Research Article

Hidden treasures: Mimallonidae (Lepidoptera) from the Museo Javeriano de Historia Natural, with descriptions of the female of *Bedosiallo moengus* (Schaus, 1928), and a new species of *Gonogramma* Boisduval, 1872

Tesoros ocultos: Mimallonidae (Lepidoptera) del Museo Javeriano de Historia Natural, descripción de la hembra de *Bedosiallo moengus* (Schaus, 1928), y una nueva especie de *Gonogramma* Boisduval, 1872

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Abstract. We present the first list focused on Mimallonidae from a Colombian biological collection, the Museo Javeriano de Historia Natural "Lorenzo Uribe, S.J." (MPUJ) of the Pontificia Universidad Javeriana in Bogotá. We report nine species and seven genera, and we highlight the museum's hidden treasures: the first known female of *Bedosiallo moengus* (Schaus, 1928) and a new species, *Gonogramma faguai* **nov. sp.**

Key words: Colombia; MPUJ; Neotropical Region; Sack-bearer moths.

Resumen. Se presenta el primer listado de la familia Mimallonidae para una colección biológica colombiana, el Museo Javeriano de Historia Natural "Lorenzo Uribe, S.J." (MPUJ) de la Pontificia Universidad Javeriana en Bogotá. Se reportan nueve especies y siete géneros de esta familia de polillas, donde se destacan los tesoros ocultos del museo: la primera hembra conocida de *Bedosiallo moengus* (Schaus, 1928) y una nueva especie, *Gonogramma faguai* **sp. nov.**

Palabras clave: Colombia; MPUJ; polillas; Región Neotropical.

Introduction

Mimallonidae moths include over 300 species found only in the New World, with most species in Central and South America (St Laurent & Kawahara 2019). These moths can be recognized by a nearly absent proboscis, bipectinate antennae, a dense covering of scales on the body, absence of a tympanal organ, and apomorphic venation (Scoble 1992; Lemaire & Minet 1998). In many ways, mimallonids resemble Bombycoidea and have long been associated with this group, despite being relatively distantly related as shown by phylogenomics (Kawahara & Breinholt 2014; Breinholt *et al.* 2018; Kawahara *et al.* 2019). The larvae are known for constructing portable cases composed of leaves, silk, and fecal material, which may be mobile in the last instars (Franclemont 1973; St Laurent pers. obs.). Unfortunately, these moths have been historically poorly studied in the Neotropical Region,

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and Colombia is not an exception. There are approximately 50 species recorded from the country (St Laurent 2016, 2017; St Laurent & Mielke 2016; St Laurent & Carvalho 2017; St Laurent *et al.* 2017; St Laurent & Kawahara 2019), however, many mimallonids remain unknown and undescribed, especially as larvae. Life history and biology studies are almost entirely lacking for Neotropical Mimallonidae.

According to St Laurent & Becker (2020), there are still many undescribed Mimallonidae species kept in natural museums around the world. In Bogotá, Colombia, the Museo Javeriano de Historia Natural "Lorenzo Uribe, S.J." (MPUJ) of the Pontificia Universidad Javeriana has gradually established itself as one of the most important entomological collections in the country, maintaining specimens from throughout the national territory (Prada-Lara & Amarillo-Suárez 2019). With this in mind, and to contribute to the study of Mimallonidae in the Neotropical region and in Colombia in particular, we decided to study the Mimallonidae deposited in the MPUJ.

Materials and Methods

Material from the Museo Javeriano de Historia Natural "Lorenzo Uribe, S.J." (MPUJ) of the Pontificia Universidad Javeriana in Bogotá, Colombia was examined. Morphological terminology follows Kristensen (2003) and St Laurent & Kawahara (2019). Dissections performed for this study followed Miller (1987) and were kept in micro vials filled with glycerol pinned to the specimen. Adults were photographed with a Fujifilm Finepix S8300 and genitalia were photographed using a ZEISS SteREO Discovery V20. Figures were created with Adobe Photoshop Creative Cloud 2021[®].

Results and Discussion

The following species were identified in the MPUJ collection, with the classification following St Laurent & Kawahara (2019) and St Laurent *et al.* (2020).

