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New species in *Rejectaria* Guenée (Lepidoptera: Erebidae: Herminiinae) with a focus on the Cyclanthaceae-feeders

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Abstract

Five species of *Rejectaria* Guenée, including two newly described, were reared from *Asplundia utilis* (Oerst.) Harling, *Asplundia microphylla* (Oerst.) Harling, *Carludovica costaricensis* (Harling) L.O. Williams, and *Cyclanthus bipartitus* Poit. ex A. Rich., all Cyclanthaceae, in Area Conservacion de Guanacaste (ACG), Costa Rica: *R. villavicencia* Dognin, 1924, *R. villosa* Druce, 1891, *R. magas* Druce, 1891, *R. richardashleyi* **sp. n.** and *R. ritaashleyae* **sp. n.**. These represent the only Noctuoidea known to feed on Cyclanthaceae. Related species with unknown foodplant associations include *R. atrax* Dognin, 1891, *R. splendida* Schaus, 1912, and *R. paratrax* **sp. n.**, the last of which is described from French Guiana, Venezuela, and Panama. The nomenclatural and phylogenetic challenges within the Herminiinae and the origins of cyclanth-feeding relative to fern- and palm-feeding are discussed.

Key words: litter moths, *Asplundia*, *Carludovica*, *Cyclanthus*, Área de Conservación Guanacaste (ACG), Costa Rica

Introduction

Rejectaria Guenée is a large genus of Neotropical litter moths (Erebidae: Herminiinae) and comprises a polyphyletic assemblage of species. Several of these have recently documented larval foodplants among the ferns, palms (Arecaceae) and panama hat palms (Cyclanthaceae) in Area Conservacion de Guanacaste (ACG). The origin of fern-feeding (pteridivory) within the Herminiinae is independent of that within Noctuidae and, based on coarse examination of foodplant data, the feeding profiles of pteridivorous noctuids and herminiine erebids include overlapping but distinct groups of plants (Goldstein *et al.*, 2021). For example, tree ferns (Cyatheaceae) figure prominently among larval foodplants recorded for ACG Herminiinae, but much less frequently for ACG Noctuidae (Janzen and Hallwachs 2020). The association of at least five species of Herminiinae with Cyclanthaceae is unusual in and of itself, since few such records for Lepidoptera are known other than Hesperiidae (e.g., Cock 2003, Burns *et al.* 2009) and Tortricidae (Brown *et al.* 2013), both documented from ACG (Janzen and Hallwachs 2020).

The discovery of many lepidopteran life histories, particularly larval foodplants, is one of the many significant benefits of long-term ACG caterpillar surveys. To the extent foodplant-associations are rare and conserved, as appears to be the case with fern-feeding (pteridivorous) insects in general, they serve as prospective taxonomic tools for informing phylogenetic and evolutionary studies. The discovery of numerous fern-feeding larvae among the litter moths (Herminiinae) leads to several questions surrounding its origins, and specifically the extent to which patterns of specialization within leptosporangiate ferns may have been phylogenetically constrained or ecologically mediated. Unfortunately, the state of herminiine systematics is among the darker voids in the Noctuoidea, with many poorly circumscribed and likely polyphyletc genera in need of revision. *Rejectaria* is a conspicuous example of such a group, with over 35 described species and many undescribed, including those from the systematic assembly of DNA barcode data from ACG Lepidoptera. Several of these are highly dissimilar from the type species *Rejectaria cocytalis* Guenée, 1854, and since a number of herminiine genera are suspected of polyphyly, significant taxon sampling will be critical to establishing their status and boundaries. The joint purpose of this paper is to associate newly discovered life histories with described species and to describe new species of both cyclanth-feeding

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Rejectaria and putative close relatives with as yet unknown larval habits, while calling attention to some character systems that may bear on other generic revisions within Herminiinae.

Materials and methods

Larvae were sampled in the course of general inventory efforts undertaken at ACG since the 1980s (Janzen and Hallwachs 2011, 2016). Identification of foodplants, rearing of larvae and parasitoids, and DNA barcoding were undertaken by the parataxonomist team in collaboration with the Consortium for the Barcode of Life (CBOL) and the Biodiversity Institute of Ontario, Guelph. Our usage of "foodplant" indicates documented feeding, not incidental occurrence.

Genitalic preparations follow Clarke (1941) in part and Lafontaine (2004), but staining with chlorazol black and slide-mounting in Euparal. Vesicae were everted with a microsyringe prior to fixation. Dissections followed either an overnight room-temperature soak in supersaturated sodium hydroxide solution or a 15-minute heated soak in the same, and were examined under dissecting microscopes prior to slide-mounting. Images were taken using Microptics and Visionary Digital imaging systems and images were manipulated with Adobe Photoshop® and Illustrator® (Adobe Systems, Mountain View, CA). Some genitalic images, in particular vesicae and female genitalia, were made of specimens held in glycerin using a sectioned plexiglass cylinder affixed to a slide. Measurements were made with the aid of an ocular micrometer. Forewing (FW) lengths were measured from the center of the axillary area to the apex of the forewing. Terminology generally follows Forbes (1954) and Lafontaine (1998, 2004).

Specimens of wild-caught larvae are not available because they were all reared, and larval descriptions generated from images thus do not reference specific setal characters or microscopic features that might further corroborate higher taxonomic decisions. Label data indicating that reared larvae were "on" a given plant refer to demonstrated feeding, not mere proximity.

Dissected USNM specimens are accompanied by USNM slide numbers as well as unique identifiers that begin USNMENT. The following label data on all reared and light-trapped specimens from ACG precede individual unique voucher codes of the format yy-SRNP-xxxxxx (SRNP = Santa Rosa National Park, a unique identifier reflecting the inventory's early focus on Sector Santa Rosa of ACG): Voucher: D.H. Janzen & W. Hallwachs DB: http://janzen.sas.upenn.edu Área de Conservacion Guanacaste, COSTA RICA. Specimens lacking food plant records were light-trapped and have a 6-digit suffix in their SRNP codes, whereas reared specimens have a 1–5-digit suffix.

We employ a combination of morphological features and DNA barcode data to evaluate and circumscribe species, but not all the species being treated in this paper, including a number of species known only from types and older specimens, are represented by reared or barcoded specimens; these include *atrax* and *splendida*, of which only types were available for study. In several cases, due to a paucity of specimens and/or constraints due to the Covid pandemic, generating DNA barcode data for older specimens, including types, has not been feasible during the preparation of this manuscript. However, we have avoided making taxonomic changes without presenting data that demonstrate clear morphological and/or molecular support. When either the number of available specimens or the number of specimens with available barcode sequences was lacking (particularly for types), the nomenclatural status quo has been retained. The generic assignment of all of these species is provisional, pending phylogenetic analysis.

In some cases, certain head/lateral images correspond to specimens other than those dissected, because the dissected specimens are damaged and missing palpi, antennae, or other critical structures. The accompanying head/lateral images are from conspecifics as the species are understood here. All specimen data accompany the figures so it is transparent which specimens were used in every case; and in all cases where external head or habitus images represent specimens for which dissections are not figured, no taxonomic changes are made on the basis of any figured features.

Dendrograms generated from DNA barcode data (658bp, COI) were used provisionally to inform and broaden the range of taxa for examination and dissections and, in part, circumscribe the taxonomic composition of this paper in the context of ongoing higher revisionary work. DNA barcode data from reared ACG specimens of *Rejectaria* were analysed with sequences from other ACG Herminiinae and from museum specimens. Most samples underwent Sanger sequencing, but for some older museum specimens, DNA barcode sequences were compiled using NGS at the Centre for Biodiversity Genomics at the University of Guelph. Although COI is not generally regarded as sufficient for phylogenetic purposes, taxonomic coverage was designed to maximize representation of type species, fern-

feeders, cyclanth-feeders, and their relatives with the ultimate aim of exploring generic monophyly in the course of ongoing revisionary projects. Among the type species included were *Rejectaria cocytalis, Strathocles ribbei* Druce, 1891, *Mamerthes nigrilinea* Druce, 1891, *Nicetas panamensis* Druce, 1891, *Renia orthosialis* Guenée, 1854, and *Bleptina caradrinalis* Guenée, 1854. Initial NJ analyses (Kimura 2-parameter) were undertaken in BOLD (http://ibol.org) and followed by parsimony analyses in TNT (Goloboff *et al.* 2008) to eliminate analytical artifacts of conflating homologous and non-homologous character state changes. Since barcode data were not available for certain species believed critical for resolving generic boundaries (e.g., *Strathocles magnipilosa* Dognin, 1923, *Bleptina albidiscalis* Warren, 1889), we do not present trees or draw phylogenetic inferences here beyond the circumscription of species. Although greater sampling and additional sequence data, ideally including that of type specimens, are needed to resolve generic boundaries and relationships unambiguously, provisional analyses consistently recover the grouping [*magas* + [*ritaashleyae* + [*villavicencia* + [*villosa*]]]; the position of *richardashleyi* is unstable, but the species falls adjacent or nearly adjacent to this grouping.

Repository abbreviations. The following abbreviations refer to collections from which specimens form the basis of this study:

AMNH	American Musem of Natural History, New York, USA
MNHN	Musem National d'Histoire Naturelle, Paris, France
MNHU	Museum für Naturkunde, Berlin, Germany
NHMUK	Natural History Museum, London, UK (formerly BMNH)
OXUM	Oxford University Museum of Natural History, Oxford, UK (Collections Online)
USNM	National Museum of Natural History, Washington D.C., USA
CMNH	Carnegie Museum of Natural History, Pittsburgh, USA

All ACG specimens are deposited in USNM and covered by collecting permit R-SINAC-ACG-PI-030-2020 and its antecedents to DHJ and WH.

Systematics As it is currently comprised, *Rejectaria* contains a constellation of variously related species groups, some directly comparable to type species in other genera. Since *Rejectaria* has been treated as a taxonomic dumping ground, it is not our purpose here to articulate diagnostic synapomorphies for the genus as a whole prior to larger revisionary work. The species treated here are dissimilar in many features from the type species *Rejectaria cocytalis* but include all five species now known to feed on Cyclanthaceae and an additional three species without foodplant records but morphological or molecular-genetic affinities to the cyclanth-feeders. They are retained in *Rejectaria* pending the establishment of their phylogenetic placement and that of other Herminiinae.

As in many related Herminiinae, the species treated here display highly modified labial palpi in the males, with the terminal segment bearing an eversible hair pencil, and variously developed forefemoral tufts. In many Herminiinae, the bursa copulatrix bears a dimple-like signum that may be developed into a spoon-shaped band or a band-like complex of spines or spinules. Among the genitalic features shared by most of the species treated here is an internal mid-ventral band of modified spine- or ridge-like setae in the corpus bursae, sometimes accompanied by a less robust secondary band closer to the ductus bursae; this "belt" is known elsewhere in Neotropical Herminiinae. Males and females of all species examined here bear a single pair of mid-tibial spurs and two pairs of hind-tibial spurs.

Species accounts

Rejectaria villosa Druce, 1891

Habitus Figs 1–2, 5–8, 10, 31, 40. Male genitalia Figs 43, 45–48, 57–58, 65–72. Female genitalia Figs 86–87, 97. Larva Figs 103–104, 106, 108–109.

Narcaea villosa Druce, 1891, *Biologia Centrali-Americana* 1: 449, pl. 36, figs. 21, 21a, 24. Type locality: Panama: Chiriqui (Holotype ♀, MNHU)

Material examined. Type material: **Holotype** ♀. **PANAMA**: Chiriqui Coll. Staudinger, *Narcaea villosa* type ♀ Druce. Typus [MNHU; Image].

FIGURES 1–8. Dorsal habitus of *Rejectaria*. Figs 1, 2, 5–8 *Rejectaria villosa* 3, 4 sp. nr. *villosa*. **1** ♂ *R. villosa*, Costa Rica, USNMENT01493304, 13-SRNP-45393, Slide USNM148507. **2** ♀ *R. villosa*, Costa Rica, USNMENT01493384, 03-SRNP-37828. **3** ♂ *R.* sp. nr. *villosa*, Costa Rica, USNMENT01493015, 02-SRNP-6046, Slide USNM148569. **4** ♀ *R.* sp. nr. *villosa*, Costa Rica, USNMENT01493174, 09-SRNP-40157. **5** ♂ *R. villosa*, Panama, USNMENT01422998, Slide USNM148665. **6** ♂ *R. villosa*, Colombia, USNMENT01422993, Slide USNM148666. **7** ♂ *R. villosa*, Bolivia, USNMENT01756824, Slide USNM148669CMNH. **8** ♀ *R. villosa*, Bolivia, USNMENT01756903, Slide USNM148670CMNH

Other material. COSTA RICA (8♂♂, 9♀♀). Costa Rica: Alajuela, Area de Conservacion Guanacaste, Sector Rincon Rain Forest (6♂♂, 2♀♀): 1♂, Malaguenya, 10.9555, -85.28381, el. 221m: larva on *Carludovica costaricensis*: 12/29/2013, Keiner Aragón, collector: ecl. 02/08/2014, 13-SRNP-45390, USNMENT01493471;

1♂, ecl. 02/06/2014, 13-SRNP-45393, USNMENT01493304, USNM slide 148507; 1♀, ecl. 02/05/2014, Keiner Aragón, collector, 13-SRNP-45392, USNMENT01493406, USNM slide 148566; 1♂, Rio Francia, 10.90425, -85.28651, el. 410m: larva on *light trap*: 01/23/2009, ecl. , R. Franco & S. Rios, collector, 09-SRNP-100270, USNMENT01493339; 1♂, Sendero Anonas, 10.90528, -85.27882, el. 405m: larva on *Asplundia utilis* 02/12/2009: ecl. 03/25/2009, Jose Perez, collector: 09-SRNP-40224, USNMENT01493412; 1♂, Sendero Juntas, 10.90661, -85.28784, el. 400m: larva on *Asplundia utilis*: 02/03/2007, ecl. 03/01/2007, Minor Carmona, collector, 07-SRNP-40358, USNMENT01493410; 1♂, Sendero Rincon, 10.8962, -85.27769, el. 430m: larva on *Asplundia utilis*; 1♀, Palomo, 10.96187, -85.28045, el. 96m: larva on *Carludovica costaricensis*: 11/20/2013, ecl. 12/22/2013, Keiner Aragón, collector, 13-SRNP-45095, USNMENT01493488. Sector Del Oro (2♂♂, 2♀♀): 1♂, Catarata Orosi, 10.99325, -85.47464, el. 700m: larva on *Cyclanthus bipartitus*: 11/29/2003: ecl. 12/30/2003, Roster Moraga, collector, 03-SRNP-37827, USNMENT01493375; 1♂, Elieth Cantillano, collector: ecl. 12/31/2003, 03-SRNP-37830, USNMENT01493373; 1♀, ecl. 12/24/2003, 03-SRNP-37828, USNMENT01493384; 1♀, ecl. 12/28/2003, 03-SRNP-37831, USNMENT01493411. **PANAMA** (2♂♂). 1♂, Ft. Sherman C.Z. Pan. Aug. 15 1923 H.G. Dyar collector, USNMENT014422998, USNM slide 148665; 1♂, Chiriqui, Narcaea villosa Druce, Rejectaria villosa Dr., Collection Wm Schaus, USNMENT014422983, USNM slide 148664. **VENEZUELA** (3♂♂)**.** 1♂, EDO. Lara, Yacambu Natl. Pk. 1560m 13km SE Sanare 1–5 Aug. 1981 J. Heppner (cloud for.), USNMENT014422978, USNM slide 148658; 2♂♂, Las Quigas Esteban Valley N. Venezuela, 1182, Carn. Mus. Acc. 5538 (CMNH). **COLOMBIA** (2♂♂)**.** 1♂, Popayan Colombie 1896, Narcaea villosa Dr, USNMENT01422988, USNM slide 148657; 1♂, Popayan Colombie 1897 Dognin Collection, USNMENT01422993, USNM slide 148666. **BOLIVIA** (4♂♂, 4♀♀). 1♂, Prov del Sar Bolivia 450m. J. Steinbach, July 1914, Carn. Mus. Acc. 5871 (CMNH); 1♀, same data as previous except Aug 1914 (CMNH); 2♂♂, 2♀♀, R. Yapacani E Bolivia Alt. 600m J. Steinbach, Sept 1914, Carn. Mus. Acc. 5871; 1♂, same data as previous USNMENT01756824, slide 148669CMNH (CMNH); 1♀, same data as previous, USNMENT01756903, slide 148670CMNH (CMNH)

Additional specimens (*Rejectaria* sp.? nr. *villosa*; see Remarks, below. Habitus Figs 3–4, 32 (lateral). Male genitalia Figs 44, 59–60. Female genitalia Figs 85, 95**.**

Four specimens shared a COI haplotype distinct from those treated above. Whether describing species on the basis of mitochondrial haplotypes alone serves a defensible purpose is a matter of debate, and since the holotype of *villosa* is not itself barcoded, we have treated both these entities under *villosa*, but flag the following four specimens (Costa Rica: Alajuela, Area de Conservacion Guanacaste: Sector Rincon Rain Forest): 1♀, Rio Francia Arriba, 10.89666, -85.29003, el. 400m: larva on *Asplundia utilis*: 01/31/2007, ecl. 02/24/2007, Jose Perez, collector, 07-SRNP-40317, USNMENT01493030, USNM slide 148567. 1♂, Sendero Rincon, 10.8962, -85.27769, el. 430m: larva on *Asplundia utilis*: 01/09/2002, Fraysi Vargas, collector, 02-SRNP-6046, USNMENT01493015, USNM slide 148569. 1♀, Sendero Rincon, 10.8962, -85.27769, el. 430m: larva on *Asplundia utilis*: 01/09/2002, ecl. 02/08/2002, Jose Perez, collector, 02-SRNP-6049, USNMENT01493061. 1♀, Sendero Anonas, 10.90528, -85.27882, el. 405m: larva on *Asplundia utilis*: 02/12/2009, ecl. 03/12/2009, Jose Perez, collector, 09-SRNP-40157, USNMENT01493174.

