



Beyond appearances: the genus *Ernassa* Walker, 1856 (Lepidoptera, Erebidae, Arctiinae, Phaegopterina) and the description of eight new species

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Abstract

The genus *Ernassa* Walker currently consists of five species: *Ernassa justina* (Stoll), *E. sanguinolenta* (Cramer), *E. ignata* Travassos, *E. gabriellae* Travassos, and *E. cruenta* (Rothschild). For about 40 years, the genus has been treated with these species. However, a large series of specimens and the study of the characters of the male genitalia, makes evident that the genus is more diverse. Eight new species are described: *Ernassa inexplorata* **sp. nov.**, *E. rufula* **sp. nov.**, *E. persivalei* **sp. nov.**, *E. tarisca* **sp. nov.**, *E. skinnerorum* **sp. nov.**, *E. harveyi* **sp. nov.**, *E. markpacei* **sp. nov.** and *E. abscondita* **sp. nov.** This work proposes that the species *E. cruenta* (Rothschild) does not have a common origin with the other species of the genus. At the moment it is treated as *incertae sedis*.

Key words: *Automolis cruenta*, French Guiana, Peru

Introduction

Through more than 260 years since the appearance of *Systema Naturae* (Linnaeus, 1758), starting point of the Zoological Nomenclature (ICZN, 2000), most of the Arctiinae species of the Neotropical region have been described considering only external morphological characters and wing color pattern (Hampson, 1898, 1901; Draudt, 1916–1919).

The genus *Ernassa* was proposed by Walker (1856), taking as a reference the specimen described by Stoll ([1782]) as *Phalaena justina*. Hampson (1901) considered the species *Bombyx sanguinolenta* (= *Ernassa sanguinolenta*), described by Cramer (1780), as a synonym of *Phalaena justina* (= *Ernassa justina*) (Stoll, 1782). Both within the genus *Automolis* Hübner [1819]. Hampson (1920) refers to the genus *Ernassa*, proposing it as a synonym for *Automolis*. The genus was re-established by Travassos (1944), stating that the two species known up to then were not identical, in opposition to Hampson's (1901) hypothesis. Furthermore, he mentions that the genus is characterized by the morphology of the genitalia. Years later, Travassos (1944, 1954) described the species *Ernassa ignata* and *Ernassa gabriellae*, both from the Atlantic Forest (Brazil). The fifth species considered so far within the genus *Ernassa*, was described by Rothschild (1909) as *Automolis cruenta*, considered as such by Hampson (1920). Watson & Goodger (1986) formally considered *Automolis cruenta* as *Ernassa*. The hypothesis that these last authors should have raised regarding the phylogenetic relationships of this species with the four known species should have been based on the color pattern. Apart from size, the wing color pattern of *Automolis cruenta* is very similar to the other species of the genus *Ernassa*.

The purpose of this work is to contribute to a better understanding of the species of the genus *Ernassa* Walker, with emphasis on the species that occur in Peru. A diagnosis is presented for each of the species. In regard to the external morphology and color pattern, there is not a great variation among some species to allow an easy differentiation, so a brief description is provided. A detailed description of the morphology of the male genitalia is provided for each species. The females of only some species are described, due to the limited availability of specimens and the difficulty of being able to relate them to the respective males. Eight new species are described, seven from Peru and one from French Guiana.

Materials and Methods

Descriptions of the new species are the result of multiple scientific exploration trips to different places in Peru, as well as the collaboration of colleagues and friends interested in learning more about the Arctiinae and the collections carried out as part of the *Discovery new species* project program at Refugio Amazonas lodge (ARA) and the Tambopata Research Center (TRC), both located at the Tambopata River (Madre de Dios, Peru).

For those species that can easily be confused when analyzing the external morphological characters and wing color pattern, only specimens that have undergone genitalia dissection have been included in the type series. For each species, a diagnosis, a brief external morphological description, the internal anatomy characters of the male genitalia as well as the geographical distributions have been provided. Whenever both morphological and molecular evidence was available, the females are also described. For four species, mitochondrial Cytochrome C oxidase subunit 1 (COI) gene sequencing is provided, having been carried out at the Biodiversity Institute of Ontario, University of Guelph, following a standardized protocol (de Waard *et al.*, 2008). The genetic distances are calculated in the MEGA 11 program (Tamura *et al.*, 2021), using the Kimura model2-parameters (K2P) with 10,000 bootstrap replicates.

The entomological collections revised for the preparation of this work were:

ICO	Instituto Oswaldo Cruz, Río de Janeiro, Brasil.
MUSM	Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú.
NHMUK	Natural History Museum, London, United Kingdom.
MNRJ	Museo Nacional, Universidad Federal do Rio de Janeiro, Rio de Janeiro, Brasil.

All the specimens belong to the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos (MUSM).

Wing venation terminology was used according to Miller (1970), Wootton (1979) and Common (1990); for the genital structures, we followed Sibatani *et al.* (1954), Kuznetsov (1967), and Klots (1970). The genitalia of the specimens were dissected and prepared using a KOH solution (10%) in a water bath. Chlorazole black was used as a staining medium to improve observation of characters (Cannon 1937, 1941; Carayon 1969). The photographs of adults were taken with a Nikon D80 camera and the genitalia with a Canon EOS Rebel T6 camera and a Canon MP-E 65mm macro.

Results

Ernassa Walker, 1856

Ernassa Walker, 1856:1643.

Type-species: *Phalaena justina* Stoll, 1782. In Cramer, *Uitlandsche Kapellen* (Papillons exot.) 4:186, 250, pl. 383, fig. E, by monotypy.

Characterized by the reddish or reddish-orange color pattern, bipectinate antennae with a whitish spot at the distal segments, a subproximal whitish spot on M_2 - M_3 of the forewings. Tegumen with narrow sides. Dorsal processes on the anterior part of the uncus, bearing long setae. For details of the characteristics of the genus, see Travassos (1944).

Ernassa justina Stoll, [1782]

(Figs. 1–6)

Neotype: Travassos, 1944:2–5.

Diagnosis: Oblique reddish spot that goes from the middle of the posterior margin to the angle at M_3 - Cu_1 , bears a visible thin black line. The lower part of the outer margin, slightly lobed. Base of valva narrow, dorsal process long, narrow and curved. It is the only species that has valvae of this shape.



FIGURES 1–2. *Ernassa justina* Stoll. Albergue Refugio Amazonas. 1. Dorsal view. 2. Ventral view. Scales=5 mm.



FIGURES 3–6. Genitalia of *Ernassa justina* Stoll. Male (Genitalia # JGA-1234, MUSM). 3. Dorsal view. 4. Ventral view. 5. Lateral view. 6. Aedeagus. Scales= 1 mm.

Material examined. **FRENCH GUYANA.** 1 male, Haute Mana, St. Leon, 24–30.ix.2003, O. Morgan leg. (GENITALIA # JGA-1234, MUSM). **PERÚ. LORETO.** 1 male, Río Arabela, Campamento Piraña 7B, 01°54'06", 75°22'56", 221 m, 16.ii.2008, W. Paredes; 1 male, Z.R. Allpahuayo-Mishana, 03°56'S, 73°28'W, 130 m, 11.viii.2004, J.J. Ramírez; 1 male, Picuroyacu, 03°39'S, 73°15'W, 110 m, 28.vi.2014, J.J. Ramírez; 1 male, Z.R. Allpahuayo-Mishana, 03°56'S, 73°28'W, 130 m, 11.viii.2004, J.J. Ramírez (GENITALIA #JGA-1242, MUSM); 1 male, Melitón Carbajal, 04°14'S, 73°34'W, 153 m, 15.vii.2012, J.J. Ramírez; 1 male, idem except (GENITALIA #JGA-1247, MUSM); 1 male, idem except (GENITALIA #JGA-1243, MUSM); 1 male, San Regis, Albergue La Posada, 04°30'30"S, 73°54'30"W, 130 m, 07.vii.2002, J.J. Ramírez (GENITALIA# JGA-1246, MUSM). **MADRE DE DIOS.** 1 male, Posada Amaz., 12°48'17"S, 69°17'35"W, 280 m, 30.ix.2004, T. Mc Cabe; 1 male, Tambopata Preserve, Laguna chica, 12°51'S, 69°18'W, 200 m, 07.xii.1996, Miller/Snyder/Brower/Rab-Green;

1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 10.ii.2016, J. Grados (MUSM, ARCT-342, JGA COLLECTION)(Voucher DNA barcoding, Arct #005 JGA-MUSM); 1 male, idem except, 14.iii.2016, D. Couceiro (MUSM, ARCT-366 JGA COLLECTION)(Voucher DNA barcoding, Arct #29 JGA-MUSM); 1 male, idem except, 02.x.2016 (MUSM, ARCT-447, JGA COLLECTION)(Voucher DNA barcoding, Arct #110 JGA-MUSM); 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 07.x.2016, D. Couceiro leg.; 1 male, idem except, 10.x.2016 (MUSM, ARCT-481 JGA COLLECTION)(Voucher DNA barcoding, Arct #144 JGA-MUSM)(GENITALIA #JGA-1295, MUSM); 1 male, idem except, 02.i.2017 (MUSM, ARCT-571 JGA COLLECTION)(Voucher DNA barcoding, Arct #234 JGA-MUSM); 1 male, idem except, 18.vi.2017 (MUSM, ARCT-650 JGA COLLECTION)(Voucher DNA barcoding, Arct #313 JGA-MUSM); 1 male, 12.vii.2017 (MUSM, ARCT-689 JGA COLLECTION)(Voucher DNA barcoding, Arct #352 JGA-MUSM); 1 male, idem except, 02.viii.2017 (MUSM, ARCT-735 JGA COLLECTION)(Voucher DNA barcoding, Arct #398 JGA-MUSM); 1 male, idem except, 05.viii.2017 (MUSM, ARCT-738 JGA COLLECTION)(Voucher DNA barcoding, Arct #401 JGA-MUSM)(GENITALIA #JGA-1296, MUSM); 1 male, idem except, 13.viii.2017 (MUSM, ARCT-759 JGA COLLECTION)(Voucher DNA barcoding, Arct #422 JGA-MUSM); 1 male, idem except, 12.ix.2017 (MUSM, ARCT-842 JGA COLLECTION)(Voucher DNA barcoding, Arct #505 JGA-MUSM); 1 male, idem except, 14.ix.2017 (MUSM, ARCT-848 JGA COLLECTION)(Voucher DNA barcoding, Arct #511 JGA-MUSM); 1 male, idem except, 16.ix.2017 (MUSM ARCT-854 JGA COLLECTION)(Voucher DNA barcoding, Arct #517 JGA-MUSM); 1 male, idem except, 18.ix.2017 (MUSM, ARCT-865 JGA COLLECTION)(Voucher DNA barcoding, Arct #528 JGA-MUSM); 1 male, idem except, 25.ix.2017 (MUSM, ARCT-910 JGA COLLECTION)(Voucher DNA barcoding, Arct #573 JGA-MUSM); 1 male, idem except, 27.ix.2017 (MUSM, ARCT-914 JGA COLLECTION)(Voucher DNA barcoding, Arct #577 JGA-MUSM); 1 male, idem except, 27.ix.2017 (MUSM, ARCT-916 JGA COLLECTION)(Voucher DNA barcoding, Arct #579 JGA-MUSM); 1 male, idem except, 15.x.2017 (MUSM, ARCT-934 JGA COLLECTION)(Voucher DNA barcoding, Arct #597 JGA-MUSM); 1 male, idem except, 07.x.2017 (MUSM ARCT-924 JGA COLLECTION)(Voucher DNA barcoding, Arct #587 JGA-MUSM); 1 male, idem except, 17.x.2017 (MUSM, ARCT-939 JGA COLLECTION)(Voucher DNA barcoding, Arct# 602 JGA-MUSM); 1 male, idem except, 09.xii.2017 (MUSM, ARCT-990 JGA COLLECTION)(Voucher DNA barcoding, Arct #653 JGA-MUSM); 1 male, idem except, 16.xii.2017 (MUSM, ARCT-995 JGA COLLECTION)(Voucher DNA barcoding, Arct # 658 JGA-MUSM); 1 male, Albergue Refugios Amazonas, 12°52'30"S, 69°24'35" 231 m, 15.iii.2018, J.D. Shoobridge *et al.* (MUSM, ARCT-1050 JGA COLLECTION)(Voucher DNA barcoding, Arct #713 JGA-MUSM); 1 male, idem except, 20.iii.2018 (MUSM, ARCT-1061 JGA COLLECTION)(Voucher DNA barcoding, Arct #724 JGA-MUSM); 1 male, idem except, 21.iii.2018 (MUSM, ARCT-1065 JGA COLLECTION)(Voucher DNA barcoding, Arct #728 JGA-MUSM); 1 male, idem except, 05.v.2018 (MUSM, ARCT-1193 JGA COLLECTION)(Voucher DNA barcoding, Arct #856 JGA-MUSM); 1 male, idem except, 16.v.2018 (MUSM, ARCT-1203 JGA COLLECTION)(Voucher DNA barcoding, Arct #866 JGA-MUSM); 1 male, idem except, 19.vi.2018 (MUSM ARCT-1254 JGA COLLECTION)(Voucher DNA barcoding, Arct #917 JGA-MUSM); 1 male, idem except, 28.vi.2018 (MUSM, ARCT-1273 JGA COLLECTION)(Voucher DNA barcoding, Arct #936 JGA-MUSM); 1 male, Albergue Refugios Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 22.viii.2018, J.D. Shoobridge *et al.*; 1 male, idem except, 18.ix.2018; 1 male, idem except, 20.ix.2018; 1 male, idem except, 26.xii.2018; 1 male, idem except, 16.vi.2019; 1 male, idem except, 05.vii.2019; 1 male, P.N. Bahuaja-Sonene, 13°11'35"S, 70°07'56"W, 353 m, 05.vi.2013 J. Grados, E. Razuri & J. Barrientos. All deposited in the MUSM.

Male (Figs.1–2). Description of the adult male and the genital organs is found in Travassos (1944). Male genitalia (Figs. 3–6) (Genitalia # JGA 1234, 1242, 1243, 1246, 1247, 1295, 1296). Tegumen with narrow sides, the anterior margin shaped as an inverted “U”. Uncus as wide as the distal part of tegumen; two rounded processes, somewhat sclerotized at the base, with abundant long and thick bristles on their posterior side; distally narrow, pointed and hook-shaped at its terminal part, a concave notch on its ventral part. Saccus short with sinusoid margin. Valva. Lateral view: wide at its base; ventral process membranous, wide, short and bearing setae, distal end rounded; dorsal process sclerotized, curved, longer than the base of the valva. Ventral view: wide at the base; mesal margins spreading distally; towards the inside, with a pronounced sinusoid invagination and abundant setae. Juxta obcordate and sclerotized. Transtilla triangular, with the base at the anterior margin; sclerotized on the sides. Aedeagus elongate and sinusoid; coecum penis elongate; vesica membranous and elongate, narrower towards the distal part, with minute spicules.

