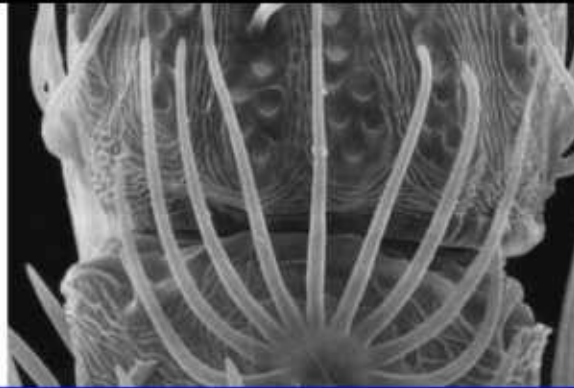
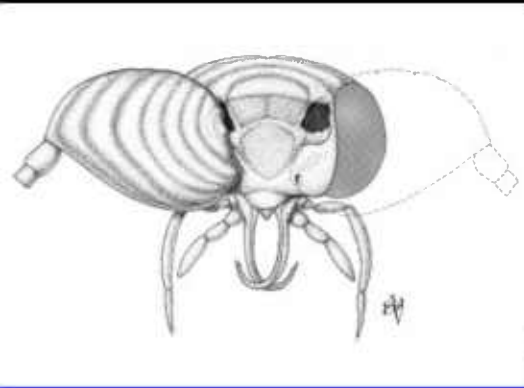




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SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 625



A Revision of the  
New World Plant-Mining  
Moths of the Family  
Opostegidae  
(Lepidoptera: Nepticuloidea)

*Donald R. Davis and Jonas R. Stonis*

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Smithsonian Institution  
Scholarly Press  
WASHINGTON, D.C.  
2007

## ABSTRACT

Davis, Donald R., and Jonas R. Stonis. A Revision of the New World Plant-Mining Moths of the Family Opostegidae (Lepidoptera: Nepticuloidea). *Smithsonian Contributions to Zoology*, number 625, 212 pages, 503 figures, 19 maps, 2 tables, 2007. — The systematics, morphology, and distributions are summarized for the 91 species and 2 subspecies of New World Opostegidae. A phylogenetic analysis using the “parsimony ratchet” in Winclada and based on 34 morphological characters for the seven currently recognized world genera indicates the monotypic Chilean genus, *Notiopostega*, to be the basal taxon. Monophyly of the Nepticuloidea (Nepticulidae + Opostegidae) is well supported by nine morphological synapomorphies. Several synapomorphies distinguish the Opostegidae from all other Lepidoptera. Principal among these are the presence of a single, spinose seta on the larval mandible, adult wing venation extremely reduced with all veins unbranched, frenulum lost in both sexes, antennal flagellomeres each typically with 3 sets of ascoid sensillae, and a pedunculate, typically elliptical, cucullar lobe bearing a well-developed pectinifer on the valva of the male genitalia. Larval biologies of only two New World species are known. Larvae of both species mine primarily the cambium layer in woody plant stems. Results from light trap sampling at the La Selva Biological Station in Heredia Province, Costa Rica, indicated that adult Opostegidae were much more abundant in canopy habitats compared with near-ground level. Four genera (*Neopostega* new genus, 5 species; *Notiopostega* Davis, 1 species; *Opostegoides* Kozlov, 1 species; and *Pseudopostega* Kozlov, 84 species and 2 subspecies) are recognized for the New World. One genus (*Neopostega*) and the following 68 species and 2 subspecies are described as new:

<i>Neopostega asymmetra</i>	<i>Pseudopostega curtarama</i>	<i>Pseudopostega mignonae</i>
<i>Neopostega distola</i>	<i>Pseudopostega denticulate</i>	<i>Pseudopostega monstrosa</i>
<i>Neopostega falcata</i>	<i>Pseudopostega didyma</i>	<i>Pseudopostega obtuse</i>
<i>Neopostega longispina</i>	<i>Pseudopostega diskusi</i>	<i>Pseudopostega ovatula</i>
<i>Neopostega petila</i>	<i>Pseudopostega divaricata</i>	<i>Pseudopostega parakempella</i>
<i>Pseudopostega acrodicra</i>	<i>Pseudopostega dorsalis dorsalis</i>	<i>Pseudopostega paraplicatella</i>
<i>Pseudopostega acuminata</i>	<i>Pseudopostega dorsalis fasciata</i>	<i>Pseudopostega plicatella</i>
<i>Pseudopostega apotoma</i>	<i>Pseudopostega duplicate</i>	<i>Pseudopostega resimafurcata</i>
<i>Pseudopostega attenuate</i>	<i>Pseudopostega ecuadoriana</i>	<i>Pseudopostega rotunda</i>
<i>Pseudopostega beckeri</i>	<i>Pseudopostega ferruginea</i>	<i>Pseudopostega sectila</i>
<i>Pseudopostega bicornuta</i>	<i>Pseudopostega floridensis</i>	<i>Pseudopostega serrata</i>
<i>Pseudopostega bidorsalis</i>	<i>Pseudopostega fumida</i>	<i>Pseudopostega spatulata</i>
<i>Pseudopostega brachybasis</i>	<i>Pseudopostega galapagosae</i>	<i>Pseudopostega sublobata</i>
<i>Pseudopostega breviapicula</i>	<i>Pseudopostega gracilis</i>	<i>Pseudopostega subtila</i>
<i>Pseudopostega brevifurcata</i>	<i>Pseudopostega lateriplicata</i>	<i>Pseudopostega suffuscula</i>
<i>Pseudopostega brevivalva</i>	<i>Pseudopostega latiapicula</i>	<i>Pseudopostega tanygnatha</i>
<i>Pseudopostega caulifurcata</i>	<i>Pseudopostega latifurcata latifurcata</i>	<i>Pseudopostega temuifurcata</i>
<i>Pseudopostega clavata</i>	<i>Pseudopostega latifurcata apoclina</i>	<i>Pseudopostega texana</i>
<i>Pseudopostega colognatha</i>	<i>Pseudopostega latisaccula</i>	<i>Pseudopostega triangularis</i>
<i>Pseudopostega concave</i>	<i>Pseudopostega lobata</i>	<i>Pseudopostega truncate</i>
<i>Pseudopostega conicula</i>	<i>Pseudopostega longifurcata</i>	<i>Pseudopostega tucumanae</i>
<i>Pseudopostega constricta</i>	<i>Pseudopostega longipedicella</i>	<i>Pseudopostega turquinoensis</i>
<i>Pseudopostega contigua</i>	<i>Pseudopostega microacris</i>	<i>Pseudopostega uncinata.</i>
<i>Pseudopostega crassifurcata</i>		