Cicinninae: Bedosiini

Bedosia turgida (Schaus, 1910) (Fig. 1A)

The species can be recognized by relatively broad, triangular wings, the light pinkish brown ground color, the oblique hyaline discal spot, a well-defined, straight, brown postmedial line, and blackish blotches submarginally (Forbes 1939; St Laurent pers. obs.). Female genitalia is shown in St Laurent & Kawahara (2019). This species is broadly distributed from Nicaragua to western Colombia; however, it is unclear whether cryptic species exist across this broad distribution.

Examined material. COLOMBIA: Chocó: 1 female. PNN Utría, Centro de Guía Turístico. N 06°00'55.9", W 77°21'31.7". 15 Ago-14 Sept 2017. 6 m. L. Prada & S. Vargas.

Bedosiallo moengus (Schaus, 1928) (Figs. 1B, 1C, 2)

Among *Bedosiallo* St Laurent and Kawahara, 2018, *B. moengus* is one of the largest species, and belongs to a species-group containing two large species with simple juxtal structures. *Bedosiallo* species are widely distributed in Central and South America but *B. moengus* is primarily known from Amazonian rainforest. We dissected a male specimen to compare 502

to the male genitalia from an Amazonian specimen shown in St Laurent *et al.* (2018) and found no notable differences. Like in our discussion of *Bedosia turgida* (Schaus, 1910) above, eventually more in-depth analyses of genetics and morphology across wide ranging Bedosiini is warranted to identify the degree to which cryptic taxa should be recognized.



Figure 1. Mimallonidae moths from MPUJ. Scale: 1 cm. A. Female *Bedosia turgida*. B. Male *Bedosiallo moengus*. C. Female *Bedosiallo moengus*. D. Male *Psychocampa cf. bactriana*. E. Male *Isoscella ventana*. F. Male *Lacosoma briasia*. G. Male *Lacosoma cf. raydela*. H. Male *Lacosoma vulfreda*. / Polillas Mimallonidae del MPUJ. Escala: 1 cm. A. Hembra de *Bedosia turgida*. B. Macho de *Bedosiallo moengus*. C. Hembra de *Bedosial turgida*. B. Macho de *Isoscella ventana*. F. Macho de *Lacosoma briasia*. G. Macho de *Lacosoma cf. raydela*. H. Macho de *Isoscella ventana*. F. Macho de *Lacosoma briasia*. G. Macho de *Lacosoma cf. raydela*. H. Macho de *Lacosoma vulfreda*. F. Macho de *Lacosoma briasia*. G. Macho de *Lacosoma cf. raydela*. H. Macho de *Lacosoma vulfreda*.

Regardless, the female of *B. moengus* was previously unknown and we offer the description and figures of one belonging to the Colombian population below.

Description. Male. See Schaus (1928), and a detailed generic description in St Laurent *et* al. (2018). Female. Head: Coloration light brown-beige. Antennae bipectinate to tip. Eyes very large, comprising more than two-thirds area of head. Labial palpus coloration as for head; labial palpus three-segmented. Thorax: Coloration as for head, with broader scales. Legs: Coloration as for thorax, speckled with dark brown petiolate scales. Forewing: Length (base to apex): 35 mm; wingspan: 60 mm. Triangular with falcate apex. Ventrally ground color light brown-beige. Outer margin mostly convex except for concavity below the apex. Postmedial line straight, doubled, inner coloration pale brown and outer a darker brown. There is a light brown, inverted L-shaped line, originating from the costa, crossing the postmedial line and ending at tornus. Discal mark present as a bisected, rectangular hyaline patch. Wing outer margin is gray to dark brown. Ventrally, wings same coloration as dorsally but postmedial line lighter, with a horizontal line from costa to the postmedial line. Hindwing: Distally rounded, coloration and patterning as for forewing dorsum. Postmedial line outwardly convex, discal spot absent. Light brown vertical line originates at the apex and ends at the anal angle. Ventrally ground color same as in dorsum, postmedial line convex. Abdomen: Robust, extending beyond the anal angle of the hindwing, coloration mostly as for thorax. Laterally with dark brown line on both sides of abdomen. Genitalia: (Fig. 2) VIII tergite as strongly sclerotized lobes at base of anal papilla. Ductus bursae membranous, roughly as long as terminal section of genitalia. Corpus bursae bag-like with no signum. Apophyses anteriores and the apophyses posteriores are equal in length. Lamella antevaginalis absent, lamella postvaginalis wrinkled and well sclerotized.