Female. Unknown.

Distribution: French Guiana, Brazil (Travassos, 1944) and Peru (Loreto and Madre de Dios).

Barcoding: The mitochondrial DNA sequence (COI) of one of the specimens from the Tambopata River is (Voucher MUSM-Arctiinae VBC #144) (GenBank: BankIt2839965_gnl|uoguelph|RFEWA144-17.COI-5P PP911850) (See Table 1) as follows:

AACATTATACTTTATTTTTGGTATTTGAGCTGGAATAGTAGGAACTTCATTAAGTTTATTAATTC
 GAGCTGAATTAGGAAATCCAGGATCTTTAATTGGAGATGATCAAATTTATAATACTATTGTTACAG
 CACATGCTTTTATTATAATTTTTTTCATAGTTATAACCAATTATAATTGGAGGTTTTGGAACTGAC
 TAGTCCCTTTAATATTAGGAGCTCCAGATATAGCTTTCCCCCGAATAAATAACATAAGTTTTT
 GACTTCTACCCCATCATTAACCTTATTAATTTCAAGAAGAATTGTTGAAAACGGAGCTGGAACAG
 GATGAACAGTTTACCCCCCACTTTCATCTAATATTGCCCATGGTGGAAAGTTCAGTAGACTTAGC
 TATCTTTTCTTTACATTTAGCAGGAATTTCTTCAATTTTAGGAGCTATTAATTTTATCACAACAATTAT
 TAATATACGATTAATAATCTATCATTTGATCAAATACCTTTATTTGTATGAGCTGTAGGAATTACCG
 CATTTTTATTACTTTTATTACCTGTTTTAGCAGGAGCTATTACTATACTTTTAACTGATCGAAATTTA
 AATACTTCATTTTTTGATCCTGCAGGAGGAGGAGACCCAATTCTTTACCAACATTTATTT

TABLE 1. GenBank and Bold Systems Codes and the species of the genus *Ernassa*.

GenBank Code	Bold Systems Code	Species
BankIt2839965 / PP911826	RFEWA352-17.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911827	RFEWA587-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911828	RFEWA573-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911830	RFEWA110-17.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911833	RFEWA505-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911837	RFEWA401-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911840	RFEWA313-17.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911841	RFEWA597-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911842	ARTPE005-16.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911843	RFEWA579-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911844	RFEWA602-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911845	RFEWA517-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911847	RFEWA653-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911848	RFEWA398-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911849	RFEWA422-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911850	RFEWA144-17.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911853	RFEWA511-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911856	RFEWA234-17.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911859	ARTPE029-16.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911860	RFEWA577-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911862	RFEWA658-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911829	RFEWA761-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911835	RFEWA728-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911836	RFEWA724-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911838	RFEWA713-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911839	RFEWA841-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911858	RFEWA528-18.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911865	RFEWA822-19.COI-5P	<i>Ernassa justina</i> Stoll
BankIt2839965 / PP911866	RFEWA771-19.COI-5P	<i>Ernassa justina</i> Stoll

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TABLE 1. (Continued)

GenBank Code	Bold Systems Code	Species
BankIt2839965 / PP911831	RFEWA740-19.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911832	RFEWA161-17.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911852	RFEWA635-18.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911854	RFEWA723-19.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911857	RFEWA139-17.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911861	RFEWA716-19.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911863	RFEWA518-18.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911864	RFEWA499-18.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911846	RFEWA764-19.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911851	RFEWA783-19.COI-5P	<i>Ernassa skinnerorum</i> Grados
BankIt2839965 / PP911834	RFEWA255-17.COI-5P	<i>Ernassa cruenta</i> (Rothschild)
BankIt2839965 / PP911855	RFEWA349-17.COI-5P	<i>Ernassa sanguinolenta</i> (Cramer)

Remarks. The species was described by Stoll ([1782]) from Suriname, without mentioning the number of specimens. The high probability of the type being lost, made Travassos (1944) designate a Neotype, through a specimen from Pará (Brazil) (Neo-typus: N°60.025), deposited in the **MNRJ**. With the disaster of September 2, 2018 at the National Museum of Rio de Janeiro, the neotype disappeared. However, the drawings published by Travassos (1944) on the morphology of the male genitalia have allowed the identification of the species.

***Ernassa sanguinolenta* (Cramer, [1780])**

(Figs. 7–16)

Diagnosis: Body and wings intense reddish in almost all its surface. Forewing with a subproximal rounded, slightly lighter area in $Cu_2-1A+2A$, and small dots at its sides; veins leaden. Base of the valva wide, dorsal process sclerotized, elongate and curved. Somewhat similar to *E. inexplorata* **sp. nov.**, but differing by the wider base of the valva and a more curved dorsal process, which is not directed towards the mesal margin.

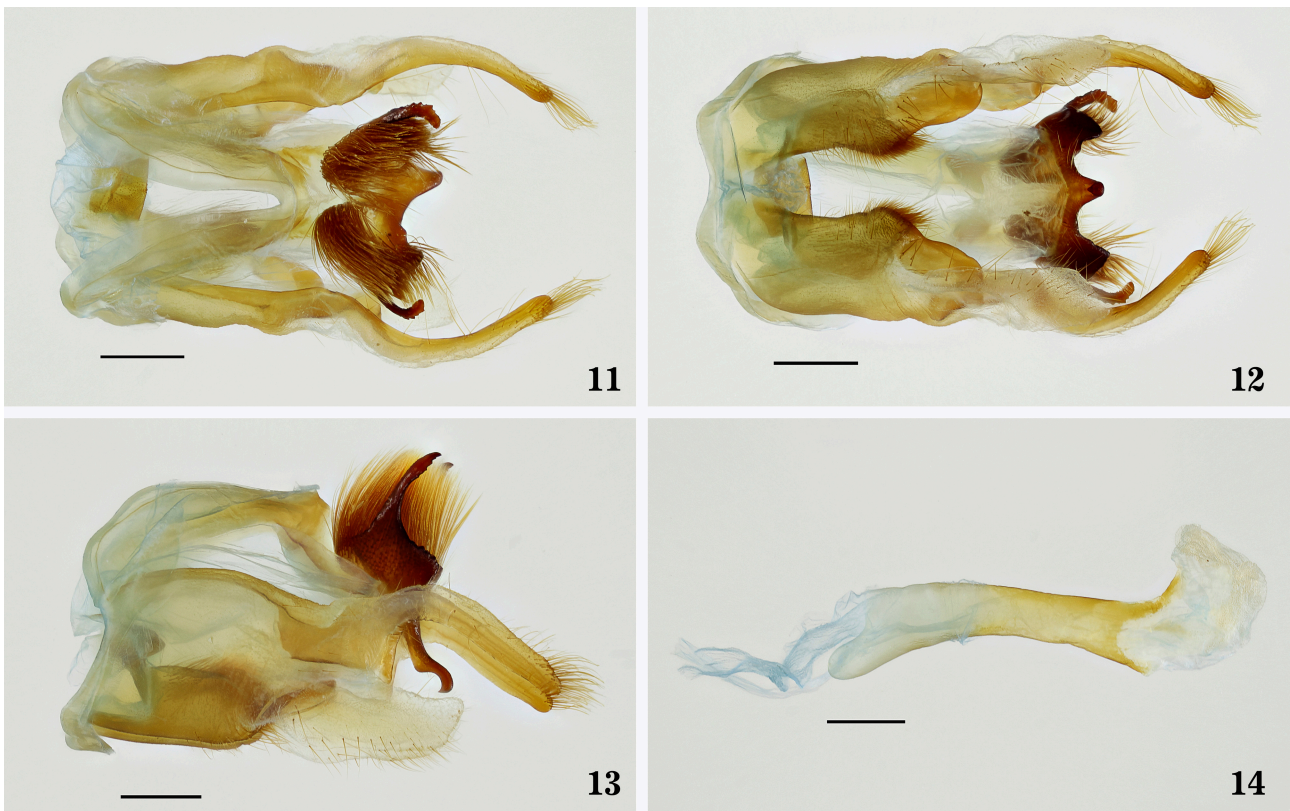
Material examinado. **PERÚ. LORETO.** 1 female, 7.5 km NO de Buenavista viejo, Río Arabela, 01°52'58"S, 75°22'19"W, 192 m, 21.iii.2013, C. Espinoza (GENITALIA# JGA-1316, MUSM). **AMAZONAS.** 1 male, Cordillera del Cóndor, P.V. Cap. Ponde Antúnez, 03°47'S, 76°21'W, 690 m, 16.xi.2003, J. Grados & A. Asenjo. **HUÁNUCO.** 1 male, Estación Biológica Panguana, 09°38'36"S, 74°54'55"W, 260 m, 13.iii.2018, J. Monzón (GENITALIA # JGA-1235, MUSM). **CUSCO.** 1 male, Estación Biológica Villa Carmen, 12°53'41.2"S, 71°24'14.7"W, 520 m, 31.i.2020, D. Bolt. **MADRE DE DIOS.** 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 11.vii.2017, D. Couceiro *et al.* (MUSM, ART-686 JGA COLLECTION)(Voucher DNA barcoding, Arct #349 JGA-MUSM); 1 male, Río Alto Madre de Dios, ca. Atalaya, 12°53'S, 71°22'W, 587 m, 03.v.2006, P. Centeno; 1 male, Tambopata Research Center, 13°08'03"S, 69°36'39"W, 239 m, 01.iii.–31.x.2021, A. Avellaneda, G. Serrano & J. Grados (GENITALIA #JGA-1236, MUSM). All deposited in the MUSM.

Male (Figs. 7–8). Description of the adult male and genital organs is found in Travassos (1944). Male genitalia (Figs. 11–14) (Genitalia # JGA-1235, 1236, MUSM). Narrow-sided tegumen, anterior margin shaped as an inverted "U". Uncus somewhat wider than the distal part of tegumen; two "L"-shaped, very sclerotized lateral processes, very wide at the base, with abundant long setae on their mesal side and converging on the dorsal side of the uncus; distal part short, pointed and hook-shaped at its end, a concave notch on its ventral part. Saccus concave at its central part. Valva. Lateral view: wide at its base; convex on dorsal margin; ventral process membranous, elongate, margin of distal end truncate; presence of elongate setae on the ventral margin; dorsal process sclerotized, curved downward ventrally, shorter than the base. Ventral view: narrow at the base; mesal margin of the proximal half, slightly concave, with abundant setae at its distal end; distal half invaginated, markedly sclerotized; dorsal process sclerotized and curved, with setae at the distal end. Juxta trapezoidal, with a wide membranous area at the

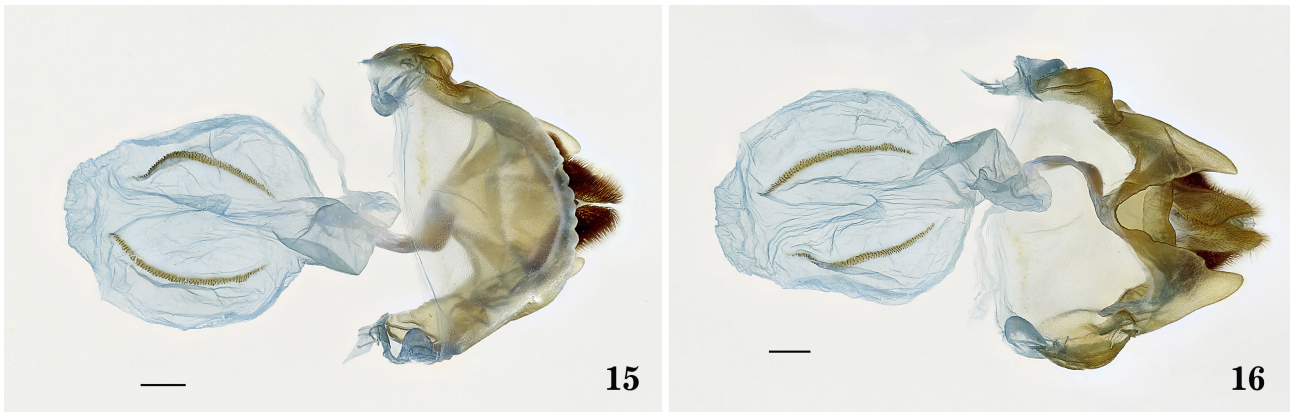
anterior central part. Transtilla digitiform and sclerotized. Aedeagus elongate and somewhat sinusoid; coecum penis elongate; vesica membranous, short, with small spicules over most of its surface.



FIGURES 7–10. *Ernassa sanguinolenta* (Cramer). 7–8. Male. Albergue Refugio Amazonas. 7. Dorsal view. 8. Ventral view. 9–10. Female. 7.5 km NO de Buenavista, río Arabela. 9. Dorsal view. 10. Ventral view. Scales=5 mm.



FIGURES 11–14. Genitalia of *Ernassa sanguinolenta* (Cramer). Male (Genitalia # JGA-1235, MUSM). 11. Dorsal view. 12. Ventral view. 13. Lateral view. 14. Aedeagus. Scales= 1 mm.



FIGURES 15–16. Genitalia of *Ernassa sanguinolenta* (Cramer). Female (Genitalia # JGA-1316, MUSM). **15.** Dorsal view. **16.** Ventral view. Scales= 1 mm.

Female (Figs. 9–10). Forewing span (31 mm) (n=1). Same characteristics of the male, except for: rami smaller than the flagellum and without retinaculum. Four bristles on the frenulum. Genitalia (Figs. 15–16) (Genitalia #JGA-1316, MUSM). Eighth tergite slightly sclerotized. Papillae taller than wide, more pubescent on the dorsal part. Posterior apophyses longer than the anterior ones; the latter almost undeveloped. Eighth sternite with two lateral, triangular-shaped extensions. Lamella antivaginalis and postvaginalis sclerotized. Ductus bursae short, flattened, and sclerotized. Cervix bursae somewhat globose and membranous. Corpus bursae globose and membranous. Two signa, long and narrow, somewhat curved at the ventral side of the Corpus bursae. Ductus seminalis arising from the left side of the Cervix bursae.

Barcoding: The mitochondrial DNA (COI) sequence of one of the specimens is as follows (Voucher MUSM-Arctiinae VBC #349) (GenBank: BankIt2839965 gnl|uoguelph|RFEWA349-17.COI-5P PP911855) (See Table 1).

