than, submarginal band; fringe brownish; ocellus in cell M_1 , extending across veins M_1 and M_2 , black with one white pupil in center, surrounded by two concentric creamy-yellow rings, outer ring forming small satellite ring in cell M_2 ; cell M_3 with whitish reniform marking containing smaller, concolorous reniform marking with dark-grey border; orange patch in cell Cu_1 .

Ventral hindwing: Regular dark-brown band near the wing base; discal band equally wide as forewing band, slightly paler, nearly straight; postdiscal band parallel to discal band, concolorous, slightly wider, with orange markings of varying length along posterior third; broad, faint, indistinct dark band covering most of median and postmedian; submarginal band undulate, gradually broadening towards tornus, posterior one-third orange, occasionally fused to postdiscal band in cell 2A; marginal band black, undulate, much thinner than submarginal band; fringe brownish; cells M_1 and Cu_1 each with a ringed, submarginal ocellus identical in appearance to forewing ocellus; ocellus in cell M_1 extends across vein M_2 ; cell M_3 with creamy-yellow reniform marking; oblong, creamy-yellow ring spanning most of submargin, enclosing both ocelli and reniform marking.

Genitalia (Fig. 2): Tegumen appears subtriangular in lateral view, dorsally flattened, approximately half the length of uncus, with conspicuous posterior projection above uncus, visible in lateral view; uncus narrow, long, without setae, slightly hooked, tapered posteriorly, appears subtriangular in dorsal view; gnathos absent; combination of ventral arms from tegumen and dorsal arms from saccus straight; appendices angulares absent; saccus approximately two-thirds length of uncus, juxta present; valvae sparsely setose, at approximately 30° angle to horizontal; basal half of valva appears subrectangular in lateral view, ventral margin convex, dorsal margin concave, distal half narrow with rounded apex, interior portion of apex projects inwards in a hook-like shape; aedeagus straight, elongate, approximately as long as valve, tubular, posterior third relatively narrow, broadening anteriorly and open anterodorsally, cornuti absent; ventral surface of anal tube weakly sclerotized.

Female is similar to male, except as follows: Both forewing and hind wings slightly wider and rounder, ground color paler, ventral bands reddish.

Holotype: ♂ (FW length: 15.5 mm) Peru: Loreto, Z[ona] R[eservada] Allpahuayo-Mishana, 170m, 03°58'S, 73°25'W, 1.XII.2001, J.J. Ramírez, Varillal seco II, 0357/7325 (genital dissection vial prepared: SN-14-3), in MUSM.

Allotype: ♀ (FW length: 12 mm) Colombia: Amazonas, Corregimiento La Pedrera, Caño Curare, Comunidad de Curare, Resguardo Indígena Curare-Los Ingleses (1°18'50"S, 69°45'18"W), J. Pinzón leg., 23-25.IX.2004, in JFLC.

Paratypes: FW length: 13.5-15.5mm (n=4). 1♂: Peru: Loreto, Río Aguas Negras, 150m, 0°31.38'S, 75°15.41'W, 3.III.1994, R. K. Robbins (MUSM); 1♂: Peru: Loreto Z[ona] R[eservada] Allpahuayo-Mishana, 170m, 0358/7325, 30.XI.2001, L. Campos

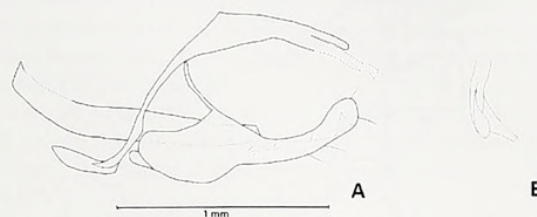


Figure 2. Male genitalia of paratype of *E. juanjoi* sp. nov. **A:** lateral view (dotted line of the uncus is drawn based on a second specimen); **B:** anterior end of valvae in dorsal view.

(MUSM); 1♂: Peru: Loreto, Z[ona] R[eservada] Allpahuayo-Mishana, 170m, 03°58'S, 73°25'W, 30.XI.2001, J.J. Ramírez, Varillal seco II, 0358/7326 (genital dissection vial prepared: SN-14-20), (DNA sample SN-MUSM-06) (MUSM); 1♂ same data as holotype (MUSM).

Etymology. We dedicate this specific epithet to Juan José Ramírez, who is the third author's good friend and who collected three specimens of this taxon, including the holotype. Juan José Ramírez is from Iquitos, Peru, where the holotype is from, and his nickname is 'Juanjo'.