Diagnosis. *Rejectaria villosa* is the only species in this treatment comparable in size to the closely-related *villavicencia*, with which it shares a number of conspicuous features such as the angled male palpi and massive forefemoral tufts. It may be distinguished from *villavicencia* by its straight, more distinct FW antemedial line in the male and the less pronounced reniform spot in the female. Both species exhibit similar sexual dimorphism, with both antemedial (am) and postmedial (pm) lines in the females of both species present and jagged but with less contrast in female *villosa*. The male genitalia of *villosa* are distinct, with the distal third of the costa free and bowed or sinuous; the free projection in *ritaashleyae* is similar but more gently curved and not sinuous, and the costal sclerotization in the valva of *villavicencia* terminates approximately halfway along the valva as a small nubbin. Both *villosa* and *villavicencia* share with *magas* and *ritaashleyae* the distinctly configured ventral band of signa in the corpus bursa, but with at least 17 toothed discs, whereas the other species have 12–14.

Re-description. ***Head***. (Figs 31, 40) Frons, vertex gray-brown; antennae setose-ciliate; male palpi (Fig. 31) similar to those of *villavicencia* (see above), angled backward at junction of 2nd and 3rd segment with visible notch between the two; female palpi (based on specimen of possible cryptic sp. nr. *villosa*; Fig. 32) with predominantly cocoa-brown scaling, 2nd segment broadest toward the base, with scattered white scales, 3rd segment fine, nearly as long as the 2nd, with dark gray scales outwardly intermixed with beige scales at base and at tip. Note that the female figured is one of four specimens bearing a distinct haplotype that may represent a distinct species (see explanation, above).

Thorax. *Wings*—(males, 25.8mm, n=5; females, 24mm, n=5) FW and HW gray-brown overall; FW antemedial line very faint, if present, pale inward; postmedial line on both FW and HW dark inward; reniform stigma black, somewhat diffuse, inwardly edged with tan; subterminal (st) line quite faint, jagged, visible primarily as pale points along a faint jagged line; terminal line a series of minute black chevrons with paler tannish-brown edging at the base of the fringe; female am and pm lines wavy, median area paler than am and pm. *Legs*— (Figs 31, 40, cf. sp. nr. *villosa*, Fig. 32) Uniformly tannish-gray; bands faint, if present, in male, conspicuous in female; male forefemoral tufts massive.

Abdomen. Gray-brown above, concolorous with ground color of uppersides of wings.

Male genitalia. (including sp. nr. *villosa*, Figs 43–48; 57–60; 65–72) Uncus elongate, setose, sheepsfoot-shaped, costal arm free of valva for distal third of its length and sinuous; vinculum bluntly tapered; small phallic ridge present; vesica multi-lobate with microspines distributed on phallus at base of vesica, concentrated on subbasal lobe and more diffusely throughout lower vesica.

Female genitalia. (including sp. nr. *villosa*, Figs 85–87, 95, 97) Ductus bursae with broad sclerotization along most of its length; laterally produced deformation at base if whorled appendix bursae, comparable to that of *villavicencia* and *ritaashleyae*; well-developed mid-ventral band of micro-spinules on corpus bursae, (Figs 95, 97), band subparallel to long axis of corpus, punctuated by a series of 17 internal toothed semicircular ridges comparable to those in *villavicencia*, *richardashleyi*, *ritaashleyae*, and *magas*; smaller secondary band of spinules near junction with ductus bursae.

Immature stages. (Figs 103–104, 106, 108–109) Mature larvae dull brown-green with reddish intersegmental rings; head calico-patterned; younger larva with distinct dark dorsal midstripe.

Biology. Larvae have been documented feeding on *Asplundia utilis* (4), *Carludovica costaricensis* (3), and *Cyclanthus bipartitus* (6).

Distribution. Costa Rica, Panama, Venezuela, Colombia

Remarks. Based on available barcode data, there is reason to suspect the existence of one or more cryptic sibling species near *villosa*. However, the combination of a limited number of available specimens, a lack of conspicuous geographic variation and variation among females in particular, and finally the absence of barcode or dissection data from the female holotype, preclude a thorough assessment or adequate description of a new species. Observed variation, even in male genitalia, among Costa Rican, Panamanian, Venezuelan, and Colombian specimens is not geographically consistent. Barcoded specimens from ACG include four specimens sharing a distinct haplotype but no observed morphological differences, listed above as a possible species near *villosa* under "anomalous specimens." We have elected not to describe a new species since the application of a name to either haplotype cluster would be arbitrary in the absence of DNA barcode data from the female holotype, but have included figures among those of *villosa*.

Rejectaria villavicencia Dognin, 1924

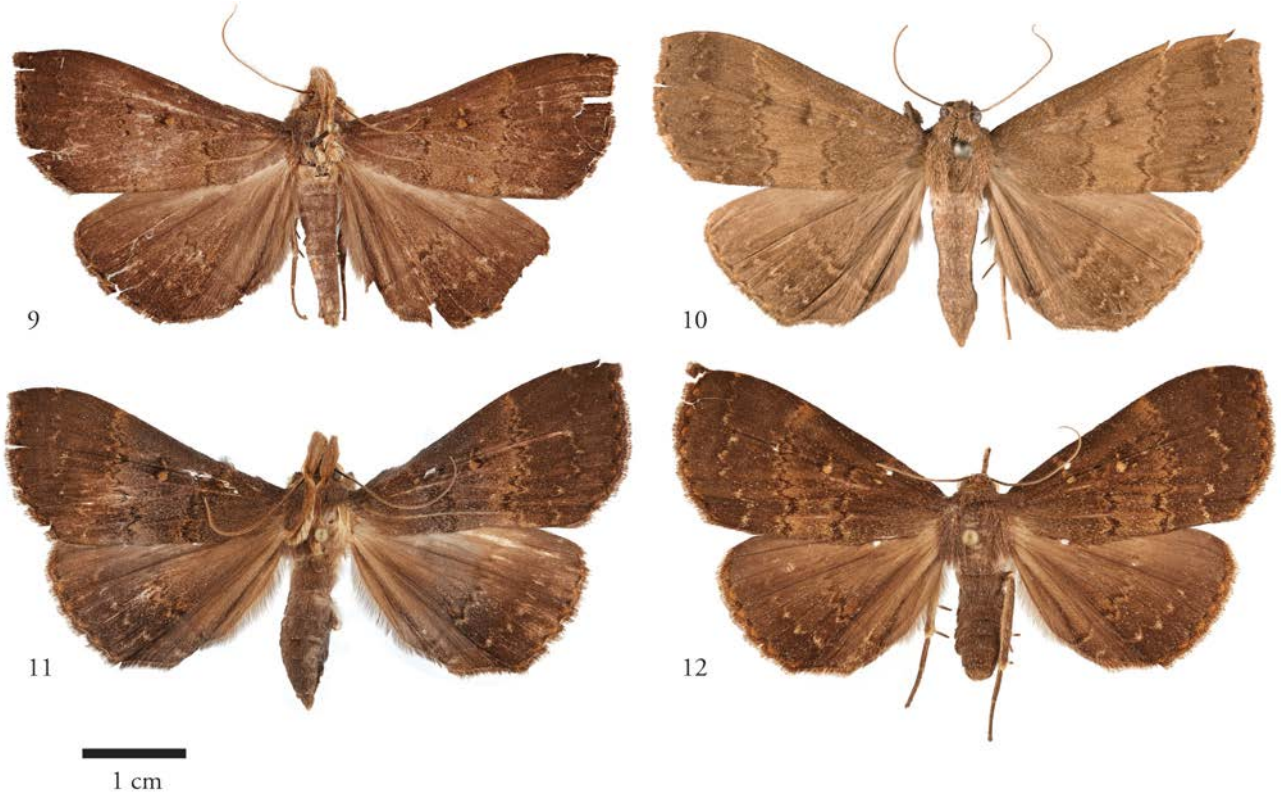
Habitus Figs 9, 11–12, 33–34, 41. Male genitalia Figs 49–50, 61–64. Female genitalia Figs 88, 96. Larva Figs 105, 107.

Rejectaria villavicencia Dognin, 1924, *Hétérocéres nouveaux de l'Amerique du Sud* 15: 4, Type locality: Colombia: Villavicencio (Holotype ♂, USNM)

Material examined. Type material: **Holotype** ♂. **COLOMBIA**: Type No. 32293 U.S.N.M.; Villavicencio Colombia IX-18, *Rejectaria villavicencia* Dogn. type ♂, USNMENT0973787 USNM slide 148642

Other material. COSTA RICA. Alajuela, Area de Conservacion Guanacaste (4♂♂, 2♀♀):
1♂, Sector San Cristobal: Sendero Corredor, 10.87868, -85.38963, el. 620m, larva on *Cyclanthus bipartitus*, 08/18/2006, ecl. 09/20/2006, Gloria Sihezar, collector, 06-SRNP-6834, USNMENT01493395, USNM slide 148571; 1♂, Sector San Cristobal: Sendero Palo Alto, 10.88186, -85.38221, el. 570m, larva on *Cyclanthus bipartitus*, 11/23/2004, ecl. 12/31/2004, Gloria Sihezar, collector, 04-SRNP-61056, USNMENT01493499. 1♂, Sector Del Oro: Catarata Orosi, 10.99325, -85.47464, el. 700m, larva on *Cyclanthus bipartitus*, 11/29/2003, ecl. 01/02/2004, Roster Moraga, collector, 03-SRNP-37826, USNMENT01493396, 1♂, Sector Pitilla: Sendero Cuestona, 10.99455, -85.41461, el. 640m. larva on *Cyclanthus bipartitus*: 08/24/2011, ecl. 10/09/2011, Manuel Rios, collector, 11-SRNP-32473, USNMENT01493494. 1♀, Sector Rincon Rain Forest, Sendero Rincon, 10.8962, -85.27769, el. 430m, larva

on *Asplundia utilis*: 01/02/2005, ecl. 02/01/2005, Jose Perez, collector, 05-SRNP-40000, USNMENT01493454. 1♀, Sector Del Oro: Catarata Orosi, 10.99325, -85.47464, el. 700m, larva on *Cyclanthus bipartitus*: 11/29/2003, ecl. 12/30/2003, Roster Moraga, collector, 03-SRNP-37825, USNMENT01493478, USNM slide 148572.



FIGURES 9–12. Dorsal habitus of *Rejectaria*. **9** ♂ *R. villavicencia*, Holotype, Colombia, USNMENT00973787, Slide USNM148642. **10** ♀ *Narcaea villosa* (=*Rejectaria villosa*), Holotype, Costa Rica. **11** ♂ *R. villavicencia*, Costa Rica, USNMENT01493499, 04-SRNP-61056. **12** ♀ *R. villavicencia*, Costa Rica, USNMENT01493478, 03-SRNP-37825, Slide USNM148572

Diagnosis. *Rejectaria villavicencia* may be the largest named species of New World Herminiinae. Both *villavicencia* and *villosa* are sexually dimorphic, but *villavicencia* less pronouncedly; the paler tannish-brown coloration in the median field of the female FW is more diffuse in *villavicencia* than in *villosa*. Male *villavicencia* are slightly larger than male *villosa* with more elongate forewings, but the am and pm lines are wavy in both sexes of *villavicencia*, whereas the pm line in *villosa* is straight. The reniform spot in *villavicencia* is light brown, larger than that in *villosa*, and, in the male of *villavicencia*, more clearly divided and circumscribed with a black boundary. The am and st lines in *villavicencia* are discontinuous and less faint than in *villosa*, and the terminal line is a series of alternating black and orange-brown curved dashes; all lines reappear in the same configuration on the middle third of the HW, as in *villosa*. The male genitalia of *villavicencia* are distinct, with the costal sclerotization terminating less than midway along the costa as a thorn-like projection. The female genitalia, again most similar to those of *villosa*, share with that species a laterally produced deformation above the whorled appendix bursa; both share with *magas* and *ritaashleyae* the distinct band of signa but the number of serrate hemi-discs differs.

Re-description. ***Head***. (Figs 33–34, 41) Frons, vertex gray-brown; antennae setose-ciliate; male palpi (Fig. 33) sweeping over head, with eye-level notch at the acutely angled junction of 1st and 2nd segment; 2nd segment broad at base and tapering as it arches over head; 3rd segment approximately as long as 2nd; female palpi (Fig. 34) incomplete on specimens examined but 2nd segment arches gently upward. ***Thorax***. *Wings*— (males, 30mm, n=5; female, 30mm, n=1[type]) Sexual dimorphism conspicuous, with paler tannish-brown coloration dominant but diffuse in median field of female FW; reniform spot tannish-orange, outlined in black; bands and coloration continue on hind wings. *Legs*— (Figs 33–34, 41) Male forefemoral tufts massive; legs more or less uniformly tannish-gray throughout; bands faint, if present.

Abdomen. Gray-brown above, concolorous with ground color of uppersides of wings.

Male genitalia. (Figs 49–50, 61–64) Uncus elongate, setose, sheepsfoot-shaped; costa rudimentary, sclerotized in basal ~third only, free terminus reduced to a small nub mid-way along the costa, bearing a small setal tuft; vinculum bluntly tapered; small phallic ridge present; vesica multi-lobate; microspines distributed on phallus at base of vesica, concentrated on subbasal lobe and more diffusely throughout lower vesica; localized sclerotization apically. ***Female genitalia***. (Fig. 88, 96) Ductus bursae elongate with sclerotized bands along most of its length; corpus bursae deformed where it meets ductus, at base of whorled appendix bursae comparable to that of *villosa* and *ritaashleyae*; well-developed mid-ventral band of micro-spinules (Fig. 96) on corpus bursae, subparallel to long axis of corpus, punctuated by a series of 14 internal perpendicular ridges comparable to those in *villosa, richardashleyi*, *ritaashleyae*, and *magas*; secondary band of spinules present near junction with ductus bursae.

Immature stages. (Figs 105, 107) Mature larvae purplish with reddish intersegmental rings; head and prothoracic shield dark brown; spiracles dark, conspicuous.

Etymology. The specific epithet *villavicencia* refers to the type locality, Villavicencio, Colombia.

Biology. Larvae have been documented feeding on *Cyclanthus bipartitus* (5) and *Asplundia utilis* (1).

Distribution. Colombia, Costa Rica

Remarks. This and the closely related *villosa* are the two largest species of New World Herminiinae of which we are aware. We acknowledge the possibility that the reared specimens of *villavicencia* from Costa Rica represent a distinct species from the Colombia holotype, but without the benefit of examining and multiple barcoded specimens, there is no evidence to support the description of a second species. Hence we treat the Costa Rican material as *villavicencia* pending the accumulation of more data.

Rejectaria atrax Dognin, 1891

Habitus Fig. 16, 27. Male genitalia Fig. 54, 77–78.

Narcaea atrax Dognin, 1891, *Le Naturaliste* 13: pp. 125–126. Type locality: Ecuador: Loja (Holotype ♂, USNM)

Material examined. Type material: *Narcaea atrax* **Holotype** ♂. **Ecuador:** Environs de Loja Equateur SJ., Narcaea sp. n. “I have described the genus in the Biologia, Narcaea atrax Dgn, type, type figure 1894, Dognin Collection”, Type No. 32294 U.S.N.M., USNMENT00973692, USNM slide 148640

Diagnosis. *Rejectaria atrax* and *R. splendida* are differentiated from other species by the presence of fine, white, entire am and pm lines on the forewing, the absence of frosting in the median field, and the presence of chalky-white patches in the postmedian field. *Rejectaria paratrax* lacks whitish frosting and *R. ritaashleyae* lacks an am line.

Supplement to original description. ***Head***. Frons, vertex dark brown; male antennae setose-ciliate; male palpi (Fig. 27) predominantly brown with scattered white scales, overall shape squared, the 1st and 2nd segments forming right angles, 1st segment turning upward at a 90˚ angle before meeting the 2nd segment; 2nd segment curving gently for most of its length before turning sharply backward, well above the head. Everted hair pencils tannish.