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AACATTATACTTTATTTTTGGTATTTGAGCTGGAATAGTAGGAACTTCATTAAGTTTACTAATCCGT
GCTGAATTAGGAAATCCAGGATCTTTAATCGGAGATGATCAAATCTATAACACTATTGTTACAG
CACATGCCTTTATTATAATTTTTTTTATAGTTATAACCAATTATAATCGGAGGTTTCGGTAATT
GATTAGTTCCTCTAATATTAGGAGCTCCAGATATAGCTTTTCCTCGAATAAATAATATAAGTTTTT
GACTTTTACCCCATCATTAACTTTACTAATTTCAAGAAGAATTGTTGAAAATGGAGCTGGAACAG
GATGAACAGTTTACCCCCCACTTTTCATCTAATATTGCCCATAGTGGAAGTTCAGTAGATTTAGC
TATTTTCTCCCTACATTTAGCAGGAATTTCTTCAATTTTAGGTGCTATTAACTTTATTACAACAATCAT
CAATATACGATTAAATAATTTATCATTGATCAAATACCATTATTTGTATGAGCAGTAGGAATTACTG
CATTTCTTTTATTACTTTTATTACCTGTTTTAGCAGGAGCTATTACTATACTTTTAACTGATCGAAATTTA
AATACTTCATTTTTTGATCCTGCAGGAGGAGGATCCAATTCCTTTATCAACATTTATTT
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Distribution: Brazil (Travassos, 1944) and Peru (Amazonas, Huánuco, Cusco and Madre de Dios).

Remarks. The species was described by Cramer ([1780]) with specimens from Suriname, with no mention of the number of specimens. Like *E. justina*, the high probability of the type being lost led Travassos (1944) to designate a Neotype, using a specimen from Obidos, State of Pará (Brazil) (Neo-typus: N°60.023, ignotus, Boy, VI-925, male), deposited in the **MNRJ**. With the disaster of September 2, 2018 at the National Museum of Rio de Janeiro, the neotype disappeared (Escobar 2018). The drawings published by Travassos (1944) on the morphology of the male genitalia allowed the identification of the species.

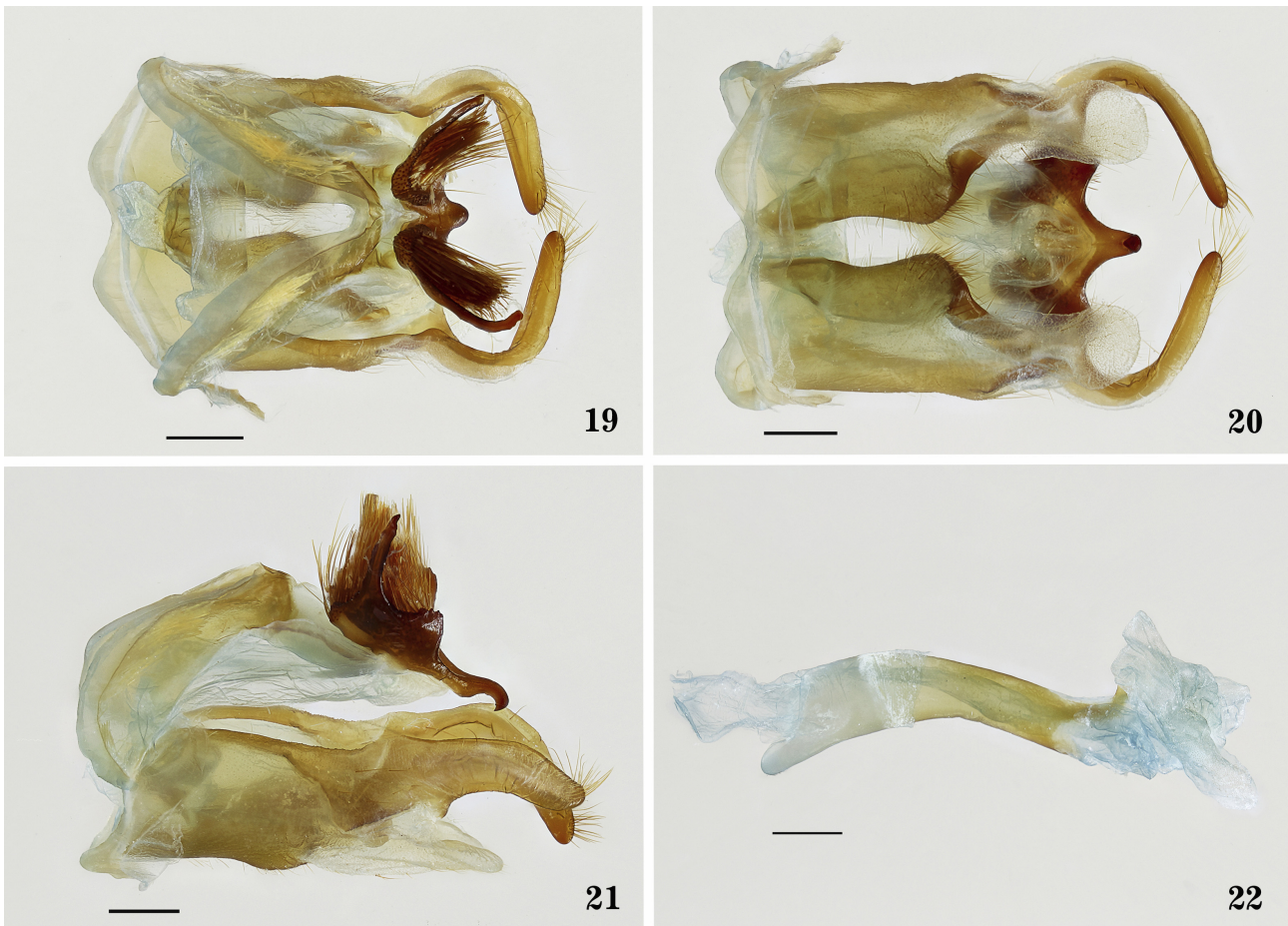
Ernassa inexplorata sp. nov.

(Figs. 17–22)

Diagnosis: Somewhat similar to *E. sanguinolenta*, differing by the wings and body, which are not as reddish, the wide spot is wider, ventrally are less reddish, the base of the valva, not as wide, the valva almost straight and slightly curved (lateral view) and strongly curved towards the mesal margin (dorsal and ventral view).



FIGURES 17–18. *Ernassa inexplorata* sp. nov. Holotype. 17. Dorsal view. 18. Ventral view. Scales=5 mm.



FIGURES 19–22. Genitalia of *Ernassa inexplorata* sp. nov. Male (Genitalia # JGA-1319, MUSM). 19. Dorsal view. 20. Ventral view. 21. Lateral view. 22. Aedeagus. Scales= 1 mm.

Type material: **HOLOTYPE** male (Figs. 17–18): **PERÚ. PASCO.** 1 male, B.P. San Matías-San Carlos, Kametza, 12 km N de Iscozacín, 10°04'28"S, 75°08'33"W, 525 m, 04.xi.2015, L. Figueroa. 1 **PARATYPE. JUNÍN.** 1 male, río Tambo, 360 m, Leg. Izersky V.V. All deposited in the MUSM.

Male. Forewing span (26–27 mm) (n=2). **Head.** Reddish. Scape reddish, flagellum brown with a whitish spot on the distal segments. **Thorax.** Reddish. Legs reddish. Anterior tibiae with a patch of feathery scales. **Forewing.** Elongate. **Dorsal.** Reddish. Half of the anterior margin brown. Termen brown. Veins with brown scales. Subproximal rounded orange spot at $Cu_2-1A+2A$, a smaller one in subdistal position; a small one at the discal cell and another at the anal cell. A subproximal subreniform white spot at M_2-M_3 , projecting towards M_3-Cu_1 . Scattered brown scales, more noticeable towards the anterior margin and the external margin. **Ventral.** Reddish. All the anterior margin

brown. Termen brown. **Hindwing.** Elongate and rhomboid with rounded angles. **Dorsal.** Reddish, with the proximal half creamy. **Ventral.** Reddish and creamy-white at the proximal part of $Cu_2-1A+2A$ and the anal area. **Abdomen.** Reddish dorsally and pale reddish ventrally. **Male genitalia** (Figs. 19–22) (Genitalia # JGA-1319). Tegumen with narrow sides, the anterior margin inverted U-shaped. Base of uncus wider than distal part of tegumen, two sclerotized lateral processes, arched L-shaped., with abundant long bristles on its mesal side; distal part short, pointed and hook-shaped at its end, a concave notch on its ventral part. Valva. Lateral view: wide, elongate; ventral process elongate, membranous, with the presence of setae; dorsal process sclerotized, slightly curved, distally rounded with setae present. Ventral view: wide, concave at the middle part of the mesal margin, ending obliquely and very sclerotized; towards the dorsal process, setae present at the edge where the direction of the valva shifts; dorsal processes strongly curved towards the mesal margin. Juxta sclerotized, triangular, membranous at the central part. Transtilla sclerotized, elongate, with a small membranous area anterior and central. Aedeagus elongate and curved; coecum penis elongate; vesica membranous, elongate dorsal process and a digitiform ventral process; with minute spicules at the dorsal area.

Female: Unknown.

Etymology: *inexplorata* is a feminine adjective in the nominative singular, which means “the unexplored”, “the unknown”.

Distribution. Central jungles of Peru, at the departments of Pasco and Junín.

Ernassa rufula sp. nov.

(Figs. 23–28)

Diagnosis. Similar to *E. justina*, it differs by the forewings, which are elongate and pointed towards the apex. The color of the dorsal side of the forewings is deep red. Base of the valva wide, dorsal process sclerotized, thick, with the distal half curved and setae at the end.



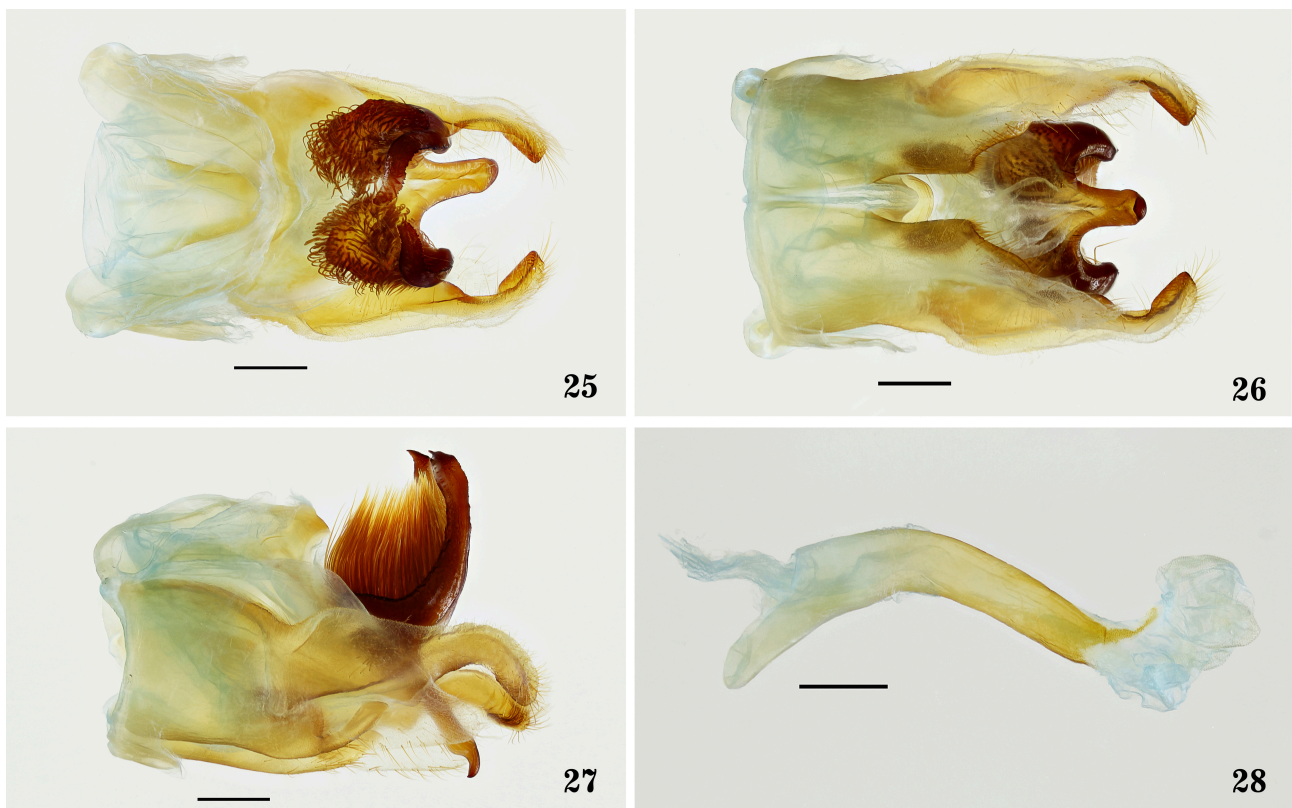
FIGURES 23–24. *Ernassa rufula* sp. nov. Grados. 23. Dorsal view. 24. Ventral view. Scales=5 mm.

Type material. **HOLOTYPE** male (Figs. 23–24). **FRENCH GUYANA.** 1 male, Piste Petit saut, 20.iv.–07.v.2006, R. Vande Merghel (GENITALIA # JGA-1233, MUSM). 2 **PARATYPES.** 1 male, Cayena, Kaw, ix.2006, R. Vande Merghel; 1 male, Mountagne de Kaw PK 15, 07.ix.2015, J.Y. Gallard leg. (GENITALIA # JGA-1232, MUSM); Saint-Laurent-du-Maroni. 1 male, Moutouchi, 08.ii.2013, R. Vande Merghel. All deposited in the MUSM.

EXTRA MATERIAL EXAMINED. **FRECH GUYANA.** 1 male, 2005, F. Lavalette; 1 male, RISQUE TOUT croisem Piè.l., 26.vi.–08.vii.2006, R. Vande Merghel. All deposited in the MUSM.

Male. Forewing span (21–25 mm) (n=5). **Head.** reddish. Scape reddish, flagellum brown with whitish segments distally. **Thorax.** Reddish. Legs reddish, the outer margin of the anterior tibiae with a narrow brown line. **Forewing.** Elongate and somewhat pointed at the apex. **Dorsal.** Orange-Red. Half of the anterior margin brown. Posterior margin with a few leaden scales. Termen brown. Veins with blackish scales. Brown spot near the base. Subproximal rhomboid orange spot, delimited by an antemedial and a medial band; the first one reddish with a faint black line, the second blackish, projecting beyond the junction of M_3 and Cu_1 , reaching almost all M_2 . Orange spots poorly

defined at the discal cell. A subproximal ovoid white spot at M_2-M_3 . With scattered, unclearly defined spaces of reddish, reddish-orange and leaden scales towards the outer margin. **Ventral.** Reddish, somewhat lighter from Cu_2 . Most of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate and rhomboid with rounded angles. **Dorsal.** Reddish, slightly lighter towards the central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 25–28) (Genitalia # JGA 1232, 1233). Tegumen with narrow sides, anterior margin shaped as an inverted “U”. Uncus with its base wider than the distal part of the tegumen; near its base, two “J”-shaped, strongly sclerotized, lateral processes, arched, with abundant long and thick bristles on its mesal side; distal part short, pointed and hook-shaped at its end, a concave notch on its ventral part. Saccus absent. Valva. Lateral view: wide at the base, concave at its dorsal margin medially; ventral process membranous, wide, short, oval at the distal end and bearing setae; dorsal process sclerotized, wider and elongate at its base, convex on its dorsal margin and slightly concave on its ventral margin; distal half curved and with setae on the tip. Ventral view: wide at its base, mesal margins at the base parallel, slightly concave at the distal part, projecting sinusoidally towards the dorsal process; at the distal part, towards the mesal side, invaginated with abundant setae; dorsal process curved towards the mesal margin. Juxta trapezoidal, with two pointed lateral processes on its posterior margin. Transtilla sclerotized, tubular and digitiform. Aedeagus elongate, conspicuously curved at its proximal half; coecum penis elongate; Vesica membranous, short, with minute spicules at its distal area.