Diagnosis. *Euptychia juanjoi* can be distinguished externally from other *Euptychia* species by the presence of the whitish reniform marking in cell M_3 of ventral forewing. In addition, the combination of the following characters can also be used: 1) orange patch in cell Cu_1 of ventral forewing; 2) creamy yellow ring surrounding ocellus in cell M_1 of ventral forewing, also forming a satellite small ring in cell M_2 ; 3) creamy-yellow ring surrounding ocellus in cell M_1 of ventral hindwing, forming a satellite small ring in cell M_2 and in cell Rs ; 4) creamy yellow ring surrounding ocellus in cell Cu_1 of ventral hindwing, forming a satellite reniform ring in cell M_3 with an inner creamy yellow reniform marking; 5) orange patch on tornus of ventral hindwing.

Variation. The size of the ventral hindwing tornal orange patch varies; two specimens have this orange patch fused to the orange patches covering the postdiscal band, whereas the orange patches remain separate in the remaining four specimens in the type series. Also, the degree to which the tornal orange patch covers the submarginal band varies.

Distribution (Fig. 3). Currently known from three localities in the Amazon basin: Allpahuayo-Mishana Reserve and Río Aguas Negras, both in Loreto, Peru, and Amazonas Department, Colombia. Four specimens were collected in the Allpahuayo-Mishana Reserve, one in the Río Aguas Negras, and two in Colombia. However, one of the Colombian specimens was not analysed and is thus excluded from the type series because the collector indicated it was in very poor condition (J. Pinzón, pers. comm.) Because only three sites are known to us, we are unable to accurately estimate the full geographical range of *E. juanjoi*.

Habitat. J.J. Ramírez (pers. comm.), who collected the holotype in the Allpahuayo-Mishana Reserve (Peru), reports that, although this white-sand forest is usually an open space with sunlight and sparse leaf litter, there are some areas with tall trees that consequently receive very little sunlight. *Euptychia juanjoi* flies in these areas, in the lower understory, and may sometimes be confused with species of *Mesosemia* (Riodinidae) when on the wing. The Río Aguas Negras locality includes a mosaic of inundation forest and white-sand forest similar to that found in Allpahuayo-Mishana. Regarding the Colombian specimens'

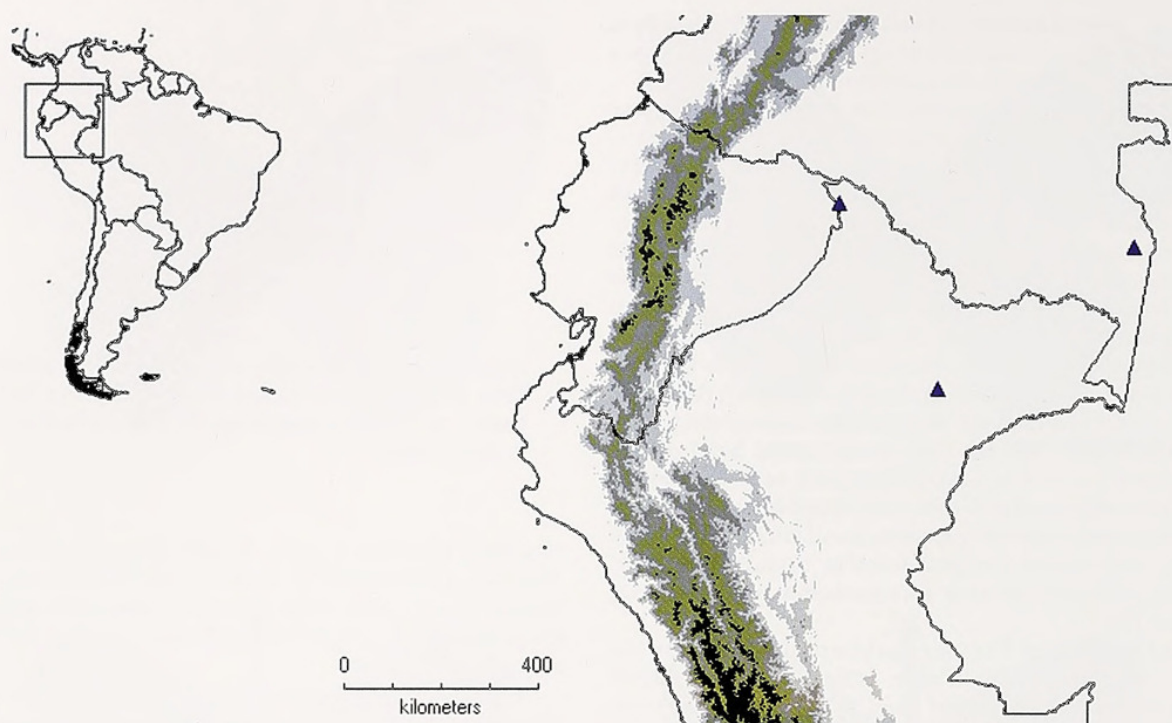


Figure 3. Map showing collecting localities (blue triangles) for *E. juanjoi* sp. nov.