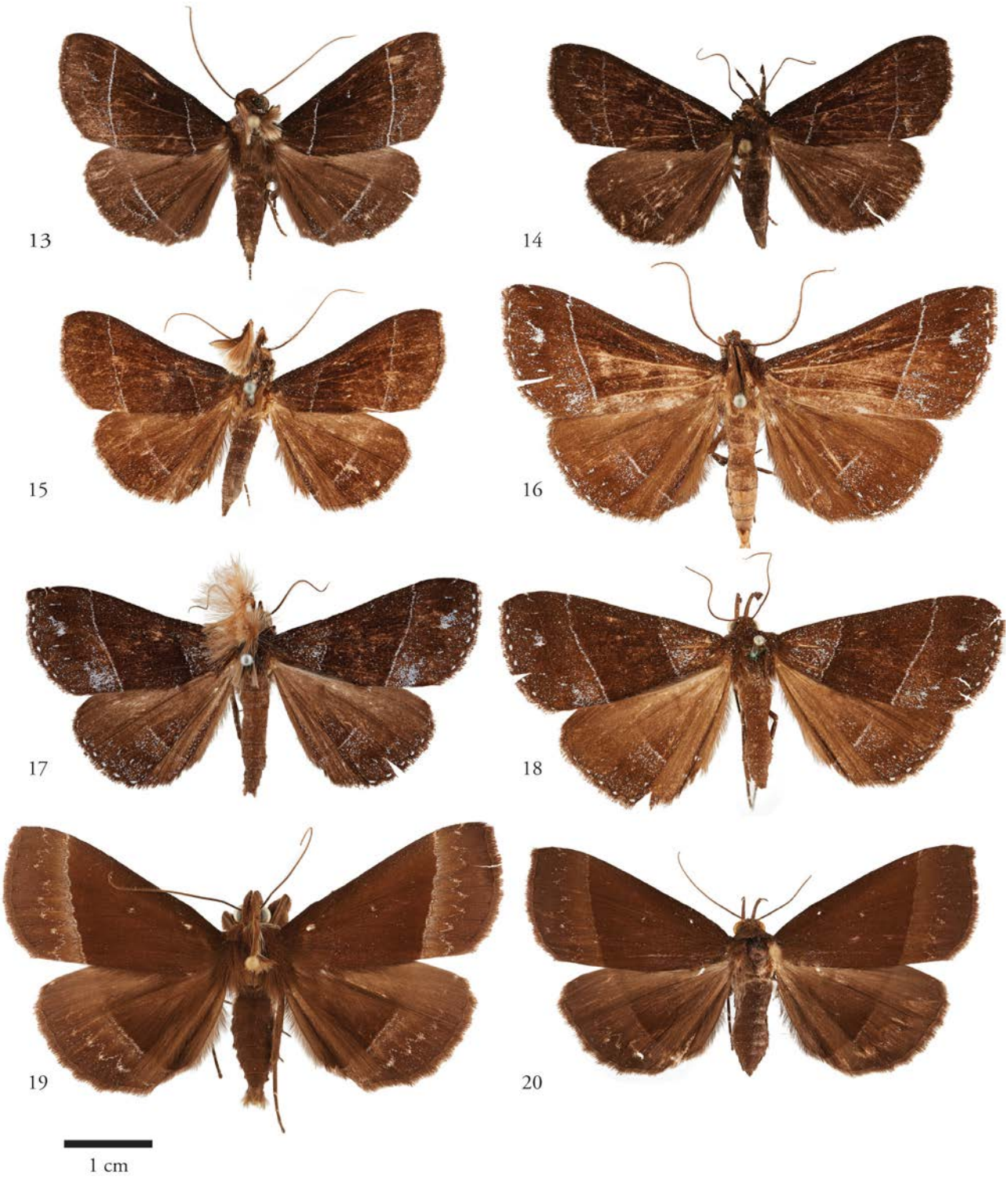
Thorax. *Wings* (Fig 16)—(male, 24.5, n=2) FW with dark brown median field, heterogeneous pale frosting in basal and postmedial fields, frosting in the postmedial area concentrated in the subapical patch and towards the pm line where it meets the inner margin; st line faint a discontinuous series of white markings, terminal line a series of white dashes; finge brown; pm, st and terminal lines continue on HW. *Legs* (Fig. 31) — (Fig. 27) Predominantly chocolate brown, male foretibia cream-colored laterally; pronounced chocolate-brown tuft with scattered white scaling; female foreleg and midleg with additional white scaling at segments; incomplete cream-colored segmental bands on legs and at base of tibial spurs.

Abdomen. Gray-brown above, concolorous with hindwing uppersides.

Male genitalia. (Figs 54, 77, 78) Indistinquishable from *splendida* (below); valva also similar to that of *paratrax* in having uneven (as opposed to smooth) outer margin.

Female genitalia. Unknown.

Immature stages. Unknown.

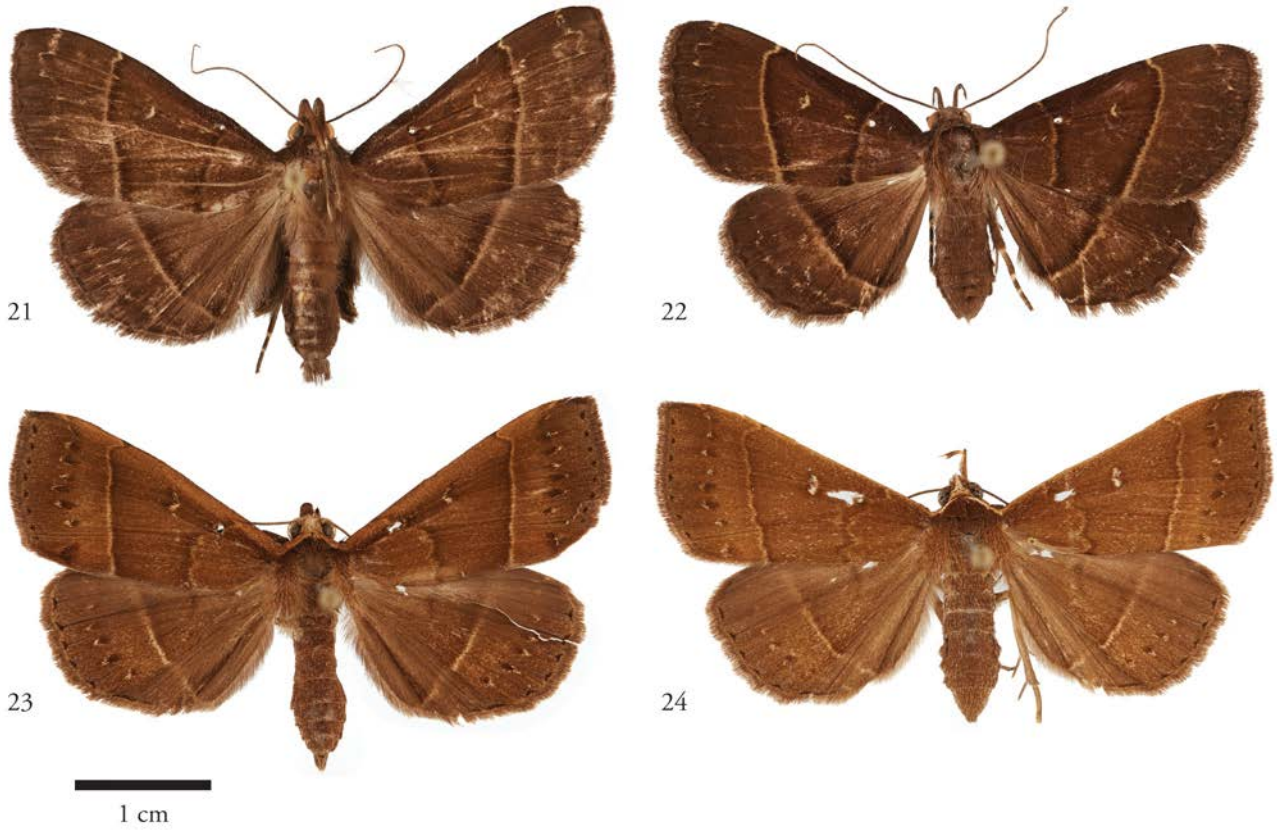


FIGURES 13–20. Dorsal habitus of *Rejectaria*. **13** ♂ *R. paratrax*, Holotype, French Guiana, (MNHN). **14** ♀ *R. paratrax*, French Guiana, (MNHN). **15** ♂ *R. paratrax*, Panama, USNMENT01756002, Slide USNM148595. **16** ♂ *Narcaea atrax* (=*Rejectaria atrax*), Holotype, Ecuador, USNMENT00973692, Slide USNM148640. **17** ♂ *R. splendida*, Syntype, Costa Rica, USNMENT00973707, Slide USNM148598. **18** ♀ *R. splendida*, Syntype, Costa Rica, USNMENT01756004, Slide USNM148641. **19** ♂ *R. ritaashleyae*, Costa Rica, Holotype, USNMENT01493223, 05-SRNP-35567. **20** ♀ *R. ritaashleyae*, Costa Rica, USNMENT01493025, 11-SRNP-32241.

Biology. Unknown.

Distribution. Ecuador

Remarks. The male holotype of *atrax* from Ecuador may be conspecific with the Costa Rican syntypes of *splendida* based on habitus and genitalia, but since no other specimens are available for comparison and there are neither barcode nor larval data available, we have chosen to maintain both names.



FIGURES 21–24. Dorsal habitus of *Rejectaria*. **21** ♂ *R. richardashleyi*, Holotype, Costa Rica, USNMENT01493269, 09-SRNP-32559. **22** ♀ *R. richardashleyi*, Costa Rica, USNMENT01493032, 10-SRNP-5399. **23** ♂ *R. magas*, Costa Rica, USNMENT01493483, 04-SRNP-27241, Slide USNM148574. **24** ♀ *R. magas*, Costa Rica, USNMENT01493354, 05-SRNP-20175, Slide USNM148575

Rejectaria splendida Schaus, 1912

Habitus Figs 17–18, 25–26, 28. Male genitalia Figs 53, 75–76. Female genitalia Fig. 91

Regectaria [sic] *splendida* , 1912, *Annals and Magazine of Natural History* 8, 9: 209.Type locality: Costa Rica: Juan Vinas (Syntypes ♂,♀, USNM)

Material examined. Type material: *Rejectaria splendida* **Syntypes (**1♂,1♀). **COSTA RICA:** 1♂, Juan Vinas CR, Nov., Rejectaria splendida type Schs., Type No. 17530 U.S.N.M., USNMENT00973707, USNM slide 148598; 1♀, Juan Vinas CR, Nov, Schaus and Barnes Coll, Rejectaria splendida Schs ♀, USNMENT01756004, USNM slide 148641.

Diagnosis. See Diagnosis for *atrax,* above.

Supplement to original description. ***Head***. (Figs 25, 26, 28) Frons, vertex dark brown; antennae setose-ciliate; male palpi (Fig. 25) predominantly brown with scattered white scales; overall shape squared, the 1st and 2nd segments forming right angles, 1st segment turned upward at a 90˚ angle before meeting the 2nd segment; 2nd segment curving gently for most of its length before turning sharply backward, well above the head; when everted from the 3rd segment, hair pencils forming expansive tan-colored fans; female palpi (Figs 26, 28) with 2nd segment more than twice as long as either of the other two; third segment bladelike, vaguely hastate, white scales at base and tip.

Thorax. *Wings*—(males, 24.5, n=2; female, 25mm, n=1) FW with dark brown median field, heterogeneous pale

frosting in basal and postmedial fields, frosting in the postmedial area concentrated in the subapical patch and towards the pm line where it meets the inner margin; st line a faint discontinuous series of white markings, terminal line a series of white dashes; finge brown; pm, st and terminal lines continue on HW; HW paler, more dingy gray-brown than FW. *Legs*—(Figs 25, 26, 28) Scaling predominantly chocolate brown with incomplete cream-colored segmental bands on legs and at base of tibial spurs; male forefemoral tuft present, chocolate brown with scattered white scaling; foretibia cream-colored laterally; female foreleg and midleg with additional white scaling at segments.

FIGURES 25–30 Head/lateral aspects. **25** ♂ *R. splendida*, Syntype, Costa Rica, USNMENT00973707, Slide USNM148598. **26** ♀ *R. splendida*, Syntype, Costa Rica, USNMENT01756004, Slide USNM148641. **27** ♂ *Narcaea atrax* (=*Rejectaria atrax*), Holotype, Ecuador, USNMENT00973692, Slide USNM148640. **28** ♀ *R. splendida*, Syntype, Costa Rica, USNMENT01756004, Slide USNM148641. **29** ♂ *R. paratrax*, Holotype, French Guiana. **30** ♀ *R. paratrax*, French Guiana, USNMENT01422973

Abdomen. Gray-brown above, concolorous with hindwing uppersides.

Male genitalia. (Figs 53, 75–76) Uncus elongate, setose, sheepsfoot-shaped; costal margin sclerotized throughout, free distally as a thumblike protruberance; outer margin not smooth, but with 2-3 protrusions bearing small setal tufts; vinculum bluntly tapered; phallic ridge undeveloped; vesica with small subbasal ridge-like field of minute spines; microspines diffusely distributed on basal lobes; body of vesica flanked by sub-conical lobes; spinules concentrated on subbasal lobe.

Female genitalia. Unknown.

Immature stages. Unknown.

Biology. Unknown.

Distribution. Known from Costa Rica

Remarks. See Remarks under *R. atrax*, above.

***Rejectaria paratrax* Goldstein, sp. n.**

Habitus Figs 13–15, 29–30. Male genitalia Figs 52, 79–80. Female genitalia Fig. 92, 101.

Material examined. Type material: **Holotype** ♂: **FRENCH GUIANA**: Kourou, Guyane Francaise, Mgne de Singes-lum. 29 Septembre 2003. **Paratypes** (1♂, 3♀♀): **FRENCH GUIANA** (2♀♀)**.** 1♀, Rés. de la Trinité, Roche Bénitier 4 October 2010; 1♀, St. Jean, Maroni, F. Guiana, Collection Wm Schaus, Rejectaria splendida Schaus, USNMENT01422780, USNM slide148596, BOLD Sample ID LNAUY828-19, Process ID CCDB-33589-F08. **PANAMA**. 1♂, Chiriqui, Pan, Collection Wm Schaus, USNMENT01756002, USNM slide 148595. **VENEZUELA.** 1♀, Venezuela, T.F. Amaz. San Carlos de Rio Negro 1˚ 56' N 67˚ 03' W 6–12 Dec. 1984 R.L. Brown, USNMENT01422973.

Diagnosis. *Rejectaria paratrax* has more uniformly dark brown FW coloration than *atrax/splendida*, due to the absence of frosting in the antemedial and postmedial fields, including the subapical patch. The presence of a white, entire am line in *paratrax* differentiates it from *ritaashleyae* from *ritaashleyae*. The male genitalia of *paratrax* are most similar to those of *splendida*, with the valval costa sclerotized along most of its length and terminating in a small thumb-like free projection at its terminus, but smaller and less robust in *paratrax*. The female genitalia of *paratrax* are distinct from others examined, particularly in the configuration of the ventral band of spines on the corpus bursae, similar to that in *richardashleyi* but with no secondary band, unlike *richardashleyi*.

Description. ***Head***. Frons, vertex, dark chocolate-brown; antennae setose-ciliate, clustered cilia more pronounced in male; male palpi (Fig. 29) predominantly dark brown with scattered white scales, overall shape squared, the 1st and 2nd segments forming right angles, 1st segment turning upward at a 90˚ angle before meeting the 2nd segment; 2nd segment curving gently for most of its length before turning sharply backward, well above the head; everted hair pencils straw-colored; female palpi (Fig. 30) predominantly chocolate brown, palpi sweeping upward, 2nd segment more than twice as long as either of the other two, third segment bladelike, vaguely hastate, white scales at base and tip.

Thorax. *Wings*—(male, 19.5mm, n=2; female, 21mm, n=3) FW and HW dark brown, the most prominent markings the fine white am and pm lines and the small white median stigma; am line terminates before reaching costa; st line faint, appearing as a series of minute white dots; terminal line consisting of a series of widely spaced white dots on both FW and HW; as in related species, am line absent on HW and pm and st lines reappear in middle third of HW; HW slightly fainter, more dingy gray-brown than FW.

Legs— (Figs 29, 30) Male forefemoral tuft present, brown with sparse white scaling; female legs Predominantly brown; leg segment and tarsal segments with a distinct ring of white scales.

Abdomen. Dark brown above, concolorous with forewing uppersides.

Male genitalia. (Fig. 52, 79–80) Uncus elongate, setose, sheepsfoot-shaped; costal margin of valva sclerotized throughout, free distally as a thumblike protruberance; outer margin with multiple small setal tufts; vinculum bluntly tapered; phallus with subbasal spicule field reduced; phallic ridge present; body of vesica flanked by sub-conical lobes; vesica highly differentiated with multiple lobes and diverticula, spinules distributed diffusely on large medio-distal lobe.

Female genitalia. (Fig. 92, 101) Ductus bursae elongate, sclerotized bands along most of its length; ductus joins corpus bursae at oblique angle as in *ritaashleyae*; corpus bursae simple, eggplant-shaped, band of signa (Fig. 101) weakly developed as series of internal toothlike spines, as in *richardashleyi*, opposite the coiled appendix bursae.

FIGURES 31–38. Head/lateral aspects. **31** ♂ *R. villosa*, Venezuela, USNMENT01422978, Slide USNM148658. **32** ♀ *R.* sp. nr. *villosa*, Costa Rica, USNMENT01493174, 09-SRNP-40157. **33** ♂ *R. villavicencia*, Costa Rica, USNMENT01493396, 03-SRNP-37826. **34** ♀ *R. villavicencia*, Costa Rica, USNMENT01493478, 03-SRNP-37825, Slide USNM148572. **35** ♂ *R. richardashleyi*, Costa Rica, USNMENT01493226, 04-SRNP-60032. **36** ♀ *R. richardashleyi*, Costa Rica, USNMENT01493032, 10-SRNP-5399. **37** ♂ *R. ritaashleyae*, Costa Rica, USNMENT01493226, 04-SRNP-60032, **38** ♀ *R. ritaashleyae*, Costa Rica, USNMENT01493025, 11-SRNP-32241.

Immature stages. Unknown.
Etymology. The specific epithet *paratrax* refers to this species similarity to *atrax.*
Biology. Unknown.
Distribution. Panama, Venezuela, French Guiana

***Rejectaria ritaashleyae* Goldstein, sp. n.**
Habitus Figs 19–20, 37–38. Male genitalia Figs 51, 73–74. Female genitalia Fig. 89–90, 98, 100. Larva Figs 110–114.