FIGURES 25–28. Genitalia of *Ernassa rufula* sp. nov. Male (Genitalia # JGA-1232, MUSM). 25. Dorsal view. 26. Ventral view. 27. Lateral view. 28. Aedeagus. Scales= 1 mm.

Female. Unknown.

Etymology. rufula is a feminine adjective in the nominative singular, which means “the little red one.”

Distribution. Known at the moment only from French Guiana.

Remarks. The area of distribution is certainly wider than that recorded in this work. At the moment it is the species with the pointed apex. However, it is advisable to perform dissections when studying other specimens, since it is likely that some other undescribed species could be recorded.

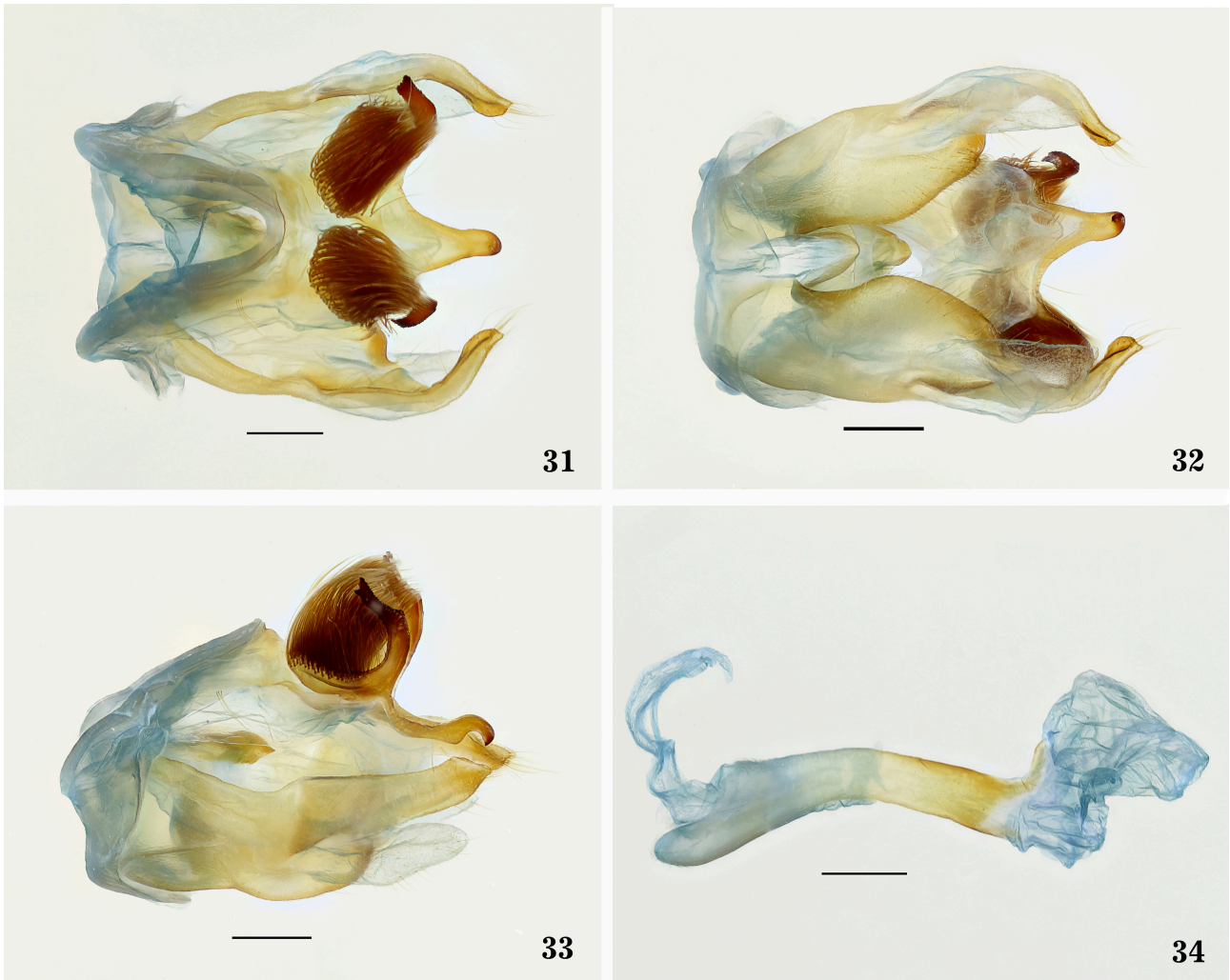
Ernassa persivalei sp. nov.

(Figs. 29–34)

Diagnosis: Similar to *E. tarisca*, it differs by the subproximal, somewhat more elongate white spot in M_2 - M_3 of the forewing, and the dorsal process of the valva, which is narrow, with the distal end directed towards the mesal margin.



FIGURES 29–30. *Ernassa persivalei* sp. nov. Holotype. 29. Dorsal view. 30. Ventral view. Scales=5 mm.



FIGURES 31–34. Genitalia of *Ernassa persivalei* sp. nov. Male (Genitalia # JGA-1248, MUSM). 31. Dorsal view. 32. Ventral view. 33. Lateral view. 34. Aedeagus. Scales= 1 mm.

Type material: HOLOTYPE male (Figs. 29–30). PERÚ, HUÁNUCO. 1 male, Estación Biológica Panguana, 09°38'36"S, 74°54'55"W, 260 m, vii–viii.2013, H. Thony (GENITALIA # JGA-1318, MUSM). 7 PARATYPES. LORETO. 1 male, Río Blanco nr. Capanahua, 06°29'03"S, 73°48'03"W, 152 m, 25–26.x.2008, A. García (GENITALIA # JGA 1265, MUSM). HUÁNUCO. 1 males, idem the holotype, except (GENITALIA # JGA 1248, MUSM); 1 male, idem except, (GENITALIA # JGA 1317, MUSM); 1 male, Estación Biológica Panguana, 09°36'48"S, 74°56'12"W, 260 m, 13.viii.2017, J. Monzón (GENITALIA # JGA-1249, MUSM). PASCO. 1 male, P.N. Yanachaga-Chemillén. Est. Biol. Paujil, 10°19'25.0"S, 75°15'48.8"W, 375 m, 02.x.2015, M. Rodriguez (GENITALIA # JGA-1254, MUSM); 1 male, P.N. Yanachaga-Chemillén, Est. Biol. Paujil, 10°19'24,8"S, 75°15'50,0"W, 373 m, 14.ix.2007, J. Grados & S. Carbonel (GENITALIA # JGA-1255, MUSM). CUSCO. 1 male, San Martín C., 11°47'S, 72°41'W, 480 m, 26.iii.1997, J. Grados (GENITALIA # JGA-1266, MUSM). All deposited in the MUSM.

Male. Forewing span (21–23 mm) (n=8). Head. Reddish-orange. scape Reddish-orange, flagellum brown with a whitish spot on the distal segments. **Thorax.** Reddish-orange. Legs reddish. **Forewing.** Elongate. **Dorsal.** Reddish-orange. Half of the anterior margin brown. Posterior margin with leaden scales, except the base. Termen brown. Veins with leaden gray scales. Brown spot near the base. Subproximal rhomboid orange spot, delimited by an antemedial and a medial band of leaden scales, flanked in turn by reddish scales. Poorly defined orange spots at the discal cell. A subproximal elongate ovoid white spot at M_2 - M_3 . With scattered, unclearly defined spaces of reddish, orange-reddish and leaden gray scales towards the outer margin area. **Ventral.** Orange red. All the anterior margin brown. Termen brown. **Hindwing.** Elongate and rhomboid with rounded angles. **Dorsal.** Reddish, slightly paler towards the central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 31–34) (Genitalia # JGA 1248, 1249). Tegumen with narrow sides, the anterior margin shaped as an inverted "U". Uncus base wider than the distal part of tegumen; near its base, two sclerotized lateral processes in the form of an arched "J", with abundant long bristles on its mesal side; distal part short, pointed and hook shaped at its end, a concave notch on its ventral part. Valva. Lateral view: wide, elongate, concave on its ventral and dorsal margins; ventral process elongate, membranous, with setae present; dorsal process sclerotized, almost straight, pointed distally and longer than the ventral process. Ventral view: wide; concave in the middle of the mesal margin, ending obliquely towards the dorsal process, setae on the mesal margin; curved dorsal processes towards mesal margin. Juxta sclerotized, pentagonal, membranous in the central part of the margins: finger-shaped on the anterior margin and slightly concave on the posterior margin. Transtilla sclerotized, triangular, with posterior side rounded. Aedeagus elongate and curved; coecum penis elongate; vesica membranous, process dorsally elongate and a digitiform process ventrally; with minute spicules at the dorsal area.

Female. Unknown.

Etymology. persivalei is a latinized noun in genitive singular, dedicated to Roberto Persivale for his contributions to sustainable businesses in blue and green economy.

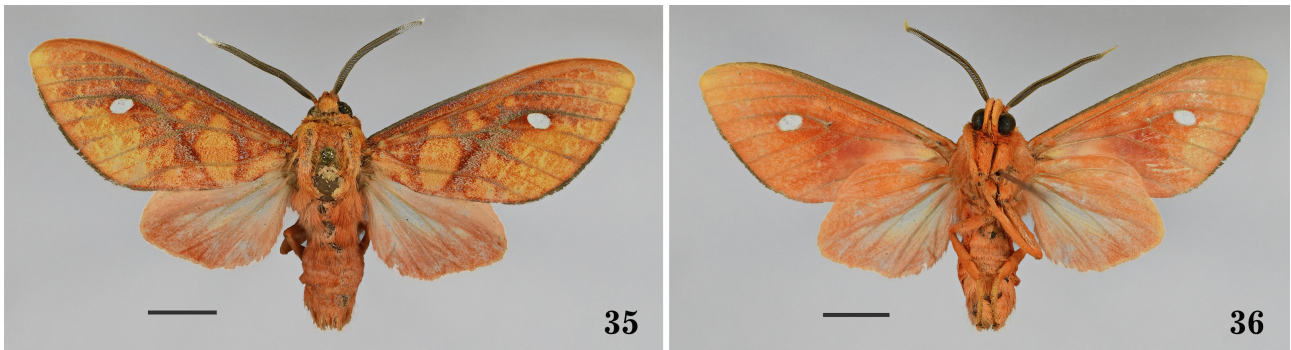
Distribution. In the Amazon forests of the departments of Loreto, Pasco, Huánuco and Cusco.

Ernassa tarisca sp. nov.

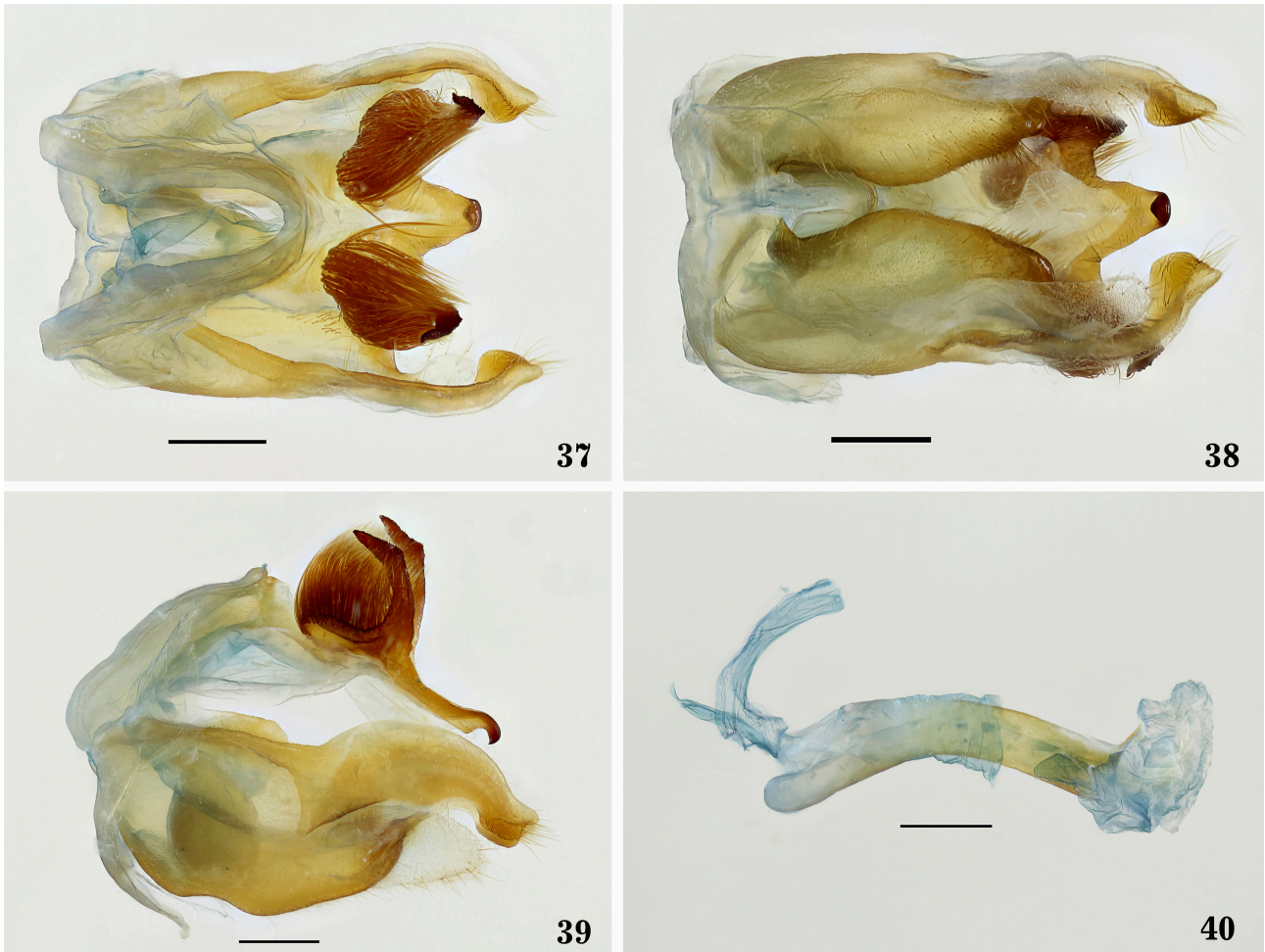
(Figs. 35–40)

Diagnosis: Similar to *E. persivalei* sp. nov., differing by the not very elongate white spot in M_2 - M_3 of the forewings and the wide dorsal process of the valva, curved and dilated at the distal end.