locality, J. Pinzón (pers. comm.) notes that the forest is typical of black-water inundation forests of the Amazon basin, with a relatively tall closed canopy (~15m) and thick litter layer on the ground. One of the specimens was collected on the northern edge of the river while the other was collected on the southern edge; the northern edge was quite swampy with very soft ground at some places and very thick understory, whereas the southern edge was on higher ground with much sparser understory, but still had a closed overstory (~20 m tall).

DISCUSSION

This species should be placed in *Euptychia* based on the presence of a conspicuous projection of the tegumen above the uncus, of a recurrent vein in the discal cell of the forewing, and by the absence of basal swelling of forewing cubital vein. The first character is considered diagnostic by several authors (Freitas *et al.*, 2012; Neild *et al.*, 2014; Nakahara *et al.*, 2014), and the latter two are shared by all members of the genus although they are present in some other euptychiine species too (S. Nakahara, pers. observ.). We were not able to examine the female genitalia of *E. juanjoi*, although it would be very interesting to see whether this species has a sclerotized 'ring' located at the base of the 8th abdominal segment, developing from the lamella antevaginalis. This character has been seen in the female genitalia of all *Euptychia* species that exhibit a tegumen projection in the male genitalia. In addition, female genitalia of *Euptychia* species appear

to lack the prominent sclerotized region of the 8th abdominal segment (located on both sides) which is seen in many other females of euptychiine species. Assessing the status of this character in a female *E. juanjoi* would support its placement in *Euptychia*.

It is very difficult to determine the systematic placement of *E. juanjoi* within *Euptychia* because this species does not closely resemble any other in the genus; it has numerous characters that are hardly seen in other congeners. Despite its unique appearance, the male genitalia of *E. juanjoi* somewhat resemble that of *E. meta* Weymer, 1911, which is a more widespread species known from the eastern Andes and also from the western Andes and Central America. Both species have similarly shaped valvae, with a rectangular basal half and slightly curved, narrow distal half.

Concerning the Colombian locality of *E. juanjoi* the collector notes that "This is a 'small' black-water river that flows from the south into the Caquetá (Japurá) river about 20km upriver west from the town of La Pedrera and perhaps a couple of kilometers from the native community of Curare. The area where I collected these specimens was a few kilometers up the Caño Curare within a km from the river margins during the dry season, most of which is flooded during the rainy season, particularly close to the Caqueta" (J. Pinzón, pers. comm.). The Allpahuayo-Mishana reserve, where four Peruvian specimens are from, is

classified as a white-sand forest growing on white-sand soil, locally known as 'Varillal', which is recognized as a distinctive forest type (Lamas *et al.*, 2003; Fine *et al.*, 2010). Floristic study of this white-sand forest revealed that its plant diversity is significantly lower compared to non white-sand forests, although 61% of white-sand forest plants are considered endemic or facultative specialists (Fine *et al.*, 2010). Similar results have been reported by comparing the white-sand forests to *terra firme* forests in the upper Rio Negro, Brazil (Stropp *et al.*, 2011). Although there have been several new discoveries of avifauna in this white-sand forest (e.g. Alvarez & Whitney, 2001), its butterfly fauna is still incompletely known. Similar white-sand forests are also present in Colombia, Venezuela, Brazil, and the Guianas (Fine *et al.*, 2010). It will therefore be interesting to see whether *E. juanjoii* also occurs in these other white-sand forests and to further investigate the butterfly fauna of this unique forest type.

ACKNOWLEDGEMENTS

We thank Paola Ancajima (MUSM) for help, Jaime Pinzón (Colombia/Canada) and Juan José Ramírez (Peru) for information regarding the habitat of *E. juanjoii*, Elena Ortiz (MGCL) and Fernanda Checa (MGCL) for helping the first author with Spanish translation, and David Plotkin (MGCL) for reviewing the manuscript. The first author would like to thank all the staff and students at the MUSM for their generous support during his visit in July 2014.

EDITOR'S NOTE

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