Material examined. Type material: **Holotype** ♂. **COSTA RICA.** Alajuela, Area de Conservacion Guanacaste, Sector Cacao: Sendero Derrumbe, 10.92918, -85.46426, el. 1220m: larva on *Asplundia microphylla*: 06/20/2005, ecl. 07/31/2005, Harry Ramirez, collector, 05-SRNP-35567, USNMENT01493223. **Paratypes**. (27♂♂, 17♀♀) **COSTA RICA:** Alajuela, Area de Conservacion Guanacaste, Sector Rincon Rain Forest (7♂♂, 3♀♀): 1♀, Jacobo, 10.94076, -85.3177, el. 461m, larva on *Asplundia microphylla*, 11/01/2014, ecl. 11/23/2014, Maria Cristina Hernandez, collector, 14-SRNP-81543, USNMENT01493044. 1♂, Rio Francia Arriba, 10.89666, -85.29003, el. 400m, larva on *Asplundia utilis*, 05/13/2011, ecl. 06/19/2011, Pablo Umaña, collector, 11-SRNP-42318, USNMENT01493242. 1♂, San Lucas, 10.91847, -85.30338, el. 320m, larva on *Asplundia utilis*, 01/25/2011, ecl. 03/12/2011, Jose Perez, collector, 11-SRNP-40412, USNMENT01493090. 1♂, Sendero Anonas, 10.90528, -85.27882, el. 405m: larva on *Asplundia utilis*, 08/01/2003, ecl. 08/28/2003, Jose Perez, collector, 03-SRNP-11914, USNMENT01493231, USNM slide 148597. 1♂, Sendero Juntas, 10.90661, -85.28784, el. 400m: larva on *Asplundia utilis*, 07/21/2005, ecl. 08/13/2005, Gloria Sihezar, collector, 05-SRNP-41839, USNMENT01479376. 1♂, Sendero Parcelas, 10.90777, -85.29137, el. 375m, larva on *Asplundia utilis*, 06/29/2006, ecl. 07/27/2006, Jose Perez, collector, 06-SRNP-42283, USNMENT01493213. 2♂♂, 1♀, Sendero Rincon, 10.8962, -85.27769, el. 430m, larva on *Asplundia utilis*: (1♂) 01/09/2002, ecl. 02/13/2002, Armando Rios, collector, 02-SRNP-6137, USNMENT01493006; (1♂) 12/18/2004, ecl. 02/03/2005, Jose Perez, collector, 04-SRNP-43093, USNMENT01493128; (1♀) 11/09/2004, ecl. 11/30/2004, Jose Perez, collector, 04-SRNP-42695, USNMENT01493108. 1♀, Camino Rio Francia, 10.90425, -85.28651, el. 410m, larva on *Asplundia utilis*, 01/08/2004, ecl. 02/05/2004, Minor Carmona, collector, 04-SRNP-40077, USNMENT01493183. Sector San Cristobal (10♂♂, 3♀♀): 1♂, Bosque Trampa Malaise, 10.8628, -85.3846, el. 815m, larva on *Cyclanthus bipartitus*, 10/17/2005, ecl. 12/02/2005, Yessenia Mendoza, collector, 05-SRNP-6499, USNMENT01493110. 1♂, Finca San Gabriel, 10.87766, -85.39343, el. 645m, larva on *Asplundia microphylla*, 03/05/2015, ecl. 04/11/2015, Yelba Vega, collector, 15-SRNP-696, USNMENT01493210. 1♂, Estacion San Ramon, 10.88354, -85.40974, el. 660m, larva on *Asplundia utilis*, 07/19/2005, ecl. 09/05/2005, Gloria Sihezar, collector, 05-SRNP-4064, USNMENT01493248. 1♂, Quebrada Cementerio, 10.87124, -85.38749, el. 700m, larva on *Asplundia utilis*, 10/04/2004, ecl. 11/13/2004, Anabelle Cordoba, collector, 04-SRNP-60032, USNMENT01493226. 1♀, Rio Areno, 10.91407, -85.38174, el. 460m, larva on *Asplundia utilis*, 09/13/2006, ecl. 10/08/2006, Osvaldo Espinoza, collector, 06-SRNP-7470, USNMENT01493038. 1♂, 1♀, Rio Blanco Abajo, 10.90037, -85.37254, el. 500m: (1♀) 10/07/2006, ecl. 10/19/2006, Osvaldo Espinoza, collector, 06-SRNP-8283, USNMENT01493071; (1♂) larva on *Asplundia utilis*, 12/24/2016, ecl. 01/31/2017, Carolina Cano, collector, 16-SRNP-1909, USNMENT01501082. 2♂♂, 1♀, Sendero Colegio, 10.89296, -85.3788, el. 520m, larva on *Asplundia utilis*, Gloria Sihezar, collector: (1♂) 10/11/2006, ecl. 11/18/2006, 06-SRNP-8360, USNMENT01493093; (1♂) 10/03/2005, ecl. 11/20/2005, 05-SRNP-6178, USNMENT01493081; (1♀) 10/03/2005, ecl. 11/14/2005, 05-SRNP-6177, USNMENT01493100, USNM slide 148568. 1♂, Sendero Palo Alto, 10.88186, -85.38221, el. 570m, larva on *Asplundia utilis*, 09/28/2004, ecl. 10/29/2004, Calixto Moraga, collector, 04-SRNP-4919, USNMENT01493281. 1♂, Sendero Perdido, 10.8794, -85.38607, el. 620m, larva on *Asplundia utilis*, 10/04/2004, ecl. 10/29/2004, Gloria Sihezar, collector, 04-SRNP-60010, USNMENT01493052. 1♂, Sendero Perdido, 10.8794, -85.38607, el. 620m, larva on *Asplundia utilis*, 11/08/2005, ecl. 12/18/2005, Carolina Cano, collector, 05-SRNP-7010, USNMENT01493031; 1♀, Sendero Huerta, 10.9305, -85.37223, el. 527m, larva on *Asplundia utilis*, 11/17/2006, ecl. 12/15/2006, Gloria Sihezar, collector, 06-SRNP-9411, USNMENT01479314. Sector Del Oro (1♂, 1♀): 1♂, 1♀, Margarita, 11.03234, -85.43954, el. 380m, Roster Moraga, collector: (1♂) larva on *Cyclanthus bipartitus*, 08/09/2005, ecl. 09/13/2005, 05-SRNP-23618, USNMENT01493039; (1♀) 07/27/2005, ecl. 08/07/2005, 05-SRNP-23085, USNMENT01493147. Sector Pitilla (10♂♂, 8♀♀): 2♂♂, 1♀, Sendero Memos, 10.98171, -85.42785, el. 740m, larva on *Asplundia microphylla*: (1♂)

11/28/2003, ecl. 01/11/2004, Lucia Ríos, collector, 03-SRNP-37131, USNMENT01493065; (1♂) 01/05/2010, ecl. 02/06/2010, Manuel Rios, collector, 10-SRNP-30036, USNMENT01493176; (1♀) 07/22/2011, ecl. 08/30/2011, Calixto Moraga, collector, 11-SRNP-32048, USNMENT01493111. 2♂♂, 1♀, Sendero Orosilito, 10.98332, -85.43623, el. 900m, larva on *Asplundia microphylla*: (1♂) 12/11/2003, ecl. 01/15/2004, Petrona Rios, collector, 03-SRNP-37377, USNMENT01493191; (1♂) 04/28/2009, ecl. 06/04/2009, Manuel Rios, collector, 09-SRNP-31391, USNMENT01493127; (1♀) 11/08/2016, ecl. 12/10/2016, Freddy Quesada, collector, 16-SRNP-31827, USNMENT01501724. 3♂♂, 1♀, Sendero Naciente, 10.98705, -85.42816, el. 700m, larva on *Asplundia microphylla*: (1♂) 12/06/2010, ecl. 01/21/2011, Manuel Rios, collector, 10-SRNP-32418, USNMENT01493280, USNM slide 148570; (1♂) 08/08/2011, ecl. 09/25/2011, Calixto Moraga, collector, 11-SRNP-32305, USNMENT01493146; (1♂) 08/18/2011, ecl. 09/28/2011, Calixto Moraga, collector, 11-SRNP-32389, USNMENT01493293. 1♂, 1♀, Sendero Cuestona, 10.99455, -85.41461, el. 640m, larva on *Asplundia microphylla*: (1♂) 11/15/2012, ecl. 01/05/2013, Freddy Quesada, collector, 12-SRNP-31713, USNMENT01493067; (1♀) 09/16/2009, ecl. 10/18/2009, Petrona Rios, collector, 09-SRNP-32560, USNMENT01493221, USNM slide 148584. 1♂, 1♀, Sendero Mismo, 10.98758, -85.41967, el. 680m, larva on *Asplundia microphylla*: (1♂) 08/14/2013, ecl. 09/17/2013, Manuel Rios, collector, 13-SRNP-31094, USNMENT01493270; (1♀) 09/24/2016, ecl. 10/20/2016, Manuel Rios, collector, 16-SRNP-31600, USNMENT01501770. 1♂, Gazo, 10.97995, -85.38593, el. 485m, larva on *Asplundia microphylla*, 11/02/2016, ecl. 12/09/2016, Calixto Moraga, collector, 16-SRNP-71798, USNMENT01501765. 1♀, Estacion Pitilla, 10.98931, -85.42581, el. 675m, larva on *Asplundia microphylla*, 08/08/2011, ecl. 09/09/2011, Manuel Rios, collector, 11-SRNP-32241, USNMENT01493025. 1♀, Sendero Laguna, 10.9888, -85.42336, el. 680m, larva on *Asplundia microphylla*, 07/23/2017, ecl. 08/22/2017, Freddy Quesada, collector, 17-SRNP-31990, USNMENT01501763. 1♀, Sendero Nacho, 10.98445, -85.42481, el. 710m, larva on *Asplundia microphylla*, 01/06/2009, ecl. 03/01/2009, Petrona Rios, collector, 09-SRNP-30032, USNMENT01493026. 1♀, Sendero Pilon, 10.99087, -85.4054, el. 561m, larva on *Asplundia microphylla*, 07/19/2011, ecl. 08/30/2011, Petrona Rios, collector, 11-SRNP-32007, USNMENT01493177. Sector Cacao: 1♀, Sendero Derrumbe, 10.92918, -85.46426, el. 1220m, larva on *Asplundia microphylla*, 06/20/2005, ecl. 07/28/2005, Roster Moraga, collector, 05-SRNP-35569, USNMENT01493085.

Other material: COSTA RICA: La Fuente, C.R. Jan. 1940, Dr. A. Alfaro, USNMENT01756203

Diagnosis. *Rejectaria ritaashleyae* is readily identified by the combination of the sharp delineation of the uniformly chocolate brown basal and medial fields from the diffuse gray-brown terminal area, the absence of an am line, and the faint whitish st line. The male genitalia of this species are similar to those of *villosa* in that the costal terminus is free, but gently downcurved and not sinuous as in *villosa*. This is one of at least four species in which the corpus is transversed by an internal band of microspinules along which a series of serrate ridges runs perpendicular. There are 13 such ridges in *ritaashleyae* and 12–13 in *magas*, fewer than in the specimens examined of *villavicencia* (14) and *villosa* (17).

Description. ***Head***. Predominantly cocoa-brown; antennae setose-ciliate; male palpi (Fig. 37) sweep backward, partially encircling the eye closely, a notch between 1st and 2nd palpal segments visible at mid-eye-level similar to that in *villavicencia* and *villosa*; male palpus uniformly chocolate brown except for tan-colored hair pencil, when everted; female palpi (Fig. 38) cocoa-brown, curved in a semicircle, 3rd segment fine, nearly as long as 2nd, scaled dark gray and faintly edged with white at base and tip.

Thorax. *Wings*— (males, 24.1mm, n=5; females, 23.7mm, n=5) Basal and medial fields uniformly chocolate brown with a minute gray medial stigma; basal and am lines barely visible as such; pm line sharp, with diffuse whitish-gray shading at the outer edge; st line faint, wavy, white; terminal line entire on both FW and HW, dark gray-brown inwardly, paler tannish-brown towards the fringe; pattern on HW recapitulates that on FW. *Legs*— (Figs 37–38) Predominantly cocoa-brown, intersegmental bands cream-colored; male forefemoral tuft present, brown towards base, otherwise gray; tannish hind-femoral tufts present.

Abdomen. Gray-brown above, concolorous with HW upperside.

Male genitalia. (Figs 51, 73–74) Uncus elongate, setose, sheepsfoot-shaped; costa free of valva for distal third of its length and gently curved, not sinuous; vinculum bluntly tapered; reduced phallic ridge present; vesica not highly differentiated, microspines largely confined to subbasal lobe; body of vesica flanked by sub-conical lobes comparable to those in *splendida* and *paratrax*, above; spinules concentrated on subbasal lobe, with localized apical sclerotization.

Female genitalia. (Figs 89, 90, 98, 100) Ductus bursae elongate but with sclerotized bands reduced relative to other species treated here, extending less than half the length of the ductus itself; ductus joins corpus bursae at

oblique angle as in *paratrax*; corpus bursae oblong; well-developed internal mid-ventral band of micro-spinules (Figs 98, 100) punctuated by a series of 13 perpendicular serrate ridges similar to those in *villavicencia, villosa,* and *magas*; as in *magas,* the band itself nearly perpendicular to long axis of the corpus, and less angled towards the apex of the corpus than in the other species; appendix bursae whorled, comparable to that of *villavicencia* and *villosa*.

Immature stages. (Figs 110–114) Fifth instar larva smooth, uniformly shamrock- or emerald-green, with pale pinacula and a faint spiracular line; spiracles dark surrounded by pale ring; head calico-patterned fronto-laterally.

Etymology. *Rejectaria ritaashleyae* is named in honor of Rita Ashley of Texas and Nicoya, Costa Rica, in recognition of her many years of support for Biodiversity Development and Inventory of Area of Conservacion Guanacaste and its recent expansion nationally as BioAlfa, an effort to support Costa Rica's bioliteracy.

Biology. Larvae have been documented feeding on *Asplundia utilis* (n=19), *Asplundia microphylla* (n=25), *Cyclanthus bipartitus* (2). Several parasitoids have been reared from *ritaashleyae,* including *Euplectrus paulhansoni* (Eulophidae) and an undescribed *Diradops* ("Wahl03OLD"; Ichneumonidae: Banchinae) from larvae feeding on *A. microphylla* (04-SRNP-34368 and 09-SRNP-32451, respectively), an undescribed *Dusona* ("INB099") from larvae feeding on *A. microphylla* and *A. utilis* (05-SRNP-32624 and 06-SRNP-7891, respectively); and an undetermined Tachinidae. None of these have been recorded from other cyclanth-feeders. The parasitoid *Zelomorpha paulgoldsteini* (Braconidae: Agathidinae) was reared from *R. ritaashleyae* larvae on *Asplundia utilis* (4 records; 05-SRNP-40147, 10-SRNP-68136, 10-SRNP-68138, 15-SRNP-45311), *Asplundia microphylla* (1 record; 13-SRNP-79938), *Carludovica costaricensis* (5 records: 02-SRNP-6055, 13-SRNP-45094, 13-SRNP-45097, 13-SRNP-45161, 13-SRNP-45284), and *Cyclanthus bipartitus* (1 record, 05-SRNP-23084). This parasitoid has also been reared from several related fern-feeding Herminiinae at ACG as well as from the fern-feeding noctuids *Callopistria floridensis* on *Nephrolepis biserrata* (Nephrolepidaceae; 11-SRNP-69208) and *Blechnum occidentale* (Blechnaceae; 13-SRNP-3034), and *Callopistria mexicana* on *Bolbitis portoricensis* (Dryopteridaceae; 10-SRNP-21839).

Distribution. Known from Costa Rica

Rejectaria magas Druce, 1891

Habitus Figs 23–24, 39. Male genitalia Figs 55, 81–82. Female genitalia Fig. 93, 99.

Bleptina? magas Druce, 1891, *Biologia Centrali-Americana* 1: 456, pl. 37, fig. 15. Type locality: Panama: Chiriqui (Holotype ♀, MNHU)

Material examined. Type Material: Holotype ♀. **PANAMA:** Chiriqui [MNHU; Image]. **Other material. COSTA RICA.** (1♂, 2♀♀). Guanacaste, Area de Conservacion Guanacaste, Sector Del Oro (1♂,1♀): 1♂, Quebrada Romero, 11.00519, -85.47398, el. 490m: larva on: *Cyclanthus bipartitus*12/21/2004, ecl. 12/23/2004, Roster Moraga, collector, 04-SRNP-27241, USNMENT01493483, USNM slide 148574. 1♀, Margarita, 11.03234, -85.43954, el. 380m: larva on *Cyclanthus bipartitus*: 01/10/2005, ecl. 01/25/2005, Roster Moraga, collector, 05-SRNP-20175, USNMENT01493354, USNM slide 148575. 1♀, Schaus and Barnes coll, Mar., Sixola Riv CR, Bleptina? magas Dr, USNMENT01422748.

Diagnosis. *Rejectaria magas* is most similar in appearance to *R. richardashleyi* sp. n., below, and to *Bleptina albidiscalis*. *Rejectaria magas* shares most of the wing pattern elements of *R. richardashleyi* but can be differentiated from both species by the paler tannish-brown (as opposed to dark brown) coloration, and can be further differentiated from *richardashleyi* by the lack of large hind-femoral tufts. The valva is similar to that of *richardashleyi* with sclerotization confined to the basal half of the costa and no free protrusion at the valva's terminus, but with a minute protrusion at the terminus of the sclerotized basal part of the costa. The female genitalia share a distinctly configured band of signa with *ritaashleyae, villavicencia,* and *villosa* but with fewer (12–13) toothed discs than the latter two species.

Supplement to original description. ***Head***. Vertex and collar mixed with beige and cream-colored scales; antennae setose-ciliate; male palpi missing from specimen examined; female palpi (Fig. 39) with 2nd segment nearly straight, 3rd segment fine, ~half as long as 2nd, closely scaled with beige at each end, with an uneven band of larger, gray scales in the middle.