Type material: HOLOTYPE male (Figs. 35–36). PERÚ. LORETO. 1 male, Coconilla, 02°42's, 75°06'W, 160 m, 23.vii.2003, J. J. Ramírez (GENITALIA #JGA-1241, MUSM). 5 PARATYPES. AMAZONAS. 1 male, Cordillera del Cóndor. P.V. 12 de Enero (P.V. 32), 03°39'30"S, 78°18'52"W, 700 m, 23.xi.2003, J. Grados & A. Asenjo (GENITALIA #JGA-1262, MUSM). LORETO. 1 male, Río Curaray, Campamento Paiche 1, 01°29'25"S, 75°23'53"W, 200 m, 03.xi.2007, J. J. Ramírez (GENITALIA #JGA-1245, MUSM); 1 male, 3 km NO de Palizada (Río Ucayali), 05°39'04"S, 74°15'28"W, 115 m, 29–31.v.2014, J. Peralta (GENITALIA #JGA-1250, MUSM); 1 male, 7 km SO de Flor de Punga (Río Ucayali), 05°27'20"S, 74°12'08", 127 m, 25–27.v.2014, J. Peralta (GENITALIA #JGA-1251, MUSM). UCAYALI. 1 male, Puerto Purin, 8°44'59.2"S, 74°08'19.52"W, 122 m, 17.vii.2008, M. Alvarado (GENITALIA #JGA-1244, MUSM). All deposited in the MUSM.



FIGURES 35–36. *Ernassa tarisca* sp. nov. Holotype. 35. Dorsal view. 36. Ventral view. Scales=5 mm.



FIGURES 37–40. Genitalia of *Ernassa tarisca* sp. nov. Male (Genitalia # JGA-1241, MUSM). 37. Dorsal view. 38. Ventral view. 39. Lateral view. 40. Aedeagus. Scales= 1 mm.

Male. Forewing extension (19–21 mm) (n=6). **Head.** Reddish-orange. scape reddish, flagellum brown with a white spot on the last segments. **Thorax.** Orange. Legs reddish. **Forewing.** Elongate. **Dorsal.** Reddish-orange. Half of the anterior margin brown. Posterior margin with few leaden scales. Termen brown. Veins partly covered with brown scales. A rhomboid orange spot, delimited by an antemedial and a medial band, both formed by reddish and leaden scales. The medial band projects to the junction of M_3 and Cu_1 . Two well defined spots in the discal cell. A subproximal ovoid white spot at M_2 - M_3 . With Scattered patches of orange, reddish, and leaden scales towards the outer margin area. **Ventral.** Orange red, slightly lighter from Cu_2 . Almost all of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate, rhomboid with rounded angles. **Dorsal.** Reddish, lighter towards the

central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 37–40) (Genitalia # JGA 1241, 1244, 1245, 1250, 1251). Tegumen narrow sided, its anterior margin shaped as an inverted “U”. Uncus base as wide as the distal part of the tegumen; near its base, two curved “J”-shaped, sclerotized lateral processes, with abundant long and thick bristles at the base; distal part short, pointed and hook shaped at its end, a concave notch on its ventral part. Valva. Lateral view: wide at the base, quadrangular, with a concave notch at the base of the ventral margin; ventral process membranous with setae; dorsal process sclerotized, wide, elongate, curved at the dorsal margin; ventral margin concave with a pronounced subdistal notch, distal end slightly wider. Ventral view: subproximal concave margins; diverging obliquely towards the dorsal process at the distal half; dorsal processes curved towards the mesal margin with wider ends. Juxta sclerotized, wide, pentagonal: with membranous areas, anterior side, small and digitiform; posterior side, a large round concavity. Transtilla sclerotized, wide, elongate, pointed at the dorsal posterior part. Aedeagus elongate and sinusoidal; coecum penis elongate; vesica short, membranous, with an elongate dorsal process and a digitiform ventral process; with minute spicules at the dorsal area.

Female. Unknown

Etymology. *tarisca* is a Quechua adjective, used as a feminine adjective in the nominative singular, which means “the discovered one”.

Distribution. In the Amazon forests of the departments of Loreto, Amazonas and Ucayali.

***Ernassa skinnerorum* sp. nov.**

(Figs. 41–50)

Diagnosis: Similar to *E. justina*. Differing by the sides of the tegumen, which are not wide, by missing the oblique spot of the margin posterior to the angle of M_3 - Cu_1 with the marked black line that *E. justina* does present, the subproximal white spot at M_2 - M_3 is more elongate in *E. skinnerorum* **sp. nov.** The genitalia are different: the uncus dorsal processes are flat and rounded in *E. justina*, while in *E. skinnerorum* **sp. nov.** they are highly sclerotized and “J” shaped; the dorsal process in *E. justina* is narrow, elongate and somewhat curved, whereas *E. skinnerorum* **sp. nov.**, presents a very curved process, widening towards the distal end.

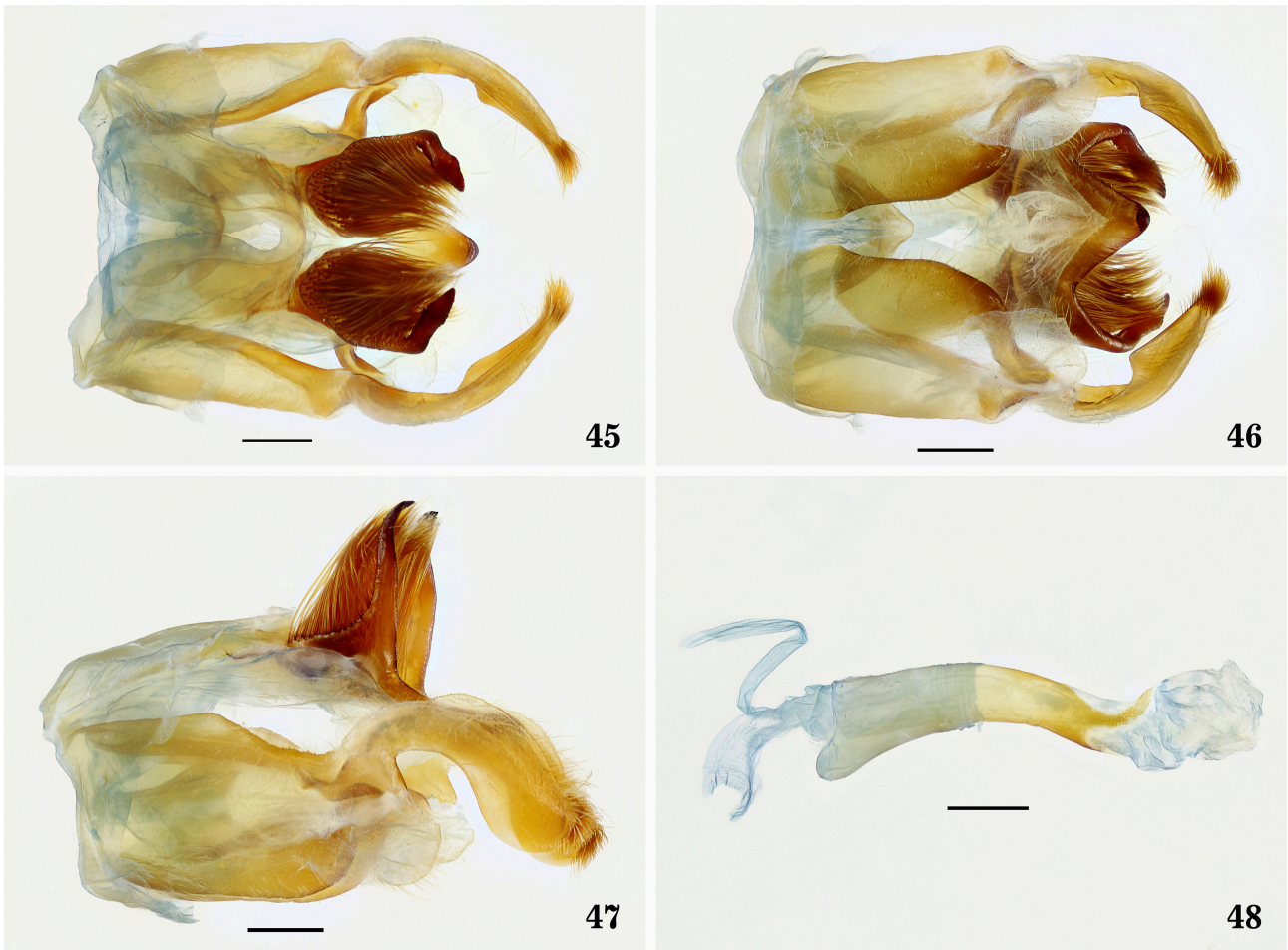
Type material: **HOLOTYPE** macho (Figs. 41–42): **PERÚ. MADRE DE DIOS.** 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 11.ix.2017, D. Couceiro (MUSM, ARCT-836 JGA COLLECTION)(Voucher DNA barcoding, Arct # 499 JGA-MUSM). 9 **PARATYPES. MADRE DE DIOS.** 1 female, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 232 m, 09.x.2016, D. Couceiro (MUSM, ART-476 JGA COLLECTION)(Voucher DNA barcoding, ARCT #139 JGA-MUSM)(GENITALIA #JGA-1315, MUSM); 1 male, idem except, 19.x.2016, J. Grados & D. Couceiro (MUSM, ARCT-498 COLLECTION)(Voucher DNA barcoding, Arct # 161 JGA-MUSM); 1 male, idem except, 16.ix.2017, D. Couceiro (MUSM, ARCT-855 JGA COLLECTION)(Voucher DNA barcoding, Arct # 518 JGA-MUSM)(GENITALIA #JGA-1293, MUSM); 1 male, idem except, 13.xi.2017 (MUSM ARCT-972 JGA COLLECTION)(Voucher DNA barcoding, Arct # 635 JGA-MUSM); 1 male, idem except, 16.iii.2018, J.D. Shoobridge *et al.* (MUSM ARCT-1053 JGA COLLECTION)(Voucher DNA barcoding, Arct # 716 JGA-MUSM); 1 male, idem except, 19.iii.2018 (MUSM, ARCT-1060, JGA COLLECTION)(Voucher DNA barcoding, Arct # 723 JGA-MUSM); 1 male, idem except, 07.iv.2018 (MUSM, ARCT-1077 JGA COLLECTION)(Voucher DNA barcoding, Arct #740 JGA-MUSM); 1 male, idem except, 25.iv.2018 (MUSM, ARCT-1215 JGA COLLECTION)(Voucher DNA barcoding, Arct # 878 JGA-MUSM)(GENITALIA #JGA-1294, MUSM); 1 male, idem except, 06.v.2018 (MUSM ART-1196 JGA COLLECTION)(Voucher DNA barcoding, Arct #859 JGA-MUSM). All deposited in the MUSM. **EXAMINED EXTRA MATERIAL. MADRE DE DIOS.** 1 male, Lago Sandoval, 12°36'S, 69°02'W, 200 m, 07.v.1997, J. Grados; 1 male, Posada Amaz., 12°48'08"S, 69°17'59"W, 280 m, 8.x.2004, T. Mc Cabe; 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 28.xii.2016, D. Couceiro; 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 04.vii.2018, J.D. Shoobridge *et al.*; 1 male, idem except, 25.ix.2018; 1 male, idem except, 02.x.2018; 1 male, idem except, 26.x.2018; 1 male, idem except, 09.iv.2019; 1 male, idem except, 17.vii.2019; 1 male, idem except, 30.vii.2019; 1 male, Tambopata Research Center, 13°08'03"S, 69°36'39"W, 239 m, 01.iii.–31.x.2021, A. Avellaneda, G. Serrano & J. Grados; 1 male, idem except, 01.xi.2021, G. Serrano & J. Grados; 1 male, idem except, 06.xi.2021; 1 male, idem except, 26.xi.2021; 1 male, idem except, 06.xi.2021; 1

male, P. N. Bahuaaja-Sonene, 13°11'35"S, 70°07'56"W, 353 m, 14.vi.2013, J. Grados, E. Rázuri & J. Barrientos. All deposited in the MUSM.

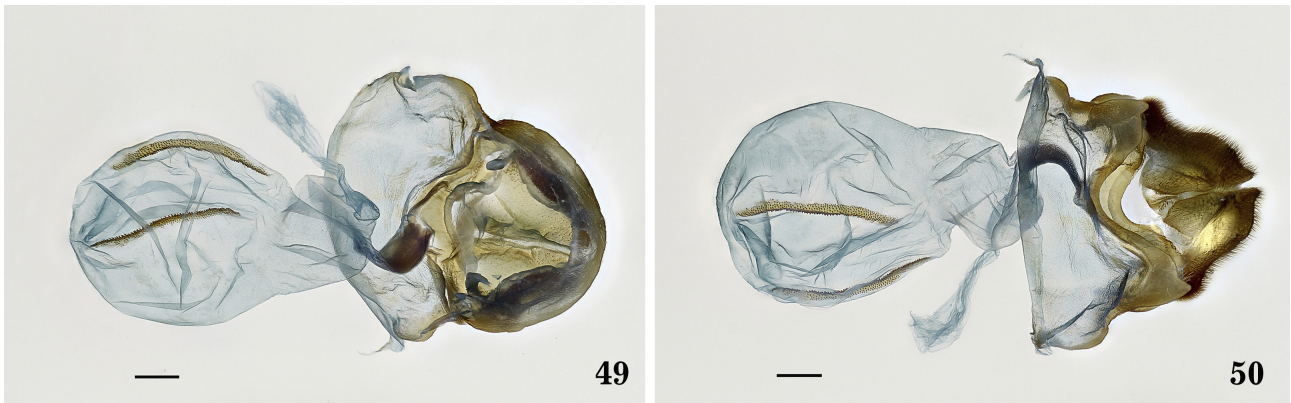


FIGURES 41–44. *Ernassa skinnerorum* sp. nov. 41–42. Male. Holotype. 41. Dorsal view. 42. Ventral view. 43–44. Female. Albergue Refugio Amazonas 43. Dorsal view. 44. Ventral view. Scales=5 mm.