Examined material. COLOMBIA: Chocó: 1 female. PNN Utría, Centro de Guía Turístico. N 06°00′55.9″, W 77°21′31.7″. 15 Ago-14 Sept 2017. 6 m. L. Prada & S. Vargas. MPUJ_ENT0055491. 3 males. PNN Utría, Segunda Estación Puente Esterogrande. N 06°01′08.8″, W 77°20′44.8″. 15 Ago-14 Sept 2017. 6 m. L. Prada & S. Vargas.



Figure 2. Female genitalia of *Bedosiallo moengus*. Scale: 1 mm. / Genitalia hembra de *Bedosiallo moengus*. Escala: 1 mm.

Cicinninae: Psychocampini

Psychocampa cf. bactriana (Butler, 1878) (Fig. 1D)

Psychocampa Grote & Robinson, 1867 is a relatively diverse genus but has not been revised and thus many undescribed taxa remain. Identifications can be difficult, especially in those taxa belonging to a group near *P. bactriana* (St Laurent & Kawahara 2019). We preliminarily identify the large *Psychocampa* in MPUJ as *P. cf. bactriana* pending a revision of the group (*bactriana* is the oldest available name for the species in this group). In general, male genitalia of *Psychocampa* are homogenous and provide few species-specific characters, but are readily recognized by the large, broad, simple *valvae*, with an elongated, narrow *uncus*, and heavily sclerotized and robust *gnathos arms* (St Laurent *et al.* 2018; St Laurent & Kawahara 2019).

Examined material. 3 males. No data. **COLOMBIA: Meta:** 2 males. San Martín, Reserva Rey Zamuro-Matarredonda. N 03.53173°, W 73.40181°. 293 m. 28 Ago- 1 Sept 2017. D. Torres, L. Parrado, V. Robles. MPUJ_ENT0054992/ MPUJ_ENT0054995.

Cicinninae: Cicinnini

Gonogramma faguai Prada & St Laurent, **nov. sp.** (Figs. 3, 4)

Type material. Holotype male. COLOMBIA: Amazonas: Leticia, Tarapacá, Resguardo Ticuna-Uitoto Monilla Amena. X-2003. N 4°06′46″, W 69°55′52″. Col. José Weisz. Light trap. MPUJ_ENT0052320/ HOLOTYPE male *Gonogramma faguai* Prada & St Laurent, 2021 [red label]/ (MPUJ). No paratypes.

Additional material examined. COLOMBIA: 1 male Tolima: Cunday, Cave Eden. 450 m. 20 mar 1999. X. Cardona. N 4°00′26″, W 74°45′02″. MPUJ_ENT0052321. Light trap.

Diagnosis. Similar to *G. despecta* (Walker, 1855) and *G. conlani* (Herbin & Mielke, 2014), but *G. faguai* is smaller and lighter gray in color with a slightly larger forewing hyaline patch relative to wing size. The genitalia are typical of *Gonogramma*, which do not vary much across the genus, the shape of the *uncus*, the base of the *phallus* which is smooth and cylindrical, and the shape of the sclerotized *vincular arms* curling upward, are all like those figured for *G. despecta* in St Laurent *et al.* (2020), however we note that the *vincular arms* are somewhat longer in *G. faguai*. The recently described *G. giustii* St Laurent, 2017 from Colombia, Valle del Cauca, Buenaventura is also quite similar and belongs to this complex group of *Gonogramma*. However, this coastal species is recognizable by its more uniform brown-gray coloration and wavy postmedial line, as well as by the thicker *phallus* and more expanded *juxtal* processes than those observed in *G. faguai*.

Description. Male. Head: Small relative to thorax. Colored pinkish cream. Antennae pale yellow, bipectinate to tip, distal half of pectinations dramatically shorter. Eyes very large, comprising more than two-thirds area of the head. Labial palpus three-segmented, short, coloration as for head though with darker pink scales. **Thorax:** Dorsally pinkish cream with profuse speckling of dark brown petiolate scales, prothorax pinker, ventrally thorax as above. **Legs:** Colored light pink. Brown tibial spurs. **Forewing:** Length (base to apex): 20 mm; wingspan: 35 mm. Triangular with a falcate apex. Outer margin mostly