Thorax. *Wings*—(male, 20mm, n=1; female 18mm, n=2). Male costa distinctly tan, concolorous with collar, darker brown shading concentrated beneath costa towards base; FW and HW tannish brown overall, paler between pm and st lines; basal line absent; FW am line wavy, shaded brown outwardly, paler inward; pm line straight, inwardly

a diffuse dark brown band, outwardly a more sharp, tannish brown line, angled inward near costa; subterminal band a series of brown dashes tipped outwardly pale; terminal line a series of fine black dashes. FW pattern recapitulated on HW. *Legs*—(Fig. 39) Male forefemoral tuft present; legs uniformly tannish brown, with bands faint, if present.

Abdomen. Tannish-brown, concolorous with uppersides of wings

Male genitalia. (Fig. 55,81–82) Uncus elongate, setose, sheepsfoot-shaped; costal margin sclerotized in basal half, entirely fused with valva except for minuscule terminal nubbin comparable to but smaller than that in *villavicencia*; outer margin of valva rounded; vinculum bluntly tapered; small phallic ridge present; vesica multi-lobate; microspines distributed on phallus at base of vesica, concentrated on subbasal lobe and more diffusely throughout lower vesica.

Female genitalia. (Fig. 93, 99) Ductus bursae with broad sclerotization along most of its length; corpus bursae swollen near junction with ductus; appendix bursae partially coiled but not whorled as in *villosa*; corpus bursae with mid-ventral band of micro-spinules well-developed (Fig. 99), punctuated by a series of 12-13 internal perpendicular ridges as in *villavicencia, villosa, richardashleyi*, and *ritaashleyae*; faint secondary band includes faint internal ridges, appearing to echo primary band.

Immature stages. Not available for examination.

Biology. Larvae documented feeding on *Cyclanthus bipartitus.*

Distribution. Panama, Costa Rica

FIGURES 39–42. Lateral/ventral aspects. **39** ♀ *R. magas*, Brazil, USNMENT01422748. **40** ♂ *R. villosa*, Colombia, USNMENT01422993, Slide USNM148666. **41** ♂ *R. villavicencia*, Holotype, Colombia, USNMENT00973787, Slide USNM148642. **42** ♂ *R. richardashleyi*, Holotype, Costa Rica, USNMENT01493269, 09-SRNP-32559

***Rejectaria richardashleyi* Goldstein, sp. n.**

Habitus Figs 21–22, 35–36, 42. Male genitalia Figs 56, 83–84. Female genitalia Figs 94, 102. Larva Figs 115–117.

Material examined. Type material: Holotype ♂ COSTA RICA: Guanacaste, Area de Conservacion Guanacaste, Sector Pitilla: Sendero Mismo, 10.98758, -85.41967, el. 680m, larva on *Asplundia microphylla*, 09/16/2009, ecl. 10/20/2009, Jose Calvo, collector, 09-SRNP-32559, USNMENT01493269.

Paratypes (68♂♂, 56♀♀) **COSTA RICA**: Alajuela, Area de Conservacion Guanacaste. Sector Rincon Rain Forest (33♂♂, 28♀♀): 1♂, Comejen, 10.95669, -85.28934, el. 213m, larva on *Asplundia microphylla*, 11/05/2012, ecl. 12/04/2012, Keiner Aragon, collector, 12-SRNP-68765, USNMENT01493114. 1♂, Laureles, 10.93319, -85.25335, el. 95m, larva on *Asplundia utilis*, 06/10/2007, Jose Perez, collector, ecl. 07/10/2007, 07-SRNP-41583, USNMENT01493209. 1♂, 1♀ Palomo, 10.96187, -85.28045, el. 96m, larva on *Asplundia utilis*, 12/14/2010, Manuel Rios, collector: (1♂) ecl. 01/13/2011, 10-SRNP-68137, USNMENT01493014; (1♀) ecl. 01/12/2011, 10-SRNP-68139, USNMENT01493079. 5♂♂, 6♀♀, Quebrada Escondida, 10.89928, -85.27486, el. 420m, larva on *Asplundia utilis*: (1♂) 10/09/2001, ecl. 11/09/2001, Freyci Vargas, collector, 01-SRNP-5975, USNMENT01493279; (1♂) 12/05/2001, ecl. 12/30/2001, Freyci Vargas, collector, 01-SRNP-23447, USNMENT01479307; (1♂) 12/18/2001, ecl. 01/24/2002, Jose Perez, collector, 01-SRNP-23524, USNMENT01493009; (1♂) 11/29/2010, ecl. 12/29/2010, Anabelle Cordoba, collector, 10-SRNP-44494, USNMENT01493153; (1♂) 02/25/2011, ecl. 03/29/2011, Jose Perez, collector, 11-SRNP-41004, USNMENT01493262. (1♀) 10/09/2001, ecl. 11/10/2001, Freyci Vargas, collector, 01-SRNP-5973, USNMENT01493138; (1♀) 12/05/2001, ecl. 12/28/2001, Freyci Vargas, collector, 01-SRNP-23446, USNMENT01493117; (1♀) 09/17/2003, ecl. 10/09/2003, Jose Perez, collector, 03-SRNP-12755.1, USNMENT01493141; (1♀) 08/06/2005, ecl. 08/29/2005, Jose Perez, collector, 05-SRNP-42034, USNMENT01493167; (1♀) 11/25/2009, ecl. 12/16/2009, Jose Perez, collector, 09-SRNP-43306, USNMENT01493290; (1♀) 02/25/2011, ecl. 03/28/2011, Jose Perez, collector, 11-SRNP-41005, USNMENT01493033. 1♂, 1♀, Quebrada Escondida, 10.89928, -85.27486, el. 420m, larva on *Carludovica costaricensis*, 12/05/2013, Jose Perez, collector: (1♂) ecl. 01/05/2014, 13-SRNP-44863, USNMENT01493237; (1♀) ecl. 01/01/2014, 13-SRNP-44864, USNMENT01493160. 3♂♂, 2♀♀, Quebrada Guarumo, 10.90445, -85.28412, el. 400m, larva on *Asplundia utilis*, Jose Perez, collector, 09/28/2010: (1♂) ecl. 10/24/2010, 10-SRNP-43538, USNMENT01493186; (1♂) ecl. 10/24/2010, 10-SRNP-43540, USNMENT01493206; (1♂) ecl. 10/24/2010, 10-SRNP-43541, USNMENT01493204; (1♀) ecl. 10/18/2010, 10-SRNP-43539, USNMENT01493245; (1♀) ecl. 10/31/2010r, 10-SRNP-43542, USNMENT01493005. 2♂♂, 1♀, Rio Francia Arriba, 10.89666, -85.29003, el. 400m: larva on *Asplundia utilis*: (1♂) 10/07/2008, ecl. 11/01/2008, Anabelle Cordoba, collector, 08-SRNP-41982, USNMENT01493082; (1♂) 07/08/2013, Jose Perez, collector, ecl. 08/04/2013, 13-SRNP-42618, USNMENT01493092; (1♀) same data as previous, ecl. 08/07/2013, 13-SRNP-42617, USNMENT01493172. 1♂, Selva, 10.92291, -85.31877, el. 410m, Larva on *Asplundia utilis*, 12/16/2016, ecl. 01/08/2017, Edwin Apu, collector, 16-SRNP-81079, USNMENT01501726. 2♂♂, 4♀♀ Sendero Anonas, 10.90528, -85.27882, el. 405m, larva on *Asplundia utilis* (1♂) Jose Perez, collector, 10/10/2003, ecl. 11/09/2003, 03-SRNP-31011, USNMENT01493059; (1♀) 08/09/2004, ecl. 09/13/2004, Jose Perez, collector, 04-SRNP-42008, USNMENT01493062; (1♂) 02/27/2013, ecl. 04/07/2013, 13-SRNP-40884, USNMENT01493179; (1♀) 02/27/2013, ecl. 03/28/2013, 13-SRNP-40883, USNMENT01493162; (1♀) 12/02/2014, ecl. 12/18/2014, Anabelle Cordoba, collector, 14-SRNP-44987, USNMENT01493244; (1♀) 09/19/2005, ecl. 10/18/2005, Minor Carmona, collector, 05-SRNP-42715, USNMENT01493022. 2♀♀, Sendero Anonas, 10.90528, -85.27882, el. 405m, larva on *Carludovica costaricensis* 02/12/2013, Pablo Umaña Calderon, collector: (1♀) ecl. 03/17/2013, 13-SRNP-40664, USNMENT01493278; (1♀) ecl. 03/13/2013, 13-SRNP-40665, USNMENT01493154. 1♀, Jacobo, 10.94076, -85.3177, el. 461m, larva on *Asplundia utilis*, 12/02/2010, ecl. 01/03/2011, Manuel Ríos, collector, 10-SRNP-81463, USNMENT01493115. 2♀♀, Sendero Guaca, 10.9061, -85.28281, el. 400m, (1♀) larva on *Cyclanthus bipartitus*, 12/27/2002, ecl. 01/24/2003, Jose Perez, collector, 02-SRNP-21559, USNMENT01493222; (1♀) larva on *Asplundia utilis*, 12/11/2003, ecl. 01/09/2004, Jose Perez, collector, 03-SRNP-31713, USNMENT01493037. 10♂♂, 4♀♀, Sendero Rincon, 10.8962, -85.27769, el. 430m, larva on *Asplundia utilis*: (1♂) 01/09/2002, ecl. 02/10/2002, Armando Rios , collector, 02-SRNP-6051, USNMENT01493250; (1♂) 02/12/2002, ecl. 03/15/2002, Jose Perez, collector, 02-SRNP-6319, USNMENT01493282; (1♂) 11/13/2004, ecl. 12/13/2004, Jose Perez, collector, 04-SRNP-42741, USNMENT01493036; (1♂) 11/25/2004, ecl. 12/27/2004, Jose Perez, collector, 04-SRNP-42810, USNMENT01493150; (1♂) 12/09/2004, ecl. 01/09/2005, Jose Perez, collector, 04-SRNP-42900, USNMENT01493187, USNM slide 148578; (1♂) 01/02/2005, ecl. 02/01/2005, Jose Perez, collector, 05-SRNP-40001, USNMENT01493118; (1♂) 01/20/2005, ecl. 02/28/2005, Minor Carmona, collector, 05-SRNP-40228, USNMENT01493241; (1♂) 12/07/2005, ecl. 01/09/2006, Jose Perez, collector, 05-SRNP-43616, USNMENT01493078; (1♂) 11/07/2008, ecl. 12/08/2008, Jose Perez, collector, 08-SRNP-42148, USNMENT01493083; (1♂) 11/07/2008, ecl. 12/11/2008, Jose Perez, collector, 08-SRNP-42149,

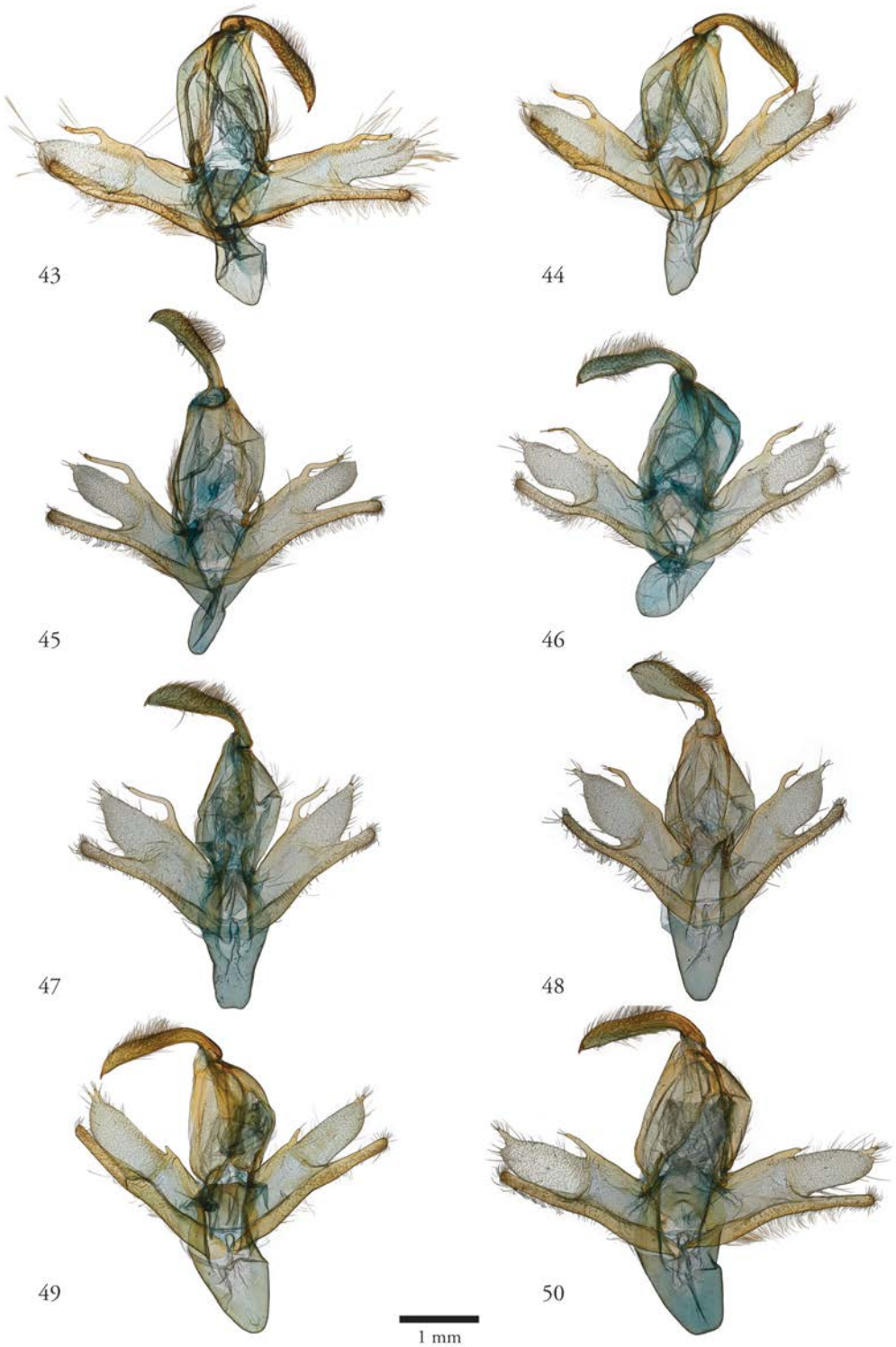
USNMENT01493042; (1♀) 01/09/2002, ecl. 02/06/2002, Jose Perez, collector, 02-SRNP-6048, USNMENT01493284; (1♀) 01/09/2002, ecl. 02/06/2002, Armando Rios , collector, 02-SRNP-6053, USNMENT01493252; (1♀) 11/07/2008, ecl. 12/09/2008, Jose Perez, collector, 08-SRNP-42147, USNMENT01493286; (1♀) 02/26/2013, ecl. 03/24/2013, Jose Perez, collector, 13-SRNP-40837, USNMENT01493292. 1♀, Sendero Rincon, 10.8962, -85.27769, el. 430m, larva on *Cyclanthus bipartitus*, 09/17/2010, ecl. 10/07/2010, Pablo Umaña Calderon, collector, 10-SRNP-43308, USNMENT01493077. 2♂♂, 2♀♀, Sendero Venado, 10.89678, -85.27001, el. 420m, larva on *Asplundia utilis*, Jose Perez, collector: (1♂) 12/03/2004, ecl. 01/10/2005, 04-SRNP-42863, USNMENT01493101; (1♂) 10/23/2013, ecl. 11/29/2013, 13-SRNP-44157, USNMENT01493164; (1♀) 12/03/2004, ecl. 01/08/2005, 04-SRNP-42864, USNMENT01493227; (1♀) 10/23/2013, ecl. 11/27/2013, 13-SRNP-44156, USNMENT01493263. 1♂, Sendero Juntas, 10.90661, -85.28784, el. 400m, larva on *Asplundia utilis*, 11/17/2010, ecl. 12/20/2010, Jose Perez, collector, 10-SRNP-44288, USNMENT01479216. 2♂♂, 1♀, Vado Rio Francia, 10.90093, -85.28915, el. 400m, Jose Perez, collector, larva on *Asplundia utilis*: (1♂) 01/07/2002, ecl. 02/09/2002, 02-SRNP-6038, USNMENT01493148; (1♂) 01/02/2015, ecl. 01/31/2015, 15-SRNP-40024, USNMENT01479359; (1♀) 11/01/2013, ecl. 12/06/2013, 13-SRNP-44276, USNMENT01493094. 1♂, Vado Rio Francia, 10.90093, -85.28915, el. 400m, Jose Perez, collector, larva on *Carludovica costaricensis*, 01/11/2013, ecl. 02/15/2013, 13-SRNP-40115, USNMENT01493132. Sector San Cristobal (9♂♂, 8♀♀): 3♂♂, Rio Blanco Abajo, 10.90037, -85.37254, el. 500m: (1♂) 11/15/2004, ecl. 12/09/2004, larva on *Asplundia utilis*, Gloria Sihezar, collector, 04-SRNP-60897, USNMENT01493012; (1♂) 11/05/2005, ecl. 12/08/2005, larva on *Asplundia utilis*, Gloria Sihezar, collector, 05-SRNP-6913, USNMENT01493066; (1♂) larva on *Asplundia microphylla*, 12/04/2005, ecl. 12/27/2005, Osvaldo Espinoza, collector, 05-SRNP-7574, USNMENT01493091. 2♂♂, 1♀, Sendero Colegio, 10.89296, -85.3788, el. 520m, Larva on *Asplundia utilis*, Gloria Sihezar, collector: (1♂) 10/03/2005, ecl. 11/09/2005, 05-SRNP-6176, USNMENT01493120; (1♀) 10/11/2006, ecl. 11/11/2006, 06-SRNP-8361, USNMENT01493229; (1♂) larva on *Cyclanthus bipartitus*, 08/25/2006, ecl. 09/18/2006, Carolina Cano, collector, 06-SRNP-7082, USNMENT01493144. 1♂, 1♀, Sendero Huerta, 10.9305, -85.37223, el. 527m, larva on *Asplundia utilis*, 01/16/2007, Osvaldo Espinoza, collector: (1♂) ecl. 02/16/2007, 07-SRNP-273, USNMENT01493063; (1♀) ecl. 02/17/2007, 07-SRNP-271, USNMENT01493289. 1♀, Brasilia: Moga, 11.01227, -85.34929, el. 320m, larva on *Asplundia utilis*, 12/03/2013, ecl. 12/30/2013, Minor Carmona, collector, 13-SRNP-65705, USNMENT01493048. 2♂♂, 2♀♀, Sendero Palo Alto, 10.88186, -85.38221, el. 570m, larva on *Asplundia utilis*: (1♂) 01/16/2017, Elda Araya, collector, ecl. 02/10/2017, 17-SRNP-67, USNMENT01501706; (1♂) 01/16/2017, Elda Araya, collector, ecl. 02/13/2017 17-SRNP-69, USNMENT01501703; (1♀) 09/20/2005, Carolina Cano, collector, ecl. 10/16/2005, 05-SRNP-5882, USNMENT01493194; (1♀) 09/20/2005, Carolina Cano, collector, ecl. 10/18/2005, 05-SRNP-5883, USNMENT01493264. 1♂, 3♀♀, Tajo Angeles, 10.86472, -85.41531, el. 540m, larva on *Asplundia utilis*, Gloria Sihezar, collector, 09/20/2010: (1♂) ecl. 10/24/2010, 10-SRNP-5402, USNMENT01493126; (1♀) ecl. 10/11/2010, 10-SRNP-5397, USNMENT01493034; (1♀) ecl. 10/16/2010, 10-SRNP-5399, USNMENT01493032; (1♀) ecl. 10/22/2010, 10-SRNP-5401, USNMENT01493166. Sector Del Oro (5♂♂, 1♀): 4♂♂, 1♀, Bosque Aguirre, 11.0006, -85.438, el. 620m, larva on *Cyclanthus bipartitus*, 11/11/2010, Lucia Ríos, collector: (1♂) ecl. 12/11/2010, 10-SRNP-22482, USNMENT01493142: (1♂) ecl. 12/12/2010, 10-SRNP-22479, USNMENT01493035; (1♂) ecl. 12/12/2010, 10-SRNP-22480, USNMENT01493193; (1♂) ecl. 12/20/2010, 10-SRNP-22481, USNMENT01493137; (1♀) 05/24/2015, ecl. 06/22/2015, 15-SRNP-20615, USNMENT01493202. 1♂, Monte Cristo, 11.01373, -85.42531, el. 525m, larva on *Cyclanthus bipartitus*, 11/07/2016, ecl. 12/03/2016, Lucia Ríos, collector, 16-SRNP-21701, USNMENT01501728. Sector Pitilla (21♂♂, 16♀♀): 4♂♂, 3♀♀, Sendero Cuestona, 10.99455, -85.41461, el. 640m, larva on *Asplundia microphylla*: (1♂) 12/06/2003, ecl. 01/08/2004, Lucia Ríos, collector, 03-SRNP-37286, USNMENT01493055; (1♀) 10/03/2006, ecl. 10/27/2006, Manuel Rios, collector, 06-SRNP-34630, USNMENT01493192; (1♂) 07/01/2011, ecl. 09/01/2011, Manuel Rios, collector, 11-SRNP-31890, USNMENT01493260; (1♀) 08/25/2011, ecl. 09/25/2011, Manuel Rios, collector, 11-SRNP-32415, USNMENT01493105; (1♂) 09/28/2011, ecl. 11/03/2011, Manuel Rios, collector, 11-SRNP-32933, USNMENT01493113; (1♂) 11/15/2012, Calixto Moraga, collector: ecl. 12/26/2012, 12-SRNP-31712, USNMENT01493076; (1♀) ecl. 12/20/2012, 12-SRNP-31711, USNMENT01493224. 2♂♂, Sendero Evangelista, 10.9868, -85.42083, el. 660m: larva on *Asplundia microphylla*: (1♂) 08/03/2011: ecl. 09/01/2011, Freddy Quesada, collector, 11-SRNP-32123, USNMENT01493257; (1♂) 08/05/2013, ecl. 09/04/2013, Manuel Rios, collector, 13-SRNP-31037, USNMENT01493276. 7♂♂, 4♀♀, Sendero Laguna, 10.9888, -85.42336, el. 680m, larva on *Asplundia microphylla*: (1♂) 08/25/2004, ecl. 09/20/2004, Calixto Moraga, collector, 04-SRNP-34808, USNMENT01493228;

