Zootaxa 4084 (4): 557–571
http://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://doi.org/10.11646/zootaxa.4084.4.6
http://zoobank.org/urn:lsid:zoobank.org:pub:B1923A1E-E9FA-421E-87C9-2151D9CD1921

The Mimallonidae (Lepidoptera, Mimallonoidea) of the Caribbean Basin, with the descriptions of two new species

RYAN A. ST. LAURENT[1,3] & TIMOTHY L. MCCABE[2]

[1]*Cornell University, Comstock Hall, Department of Entomology, Ithaca, NY 14853-2601 USA. E-mail: ras569@cornell.edu*
[2]*New York State Museum, 222 Madison Ave, Albany, NY 12230, USA. E-mail: timothy.mccabe@nysed.gov*
[3]*Corresponding author*

Abstract

Mimallonidae of the Caribbean Basin are discussed, with attention primarily given to species endemic to the Caribbean islands and the northern coast of Venezuela. The Caribbean Basin is a political term for tropical regions circumscribed by the Gulf of Mexico. *Cicinnus bahamensis* **sp. n.** is described from the Bahamas, the first species of Mimallonidae from this country. The Cuban species *Cicinnus packardii* (Grote, 1865), the closest relative of *C. bahamensis* **sp. n.**, is figured and compared. A third, similar, species from northern coastal Venezuela, *C. falcoargenteus* **sp. n.**, is described and compared to the previous two species.

Key words: Bahamas, Caribbean Basin, *Cicinnus*, Cuba, Mimallonidae, Venezuela

Introduction

Recent years have shown an increasing interest in the taxonomy of the previously understudied family Mimallonidae, the sole representative of superfamily Mimallonoidea (Herbin 2012, 2015, Herbin & Mielke 2014, Herbin & Monzón 2015, St Laurent & Dombroskie 2015). The higher-level arrangement of the family is poorly understood and a family-level revision has not been completed since Schaus (1928). We follow previous authors and do not recognize intrafamilial classification above the genus-level until a phylogenetic study has been performed.

Becker (1996) listed 57 species in the genus *Cicinnus* Blanchard, 1852 but recent work involving the transferal of *C. pulverula* (Schaus, 1896) to *Eadmuna* Schaus, 1928 by St Laurent & Dombroskie (2015) as well as the description of 15 additional new species by Herbin (2012 & 2015), Herbin & Mielke (2014), and Herbin & Monzón (2015) has shifted this number to 71. These recent publications have shown *Cicinnus* to be a rather diverse genus, but one poorly defined morphologically. Both Forbes (1942) and Franclemont (1973) recognized the improper placement of various species in *Cicinnus*. Until a more detailed study can be completed on *Cicinnus* as a whole, we place new species described herein in this genus based on their morphological resemblance to several species currently described in *Cicinnus*. However, it is necessary to mention that the type species of *Cicinnus*, *C. orthane* Blanchard, 1852, differs in external characters from most other species currently placed in *Cicinnus*, including the species described herein, and suggests that the name *Cicinnus* may eventually prove to only be applicable to a more restricted group of species.

Only one species, *C. packardii* (Grote, 1865), is currently known from the Caribbean islands (not including Trinidad), and is restricted to Cuba. The present work describes a new species from the Bahamas, and a second, related new species from the northern coast of Venezuela. Both new species are compared to *C. packardii* because of the apparent similarities in external and genitalia morphology.

Accepted by M. Pellinen: 27 Jan. 2016; published: 29 Feb. 2016

Material and methods

Dissections were performed as in Hardwick (1950), however, not all genitalia were prepared on slides to allow for three-dimensional analysis of the complex male genitalia. Genitalia and abdomens, when not slide mounted, are preserved in glycerol filled microvials. Morphological, including genitalia, terminology follows Lemaire & Minet (1999).

Specimens from the following collections were examined:

AMNH	American Museum of Natural History, New York, New York, USA
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania, USA
BME	Bohart Museum of Entomology, University of California, Davis, California, USA
CUIC	Cornell University Insect Collection, Ithaca, New York, USA
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
MGCL	McGuire Center for Lepidoptera & Biodiversity, Gainesville, Florida, USA
NHMUK	The Natural History Museum [formerly British Museum (Natural History), BMNH], London, U.K.
NYSM	New York State Museum, Albany, NY, USA
RAS	Research collection of Ryan A. St. Laurent, Ithaca, NY, USA
TM	Research collection of Tim L. McCabe, Albany, NY, USA
USNM	National Museum of Natural History [formerly United States National Museum], Washington D.C., USA

Figures were manipulated with Adobe Photoshop CS4 (Adobe 2008). Maps were created with SimpleMappr (Shorthouse 2010) and edited with CS4. All geographical coordinates are approximate, and are based on the localities provided on specimen labels. GPS data was acquired with Google Earth.

Genitalia have been stained with a combination of chlorazol black and orange-G stains. Adobe Photoshop CS4 was used to brighten characters. Genitalia were photographed with a Macroscopic Solutions Macropod Pro and Canon EOS 6D DSLR camera body using the Macro Photo MP-E 65mm f/2.8 1–5× Manual Focus Lens for EOS. Thirty (3×) photographs were taken of each specimen in ethanol under glass, and stacked using Zerene Stacking Software.

Results

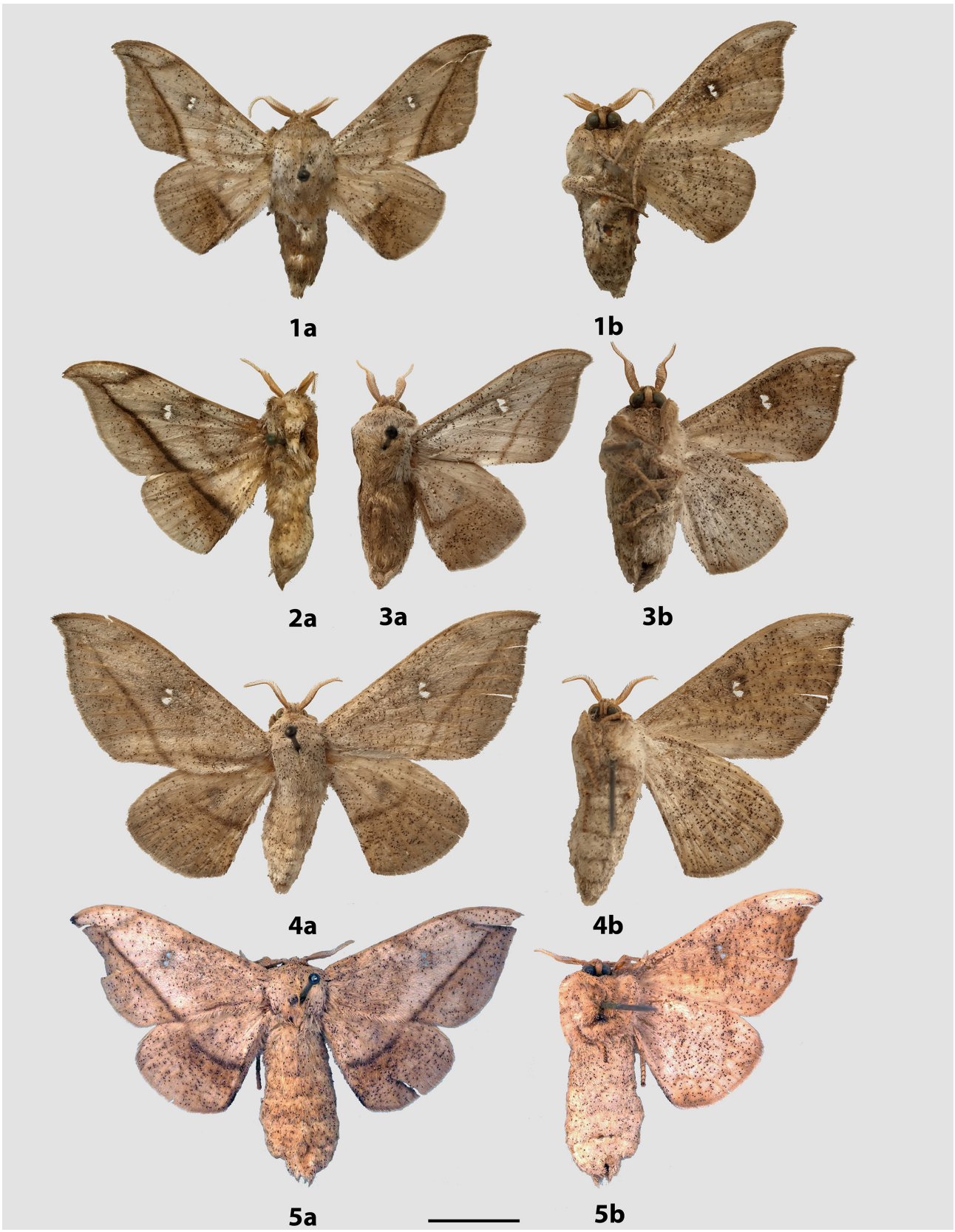
Cicinnus packardii (Grote, 1865)

(Figs 1–5, 18, 19, 22)

Perophora packardii Grote, 1865, Plate 4, Fig. 6 female
Perophora packardii; Grote 1867
Perophora packardi; Foetterele 1902, misspelling
Perophora packardi; Lima 1922*, misspelling
Perophora packardi; Lima 1927*, misspelling
Cicinnus packardi; Schaus 1928, Fig. 87c male, misspelling
Cicinnus packardi; Monte 1934*, misspelling
Cicinnus packardi; Bondar 1950*, misspelling
Cicinnus packardii; Silva et al. 1968*
Cicinnus packardi; Biezanko 1986*, misspelling
Cicinnus packardi; Becker 1996, misspelling
Cicinnus packardi; Pastrana 2004*, misspelling
Cicinnus packardii; Herbin & Monzón 2015

*References that almost certainly refer to *Cicinnus despecta* (Walker, 1855) or a related South American species.