convex except for concavity below the apex. Inner ground color pinkish to gray, speckled with dark brown petiolate scales. Outer margin color gray with light patches of pink to orange scales. Postmedial line well defined, nearly straight, dark brown, perpendicularly angled toward costa with an orange outer margin. Discal spot hyaline, B-shaped. Ventral ground color similar to dorsum but there is a subapical bright patch of orangepink scales. Outer margin color darker than the medial area. A dark patch of orangepink scales surrounding the discal spot is present. Postmedial line absent. Hindwing: Distally rounded, coloration and patterning as for forewing dorsum, postmedial line outwardly convex, discal spot absent. Ventrally ground color pinkish to gray, speckled with dark brown petiolate scales. Postmedial line and discal spot absent. Abdomen: Robust, extending beyond the anal angle of the hindwing, coloration mostly as for thorax. Genitalia: (Fig. 4) Valvae rectangular in shape with a membranous distal lobe, more heavily sclerotized and projected mesally. Vinculum arms present and extending to sclerotized mesal portion of valvae. Gnathos without mesal projections. Uncus simple, triangular, extending beyond saccular edge of valvae. Juxtal structure complex, fused to phallus and inner ring of the vinculum. Phallus cylindrical, sclerotized basally, vesica membranous, with attached *juxtal* complex, and present a pair of sclerotized projections curling upward. Female. Unknown.

Distribution. Only known from southern Colombia in the Amazon but see remarks below.

Etymology. *faguai* is a latinized noun in genitive singular. This new species is named after Dr. Giovanny Fagua, who has dedicated himself to the study of Colombian butterflies and moths.

Remarks. A second specimen from Tolima, Colombia, is very similar to the holotype in all respects, including genitalia morphology. This specimen is in poor condition, however, and given the significant distance from the type locality, we exclude it from the type series. Furthermore, we are aware of yet another somewhat similar *Gonogramma* from Colombia, Cundinamarca, Anapoima, 14.IV.1975; deposited in the Natural History Museum of Geneva, Switzerland (MHNG). Though unlike the specimen from Tolima, this specimen bears a wavy postmedial line and in this respect is more similar to coastal *G. giustii. Gonogramma* is in need of thorough revision, however, the uniqueness of *G. faguai* and the lack of other similar *Gonogramma* from the Amazon rainforest aids in our confidence in the novelty of *G. faguai*.



Figure 3. *Gonogramma faguai* Prada & St Laurent, **nov. sp.** Holotype male. A. Dorsal habitus. B. Ventral habitus. Scale: 1 cm. / *Gonogramma faguai* Prada y St Laurent, **sp. nov.** Holotipo macho. A. Hábito dorsal B. Hábito ventral. Escala: 1 cm.



Figure 4. Male genitalia of *Gonogramma faguai* Prada & St Laurent, **nov. sp.** holotype. A. Ventral natural position. *Phallus* not removed, B. Dorsal, *phallus* not removed, C. Ventral opened genitalia. Part of the *juxta* and *vinculum* arms broke when removing the complex *phallus*, D. Lateral natural position. *Phallus* not removed, E-G. *Phallus* with dorsal *juxtal* component. E. Ventral, F. Dorsal, G. Lateral, H. Close-up of one of the dorsal *phallus-juxtal* projections. Scale: 1 mm (4H not to scale with rest of figures). / Genitalia macho de *Gonogramma faguai* Prada y St Laurent, **sp. nov.** holotipo. A. Posición ventral natural. *Phallus* no removido, B. Dorsal, *phallus* no removido, C. Genitalia ventral abierta. Parte de la *juxta* y los brazos del *vinculum* se rompieron al retirar el *phallus*, D. Posición natural lateral. *Phallus* no removido, E-G. *Phallus* con componente dorsal *juxtal*. E. Ventral, F. Dorsal, G. Lateral, H. Primer plano de una de las proyecciones *falo-yuxtal* dorsal. Escala: 1 mm (4H no a escala con el resto de las figuras).

Isoscella ventana (Dognin, 1897) (Fig. 1E)

Isoscella ventana is the northernmost representative of the genus, it is found in Colombia and Venezuela, and can be recognized by the slightly rounded forewing apices and brighter orange coloration in general as well as genitalia characters. Distribution in Colombia includes Boyacá, Casanare, Cundinamarca, and Valle del Cauca departments. Our report from Casanare is the first from this department. Genitalia is shown in St Laurent & Carvalho (2017). The darker *I. peigleri* St Laurent & Carvalho, 2017 occurs in the western Cordillera Central of Colombia as well as in northwestern Ecuador (St Laurent & Carvalho 2017). It is not clear if these two *Isoscella* are sympatric in Colombia.