(1♂) 10/07/2006, ecl. 11/06/2006, Manuel Rios, collector, 06-SRNP-34667, USNMENT01493028; (1♂) 12/22/2008, ecl. 01/26/2009, Manuel Rios, collector, 08-SRNP-33140, USNMENT01493088 (1♂) 11/23/2009, ecl. 12/25/2009, Calixto Moraga, collector, 09-SRNP-33319, USNMENT01493149; (1♂) 08/15/2011, ecl. 09/07/2011, Freddy Quesada, collector, 11-SRNP-32330, USNMENT01493235; (1♂) 02/19/2013, ecl. 04/06/2013, Calixto Moraga, collector, 13-SRNP-30344, USNMENT01493016; (1♂) 08/26/2013, ecl. 10/02/2013, Freddy Quesada, collector, 13-SRNP-31215, USNMENT01493047; (1♀) 10/09/2006, ecl. 11/02/2006, Petrona Rios, collector, 06-SRNP-34701, USNMENT01493089; (1♀) 12/09/2008, ecl. 01/11/2009, Petrona Rios, collector, 08-SRNP-33069, USNMENT01493002; (1♀) 12/09/2008, ecl. 01/15/2009, Petrona Rios, collector, 08-SRNP-33070, USNMENT01493163; (1♀) 12/22/2014, ecl. 01/25/2015, Freddy Quesada, collector, 14-SRNP-31775, USNMENT01493080. 1♂, 1♀, Sendero Memos, 10.98171, -85.42785, el. 740m, larva on *Asplundia microphylla*: (1♂) 11/28/2003, ecl. 01/07/2004, Lucia Ríos, collector, 03-SRNP-37132, USNMENT01493211; (1♀) 12/04/2007, ecl. 12/30/2007, Manuel Rios, collector, 07-SRNP-34060, USNMENT01493060, USNM slide 148389. 4♂♂, 2♀♀, Sendero Mismo, 10.98758, -85.41967, el. 680m, larva on *Asplundia microphylla*: (1♂) 09/28/2011, ecl. 11/09/2011, Manuel Rios, collector, 11-SRNP-32934, USNMENT01493253; (1♂) 08/22/2013, ecl. 09/24/2013, Freddy Quesada, collector, 13-SRNP-31144, USNMENT01493129; (1♂) 08/22/2013, ecl. 10/06/2013, Freddy Quesada, collector, 13-SRNP-31213, USNMENT01493190; (1♂) 08/22/2013, ecl. 10/07/2013, Freddy Quesada, collector, 13-SRNP-31235, USNMENT01493045; (1♀) 08/20/2010, ecl. 09/20/2010, Petrona Rios, collector, 10-SRNP-31827, USNMENT01493216, USNM slide 148577; (1♀) 09/14/2016, ecl. 10/12/2016, Freddy Quesada, collector, 16-SRNP-31531, USNMENT01501768. 1♂, Sendero Nacho, 10.98445, -85.42481, el. 710m: larva on *Asplundia microphylla*, 09/27/2011, ecl. 10/23/2011, Manuel Rios, collector, 11-SRNP-32907, USNMENT01493104. 2♂♂, 3♀♀, Sendero Naciente, 10.98705, -85.42816, el. 700m, larva on *Asplundia microphylla*: (1♂) 11/25/2013, ecl. 01/07/2014, Calixto Moraga, collector, 13-SRNP-31690, USNMENT01493214; (1♂) 11/25/2013, ecl. 01/04/2014, Calixto Moraga, collector, 13-SRNP-31693, USNMENT01493170; (1♀) 10/19/2012, ecl. 11/27/2012, Manuel Rios, collector, 12-SRNP-31546, USNMENT01493130; (1♀) 11/19/2014, ecl. 01/02/2015, Freddy Quesada, collector, 14-SRNP-31689, USNMENT01493003; (1♀) 11/09/2016, ecl. 12/08/2016, Freddy Quesada, collector, 16-SRNP-31843, USNMENT01501778. 1♀, Sendero Tierra Blanca, 10.98122, -85.41773, el. 680m: larva on *Asplundia microphylla*: 03/07/2013, ecl. 04/09/2013, Manuel Rios, collector, 13-SRNP-30378, USNMENT01493169. 1♀, Estacion Pitilla, 10.98931, -85.42581, el. 675m: larva on *Asplundia microphylla*: 10/02/2014, ecl. 11/06/2014, Freddy Quesada, collector, 14-SRNP-31297, USNMENT01493086. 1♀, Sendero Bernales, 10.9835, -85.42117, el. 660m: larva on *Asplundia microphylla*: 01/09/2017, ecl. 02/09/2017, Freddy Quesada, collector, 17-SRNP-30083, USNMENT01501776.

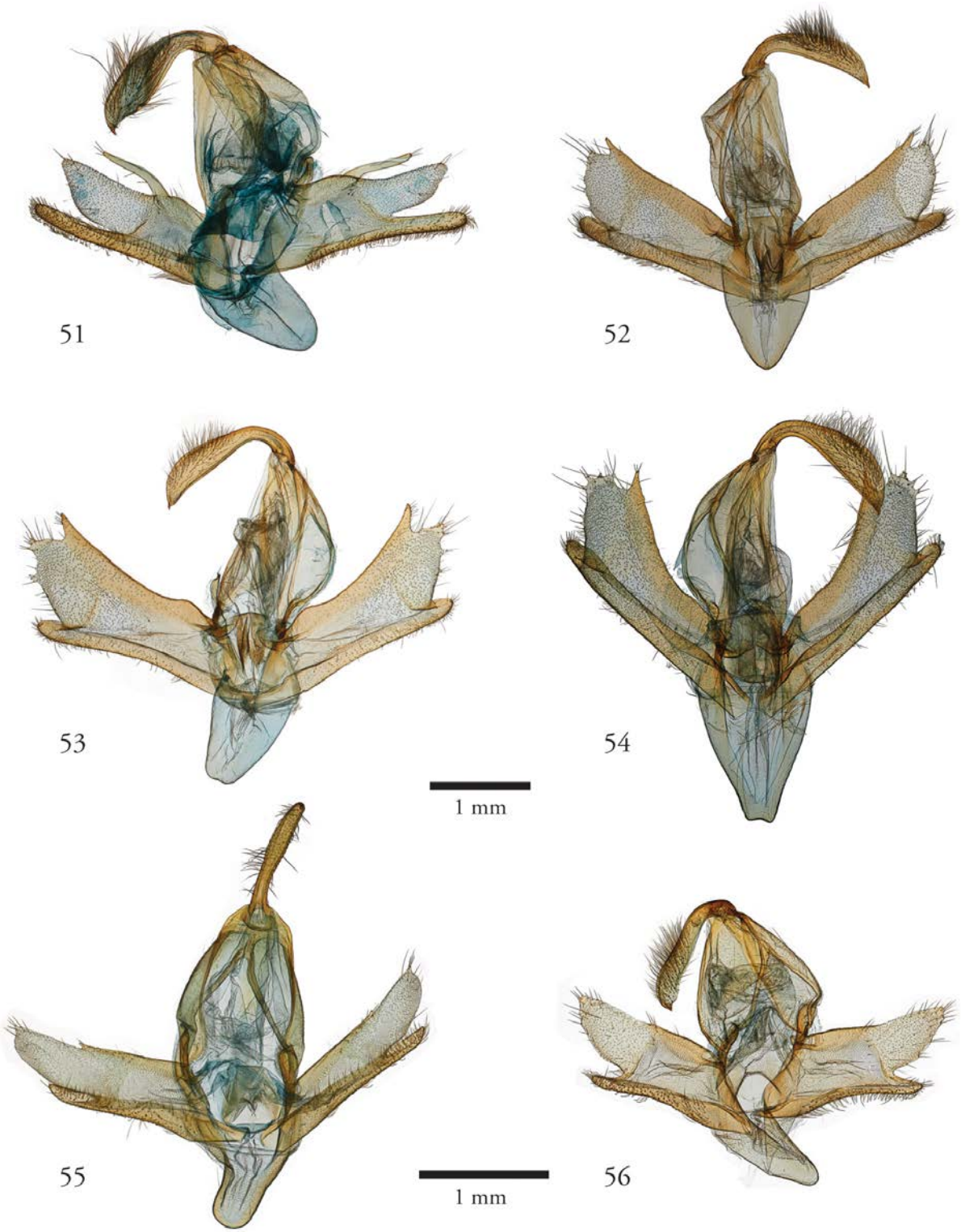
Diagnosis. *Rejectaria richardashleyi* bears a number of strong similarities to both *R. magas* (see diagnosis above) and *B. albidiscalis.* It differs from both species in its large hind-femoral tufts; from *albidiscalis* in the broken HW submarginal band, which is more continuous in *albidiscalis*, and possibly in the configuration of the male palp, the second segment of which extends approximately to just beyond the patagium in *richardashleyi*, and to the center of the thorax in *albidiscalis*. *Rejectaria richardashleyi* is also similar to *Strathocles magnipilosa* but the latter species has vastly expanded hind femoral tufts and elongate forewings, each with a posteromedial hyaline patch. *Rejectaria richardashleyi* is outwardly distinguished from other Neotropical Herminiinae by the combination of the bold yellowish-tan am and pm lines on the forewing, their dark shading flanking the median field, and the small pale crescent lunule; additionally, in the male genitalia, the costa of the valva is completely fused to the valva, and sclerotized in its basal half; the vesica bears a conspicuously anvil-shaped subbasal lobe, similar to that in *magas*. The female genitalia lack the serrate semicircular ridges inside the bursa which are present in *villosa, villavicencia, magas,* and *ritaashleyae.*

Description. ***Head***. Frons, vertex dark chocolate-brown; antennae setose-ciliate; male palpi (Fig. 35) dark brown, orange scaling along inner edge of 2nd segment, highly developed, sweeping back sharply over the head, but with no acute angles; female palpi (Fig. 36) cocoa-brown, curved in a semicircle, 3rd segment fine, nearly as long as 2nd, scaled dark gray and faintly edged with white at base and tip.

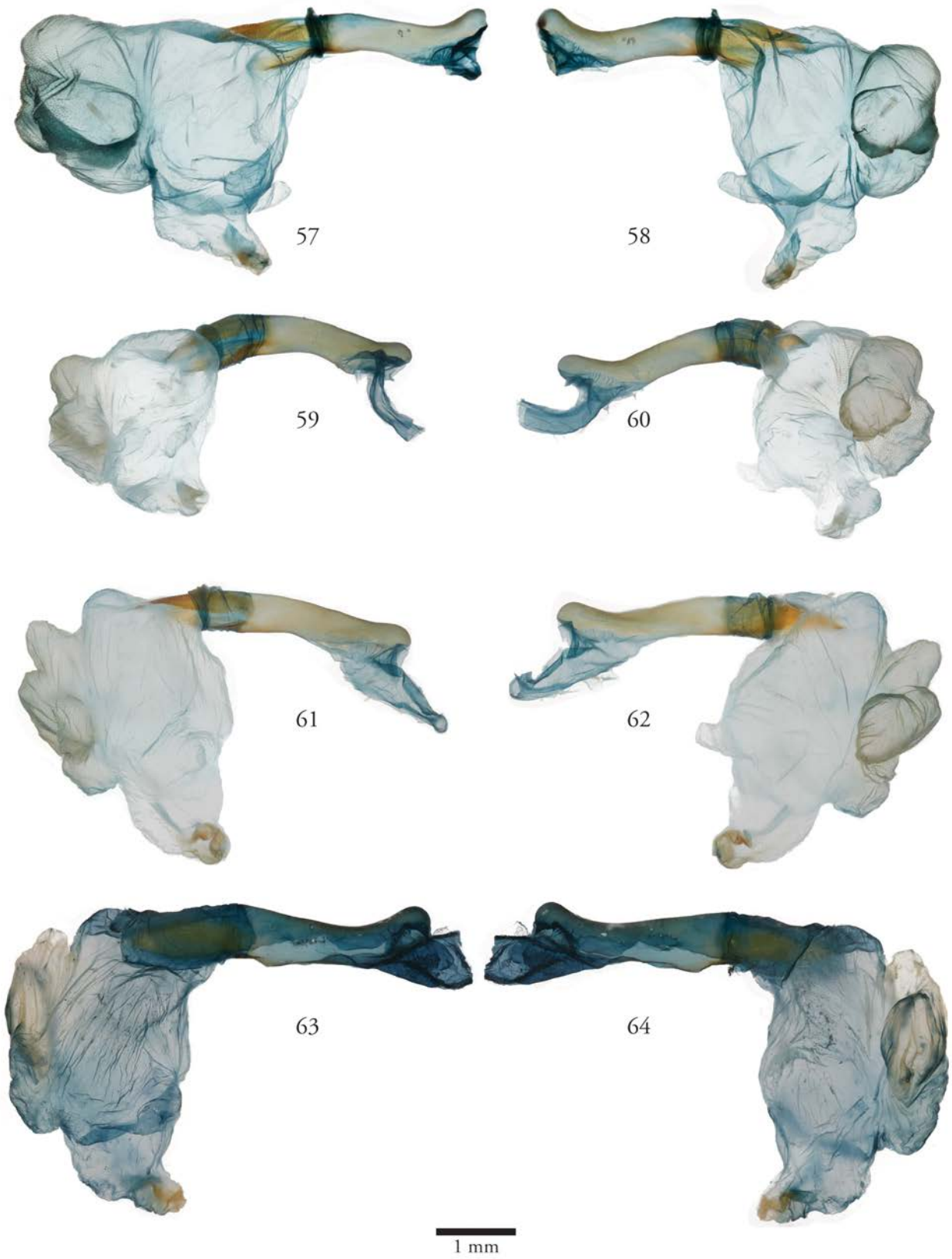
Thorax. *Wings*—(males, 19mm, n=5; females, 18mm, n=5) Forewing dusky brown; basal line absent; am and pm lines both present and bicolorous, dark brown outwardly, paler inward; median stigma a small pale lunule; pm line sharp, inwardly a diffuse dark brown band, outwardly a more sharp, tannish brown line, angled slightly inward near costa; st line faint, pale, jagged; terminal line a series of black chevrons edged outwardly with tannish brown; HW concolorous with FW, basal and am lines absent, pm and st lines continuous with those of FW. *Legs*— (Figs 35, 36) Male with conspicuous tufts on all legs, hind-femoral tufts the most expansive; white bands present in female.