Type material. Holotype, ♀: **CUBA:** Cuba., Poey, Collection/ 612/ Type No. 7749, Perophora PACKARDII, A.R. Grote/ [photo examined, ANSP]. No paratypes.



FIGURES 1–5. *Cicinnus packardii* adults, a= recto, b= verso. 1. Male, Cuba, Soledad, Santa Clara (MCZ). 2. Male, Cuba (USNM). 3. Male, Cuba, Soledad, Santa Clara (MCZ). 4. Female, Cuba, Soledad, Santa Clara (MCZ). 5. Holotype female, Cuba [color manipulated in CS 4 due to poor true color capture, photo courtesy of ANSP] (ANSP). Scale bar= 1 cm.

Additional specimens examined. (14 ♂, 2 ♀ total) **CUBA:** 4 ♂, 1 ♀, Matazanas: W. Schaus coll., St. Laurent diss.: 10-31-15:2 (AMNH); VII, XI, USNM-Mimal: 1314, 1316, 1317 (USNM). 1 ♂, Central Soledad: 29.VIII.1932, B.B. Leavitt (MCZ). 3 ♂, 1 ♀, Soledad, Santa Clara: 3.VIII.1932, 5.IX.1932, Bates and Fairchild, St. Laurent diss.: 11-6-15:1, 11-12-15:1, 11-20-15:1 (MCZ). 2 ♂, Santiago: Collection Wm Schaus, USNM-Mimal: 1319, 1320 (USNM). 1 ♂, Sierra Maestra, East Cuba, 1000 ft: 28.I.1930, O. Querci, 47 I.C.M., USNM-Mimal: 1315 (USNM). 3 ♂, No additional collecting data: Dognin Collection, USNM-Mimal: 1321, 1322, 1324, St. Laurent diss.: 12-1-15:1 (USNM).

Additional specimen photographs examined. (2 ♂, 1 ♀ total) **CUBA:** 1 ♂, Santiago de las Vegas: USNM-Mimal: 2736 (USNM). 1 ♂, Matazanas Province, Cienga Zapata, nr. Playa Larga, 3 m: 10–11.II.1981, D.R. Davis, USNM-Mimal: 2734 (USNM). 1 ♀, Cienfuegos Prov., nr. Pasa Caballos, 6 km S. Cienfuegos, 10 m: 13–14.II.1981, D.R. Davis, USNM-Mimal: 2735 (USNM).

Diagnosis. Both sexes of this species can be recognized by the presence of a B-shaped hyaline patch on the forewings and strongly contrasting postmedial lines on both fore and hindwings. Postmedial lines are accented by brown shading on the outer edges, especially on the hindwings. The most similar species not treated in the present work, *C. felderia* Schaus, 1928 and *C. hanseni* Herbin & Monzón, 2015, display more heavily contrasting markings and deeper, redder shading on the outer edges of the postmedial lines, and are found in Mexico and Central America. Additionally, *C. hanseni* is smaller and has narrower wings than *C. packardii*. The light brown ground color, presence of dark shading in the postmedial region of all wings, especially along the outer edge of the postmedial line, and the usually larger hyaline discal mark differentiates *C. packardii* from the following two species. The hindwing discal spot of the female of *C. packardii* is somewhat darker than that of female *C. bahamensis* **sp. n.**, described below.

Description. Male. *Head*: Small, scales on frons swept ventrad, pale off-white to gray, eyes very large comprising roughly half of head area, eyes bordered posteriorly by dark brown collar of scales reaching labial palpi, labial palpi small, segments weakly defined ventrally because of the presence of ventral tufts, segments smaller distally, dorsally with darker scales contrasting with overall straw coloration. Antenna bipectinate to tip, scape and pedicel weakly tufted.

Thorax: Gray to very light brown, densely covered in scales of varying widths, generously sprinkled with darker petiolate scales.

Legs: Vestiture thick, scales long, coloration as for thorax, darker petiolate scales present. Tibial spurs short, indistinct.

Forewing dorsum: Forewing length: 19–24 mm, avg.: 21.4 mm, n=14. Triangular, apical quarter of outer margin concave, convex mesally, apex falcate. Ground color pale gray, overall generously speckled by dark petiolate scales. Discal spot marked by small, fused B-shaped hyaline area, bisected by M_2, outlined by darker gray scales. Postmedial line pale brown, nearly straight, sometimes with slight undulations near posterior wing margin, postmedial line angled sharply towards costa immediately after passing R_5. Antemedial line very faint or absent, brownish, bulging outward. Postmedial area always darker than medial area, usually brown, but sometimes darker gray, shading darkest along postmedial line, shaded region widening approaching posterior wing margin.

Forewing venter: As in forewing dorsum but more heavily speckled, pinkish suffusion sometimes present near discal mark, postmedial and antemedial lines absent, postmedial line replaced by faint gray, curved streak extending from costa to M_3.

Hindwing dorsum: Rounded, similar coloration and patterning as forewings but postmedial line terminates before reaching anterior wing margin, brown postmedial suffusions concentrated near anal angle of wing, hyaline discal mark absent, but replaced by faint gray mark.

Hindwing venter: Following similar pattern as forewing venter but lines usually absent, faint remnant of postmedial line may be present, frenulum absent or highly reduced.

Abdomen: Short, vaguely triangular, reaching just barely beyond anal margin of hindwing, depth equal to that of thorax, truncated to slightly upturned posterior tip, coloration a continuation of gray thoracic color. Venter as for dorsum.

Genitalia: (Fig. 19) n=4. Very complex; uncus elongate, very narrow, tubular, apex rounded. Tegumen somewhat box-like or ovoid, indented or smooth mesally. Gnathos absent. Valves mostly membranous, relatively short, bent upwards at base of uncus, sclerotized mesally as two robust, somewhat pointed processes, thin band of sclerotization from processes to ventral valve edge curved to nearly straight. Vinculum box-like, ventral corners of

vinculum accentuated as relatively large, rounded knobs. Saccus quadrate, variable, smooth or wrinkled, weakly sclerotized distally. Elongated, inward curving tusks originating at base of vinculum reach just below tegumen. Juxta fused to both phallus and vinculum; pair of complicated, invaginated structures extend from juxta dorsally over phallus, forming connection with vinculum. Phallus short, broad, somewhat rectangular when viewed ventrally, cannot be excised from genitalia capsule without damaging juxta-vinculum complex. Vesica roughly phallus-length, bag-like, without cornuti.

Female. *Head*: As in male but smaller, antenna smaller overall.

Thorax: As in male.

Legs: As in male.

Forewing dorsum: Forewing length: 26 mm, avg. 26, n=2. As in male but slightly broader, less falcate, postmedial and antemedial lines fainter or absent, postmedial shading fainter but present. B-shaped hyaline discal spot with dark gray scales along M_2 separating hyaline patch into two distinct halves.

Forewing venter: As in forewing dorsum but more heavily speckled, pale pink-brown suffusion present.

Hindwing dorsum: As in male but broader, postmedial shading fainter but present, discal mark darker and larger.

Hindwing venter: Following similar pattern as forewing venter.

Abdomen: As in male but stouter, venter of VIII segment with pair of small, longitudinal sclerotized bands.

Genitalia: (Fig. 22) n=1. Simple; papillae anales somewhat widened distally, trapezoidal, covered in fine setae, setae shorter basally. Apophyses anteriores longer and more curved than apophyses posteriores. Apophyses widened distally. Ductus bursae short, wide, opening immediately into elongate corpus bursae. Corpus bursae poorly preserved. Dorsal sclerotization of VIII tergite doubled, accordion-like, forming posteriorly directed subtriangle with internal, bulbous mass apically. Lamella antevaginalis small, concave, with small, thin, amorphous masses covered in short, thick setae located on either side of ostium.

Distribution (Fig. 18). This species is endemic to Cuba, with most records from the western and west-central parts of the island. Eastern records are restricted to the southern coast.