Male. Forewing span (22–26 mm) (n=10). **Head.** Reddish. Scape Reddish, flagellum brown with a white spot on the distal segments. **Thorax:** Orange-red. Legs reddish, the outer margin of the front tibiae with a narrow brown line. **Forewing.** Elongate. **Dorsal.** Orange red. Half of the anterior margin brown. Posterior margin with leaden scales, except for the base. Termen brown. Veins with brown scales. Subproximal rhomboid orange spot, delimited by an antemedial band of leaden scales and an oblique medial band of leaden scales with a thin reddish line. Poorly defined orange spots in the discal cell. A subproximal ovoid white spot at M_2 - M_3 . With unclearly defined scattered spaces of orange, reddish and leaden scales towards the outer margin area. **Ventral.** Orange red, slightly lighter from Cu_2 . Most of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate and rhomboid with rounded angles. **Dorsal.** Reddish, lighter towards the central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 45–48) (GENITALIA # JGA-1293, 1294, MUSM): Tegumen with wide sides, its anterior margin shaped as an inverted “U”, mesal margins very close together at the medial part. Uncus base wider than the distal part of the tegumen; near its base, two “J”-shaped lateral processes, sclerotized with abundant long and thick bristles on their mesal side; distal part triangular, pointed and hook-shaped at its end, a concave notch on its ventral part. Saccus absent. Valva. Lateral view: base wide, rectangular, dorsal margin convex; ventral process membranous, truncated with setae present; dorsal process sclerotized, narrow at its base, widening distally; end rounded with abundant short setae at the dorsal area; strongly curved downward ventrally. Ventral view: wide, mesal margins almost close together at the base, receding distally, ending sinusoidally towards the dorsal process; setae on the mesal margins. Juxta trapezoidal, curved dorso-ventrally, the central part membranous. Transtilla sclerotized, wide, oval, dome-shaped at its distal end. Aedeagus elongate and somewhat sinusoid; coecum penis short; vesica membranous, short, with minute spicules in the distal area.



FIGURES 45–48. Genitalia of *Ernassa skinnerorum* sp. nov. Male (Genitalia # JGA-1293, MUSM). 45. Dorsal view. 46. Ventral view. 47. Lateral view. 48. Aedeagus. Scales= 1 mm.



FIGURES 49–50. Genitalia of *Ernassa skinnerorum* sp. nov. Male (Genitalia # JGA-1315, MUSM). 49. Dorsal view. 50. Ventral view. Scales= 1 mm.

Female (Figs. 49–50). Forewing span (28 mm) (n=1). With the same characteristics as the male, except rami are smaller than the flagellum width and do not bear retinaculum. Four bristles at the frenulum. Genitalia (Figs. 49–50) (Genitalia # JGA 1315, MUSM). Posterior part of the eighth tergite sclerotized. Papillae taller than wide, with a widening rounded dorsolaterally; with greater pubescence at the dorsal part. Posterior processes longer and wider than the anterior ones; the latter almost undeveloped. Eighth sternite with two lateral extensions with sinusoid posterior margins. Lamella antivaginalis and postvaginalis sclerotized. Ductus bursae short, flattened, and

sclerotized. Cervix bursae wide and membranous. Corpus bursae globose and membranous. Two signa, long and narrow, located at the left side: a dorsal one and a ventral one. Ductus seminalis from the anterior and dorsal part of the Cervix bursae. Specimen Barcoding data are: MUSM, ARCT-476 COLLECTION; Voucher DNA barcoding, ARCT # 139 JGA-MUSM.

Etimology: *skinnerorum* is a noun in plural genitive, dedicated to Andrew Skinner y Valerie Skinner for being the first to collect specimens of the new species in the project *Discovery new species* in Tambopata.

Barcoding: The mitochondrial DNA sequence (COI) of one of the paratypes is as follows (Voucher DNA barcoding, ARCT #635 JGA, MUSM) (GenBank: BankIt2839965 gnl|uoguelph|RFEWA635-18.COI-5P PP911852) (See Table 1).

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AACATTATACTTTATTTTTGGTATTTGAGCTGGAATAGTAGGAACTTCATTAAGTTTACTAATTCGT
GCTGAATTAGGAAATCCAGGATCCTTAATTGGAGATGATCAAATTTATAATACTATTGTTACAGCACAT
GCTTTTATTATAATTTTTTTTATGGTTATAACCAATTATAATTGGAGGTTTCGGTAATTGATTAGTCCCTT
TAATATTAGGAGCTCCGGATATAGCTTTTCCTCGAATAAATAATATAAGTTTTTGGACTCTTACCCCAT
CATTAACTTTATTAATCTCAAGAAGAATTGTTGAAAATGGAGCCGGAACAGGATGAACAGTT
TATCCCCCACTTTCATCTAATATTGCCCATGGTGGAAAGTTCAGTAGATTTAGCTATCTTTTCTTTA
CATTTAGCGGGAATCTCTTCAATTTTAGGTGCTATTACTTTATTACAACAATTATTAATATACGAT
TAAATAACTTATCATTTGATCAAATACCATTATTTGTGTGAGCAGTAGGAATTACTGCATTCCTATTAT
TACTTTCATTACCTGTTTTAGCAGGGGCTATTACAATACTTTTAACTGATCGAAACTTAAATACCT
CATTTTTTGATCCTGCAGGAGGGGGAGATCCAATTCTCTATCAACACTTATT
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Distribution: In the southeastern Peru (department of Madre de Dios).

Remarks: One of the few species with a known female. Due to the morphological similarity and color pattern, it is difficult to relate sexes of the same species. This will be possible through breeding and DNA analysis. In our case, the relationship of the sexes is based on genetic distances of sympatric male and female specimens and by comparing barcoding DNA sequences. The genetic distances of the female compared to the 9 males, were between 0% and 0.7%.

Ernassa harveyi sp. nov.

(Figs. 51–56)

Diagnosis: Similar to *E. markpacei* sp. nov., from which it differs mainly by the shape of the valva. Ventrally, valva is shorter and truncated towards the dorsal process, while in *E. markpacei* sp. nov., it is elongate and oblique towards the dorsal process; lateral view, the dorsal process is longer, very thin, with an acute tip and curved, while in *E. markpacei* sp. nov., it is wide and strongly curved.

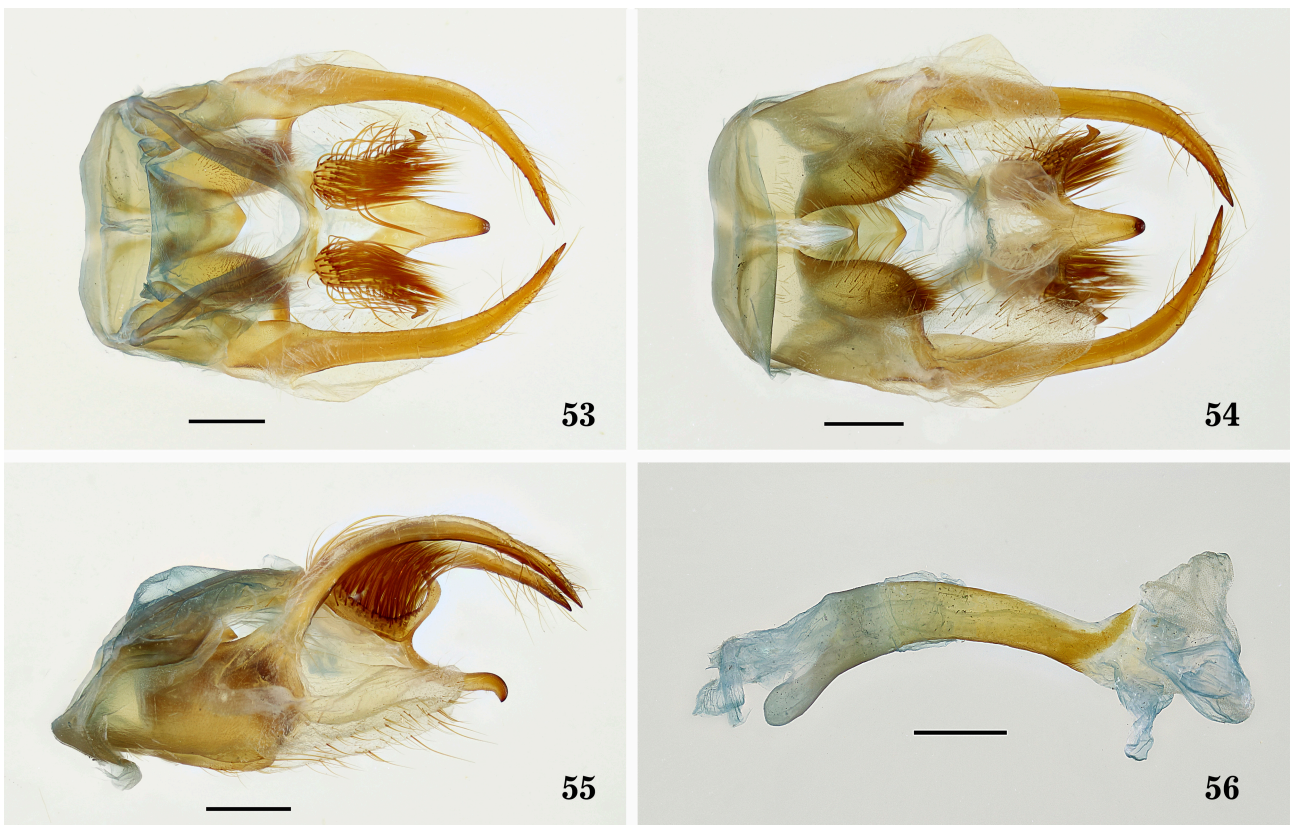
Type material: HOLOTIPO male (Figs. 51–52). PERÚ. AMAZONAS. 1 male, Cordillera del Cóndor PV3 (Alfonso Ugarte), 03°55'S, 78°26'W, 1070 m, 15.vii.94, G. Lamas (GENITALIA #JGA-1324, MUSM). 1 PARATYPE. SAN MARTÍN. 1 male, ca. Tarapoto, 06°27'S, 76°17'W, 1000 m, xii.2003, U. Roosileht leg. EXPEDITION ESTONIA PERÚ 2003 (GENITALIA #JGA-1314, MUSM). All deposited in the MUSM.

Male. Forewing span (27 mm) (n=2). **Head.** Reddish-orange. Scape reddish, flagellum brown with a white spot at the last segments. **Thorax.** Orange. Legs reddish-orange. **Forewing.** Elongate. **Dorsal.** Reddish-orange. Half of the anterior margin brown. Termen brown. Veins with brown scales. Subproximal rhomboid orange spot, delimited by an antemedial and a medial band, formed by reddish scales; the medial with a blackish line and projecting almost to the end of the M_2 . Poorly defined spots at the discal cell. A subproximal elongate ovoid white spot at M_2 - M_3 . With scattered patches of orange, reddish, and leaden scales towards the external margin area. **Ventral.** Orange red, a little lighter towards the apex and from Cu_2 . Most of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate rhomboid, with rounded angles. **Dorsal.** Reddish, lighter towards the anterior margin and towards the central part. **Ventral.** Reddish. **Abdomen.** Reddish-orange. **Male genitalia** (Figs. 51–52) (Genitalia # JGA-1314, MUSM). Tegumen with narrow sides, anterior margin shaped as an inverted “V”. Uncus base wider than the distal part of the tegumen; near its base, two lateral processes, sclerotized, “J”-shaped, curved, with abundant long and thick bristles at their base; distal part short, pointed and hook-shaped at its end, a concave notch on its

ventral part. Saccus absent. Valva. Lateral view: wide and quadrangular; ventral process elongate, membranous, with the presence of thick setae on the ventral margin; dorsal process sclerotized, elongate, thin, curved, acute distally. Ventral view: wide and quadrangular; slightly concave in its medial part, truncated towards the dorsal process; with an internal invagination, with abundant setae; dorsal processes directed mesally. Juxta sclerotized, pentagonal; a membranous area at the anterior margin, small and digitiform; and markedly concave at the posterior margin. Transtilla sclerotized, elongate, pointed towards the posterior part. Aedeagus elongate and sinusoid; coecum penis elongate; vesica short, membranous, an elongate dorsal process and a digitiform ventral process; with minute spicules at the dorsal area.



FIGURES 51–52. *Ernassa harveyi* sp. nov. Holotype. 51. Dorsal view. 52. Ventral view. Scales=5 mm.



FIGURES 53–56. Genitalia of *Ernassa harveyi* sp. nov. Male (Genitalia # JGA-1314, MUSM). 53. Dorsal view. 54. Ventral view. 55. Lateral view. 56. Aedeagus. Scales= 1 mm.

Female. Unknown.

Etimology. *harveyi* is a latinized noun in the genitive singular, dedicated to the lepidopterologist Dr. Donald Harvey who shared images of some *Ernassa* species.

Distribution. In the departments of Amazonas and San Martín (Peru).

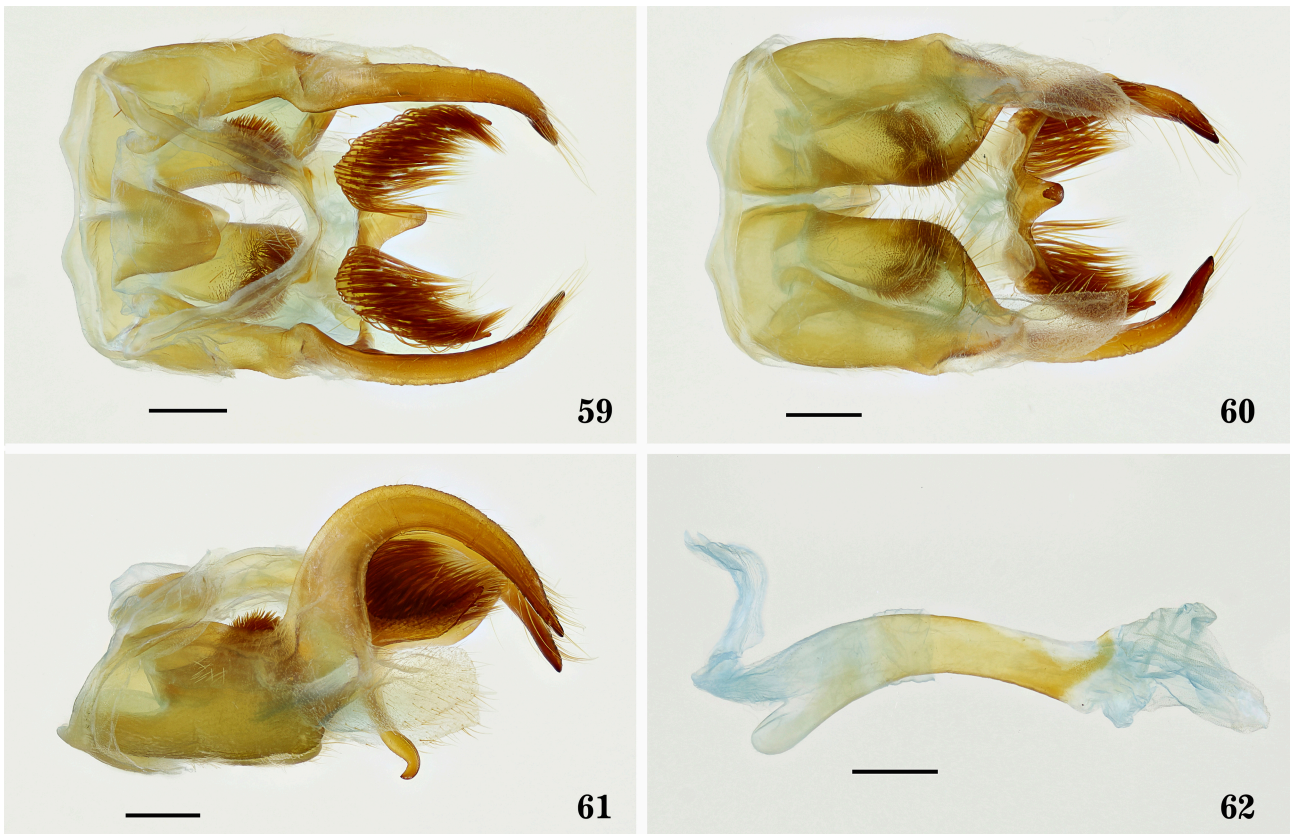
Ernassa markpacei sp. nov.