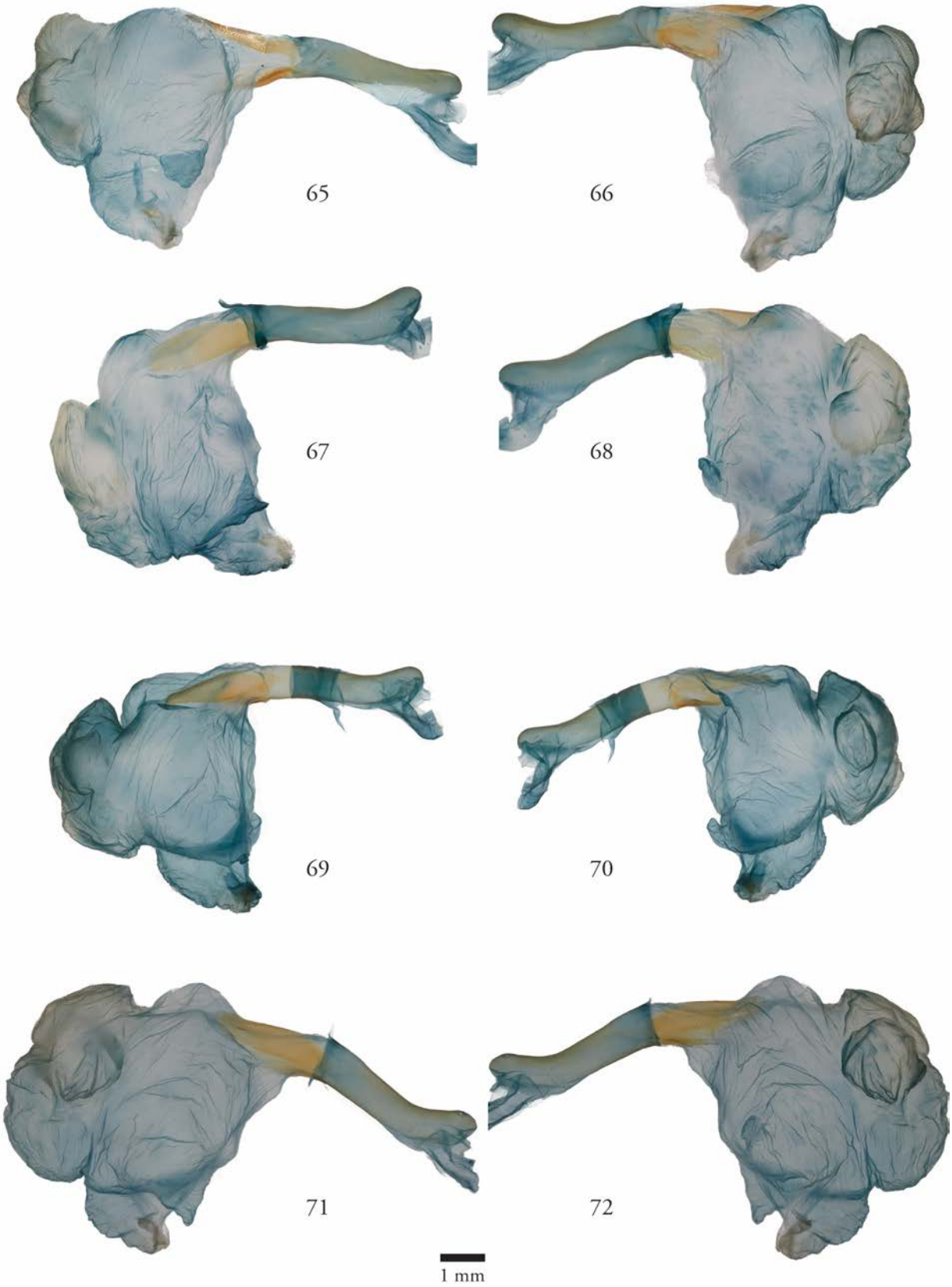
FIGURES 43–50. Male genitalia, valvae. **43** *R. villosa*, Costa Rica, USNMENT01493304, 13-SRNP-45393, Slide USNM148507. **44** *R.* sp. nr. *villosa*, USNMENT01493015, 02-SRNP-6046, Slide USNM148569. **45** *R. villosa*, Panama, USNMENT01422998, Slide USNM148665. **46** *R. villosa*, Venezuela, USNMENT01422978, Slide USNM148658. **47** *R. villosa*, Bolivia, USNMENT01756824, Slide 148669CMNH. **48** *R. villosa*, Colombia, USNMENT01422993, Slide USNM148666. **49** *R. villavicencia*, Costa Rica, USNMENT01493395, 06-SRNP-6834, Slide USNM148571. **50** *R. villavicencia*, Holotype, Colombia, USNMENT00973787, Slide USNM148642



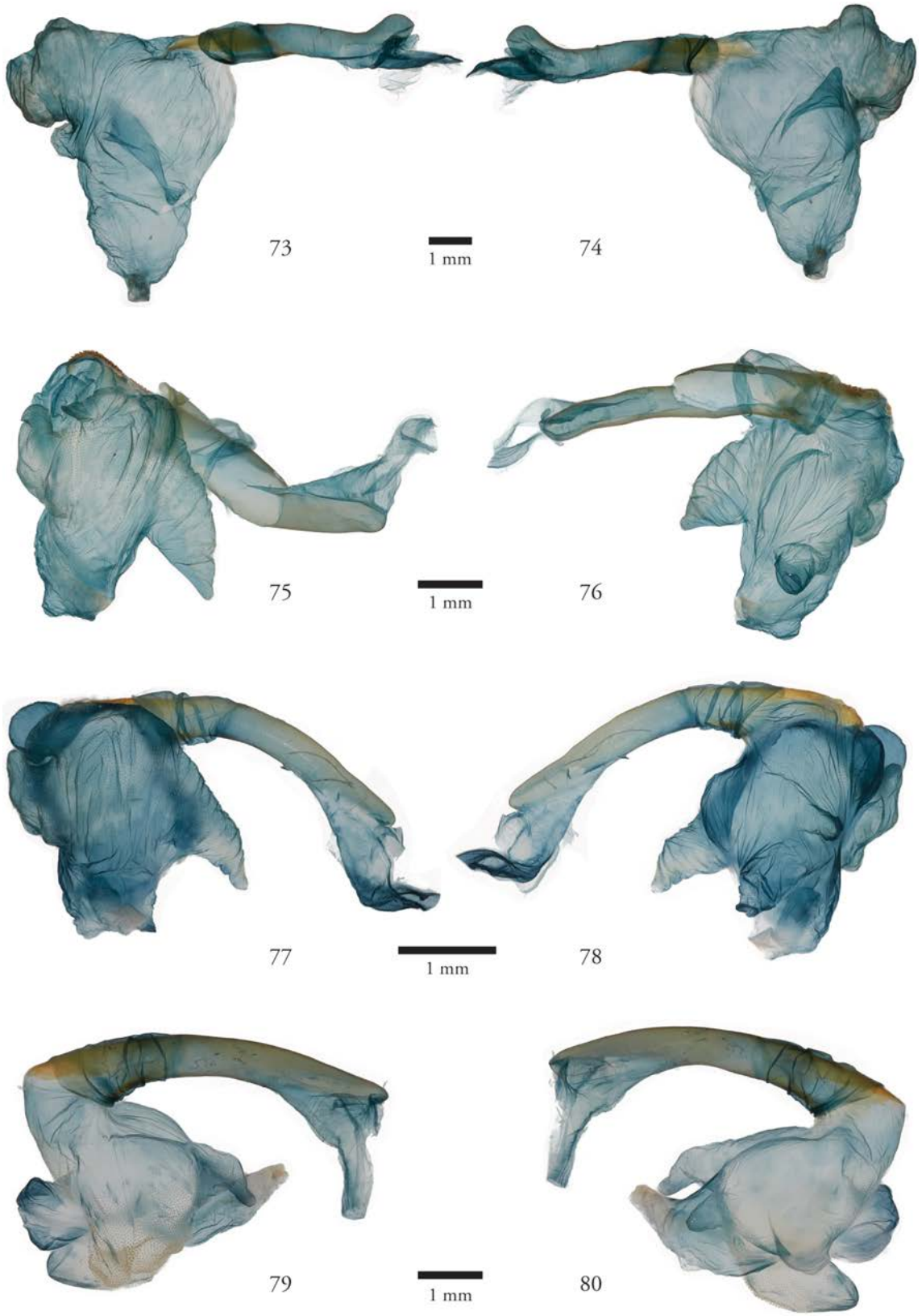
FIGURES 51–56. Male genitalia, valvae. **51** *R. ritaashleyae*, Costa Rica, USNMENT01493231, Slide USNM148597. **52** *R. paratrax*, Panama, USNMENT01756002, Slide USNM148595. **53** *R. splendida*, Syntype, Costa Rica, USNMENT00973707, Slide USNM148598. **54** *Narcaea atrax* (=*Rejectaria atrax*), Holotype, Ecuador, USNMENT00973692, Slide USNM148640. **55** *R. magas*, Costa Rica, USNMENT01493483, 04-SRNP-27241, Slide USNM148574. **56** *R. richardashleyi*, Costa Rica, USNMENT01493187, 04-SRNP-42900, Slide USNM148578



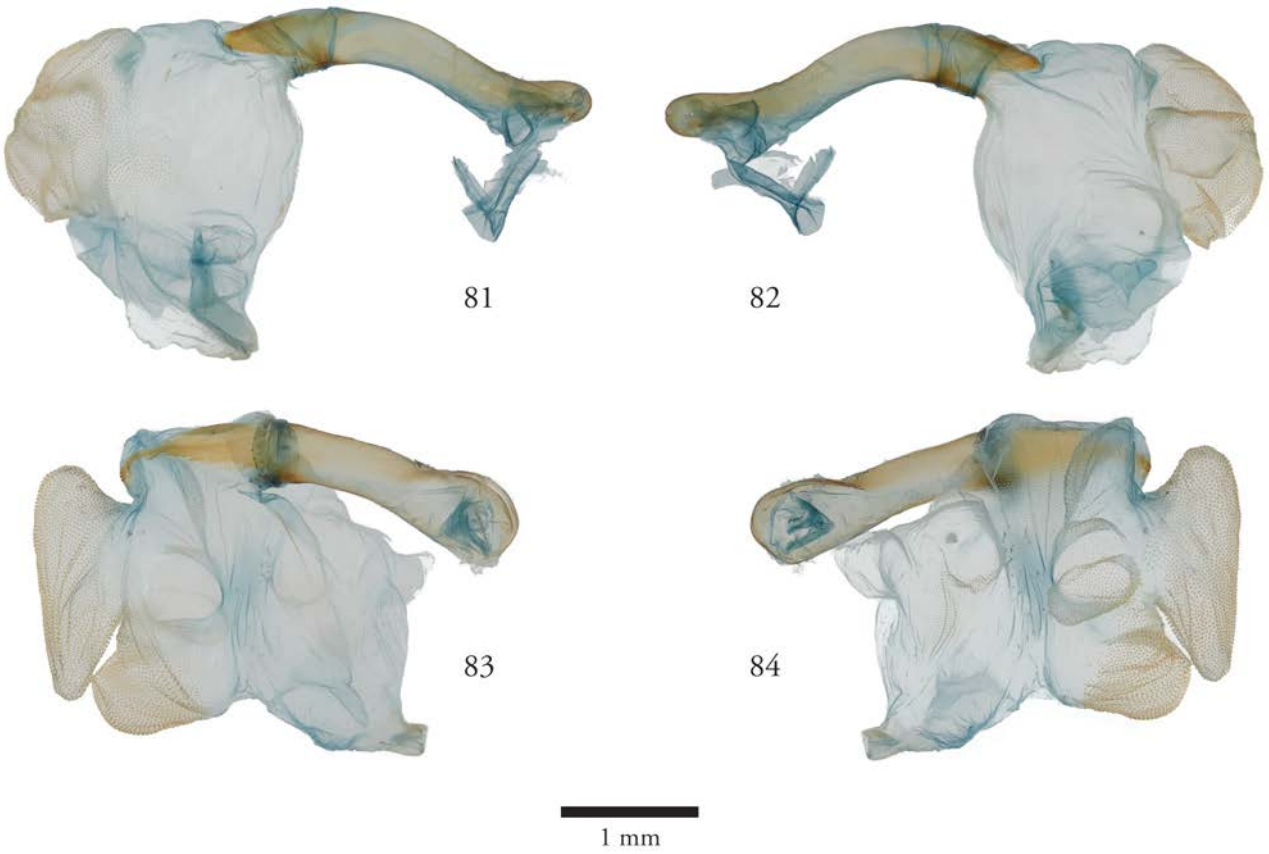
FIGURES 57–64. Male Genitalia, vesicae. **57–58** *R._villosa*, Costa Rica, USNMENT01493304, 13-SRNP-45393, Slide USNM148507. **59–60** *R.* sp. nr. *villosa*, Costa Rica, USNMENT01493015, 02-SRNP-6046, Slide USNM148569. **61–62** *R. villavicencia*, Costa Rica, USNMENT01493395, 06-SRNP-6834, Slide USNM148571. **63–64** *R. villavicencia*, Holotype, Colombia, USNMENT00973787, Slide USNM148642



FIGURES 65–72. Male Genitalia, vesicae. **65–66** *R._villosa*, Panama, USNMENT01422998, Slide USNM148665. **67–68** *R._villosa*, Venezuela, USNMENT01422978, Slide USNM148658. **69–70** *R._villosa*, Bolivia, USNMENT01756824, Slide USNM148669CMNH. **71–72** *R._villosa*, Bolivia, USNMENT01422993, Slide USNM148666



FIGURES 73–80. Male genitalia, vesicae. **73–74** *R. ritaashleyae*, Costa Rica, USNMENT01493231, 03-SRNP-11914, Slide USNM148597. **75–76** *R. splendida*, Syntype, Costa Rica, USNMENT00973707, Slide USNM148598. **77–78** *Narcaea atrax* (=*Rejectaria atrax*), Ecuador, Holotype, USNMENT00973692, Slide USNM148640. **79–80** *R. paratrax*, Panama, USNMENT01756002, Slide USNM148595



FIGURES 81–84. Male genitalia, vesicae. **81–82** *R. magas*, Costa Rica, USNMENT01493483, 04-SRNP-27241, Slide USNM148574. **83–84** *R. richardashleyi*, Costa Rica, USNMENT01493187, 04-SRNP-42900, Slide USNM148578

Abdomen. Dark brown, concolorous with uppersides of wings.

Male genitalia. (Figs 56, 83–84) Uncus elongate, setose, sheepsfoot-shaped, costal margin of valva sclerotized or partially sclerotized basally, without any part free, sclerotized in basal half, a small setal tuft at terminus of sclerotization; vinculum bluntly tapered; phallic ridge present; vesica multi-lobate, with thin sclerotized patch originating on phallus and bearing reduced patch of microspines; microspines on remainder of vesica concentrated primarily on two subbasal lobes, one anvil-shaped.