Natural history. While there is nothing published on the biology of *C. packardii* in Cuba, the CUIC has three larval sacks collected in Pinar del Rio, Cuba on 29.III.1939. There are no adults accompanying these sacks, therefore it is not possible to verify their identity, though the locality certainly suggests *C. packardii* since no other Mimallonidae are known from the island. The sack structure is exactly like that of *C. bahamensis* **sp. n.** (Figs 9, 10). Unfortunately no host records accompany these specimens, except the word "Artemisia" which is probably a misspelling of Artemisa, a municipality near Pinar del Rio, and not the plant genus belonging to Asteraceae.

Remarks. *Cicinnus packardii* is frequently misspelled as "*C. packardi*" in the literature. Confusingly, *C. packardii* is numerously referenced in Brazilian literature (Lima 1922, 1927, Monte 1934, Bondar 1950, Silva 1968, Biezanko 1986) as occurring in Brazil, often in agricultural publications listing larval host plants. However, this species is known only from Cuba, and all South American references to this species almost certainly can be attributed to the somewhat similar *C. despecta* or a related species such as *C. conlani* Herbin & Mielke, 2014. Pastrana (2004) later repeated this mistake, listing this species for Argentina as well as Brazil. *Cicinnus despecta*, identified as *C. packardii*, was commonly seen in many of the visited collections (R. A. St. Laurent pers. obs.).

Cicinnus bahamensis St. Laurent & McCabe, sp. n.

(Figs 6–15, 18, 20, 23)

Type material. Holotype, ♂: **BAHAMAS: Great Exuma:** BAHAMAS-Great, Exuma-Simons Pt, 23.31.50 – 75.47.30, 23 January 1980, Tim L. McCabe/ St. Laurent diss.: 10-15-15:5/ HOLOTYPE male *Cicinnus bahamensis* St Laurent and McCabe, 2016 [handwritten red label]/ (CUIC).

Paratypes, 84 ♂, 16 ♀ total: **BAHAMAS: Abaco:** 4 ♂, J.L. Bonhote, St. Laurent diss.: 10-15-15:3 (NHMUK). **Great Exuma:** 53 ♂, 13 ♀, Simon's Point, 23.31.50 – 75.47.30, T. McCabe: 10.I.1980 [1♂, CUIC]; 11.I.1980 [3♂, 2♀, AMNH, TM]; 12.I.1980 [3♂, TM], McCabe slide 5305; 13.I.1980 [2♂, 2♀, CUIC, TM], St. Laurent diss.: 11-10-15:1; 14.I.1980 [2♂, 1♀, TM]; 18.I.1980 [4♂, 1♀, TM]; 20.I.1980 [1♂, TM]; 21.I.1980 [1♂, 1♀, RAS]; 22.I.1980 [4♂, TM, NYSM]; 23.I.1980 [5♂, 2♀, CUIC, USNM, NYSM, TM], McCabe slide 5302; 26.I.1980 [1♀, NYSM]; 22.XII.1981 [1♂, CMNH]; 20.XII.1981 [1♂, TM]; 26.XII.1981 [1♂, RAS]; 27.XII.1981

[1♂, MGCL]; 8.I.1982 [1♂, TM]; 13.I.1982 [1♂, TM]; 17.I.1982 [2♂, TM]; 21.I.1982 [1♂, TM]; 23.I.1982 [1♂, TM]; 28.I.1982 [1♂, TM], McCabe slide 5015; 10.IV.1986 [3♂, USNM, TM]; 11.IV.1986 [5♂, TM, donated to research collection of Daniel Herbin, France]; 12.IV.1986 [2♂, TM]; 13.IV.1986 [1♀, TM], McCabe slide 5030; 15.IV.1986 [2♂, TM]; 16.IV.1986 [3♂, TM]; 21.IV.1986 [1♂, 2♀, TM]. **New Providence:** 7 ♂, Nassau: 16.II1902, J.L. Bonhote, St. Laurent diss.: 10-15-15:2 (NHMUK). **North Andros:** 1 ♂, Fresh Creek: no additional data (AMNH). **South Bimini:** 17 ♂, 1 ♀, F.H. Rindge, 8.VI.1950 [3♂]; 9.VI.1950 [6♂]; 10.VI.1950 [4♂], St. Laurent diss.: 10-31-15:1; 12.VI.1950 [4♂]; V.1951 [1♀] (AMNH). 2 ♂, 2 ♀, No collector: V.1950 [1♀]; V.1951 [2♂]; 14–22.VIII.1951 [1♀] (AMNH). All paratypes with the following yellow label: PARATYPE male/female *Cicinnus bahamensis* St Laurent and McCabe, 2016.

Additional specimens examined [not to be included in type series.] (5 ♂, 1 ♀ total) **BAHAMAS:** 1 ♂, "Bahamas," no specific island data: L. Bonhote (NHMUK). **Abaco:** 1 ♀, near Snake Creek, N 26.417915°, W 77.041898°: 9.IX.2014, coll. L. Yang, ex. larva (BME). **Great Inagua:** 2 ♂, 5 km. S of Salt Works: 30.IX.1986, M. Simon & L. Miller, UV, Allyn Museum, Acc. 1986–19, St. Laurent diss.: 10-15-15:1 [possibly representing a second, undescribed, species from the Bahamas] (MGCL). **Little Abaco:** 2 ♂, emerged 8.VII.1922, 10.XI.1922, LRG? [initials illegible] (NHMUK).

Diagnosis. Both sexes of this species can be distinguished from the similar *C. packardii* by the lighter gray ground color, fainter markings on all wings, and the reduction of brown shading on the outer margin of the postmedial lines, which is usually entirely absent. Additionally, the postmedial region in *C. packardii* is always much darker than that of the medial region, whereas these regions are nearly always concolorous in *C. bahamensis* **sp. n.** Genitalia differences also reliably separate *C. bahamensis* **sp. n.** from *C. packardii*: in *C. bahamensis* **sp. n.** the uncus is slightly broader, the sclerotized mesal processes of the valves are smaller, less robust, and usually sharper, and the ventral knobs of the vinculum are smaller.

Description. Male. *Head*: Small, scales on frons swept ventrad, pale off-white to gray, eyes very large comprising roughly half of head area, eyes bordered posteriorly by dark brown collar of scales reaching labial palpi, labial palpi small, segments weakly defined ventrally due to ventral tufts, segments smaller distally, dorsally with darker scales contrasting with overall straw coloration. Antenna bipectinate to tip, scape and pedicel weakly tufted.

Thorax: Gray, densely covered in scales of varying widths, generously sprinkled with darker petiolate scales.

Legs: Vestiture thick, scales long, coloration as for thorax, except tarsus off-white, darker petiolate scales present. Tibial spurs short, triangular.

Forewing dorsum: Forewing length: 19.5–21 mm, avg.: 20 mm, n=14. Triangular, apical quarter of outer margin concave, convex mesally, apex falcate. Ground color pale gray, overall generously speckled by dark petiolate scales. Discal spot marked by small, fused B-shaped hyaline area, bisected by M_2, outlined by darker gray scales. Postmedial line dark gray or pale brown, nearly straight with slight undulations along length or somewhat curved after M_2, postmedial line angled sharply toward costa immediately after passing R_5. Antemedial line very faint or absent. Postmedial area occasionally with tan suffusion near wing margin, overall barely darker than medial area.

Forewing venter: As in forewing dorsum but more heavily speckled, pinkish suffusion sometimes present near discal mark, postmedial and antemedial lines absent, postmedial line replaced by faint gray, curved streak from costa to M_3.

Hindwing dorsum: Rounded, similar coloration and patterning as forewings but postmedial line terminates before reaching anterior wing margin, hyaline discal mark absent, but replaced by faint gray mark.

Hindwing venter: Following similar pattern as forewing venter but lines absent, frenulum absent or highly reduced.

Abdomen: Short, vaguely triangular, reaching just barely beyond anal margin of hindwing, depth equal to that of thorax, truncated to slightly upturned posterior tip, coloration a continuation of gray thoracic color. Venter as for dorsum.

Genitalia: (Fig. 20) n=7. Very complex; uncus elongate, tubular, apex rounded. Tegumen circular or ovoid, indented mesally, width of indent variable. Gnathos absent. Valves mostly membranous, relatively short, bent upwards at base of uncus, sclerotized mesally as two somewhat pointed processes, thin band of sclerotization from processes to ventral valve edge steeply curved, nearly C-shaped. Vinculum box-like, ventral corners of vinculum accentuated as rounded knobs. Saccus quadrate, variable, smooth or wrinkled. Elongated, inward curving tusks

originating at base of vinculum reach just below tegumen. Juxta fused to both phallus and vinculum; pair of complicated, invaginated structures extend from juxta dorsally over phallus, forming connection with vinculum. Phallus short, broad, somewhat rectangular when viewed ventrally, cannot be excised from genitalia capsule without damaging juxta-vinculum complex. Vesica roughly phallus-length, bag-like, without cornuti.