(Figs. 57–62)

Diagnosis: Similar to *E. harveyi* sp. nov., mainly differing by the shape of the valva. Ventral view, bases are elongate and oblique towards the dorsal process, while in *E. harveyi* sp. nov., they are shorter and truncated towards the dorsal process; In lateral view, the dorsal process is wide and strongly curved, while in *E. harveyi* sp. nov., it is long, very thin, and curved.



FIGURES 57–58. *Ernassa markpacei* sp. nov. Holotype. 57. Dorsal view. 58. Ventral view. Scales=5 mm.



FIGURES 59–62. Genitalia of *Ernassa markpacei* sp. nov. Male (Genitalia # JGA-1237, MUSM). 59. Dorsal view. 60. Ventral view. 61. Lateral view. 62. Aedeagus. Scales= 1 mm.

Type-material: HOLOTYPE male (Figs. 57–58). PERU. JUNÍN. 1 male, Pampa Hermosa, 10°59'16"S, 75°25'26"W, 1230 m, 29.ix.2008, J. Grados (GENITALIA #JGA-1325, MUSM). 3 PARATYPES. CUSCO. 1 male, Vitobamba (Camanti) 13°18'38"S, 70°48'59"W, 818 m—Culebrayoc, 13°29'58"S, 70°53'58"W, 1700 m, 08-vi–01.xi.2010, C. Sublett; 1 male, Huancacalle, 13°06'30"S, 72°56'00"W, 2800 m, vii.2005, J. Böttger.

PUNO. 1 male, Lanlacuni, 13°28'18.7"S, 70°25'07.24"W, 676 m, 27–28.xii.2009, E. Huamaní. All deposited in the MUSM.

Male. Forewing span (28–30 mm) (n=4). **Head.** Reddish. Scape reddish, flagellum brown with a white spot on the last segments. **Thorax.** Reddish-orange. Legs reddish. **Forewing.** Long and somewhat pointed towards the apex. **Dorsal.** Reddish-orange. Half of the anterior margin brown. Posterior margin with leaden scales, except the base. Termen brown. Veins with leaden scales. Brown spot near the base. Subproximal rhomboid orange spot, delimited by a medial and an antemedial band of reddish and blackish-white scales; the medial one projects throughout M_2 . Poorly defined orange spots at the discal cell. A subproximal elongate white spot at M_2 - M_3 . With scattered patches of orange, reddish, and leaden scales on several parts of the wing. **Ventral.** Orange red, somewhat lighter towards the apex. Most of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate and rhomboid with rounded angles. **Dorsal.** Reddish, slightly lighter towards the central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 59–62) (Genitalia # JGA-1237, 1238, MUSM). Tegumen narrow sided, with the anterior margin in the form of an inverted “V”. Uncus with its base the same width as the distal part of the tegumen; near its base, two lateral processes, sclerotized, shaped as an arched “J”, with abundant long and thick bristles; distal part short, pointed and hook-shaped at the end, concave notch on its ventral part. Saccus very short, central part concave. Valva. Lateral view: wide at the base, rectangular, elongate, ventral process membranous, somewhat wide, truncated distally and with setae; dorsal process sclerotized, wider at its base, pronouncedly curved, its end more sclerotized, pointed, with setae. Ventral view: wide at the base; basal third nearly close together, distal two thirds somewhat apart, obliquely towards the dorsal process; invaginated towards the internal part, with abundant setae at the margin. Juxta sclerotized, trapezoidal, membranous at the anterior and central part. Transtilla sclerotized, digitiform, somewhat wider at the base. Aedeagus elongate and somewhat sinusoid; coecum penis elongate; vesica membranous, short, with minute spicules in almost all its area.

Female. Unknown.

Etymology. *markpacei* is a genitive singular noun. The species is dedicated to Mark Stephen Pace, for his support to the systematic research and conservation of nature.

Distribution. In Peru, in the departments of Junín, Cusco and Puno.

***Ernassa abscondita* sp. nov.**

(Figs. 63–68)

Diagnosis: Similar to *E. markpacei* sp. nov. differing by the following: saccus and anterior margin of the valvae are not as straight; in lateral view, the dorsal margin of the valva is straight; dorsal process is shorter and slightly thicker distally; in ventral view, the valvae are narrower, at the basal half, the concavity of the valvae is more pronounced and the angle of continuity of the valva towards the dorsal process is more obtuse; the curve of the distal end of the dorsal process is more pronounced.

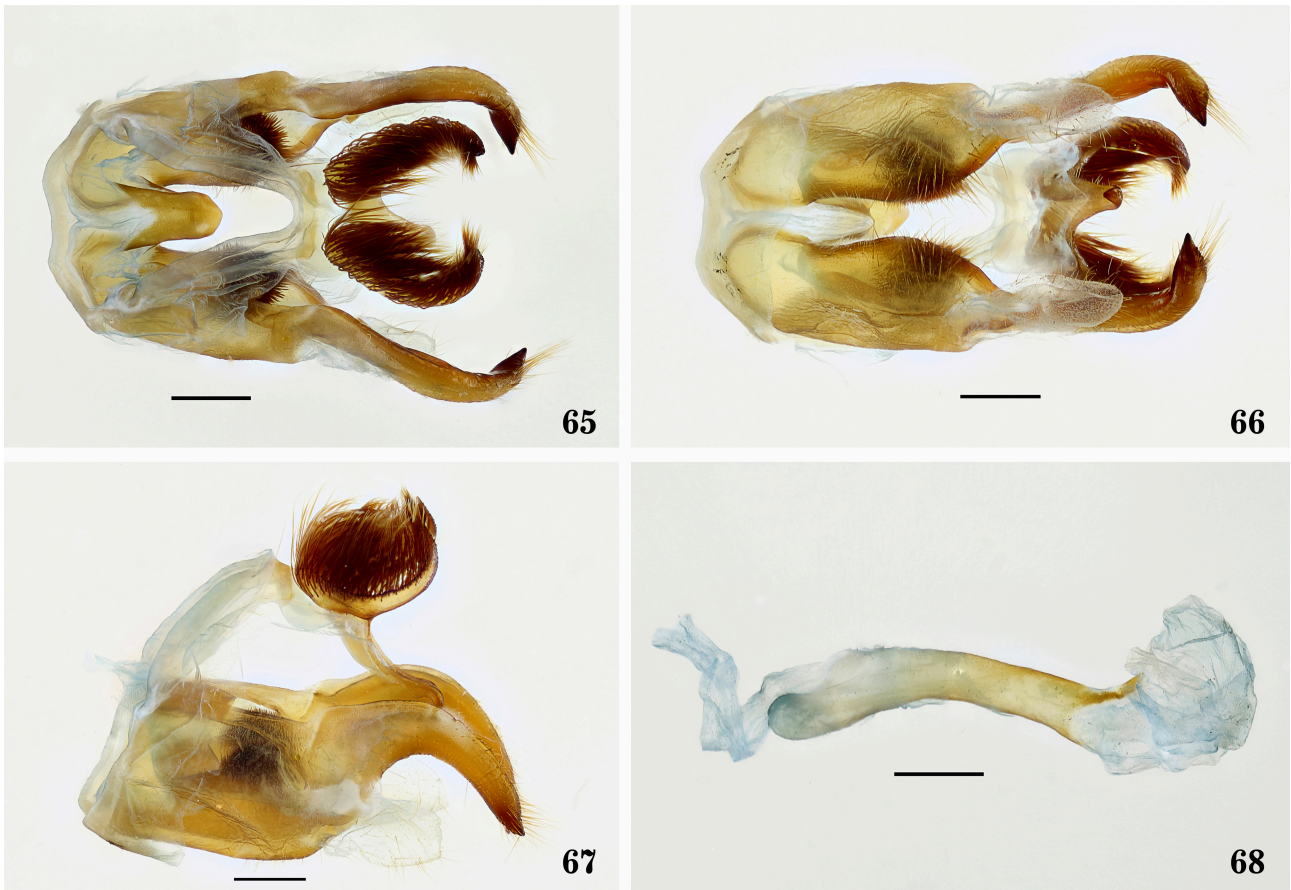
Type material: HOLOTIPO macho (Figs. 63–64). **PERÚ. CUSCO.** 1 male, Qda. Quitacalzón, 13°01'19.9"S, 71°29'50.7"W, 967 m. 14.v.2019, J. Grados. Deposited in the MUSM.

Male. Forewing span (27 mm) (n=1). **Head.** Reddish-orange. Scape reddish, flagellum brown with a white spot on the last distal segments. **Thorax.** Orange Red. Reddish legs. **Forewing.** Elongate. **Dorsal.** Reddish. Half of the anterior margin brown. Posterior margin with leaden scales, except for the base. Termen brown. Brown spot near the base. Subproximal orange rhomboid spot, delimited by an antemedial band of reddish and leaden-white scales and an oblique medial band of reddish and blackish-white scales. Poorly defined orange spots at the discal cell. A white, ovoid subproximal spot at M_2 - M_3 . Dispersed patches of orange and leaden scales on various parts of wing. **Ventral.** Orange red, somewhat lighter towards the apex. Most of the anterior margin brown. Termen brown. **Hindwing.** Reddish, elongate and rhomboid with rounded angles. **Dorsal.** Reddish, barely lighter towards the central part. **Ventral.** Reddish, with the same traits as the dorsal side. **Abdomen.** Reddish. **Male genitalia** (Figs. 65–68) (Genitalia #JGA-1312, MUSM). Tegumen with narrow sides, the anterior margin shaped as an inverted “U”. Uncus base the same width as the distal part of tegumen; near its base, two curved “J”-shaped sclerotized lateral processes, with abundant long and thick bristles; distal part short, pointed and hook-shaped at its end, a concave notch on its ventral part. Saccus barely present, its central part concave. Valva. Lateral view: wide at the base, rectangular, somewhat elongate, ventral process membranous, somewhat wide, with setae; dorsal process sclerotized, wider at

its base, curved, its pointed end with setae. Ventral view: rounded and somewhat narrower at its proximal margin; concave at the central part of the basal half; towards the dorsal process forming a pronounced obtuse angle. Juxta and transtilla sclerotized. Aedeagus elongate and somewhat sinusoid; coecum penis elongate; vesica membranous, short, with minute spicules in almost all its area.



FIGURES 63–64. *Ernassa abscondita* sp. nov. Holotype. 63. Dorsal view. 64. Ventral view. Scales=5 mm.



FIGURES 65–68. Genitalia of *Ernassa abscondita* sp. nov. Male (Genitalia # JGA-1312, MUSM). 65. Dorsal view. 66. Ventral view. 67. Lateral view. 68. Aedeagus. Scales= 1 mm.

Female. Unknown

Etymology. *abscondita* is a feminine adjective in the nominative singular, which means “the hidden one”, “the mysterious one”, “the unknown one”.

Distribution. In the lower montane forests of the department of Cusco (Peru).

Insertae Sedis

Ernassa cruenta (Rothschild, 1909)

(Figs. 69–78)

Diagnosis. Wings reddish, with a subproximal rounded white spot between M_2 and Cu_1 . An oblique blackish line passing above the white spot and projecting towards the external margin. Tegumen with wide sides, with posterolateral pojections. Uncus rhomboid, posterior part rounded with a row of thick and rigid bristles; in lateral view, wide at its base, with a large concavity, followed by the narrow and elongated projection of pointed and hook-shaped end.

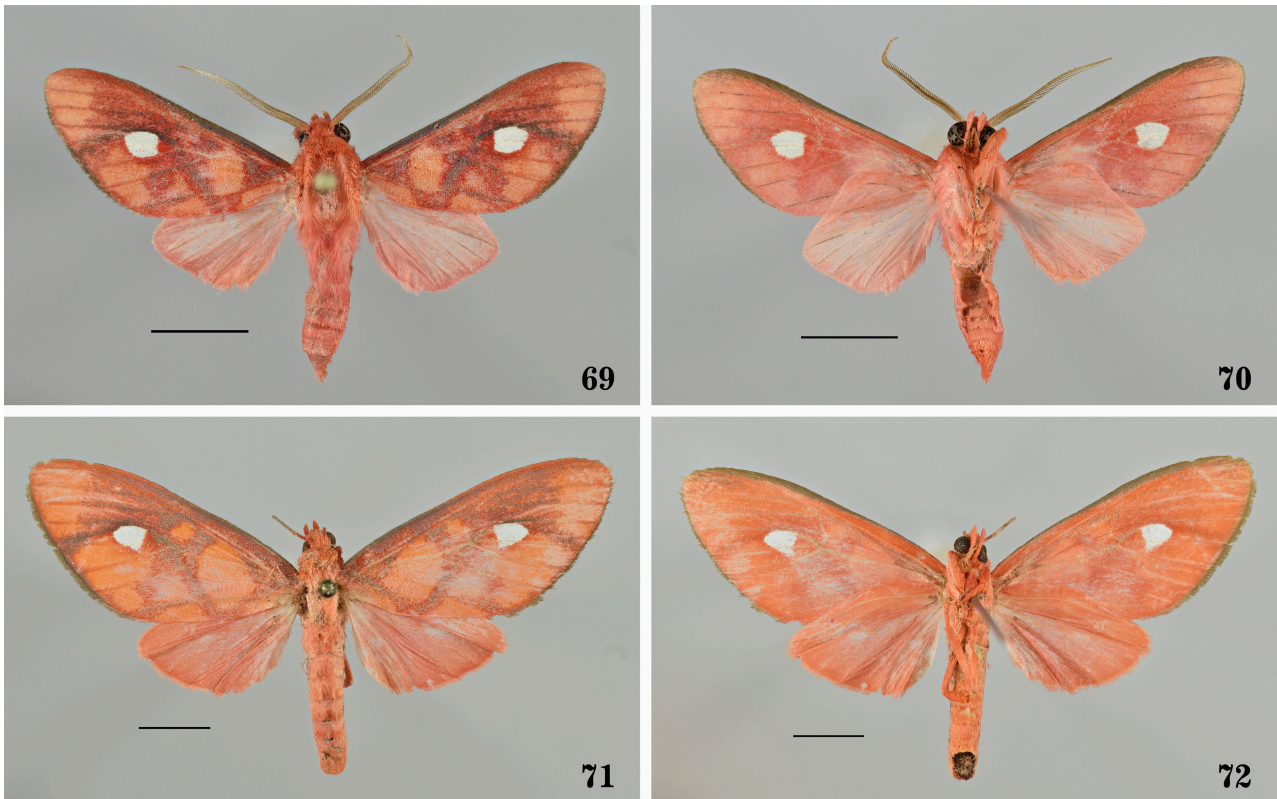
Material examinado. PERÚ. LORETO. 1 male, Qda. Rumiyaçu, Campamento Dorado 5, 01°48'09"S, 75°29'14"W, 230 m, 24.ii.2008, William Yawuarcani (GENITALIA #JGA-1240, MUSM); 1 male, Picuroyacu, Río Nanay, 03°39'S, 73°15'W, 100 m, 04.ii.2022, J. J. Ramirez (GENITALIA#JGA-1321, MUSM). UCAYALI. 1 male, Río Suaya, 8°56'54.13"S, 74°0'28.9"W, 230 m, 13–14.vii.2008, M. Alvarado; 1 male, idem except (GENITALIA #JGA-1322, MUSM). MADRE DE DIOS. 1 male, 10 km E Sudadero, 12°21'57.32"S, 69°04'18.09"W, 221 m, 30.iii.2009, L. Figueroa; 1 male, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 19.iii.2017, D. Couceiro (MUSM ARCT-00592, JGA COLLECTION)(Voucher DNA dataing Arct #00255 JGA-MUSM); 1 male, idem except, 01.vi.2018, J. D. Shoobridge (GENITALIA #JGA-1320, MUSM)(MUSM ARCT-001223 JGA COLLECTION)(Voucher DNA barcoding Arct #00886 JGA-MUSM); 1 female, Albergue Refugio Amazonas, 12°52'30"S, 69°24'35"W, 231 m, 10.viii.2022, A. Yarasca & J. Grados. PUNO. 1 female, P.N. Bahuaja-Sonene, 4.5 km NO Qda. Aguajal, Río Tambopata, 13°23'31.8"S, 69°29'58.7"W, 335 m, 14.ix.2011, J. Grados, Razuri & E. Guillermo (GENITALIA #JGA-1311, MUSM). All deposited in the MUSM.