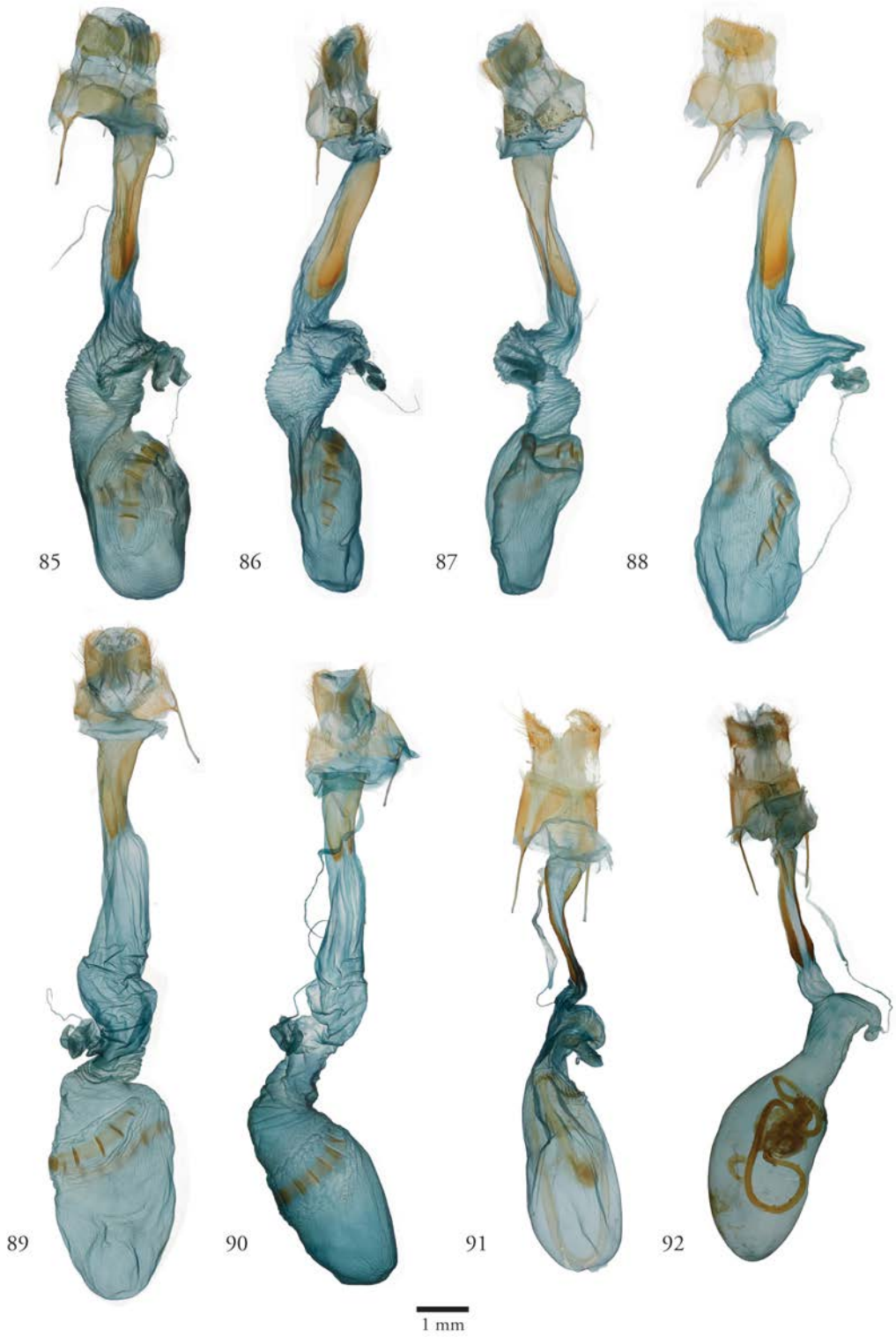
Female genitalia. (Figs 94, 102) Ductus and corpus bursae more stout than in previous species; bursal band of signa (Fig. 102) weakly developed as series of rudimentary toothlike internal spines, less well developed than in *paratrax,* and opposite corkscrew-shaped appendix bursae, also shared by those species; a small patch and partial second band of toothlike spines closer to ductus; spinules distributed medioventrally in the vicinity of the belt.

Immature stages. (Figs 115–117) Mature larva green with pale subdorsal and spiracular stripes; head green with four dark stripes; dorsal stripes yellowish; subdorsal and spiracular stripes white; intersegmental bands yellowish white.

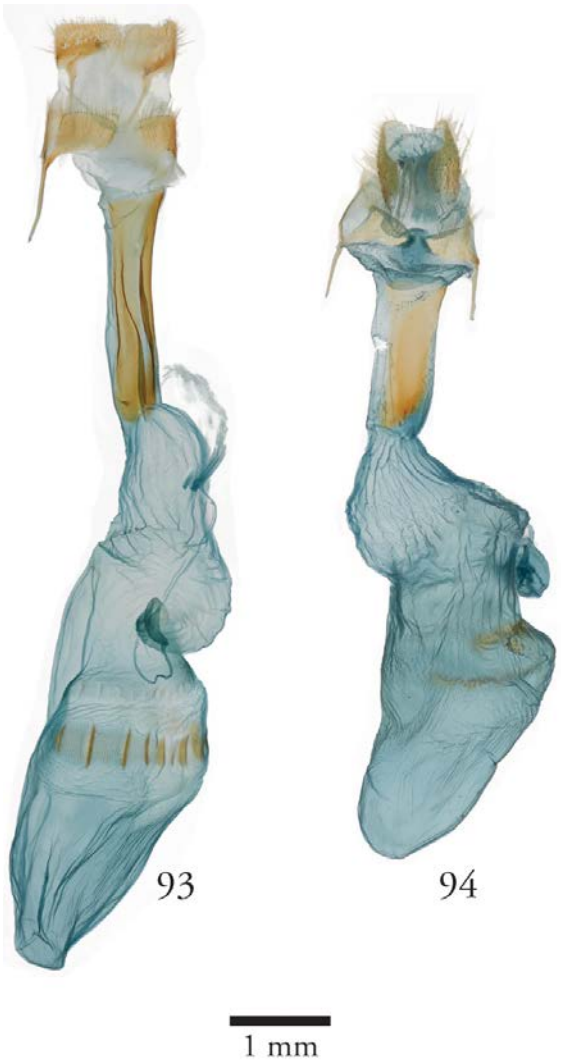
Etymology. *Rejectaria richardashleyi* is named in honor of Richard C. Ashley of Texas and Nicoya, Costa Rica, in recognition of his many years of support for Biodiversity Development and Inventory of Area of Conservacion Guanacaste and its recent expansion nationally as BioAlfa, an effort to support Costa Rica's bioliteracy.

Biology. Larvae documented feeding on *Asplundia microphylla* (n=43), *Asplundia utilis* (n=74), *Carludovica costaricensis* (n=5), and *Cyclanthus bipartitus* (n=9). The parasitoid *Zelomorpha paulgoldsteini* (Braconidae: Agathidinae) was reared from *R. richardashleyi* larvae on *Asplundia utilis* (3 records: 10-SRNP-68136, 10-SRNP-68138, 15-SRNP-45311); see parasitoid records under *ritaashleyae,* above.

Distribution. Costa Rica



Figures 85–92. Female genitalia. **85** *R.* sp. nr. *villosa*, Costa Rica USNMENT01493030, 07-SRNP-40317, Slide USNM148567. **86** *R. villosa*, Costa Rica, USNMENT01493406, 13-SRNP-45392, Slide USNM148566. **87** *R. villosa*, Costa Rica, USNMENT01493406, 13-SRNP-45392, Slide USNM148566. **88** *R. villavicencia*, Costa Rica USNMENT01493478, 03-SRNP-37825, Slide USNM148572. **89** *R. ritaashleyae*, Costa Rica USNMENT01493100, 05-SRNP-6177, Slide USNM148568. **90** *R. ritaashleyae*, Costa Rica USNMENT01493221, 09-SRNP-32560, Slide. **91** *R. splendida*, Syntype, Costa Rica, USNMENT01756004, Slide USNM148641. **92** *R. paratrax*, French Guiana USNMENT01422780, Slide USNM148596

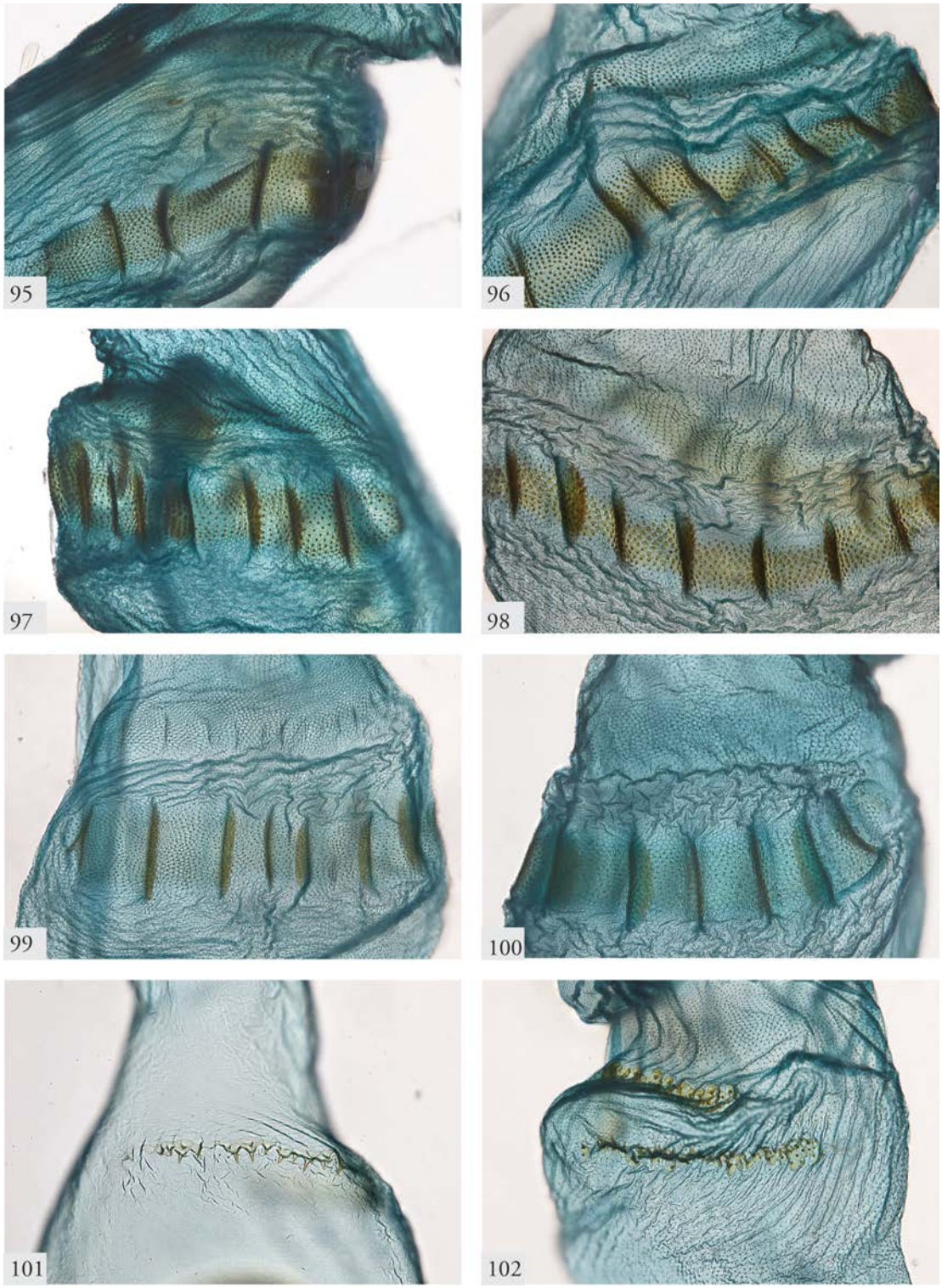


FIGURES 93–94. Female genitalia. **93** *R. magas*, Costa Rica USNMENT01493354, 05-SRNP-20175, Slide USNM148575. **94** *R. richardashleyi*, Costa Rica USNMENT01493216, 10-SRNP-31827, Slide USNM148577

Remarks. This species bears a number of similarities to both *Bleptina albdidiscalis* and *Strathocles magnipilosa* as well as *Rejectaria magas*, but in the absence of a phylogenetic analysis it is unclear whether these represent synapomorphies.

Discussion

As the name *litter moth* implies, Herminiinae caterpillars are generally thought of as detritivores. Hence the documentation of cyclanth-feeding (as well as fern-feeding) herminiines is noteworthy. In this paper, we have documented the Cyclanthaceae-feeding records of three described *Rejectaria* species (*magas, villavicencia* and *villosa*) and two new species (*richardashleyi* and *ritaashleyae*), and revised the nomenclature surrounding some of their presumptive relatives *atrax*, *splendida*, and *paratrax*, the life histories of which remain uknown. Although treating the cyclanth-feeding ACG Herminiinae is the *raison d'être* for this paper, the evidence that they form a monophyletic group is ambiguous: Altough *R. ritaashleyae* may link the the *Rejectaria atrax/splendida-paratrax* group to the cyclanth-feeders, both molecular data and life history data are as yet wanting for the *atrax* group. The more distant species *magas* and *richardashleyi* are morphologically distinct enough to suggest a separate generic placement, a separate origin of cyclanth-feeding, or both, but these questions await phylogenetic analysis.



FIGURES 95–102. Female genitalia, signa. **95** *R.* sp. nr. *villosa*, Costa Rica USNMENT01493030, 07-SRNP-40317, Slide USNM148567. **96** *R. villavicencia*, Costa Rica USNMENT01493478, 03-SRNP-37825, Slide USNM148572. **97** *R. villosa*, Costa Rica USNMENT01493406, 13-SRNP-45392, Slide USNM148566. **98** *R. ritaashleyae*, Costa Rica USNMENT01493100, 05-SRNP-6177, Slide USNM148568. **99** *R. magas*,_Costa Rica USNMENT01493354, 05-SRNP-20175, Slide USNM148575. **100** *R. ritaashleyae*, Costa Rica USNMENT01493221, 09-SRNP-32560, Slide USNM148584. **101** *R. paratrax*, French Guiana USNMENT01422780, Slide USNM148596. **102** *R. richardashleyi*, Costa Rica USNMENT01493216, 16-SRNP-31531, Slide USNM148577.

FIGURES 103–109. Larvae of *Rejectaria* on *Cyclanthus bipartitus* (Cyclanthaceae), Area Conservacion Guanacaste. **103–104** *R. villosa*, 03-SRNP-37830, USNMENT01493373 on *Cyclanthus bipartitus*. **105** *R. villavicencia*, 03-SRNP-37825, on *Cyclanthus bipartitus* (adult USNMENT01493478, Slide USNM148572). **106** *R. villosa*, 03-SRNP-37830, USNMENT01493373 on *Cyclanthus bipartitus*. **107** *R. villavicencia*, 03-SRNP-37825, on *Cyclanthus bipartitus* (adult USNMENT01493478, Slide USNM148572). **108–109** *R. villosa*, 03-SRNP-37829

FIGURES 110–117. Larvae/immatures of *Rejectaria* on *Asplundia* spp. (Cyclanthaceae), Area Conservacion Guanacaste. **110** *R. ritaashleyae*, USNMENT01493213, 06-SRNP-42283, image DHJ414682, on *Asplundia utilis*. **111** *R. ritaashleyae*, USNMENT01493065, 03-SRNP-37131, image DHJ80231, on *Asplundia microphylla*. **112** *R. ritaashleyae*, USNMENT01493231, 03-SRNP-11914, image DHJ76003, on *Asplundia utilis*. **113** *R. ritaashleyae*, USNMENT01493065, 03-SRNP-37131, image DHJ90997, on *Asplundia microphylla*. **114** *R. ritaashleyae*, Cocoon, 06-SRNP-42283-414679, on *Asplundia utilis*. **115** *R. richardashleyi* USNMENT01493213, 06-SRNP-34667, image DHJ425420, on *Asplundia microphylla*. **116** *R. richardashleyi*, USNMENT01493059, 03-SRNP-31011, image DHJ80886, on *Asplundia utilis*. **117** *R. richardashleyi*, USNMENT01493089, 06-SRNP-34701, image DHJ425428, on *Asplundia microphylla*.

Herminiinae are understudied as a group and much in need of global revision, and the cyclanth-feeding species treated here stand out within a broader group of largely fern-feeding species. Cyclanth-feeding is not a widespread habit among Lepidoptera, the most conspicuous examples apart from those treated here are skippers (Hesperiidae) (Burns *et al.* 2003, Cock 2009) and leafrollers (Tortricidae) (Brown *et al.* 2013) also described from ACG. McKenna and Farrell (2005) examined the origins of cyclanth-feeding among lineages of Neotropical cassidine Chrysomelidae (Coleoptera), and hypothesized a coarse correlation between the relative ages of the beetles and their monocot foodplants. Their work has bearing here because they uncovered relatedness between Cyclanthaceae-feeders and Arecaceae-feeders, and these two families are among the more conspicuous angiospermous hosts within a predominantly fern-feeding group of Herminiinae (Goldstein *et al.*, 2021).

Hermiinae are well known for the morphological diversity of their secondary sexual features, which appear variously on palpi, antennae, legs, and wings alike. Although a rigorous comparative study of herminiine secondary sexual features is beyond the scope of this paper, we mention them because of their historical prominence in the taxonomy of Herminiinae and Hypeninae, which were combined by Schaus (1916). Several of the male *Rejectaria* treated here exhibit elaborate palpal hair pencils and highly developed femoral tufts, particularly among the more robust species such as *villosa, villavicencia, ritaashleyae,* and *richardashleyi.* Among the other features we noted among these species are those associated with the female terminalia, and specifically the configuration of the band or belt of spines or highly modified semicircular, serrate plates inside the bursae copulatrices. The function of these structures may to be one of securing purchase for the spermatophore.

Ongoing comparative work within Herminiinae strongly suggests polyphyly of *Rejectaria,* and a stable generic placement of the species treated here will await more exhaustive taxon sampling and analyses. A range of morphological features, including genitalic characters, appear to unite several of the cyclanth-feeding *Rejectaria* to the exclusion of their congeners. However, similarities shared with species currently outside *Rejectaria*, for example between *R. richardashleyi* and *Strathocles magnipilosa*, underscore the need for more comprehensive revision before questions surrounding the number of origins of cyclanth-feeding in the group can be addressed phylogenetically.

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