Female. *Head*: As in male.

Thorax: As in male.

Legs: As in male.

Forewing dorsum: Forewing length: 25–26 mm, avg.: 25.5 mm, n=3. As in male but slightly broader, less falcate, postmedial and antemedial lines fainter or absent. B-shaped hyaline discal spot with dark gray scales along M_2 separating hyaline patch into two distinct halves.

Forewing venter: As in forewing dorsum but more heavily speckled.

Hindwing dorsum: As in male but broader.

Hindwing venter: Following similar pattern as forewing venter but more heavily speckled.

Abdomen: As in male but stouter, venter of VIII segment with pair of small, longitudinal sclerotized bands.

Genitalia: (Fig. 23) n=3. Simple; papillae anales somewhat widened distally, trapezoidal, covered in fine setae, setae shorter basally. Apophyses anteriores roughly same size as apophyses posteriores, but thinner. Apophyses widened distally. Ductus bursae short, wide, opening immediately into elongate corpus bursae. Corpus bursae cylindrical, without any sclerotized structures. Small, bag-like appendix bursae present. Dorsal sclerotization of VIII tergite forms posteriorly directed subtriangle. Lamella antevaginalis small, concave, with amorphous masses covered in short, thick setae located on either side of ostium, left mass (when viewed ventrally) larger than right.

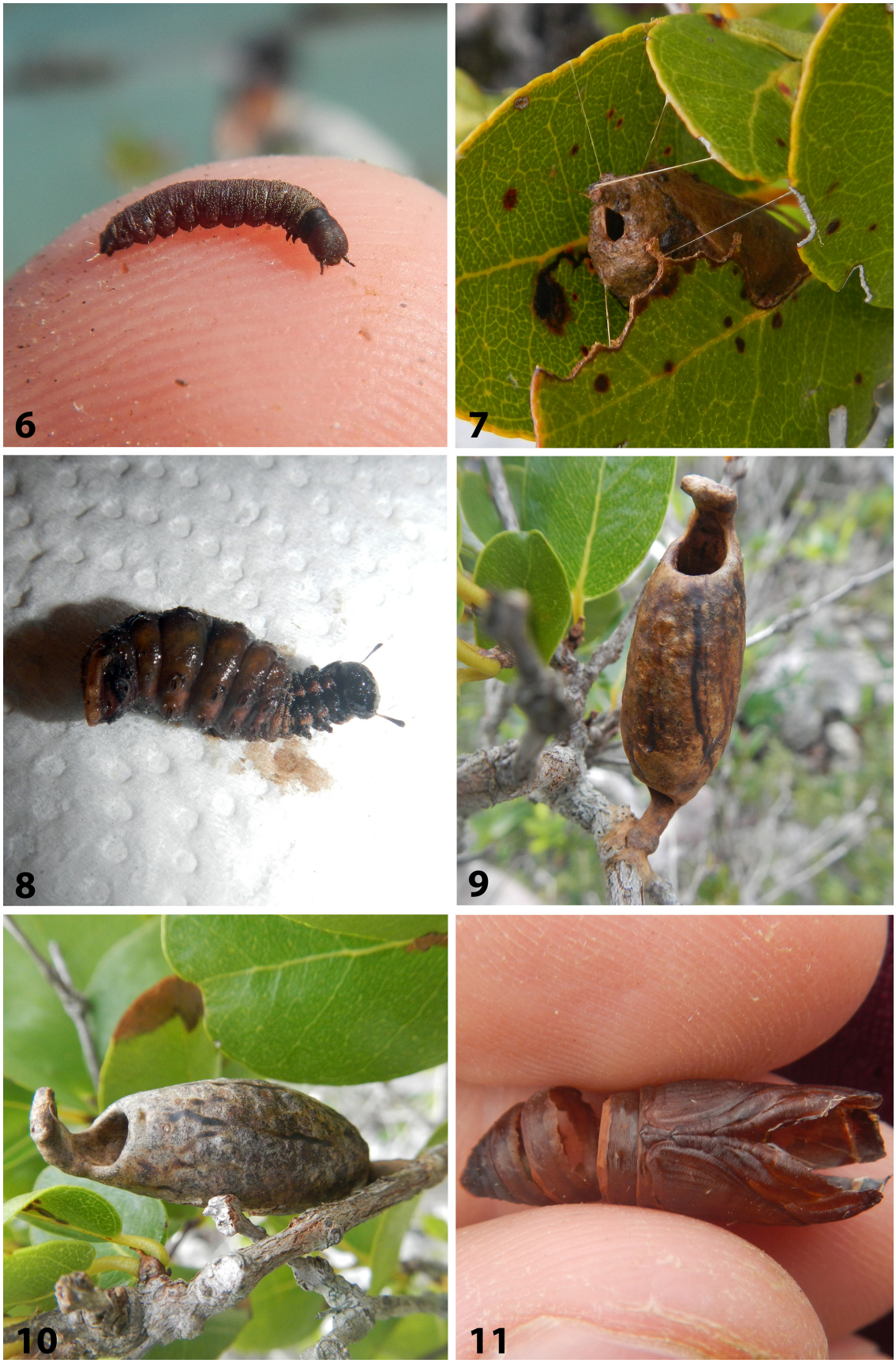
Distribution (Fig. 18). This species is endemic to the Bahamas, with records from the following islands: Great Exuma, the Abacos, New Providence, South Bimini, and North Andros. This species may also be present on Great Inagua of the lower Bahamas, but see remarks.

Habitat. The plant community at the type locality of *C. bahamensis* **sp. n.**, Simon's Point, Great Exuma Island, can be considered a "Coastal Coppice" (Correll & Correll 1982). Annual average rainfall is about 114 cm per year on Exuma, but typically only about 15 cm for January through April. The mid-winter xeric conditions are reflected by the plant community on the island, whereby the following species are among the most common: *Chrysobalanus icaco* L. (Rosaceae), *Erithalis fruticosa* L. (Rubiaceae), *Bourreria ovata* Miers (Boraginaceae), *Caesalpinia bahamensis* Lam., *Leucaena leucocephala* (Lam.) de Wit (Fabaceae), *Malphigia polytricha* A. Juss. (Malphigiaceae), and *Metopium toxiferum* (L.) Krug & Urb. (Anacardiaceae). Simon's Point is on the windward side of the island, consequently mangrove species were virtually absent. The leeward side of the island (a mangrove community) was subjected to infrequent sampling. *Cicinnus bahamensis* **sp. n.** was common at light on the windward side but was not observed on the leeward side of the island. Constant offshore winds made it necessary to collect in a recessed, wind-protected carport on Simon's Point.

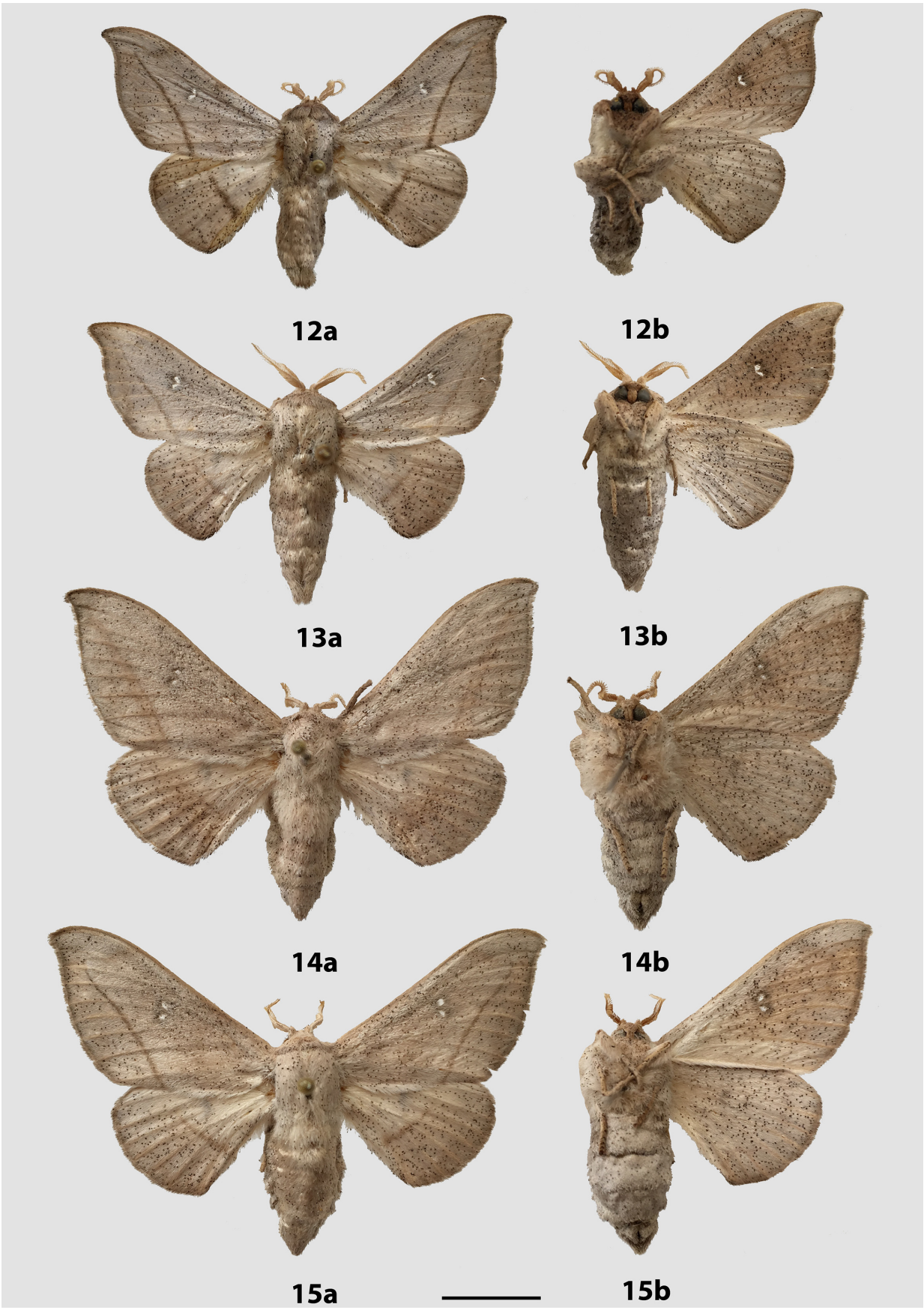
According to Eric LoPresti and Louie Yang (BME) (pers. comm.), *C. bahamensis* **sp. n.** larvae were frequently encountered on *Psidium* L. (Myrtaceae) on coppices of small islands on the eastern side of Abaco Island. *Psidium* was also present on Great Exuma but not in the immediate vicinity of the light traps, suggesting either polyphagy or dispersal abilities.