Male (Figs. 69–70). Forewing span (9–10 mm) (n=7). A good description of the male external morphology is available in Hampson (1920). **Male genitalia** (Figs. 73–76) (Genitalia #JGA-1240). Tegumen with wide sides, with projections on the lateral parts of the posterior margin. Uncus rhomboid, pointed towards the anterior part, narrower than the posterior part of tegumen; posterior part rounded with a row of stiff, thick bristles; in lateral view, wide at its base, with a great concavity, continuing with the narrow, elongate projection which ends pointed and hook-shaped. Saccus short and concave in the central part. Valva. Lateral view, elongate, dorsal margin sinusoid; ventral margin convex; ventral process membranous, short, with setae at the proximal half; dorsal process slightly sclerotized, short and curved. Ventral view. Valvae wide, elongate, at the distal half oblique towards the dorsal processes, setae at the mesal margin. Juxta, sclerotized, elongate and convex. Transtilla, sclerotized, pentagonal. Aedegaus, elongate, almost straight; coecum penis developed; Vesica membranous and short.

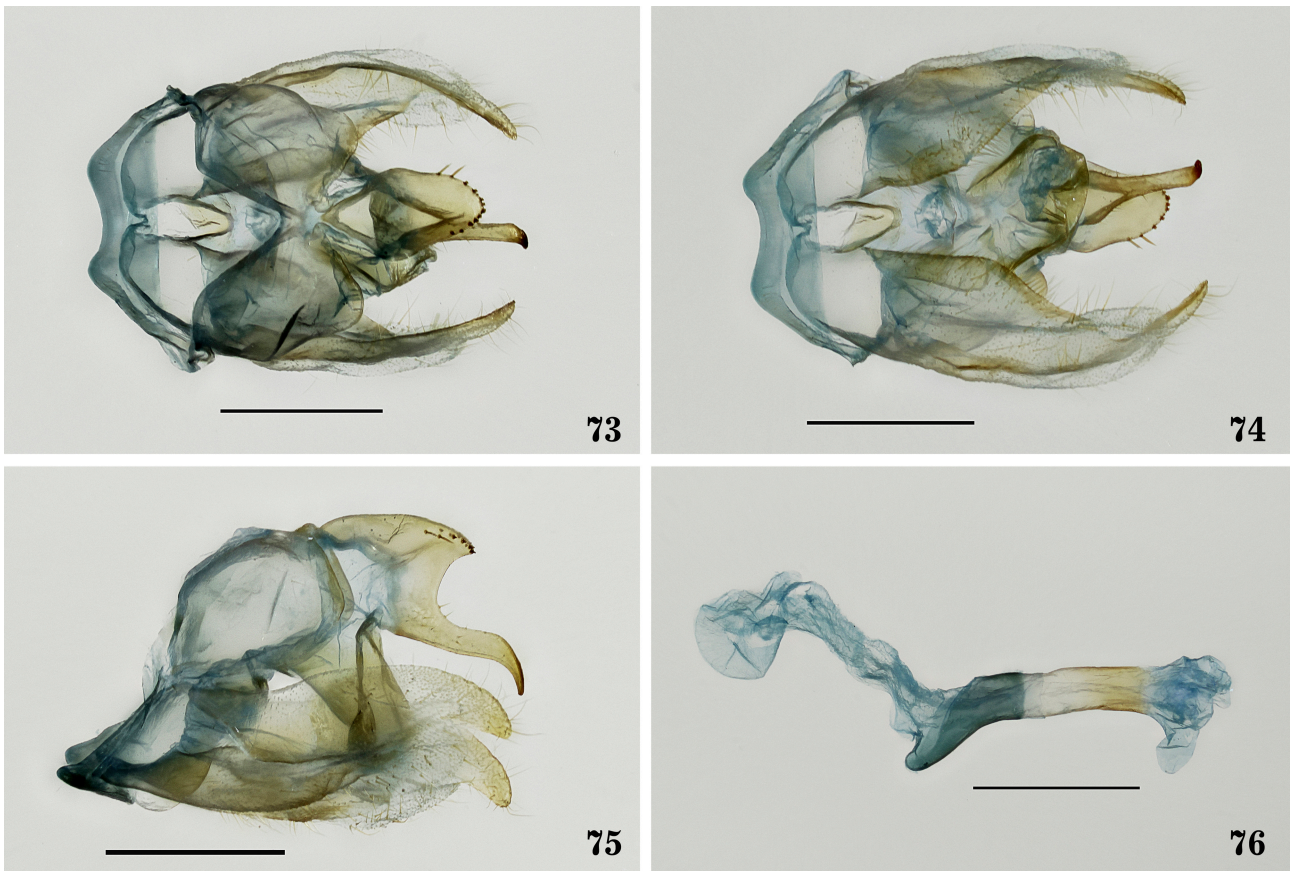
Female (Figs. 71–72). Forewing span (20 mm) (n=2). With the same traits as the male except for the short rami, less than the width of the flagellum and the absence of retinaculum. The white spot of the forewings, in subproximal position at M_2 - M_3 , while in males, at M_2 - Cu_1 . Three bristles at the frenulum. **Female genitalia** (Figs. 77–78) (GENITALIA #JGA-1311, MUSM). Eighth tergite slightly sclerotized. Papillae taller than wide, with a rectangular dilation at the medial part; with greater density of setae at the dorsal part. Glands elongate and narrow. Posterior processes longer than the anterior ones. Lamella antivaginalis and postvaginalis slightly sclerotized. Ductus bursae membranous, short and wide. Cervix bursae short and somewhat quadrangular. Corpus bursae membranous and globose. Ductus seminalis from the left side of the Cervix bursae.

Barcoding: The mitochondrial DNA sequence (COI) of one specimeni is as follows (Voucher DNA barcoding, ARCT #255 JGA, MUSM) (GenBank: BankIt2839965 gn|uoguelph|RFEWA255-17.COI-5P PP911834) (See Table 1).

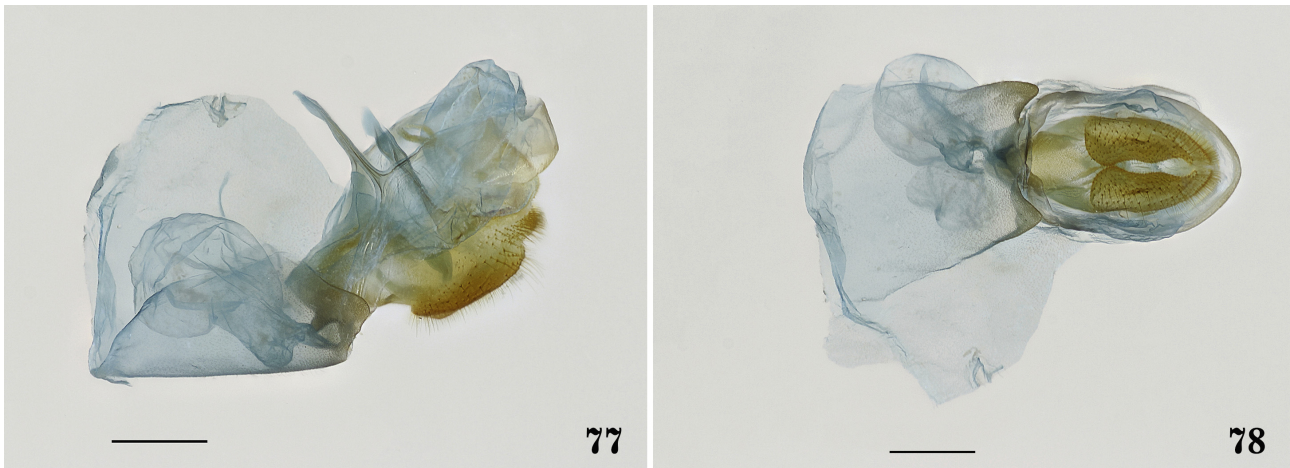
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GATTAGTTCCTTTAATATTAGGAGCCCCAGATATAGCTTTCCCCGAATAAACAATATAAGTTTTT
GACTTTTACCCCATCATTAACCTTTATTAATTTCAAGAAGAATTGTTGAAAATGGGGCCGGAACAG
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FIGURES 69–72. “*Ernassa cruenta*” Rothschild. 69–70. Male. Albergue Refugio Amazonas. 69. Dorsal view. 70. Ventral view. 71–72. Female. P.N. Bahuaaja-Sonene. 71. Dorsal view. 72. Ventral view. Scales=5 mm.



FIGURES 73–76. Genitalia of “*Ernassa cruenta*” Rothschild. Male (Genitalia # JGA-1239, MUSM). 73. Dorsal view. 74. Ventral view. 75. Lateral view. 76. Aedeagus. Scales= 1 mm.



FIGURES 77–78. Genitalia of “*Ernassa cruenta*” Rothschild. Female (Genitalia # JGA-1311, MUSM). 77. Dorsal view. 78. Ventral view. Scales= 1 mm.

Distribution. In the Amazon forests of the departments of Loreto, Ucayali, Madre de Dios and Puno (Peru).

Remarks. The species *Automolis cruenta* Rothschild, 1909 was described based on 4 male specimens, from Peru and Brazil: “La Union, R. Huacamayo, Carabaya, Peru 2000 ft., December 1904 (G. Ockenden)” and “Fonte Boa, Amazonas, May 1906 (S.M. Klages)”. Years later, Hampson (1920) considered the species in the same genus. More than 60 years later, Watson & Goodger (1986) formally considered the species *Automolis cruenta* as *Ernassa*. It is almost certain that the wing color pattern, very similar to the other species of the *Ernassa* genus, must have been considered for the incorporation of the species within the genus.

According to our analysis of the external morphological characters, wing color pattern, male genitalia characters, and molecular barcoding data, the hypothesis we propose is the polyphyly of the genus. That is, *Automolis cruenta* would not have a common origin with the other species of the genus *Ernassa*. The morphological differences between the genus *Ernassa* and the species *Automolis cruenta* are the following: *Ernassa* presents the subproximal whitish spot at M_2 - M_3 of the forewings; the blackish spot that passes over the white spot, when present, projects over the M_2 vein; tegumen with narrow sides; with sclerotized processes at the dorsal and anterior part of the uncus, with long setae present; dorsal valvar process sclerotized; aedeagus sinuosid. Whereas *A. cruenta* presents the subproximal whitish spot at M_2 - Cu_1 ; the blackish spot passing over the white spot, projects up to middle of M_2 and another part projecting obliquely towards M_3 ; tegumen with wide sides; uncus without sclerotized processes, rhomboid, pointed towards the anterior side, posterior part rounded with a row of rigid, thick bristles; dorsal valvar process slightly sclerotized; aedeagus straight.

Discussion

Since the proposal raised by Hebert *et al.* (2003), with barcoding as a universal molecular alternative to solve the taxonomic identification problem, some advantages and limitations of the proposal have been mentioned (Grados, 2018). In reality, barcoding would become another tool for the determination of new species, but by no means the one and only irreplaceable tool. With the increase of studies in various groups of organisms, intraspecific and interspecific genetic divergence thresholds have been better defined. These thresholds are not homogeneous for all groups. These results are consistent, since not all groups of organisms develop the same evolutionary processes. Results in some groups of Lepidoptera have shown that intraspecific variation can take different values, ranging from less than 1% to a high intraspecific genetic variation, with values above 3%. The presence of a high intraspecific genetic variation would be related to the gradual accumulation of mutations in the COI DNA that should not necessarily correspond to a morphological change (Huemer *et al.*, 2014; Zhang & Bu, 2022).

It is necessary to recover the value of the detailed analysis of the genitalia morphological traits of the species. These are an important source of characters for species discrimination, including species complexes. Relating the

morphological traits with molecular data will help to provide more evidence when proposing hypotheses. The genetic distances values provided are the result of the analysis of 42 specimens, all from Tambopata. It will be important as preliminary information, which I am sure will increase with other works in the future by colleagues interested in this group of Lepidoptera. The maximum intraspecific genetic distance value we have for *E. justina* is 0.97%, while for *E. skinnerorum* **sp. nov.** it is 0.8%. Higher values were found for the congeneric species: between *E. justina* and *E. skinnerorum* **sp. nov.** they are between 4.80% and 8.15%; between *E. justina* and *E. sanguinolenta* they are between 6.85% and 7.40%; between *E. skinnerorum* **sp. nov.** and *E. sanguinolenta* they are between 5.79% and 6.71%. Something different occurs with the species *Automolis cruenta*, which I do not consider as belonging to the genus *Ernassa*, due to the marked differences in the genitalia characters and the genetic distance with the species for which information is available. Comparing *A. cruenta* with *E. justina*, *E. sanguinolenta* and *E. skinnerorum* **sp. nov.**, the distances are between 8.70% and 9.86%.

There are certainly other new species of *Ernassa* that need to be described, some of them just need to be “collected” from the entomological boxes that would be deposited in the cabinets of Natural History Museums. It would be interesting if genital morphology studies could be carried out on the males of the museum samples, this would open the doors to discover the true species richness of the genus in the Neotropical region.

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