Examined material. 2 males. No data. **COLOMBIA: Boyacá:** 1 male. Garagoa, Reserva "El Secreto", 2320 m. 12 oct 2001. T. luz 10:20 pm, nublado. Zubiria et al. MPUJ_ENT0052319. **Casanare:** 1 male. Trinidad, Finca la Palmita. Septiembre del 2019, J. Torres

Lacosominae: Lacosomini

Lacosoma briasia Schaus, 1928 (Fig. 1F)

This species has been recorded in Brazil, French Guiana, Colombia (St Laurent & Kawahara 2019), Bolivia and Ecuador (Ueda 2021). Distribution in Colombia includes Quindío and Chocó departments. Originally described from various localities, St Laurent & Kawahara (2019) designated a lectotype from western Colombia.

Examined material. COLOMBIA: Chocó: 1 male. PNN Utría, Segunda Estación Puente Esterogrande. N 06°01′08.8″, W 77°20′44.8″. 15 Ago-14 Sept 2017, 6 m. L. Prada & S. Vargas.

Lacosoma cf. raydela Schaus, 1928 (Fig. 1G)

Described from various localities in Central and South America, but St Laurent & Kawahara (2019) designated a lectotype from Cayuga, Guatemala. *Lacosoma raydela sensu stricto* occurs throughout Central America, apparently into western Colombia, but given that no formal generic revision of *Lacosoma* has yet been published, it is not clear as to whether the name *L. raydela* applies to multiple cryptic species. Therefore, we preliminarily assign the population from Chocó cited below to *L. cf. raydela* based on external morphology and comparison to genitalia of a *L. cf. raydela* specimen from Costa Rica (St Laurent pers. obs.). *Lacosoma* species can be recognized by their small size and usually scalloped wing margins (St Laurent *et al.* 2018), and many species are difficult to identify without genitalia and/or genetic barcoding.

Examined material. COLOMBIA: Chocó: 1 male. PNN Utría, Segunda Estación Puente Esterogrande. N 06°01′08.8″, W 77°20′44.8″. 15 Ago-14 Sept 2017, 6 m. L. Prada & S. Vargas.

Lacosoma vulfreda Schaus, 1928 (Figs. 1H, 5)

This rarely collected species is only known from coastal Chocó department (type locality Bellavista). For the first time, the male genitalia is shown (Fig. 5). The species *L. aurora* Dognin, 508

1916 is very similar but was described from higher elevations in Boyacá and is likely distinct from *L. vulfreda*.

Examined material. COLOMBIA: Chocó: 2 males. PNN Utría, Segunda Estación Puente Esterogrande. N 06°01′08.8″, W 77°20′44.8″. 15 Ago-14 Sept 2017, 6 m. L. Prada & S. Vargas. MPUJ_ENT0048636/ MPUJ_ENT0048635.



Figure 5. Male genitalia of *Lacosoma vulfreda* A. Ventral, B. Lateral, C. broken *phallus* with dorsal projections separated shown. Scale: 1 mm. / Genitalia macho de *Lacosoma vulfreda* A. Ventral, B. Lateral, C. *Phallus* roto con proyección dorsal se muestra por separado. Escala: 1 mm.

Additional comments: We found two *Druentica* Strand, 1932 morphotypes represented by four specimens in the MPUJ, however, they could not be identified to the specific level. They may be undescribed species, but are similar to *D. patawa* Herbin, 2016, *D. differenciata* Bryk, 1953, and related species. Nevertheless, barcoding and a full genus revision are needed for clear identifications of *Druentica* in Colombia and the rest of the Neotropics. Upon completion of this manuscript, we identified one additional mimallonid specimen, representing a second species of *Gonogramma* deposited in the MPUJ: *G. eminens* (Dognin, 1923) COLOMBIA: Cundinamarca: 1 Male. Reserva Chicaque. 29 Ago- 02 Sept 2016. D. Cualla. Little has been published about this species, but it is widespread in the Andes, and was originally described from Distrito Capital, Colombia.

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