Natural history. Eric LoPresti and Louie Yang (pers. comm.) provide evidence that *C. bahamensis* **sp. n.** feeds on *Psidium longipes* Berg (McVaugh) as per encounters with larvae and larval sacks on this plant on Abaco Island. Feeding damage in close proximity to the affixed larval sacks suggests that *P. longipes* is indeed being utilized as the host plant. An adult reared from collected larvae (in BME) matches the habitus of *C. bahamensis* **sp. n.** and the first author examined several specimens of *C. bahamensis* from the Abaco Islands (NHMUK). Therefore, we reasonably determine that the natural history information that has been made available to us pertains to this new species. Furthermore, *Psidium* has been reported as hosts for several Mimallonidae and thus the association of *C. bahamensis* **sp. n.** with this host plant genus was not unexpected (Silva et al. 1968).

Larval vouchers are not available for our detailed examination, thus a larval description cannot be provided at this time. We do however recognize the distinct similarity in larval morphology to that of *C. melsheimeri* (Harris, 1841), which the first author has reared. The sack structure of the probable final instar larvae of *C. bahamensis* **sp. n.** differs from that of *C. melsheimeri* in that it is formed from larval frass covered in silk (see Figs 9, 10), and apparently does not incorporate leaf tissue, as is the case in the latter species. We note, however, that the smaller sacks of earlier instars (Fig. 7) collected on *Psidium* do incorporate some leaf material, and in this way greatly resemble the sacks of *C. melsheimeri*.



FIGURES 6–11. *Cicinnus bahamensis* **sp. n.** natural history, Bahamas, Abaco, courtesy of Eric LoPresti (BME), used with permission. 6. Early instar larva. 7. Early instar larval shelter. 8. Late instar larva. 9–10. Late instar larval sacks. 11. Pupal exuvium.



FIGURES 12–15. *Cicinnus bahamensis* **sp. n.** adults, a= recto, b= verso, Bahamas, Great Exuma, Simon's Point. 12. Holotype male (CUIC). 13. Paratype male (RAS). 14. Paratype female (CUIC). 15. Paratype female (RAS). Scale bar= 1 cm.

Etymology. This new species is named for the Bahamas, the country to which it is endemic.

Remarks. Material of *C. bahamensis* **sp. n.** has existed in major collections (AMNH, NHMUK) for decades but has avoided formal description. Only one other species has been described from the Caribbean Islands until now (with the exception of Trinidad), and thus the description of *C. bahamensis* **sp. n.** effectively doubles the known diversity of this family in the region. We note that no Mimallonidae, including this new species, have been recorded from Hispaniola.

The Cuban species *C. packardii* appears to be very closely related to *C. bahamensis* **sp. n.** based on external and genitalia morphology, and this previously described species was thus included in the present work for comparison purposes. Morphological differences suggest that these two species are not conspecific, despite their general similarity. Although we note only minor differences in genitalia, the degree of similarity between these two species is not unique. Both *C. bahamensis* **sp. n.** and *C. packardii* belong to a larger group of *Cicinnus* characterized by hyaline patches on the forewings and genitalia characters, whereby members of this group have some of the most homogenous male genitalia across species (R. A. St. Laurent pers. obs.). Another member of this group, the recently described *C. conlani*, displays male genitalia highly reminiscent of the Caribbean species (Herbin & Mielke 2014, Fig. 15 [incorrectly oriented and labeled in print]). However, *C. conlani*, of the Brazilian Cerrado, is broadly allopatric with the two Caribbean island species (Herbin & Mielke 2014). Furthermore, *C. falcoargenteus* **sp. n.**, to be described below, also belongs to this closely related group of *Cicinnus*, and shows very similar genitalia characters, despite distinct external characters and allopatry. We also examined *C. felderia* from Mexico (St. Laurent diss.: 10-31-15:3, AMNH) and the published figures of the Guatemalan species *C. hanseni*, and noted great similarity in male genitalia. These species clearly belong to a group with very close affinities, and future work may prove this group of *Cicinnus* to be more aptly placed in a distinct genus or at least a well-defined species-group.

Two extremely worn, nearly destroyed, specimens from Great Inagua, Bahamas (in MGCL) are smaller, have shorter wings, and somewhat browner coloration when compared to specimens from the rest of the Bahamas. These specimens also show some differences in the genitalia, namely in the more widely flailed proximal end of the phallus. Given the relative isolation of Great Inagua from more northern Bahamas islands and minor differences in genitalia and external characters, we consider this population as possibly belonging to an additional undescribed species, if not, at least a geographic variation. We do not describe this population as new for lack of a good series of quality specimens on which to base a description and designate type specimens. Pending additional material from Great Inagua or nearby, we will merely acknowledge the presence of this population and bring awareness of it into the scientific record for potential future work.

Cicinnus falcoargenteus St. Laurent & McCabe, sp. n.

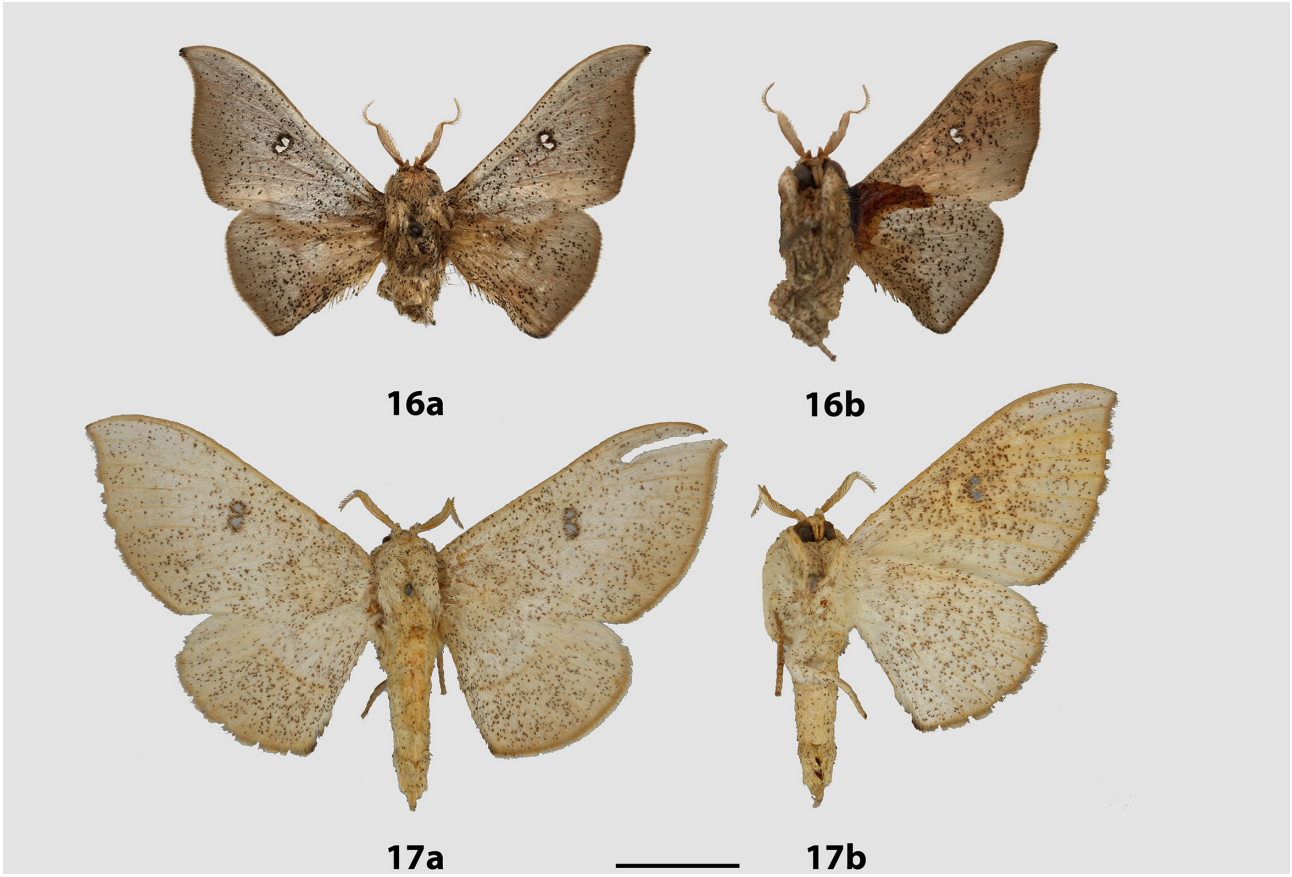
(Figs 16–18, 21)

Type material. Holotype, ♂: **VENEZUELA:** San Estaban, Carabobo, Venez., Dec. 1–20, 1939, Pablo J. Anduze/ "Eadmuna paloa Schaus 1931"/ St. Laurent diss.: 9-7-14:1/ HOLOTYPE male *Cicinnus falcoargenteus* St Laurent and McCabe, 2016 [handwritten red label]/ (CUIC). No paratypes.

Additional specimens examined. [not to be included in type series] (2 ♀ total) **VENEZUELA:** Palma Sola [Carabobo]: Joicey Coll. Brit. Mus, 1925–157, BMNH(E) 1377212 (NHMUK).

Diagnosis. *Cicinnus falcoargenteus* can be distinguished from all other described Mimallonidae by the combination of the following characters: silvery, sharply falcate forewings with black scaling at the apical tip, an almost indistinguishable postmedial line, absent antemedial line, and B-shaped hyaline patch. Genitalia are most similar to the above species but differ in that the juxta is much more robust, with the invaginated portion much broader. Additionally, the sclerotized portion of the valve is larger, with thicker processes, the sclerotized band leading from the valve processes to the valve edge is more strongly curved, and the tegumen is broader without a deep indentation mesally.

Description. Male. *Head*: Small, scales on frons swept ventrad, pale gray [grease on the holotype makes the head and thorax appear light brown], eyes very large comprising roughly half of head area, eyes bordered posteriorly by dark brown collar of scales reaching labial palpi, labial palpi small, segments weakly defined ventrally due to ventral tufts, segments smaller distally, dorsally with darker scales contrasting with overall straw coloration. Antenna bipectinate to tip, scape and pedicel weakly tufted.



FIGURES 16–17. *Cicinnus falcoargenteus* **sp. n.** adults, a= recto, b= verso. 16. Holotype male, Venezuela, Carabobo, San Estaban (CUIC). 17. Probable female, Venezuela, Carabobo, Palma Sola [photo courtesy of NHMUK] (NHMUK).

Thorax: Gray, densely covered in scales of varying widths, generously sprinkled with darker petiolate scales.

Legs: Vestiture thick, scales long, coloration as for thorax darker petiolate scales present. Tibial spurs short, triangular.

Forewing dorsum: Forewing length: 19.5, n=1. Triangular, apical quarter of outer margin deeply concave, convex mesally, apex falcate. Ground color pale, silvery gray, overall generously speckled by dark petiolate scales, especially antemedially. Discal spot marked by small, fused B-shaped hyaline area, bisected by M_2, outlined by darker gray scales. Postmedial line very faint, nearly absent. Antemedial line absent. Postmedial area tan-gray mesally, especially along wing margin. Fringe contrasting, cream colored.

Forewing venter: As in forewing dorsum but more heavily speckled, pinkish suffusion present medially and near wing margin, postmedial and antemedial lines absent.

Hindwing dorsum: Subtriangular, similar coloration and patterning as forewings but hyaline discal mark absent, replaced by faint gray mark.

Hindwing venter: Following similar pattern as forewing venter but lines absent, pinkish suffusion absent, frenulum absent. Holotype with thick glue applied to base of wing, obscuring this region.

Abdomen: Short, vaguely triangular, reaching just barely beyond anal margin of hindwing, depth equal to that of thorax, truncated to slightly upturned posterior tip, coloration a continuation of gray thoracic color.

Genitalia: (Fig. 21) n=1. Very complex; uncus elongate, somewhat triangular, apex rounded. Tegumen broadly ovoid. Gnathos absent. Valves mostly membranous, relatively short, bent upwards at base of uncus, sclerotized mesally as two somewhat pointed, thick, cupped processes; thick, curved, sclerotized band extend from mesal processes to ventral valve edge. Vinculum box-like, ventral corners of vinculum accentuated as rounded knobs. Saccus quadrate, indented mesally. Moderately elongated, inward curving tusks originating at base of vinculum reach just below tegumen. Juxta fused to both phallus and vinculum; pair of robust, complicated, invaginated structures extend from juxta dorsally over phallus, forming connection with vinculum. Phallus short, broad,

somewhat rectangular when viewed ventrally, proximal end with small, flattened lobes, phallus cannot be excised from genitalia capsule without damaging juxta-vinculum complex. Vesica bag-like, without cornuti.

Female. [description based on two females from NHMUK that probably belong to this species, but were not included in the type series due to lack of males from same series] *Head*: As in male, but light brown.

Thorax: As in male.

Legs: As in male.

Forewing dorsum: Forewing length: ~27 mm, avg. 27 mm, n=2. As in male but broader, much less falcate, postmedial line about as faint or fainter. B-shaped hyaline discal spot with dark gray scales along M_2 separating hyaline patch into two distinct halves.

Forewing venter: As in forewing dorsum but more heavily speckled, lines absent, light brown suffusion medially and near margin.

Hindwing dorsum: As in male but broader, more rounded, postmedial line darker.

Hindwing venter: Following similar pattern as forewing venter but more heavily speckled, postmedial line absent.

Abdomen: As in male but stouter.

Genitalia: Not examined.

Distribution (Fig. 18). This new species is known only from two locations separated by about 40 km, in the state of Carabobo, Venezuela.

Etymology. *Cicinnus falcoargenteus* **sp. n.** is named for the highly falcate (*falcis* Latin) forewings of the male, combined with the silvery (*argenteus* Latin) ground color.

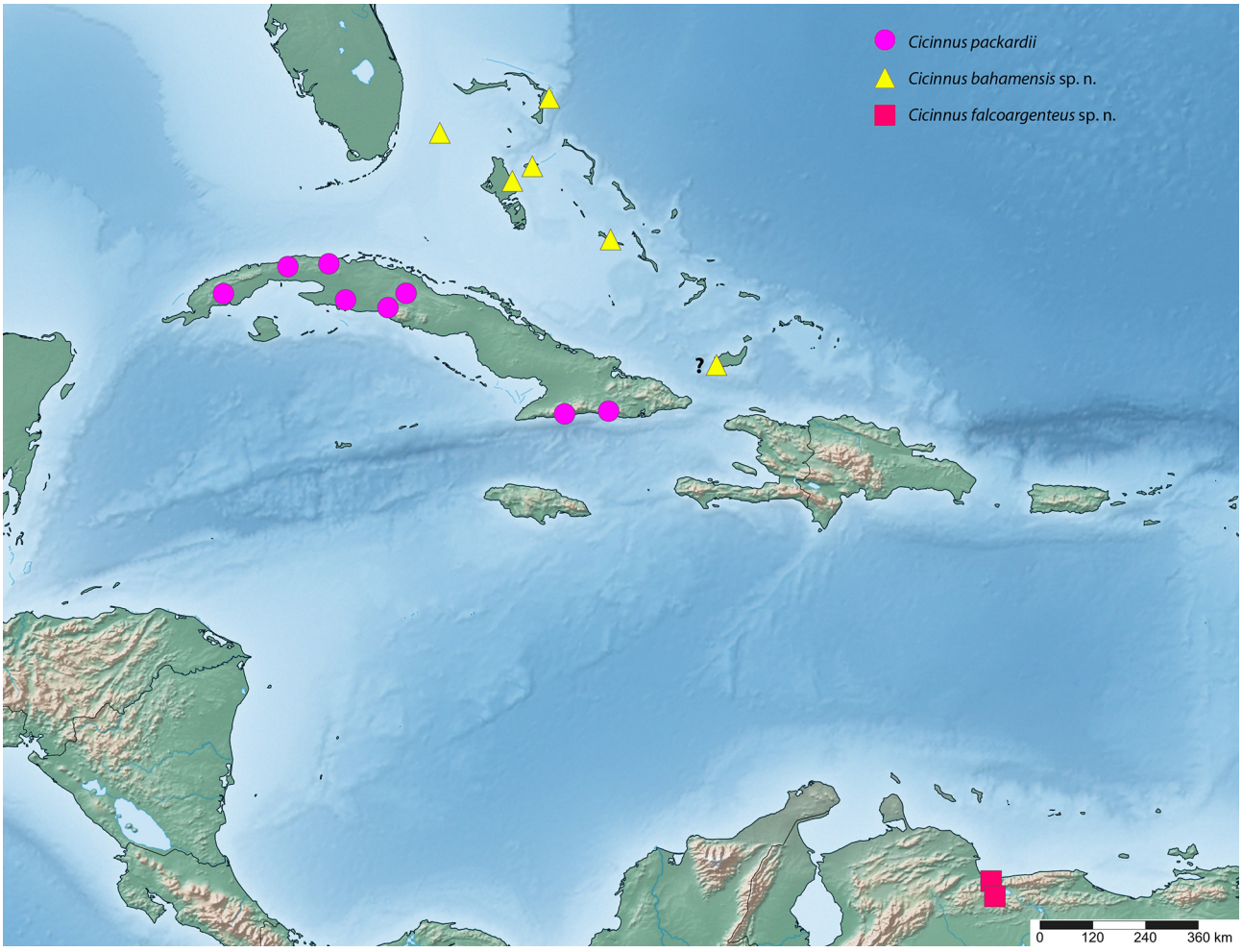
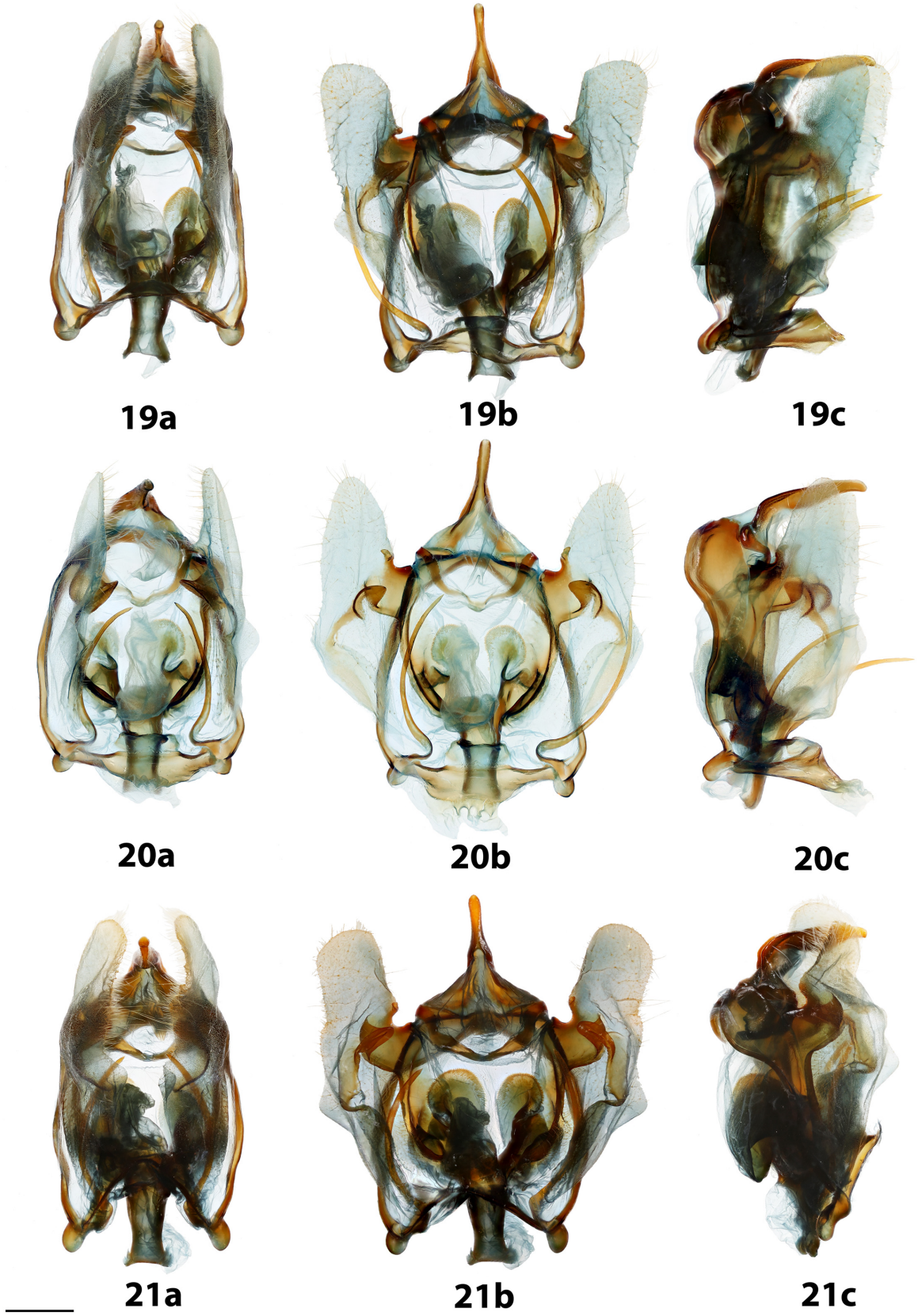
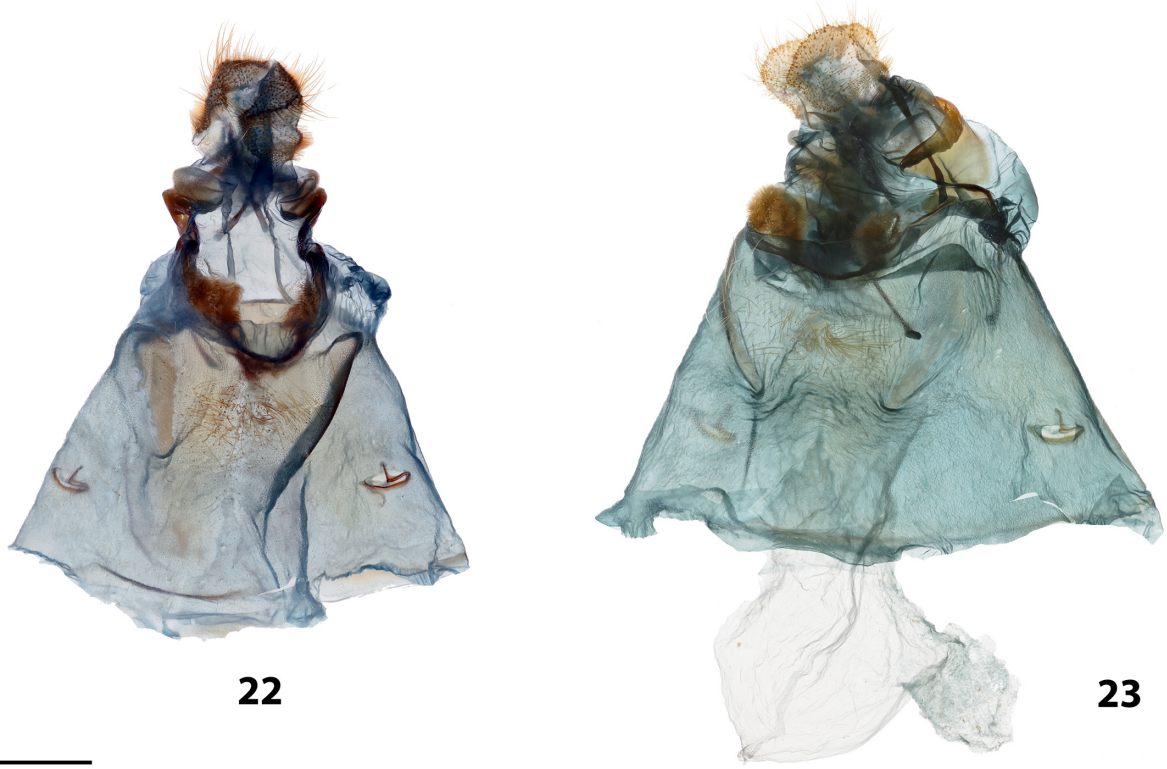


FIGURE 18. Distribution of *Cicinnus* species in the Caribbean Basin. The question mark denotes a questionable locality for *C. bahamensis* **sp. n.**, which probably represents an undescribed species.



FIGURES 19–21. *Cicinnus* male genitalia, a= ventral, b= ventral with valves spread, c= lateral. 19. *C. packardii*, Cuba, Soledad, Santa Clara [St. Laurent diss.: 11-6-15:1] (MCZ). 20. *C. bahamensis* **sp. n.** holotype, Bahamas, Great Exuma, Simon's Point [St. Laurent diss.: 10-15-15:5] (CUIC). 21. *C. falcoargenteus* **sp. n.** holotype, Venezuela, Carabobo, San Estaban [St. Laurent diss.: 9-7-14:1] (CUIC). Scale bar= 1 mm.



FIGURES 22–23. *Cicinnus* female genitalia, ventral. 22. *C. packardii*, Cuba, Soledad, Santa Clara [St. Laurent dis.: 11-20-15:1, corpus bursae damaged] (MCZ). 23. *C. bahamensis* **sp. n.** paratype, Bahamas, Great Exuma, Simon's Point [St. Laurent diss.: 11-10-15:1] (CUIC). Scale bar= 1 mm.

Remarks. This new species is apparently very restricted in distribution, and very poorly represented in collections. We chose to include this species in the present work because of its clear affiliation with the Caribbean island species based on genitalia and external characters, as well as the biogeographic region in which it inhabits. Coastal Venezuela is part of the Caribbean Basin and thus *C. falcoargenteus* **sp. n.**, *C. bahamensis* **sp. n.**, and *C. packardii* likely share an evolutionary history. As mentioned earlier, the morphological similarities among these species may eventually provide grounds for placing them in a separate genus along with other "*Cicinnus*" species displaying similar traits.

Acknowledgments

Mr. Sidney Russell, on behalf of the Bahamian government, granted permission to Tim L. McCabe to collect insects on Exuma. Eric LoPresti, Louie H. Yang, and Ziad Khouri (BME) generously provided data and images critical to our understanding of the natural history of *C. bahamensis*. We would also like to thank Jason Weintraub (ANSP) for type images of *C. packardii*. Jason Dombroskie (CUIC) provided access to the collection's specimens, camera equipment, and stacking software, as well as valuable feedback on the manuscript and photos of some material in the USNM. Harry Pavulaan also provided photos of additional material in the USNM. Ana P. S. Carvalho (University of Florida), Alexander Schintlmeister (Museum Witt München), and an anonymous reviewer reviewed the manuscript and offered helpful suggestions. The following individuals facilitated the loan of important specimens: John Brown (USNM), Alessandro Giusti (NHMUK), David Grimaldi (AMNH), Rachel Hawkins (MCZ), Phil Perkins (MCZ), Courtney Richenbacher (AMNH), and James Hayden (MGCL). We would also like to thank the Hunter R. Rawlings III Cornell Presidential Research Scholars program for providing funding to Ryan St. Laurent for this and ongoing research with Mimallonidae.

References

Adobe (2008) Photoshop CS4: version 11.0.

Becker, V.O. (1996) Mimallonidae. *In*: Heppner, J.B. (Eds), *Atlas of Neotropical Lepidoptera, Checklist. Part 4B. Drepanoidea, Bombycoidea, Sphingoidea*. Association for Tropical Lepidoptera & Scientific Publishers, Gainesville, Florida, pp. 17–19.

Biezanko, C.M. (1986) Adelocephalidae, Saturniidae, Mimallonidae, Lasiocampidae, Eupterotidae e Lymantriidae da Região Missioneira do Rio Grande do Sul. *Revista Centro de Ciências Rurais*, 16 (2), 89–112.

Blanchard, E. (1852) Insectos, Orden IV, Lepidopteros. *In*: Gay, C. *Historia fisica y política de Chile. Zoología*, 7. The author, Paris, pp. 112.

Bondar, G. (1950) Os insectos daminhos na Agricultura. *Secretaria de Agricultura, Industria e Commercio*, São Paulo, pp. 39.

Correll, D.S. & Correll, H.B. (1982) *Flora of the Bahama Archipelago*. J. Cramer, pp. 1692.

Foetterle, J.G. (1902) Descripção de Lepidopteros novos do Brasil. *Revista do Museu Paulista*, São Paulo, 5, 641–644.

Forbes, W.T.M. (1942) The Lepidoptera of Barro Colorado Island, Panama (No. 2). *Bulletin of the Museum of Comparative Zoology*, Harvard, 90 (2), 265–406.

Franclemont, J.G. (1973) Mimallonoidea (Mimallonidae) and Bombycoidea (Apatelodidae, Bombycidae, Lasiocampidae). *In*: Dominick, R.B., Ferguson, D.C., Franclemont, J.G., Hodges, R.W. & Munroe, E.G. (Eds), *The moths of North America north of Mexico* fasc. 20.1. E.W. Classey Ltd. and Richard B. Dominick Publ., London.

Grote, A.R. (1865) Notes on the Bombycidæ of Cuba. *Proceedings of the Entomological Society of Philadelphia*, 5, 227–255.

Grote, A.R. (1867) Notes on the Zygænidae of Cuba. *Proceedings of the Entomological Society of Philadelphia*, 6, 297–334.

Hardwick, D.F. (1950) Preparation of slide mounts of lepidopterous genitalia. *The Canadian Entomologist*, 57 (11), 231–235.

Harris, T.W. (1841) *Report on the insects of Massachusetts, injurious to vegetation*. Cambridge, pp. 290.

Herbin, D. (2012) Descriptions of a new genus and ten new species of Mimallonidae (Lepidoptera: Mimallonoidea). *The European Entomologist*, 4 (1), 1–31.

Herbin, D. & Mielke, C. (2014) Preliminary list of Mimallonidae from Feira Nova do Maranhão, Maranhão, northern Brazil with descriptions of some new species (Lepidoptera Heterocera Mimallonoidea). *Antenor*, 1 (2), 130–152.

Herbin, D. (2015) Description de nouvelles espèces d'Hétérocères de Guyane française avec notes taxinomiques (Lepidoptera Mimallonidae et Apatelodidae). *Antenor*, 2 (1), 81–105.

Herbin, D. & Monzón Sierra, J. (2015) Description of four new species of Mimallonidae and four new species of Apatelodidae from the El Mirador Basin in northern Guatemala. *Antenor*, 2 (2), 176–197.

Lemaire, C. & Minet, J. (1999) The Bombycoidea and their relatives. *In*: Kristensen, N.P. (Ed.), *Handbook of Zoology/ Handbuch der Zoologie. 4 (35). Lepidoptera, Moths and Butterflies. 1. Evolution, systematics, and biogeography.* Walter de Gruyter, Berlin & New York, pp. 321–353.

Lima, A.M.C. (1922) Catalogo systematico dos insectos que vivem nas plantas do Brasil e ensalo de bibliographia entomologica brasileira. *Archivos da Escola Superior de Agricultura e Medicina Veterinaria*, Rio de Janeiro, 6 (1 & 2), p. 168.

Lima, A.M.C. (1927) Segundo catalogo systematico dos insectos que vivem nas plantas do Brasil e ensalo de bibliographia entomologica brasileira. *Archivos da Escola Superior de Agricultura e Medicina Veterinaria*, Rio de Janeiro, 8 (1 & 2), p. 156.

Monte, O. (1934) Borboletas que vivem em plantas cultivadas. *Boletim de Agricultura, Zootecnica e Veterinária, Série Agrícola*. Belo Horizonte, Minas Gerais, 21, pp. 126.

Pastrana, J.A. (2004) Los Lepidópteros Argentinos. Sus plantas hospedadoras y otros sustratos alimenticios. Braun, K., Logarzo, G., Cordo, H.A. & Di Iorio, O.R. (coordinadores). *Sociedad Entomológica Argentina ediciones*. Buenos Aires, pp. 334.

Schaus, W. (1928) Familie Mimallonidae. *In*: Seitz, A. (Ed.), *Die Gross-Schmetterlinge der Erde. 6. Die amerikanischen Spinner und Schwärmer*. A. Kernen, Stuttgart, pp. 635–672.

Shorthouse, D.P. (2010) SimpleMappr, an online tool to produce publication-quality point maps. Available from: http://www.simplemappr.net (accessed 24 November 2015)

Silva, A.G.D., Gonçalves, C.R., Galvão D.M., Gonçalves, A.J.L., Gomes, J., Silva, M. do N. & Simoni, L. (1968) *Quarto catálogo dos insetos que vivem nas plantas do Brasil: seus parasitas e predadores, part 1, volume 2.* Ministério da Agricultura, Rio de Janeiro, 622 pp.

St Laurent, R.A. & Dombroskie, J.J. (2015) Revision of the genus *Eadmuna* Schaus, 1928 (Lepidoptera, Mimallonidae) with a description of a new species from French Guiana. *ZooKeys*, 494, 51–68. http://dx.doi.org/10.3897/zookeys.494.9208

Walker, F. (1855) *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum 6*, 1341. London, Printed by order of the Trustees, London, 1808 pp. http://dx.doi.org/10.5962/bhl.title.58221