Published by Smithsonian Institution Scholarly Press

P.O. Box 37012

MRC 957

Washington, D.C. 20013-7012

www.scholarlypress.si.edu

## Library of Congress Cataloging-in-Publication Data

Davis, Donald R. (Donald Ray)

A revision of the new world plant-mining moths of the family Opostegidae (Lepidoptera: Nepticuloidea) / Donald R. Davis and Jonas R. Stonis.

p. cm. -- (Smithsonian contributions to zoology ; no. 625)

Includes bibliographical references and index.

1. Opostegidae—Classification. I. Stonis, Jonas R. II. Title.

QL561.O7D38 2007

595.78—dc22

2007021148

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# A Revision of the New World Plant-Mining Moths of the Family Opostegidae (Lepidoptera: Nepticuloidea)

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## INTRODUCTION

Opostegidae are a morphologically distinct family of small, predominantly white moths whose females possess a primitive, monotrysian reproductive system. Together with their sister family, Nepticulidae, the Opostegidae contain some of the smallest Lepidoptera known, with a wingspan ranging from 4 to 16 mm. Although generally global in distribution, evidence now indicates the greatest diversity for Opostegidae occurs in the continental tropical/subtropical regions. One of the more obvious diagnostic features of the family is the greatly expanded antennal scape (Figures 5, 6, 8, 10, 12), which entirely covers the eye at rest and is the origin for the names of the type genus and family [derived from the Greek *opos* (eye) and *stego* (cover)]. The Nepticulidae also possess an enlarged scape (but usually developed to a relatively lesser degree), as well as a short, nonpiercing ovipositor superficially similar to that of Opostegidae. Opostegidae are easily distinguished from Nepticulidae by their more specialized larvae, the presence of ascoid antennal sensillae (Figures 14, 58), and the development of a highly modified, pedunculate cucullar lobe on the male valva that bears a prominent pectinifer consisting of a single row of blunt spines (Figure 44).

Since the first reported discovery of a member of this family in 1813 (*Pseudopostega auritella* (Hübner)) and the family formally recognized as one (Opostegidae) of seven groups under Tineidae by Meyrick (1893), the world literature concerning Opostegidae has largely consisted of poorly diagnosed species descriptions without illustrations. Within the past 15 years, notable efforts have appeared to raise this family from obscurity. The first of these was a generic review of the family and world catalogue (Davis, 1989), followed by a revision of the Oriental Opostegidae (Puplesis and Robinson, 1999), and most recently by a review and world catalogue of the Nepticuloidea and Tischerioidea by Puplesis and Diškus (2003). Before 1985, only one generic name, *Opostega*, had been proposed in this cosmopolitan family. This conservatism was largely a result of the superficial morphological uniformity of these moths apparent to earlier workers as well as the lack of serious morphological examination. In a brief but significant review of a few Asian Opostegidae, Kozlov (1985) proposed the new genus *Opostegoides* and the subgenus *Pseudopostega*. Davis (1989) soon afterward proposed three additional genera and recognized *Pseudopostega* as a distinct genus. The present study continues our investigations on the

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Manuscript received 18 January 2007; accepted  
5 March 2007.

diversity and systematics of the Opostegidae with a revision of the New World fauna. Of the 91 species recognized for the New World, nearly 75% (i.e., 68 new species, and 2 new subspecies) are proposed for the first time, in addition to one new genus, bringing the total world's fauna to seven genera, 196 species (including 2 species of *Pseudopostega* and 7 species of *Opostegoides*, which were described but unnamed by Puplesis and Robinson, 1999), and 2 subspecies. In addition, at least three Neotropical species examined during the course of this study are believed to represent new taxa but were not named because of their poor physical condition.

Many factors combine to entitle the Opostegidae as arguably the most difficult family among all Lepidoptera to study. The small size and apparent rarity of most species of Opostegidae, coupled with the great difficulty in locating their usually well concealed, plant-mining larvae, undoubtedly have hindered previous attempts to collect and study this group. The often sparingly marked and similar forewing pattern of most species, together with the possibility for appreciable pattern variation (see Figures 183–190), necessitate that nearly every specimen be dissected for species identification; this is particularly true in areas of high species diversity, such as the Neotropical Region. Furthermore, the one feature of the forewing typically exhibiting the most consistent (and often only) pattern—the subapical strigula—is largely confined to the terminal fringe of the wing, the region most frequently damaged and largely missing in flown adults. Because the forewings are often similar or variable in pattern, the association of males and females within species is frequently difficult and sometimes impossible unless adequate series are available for comparison. The small size of the male genitalia equals that of the Nepticulidae, but the male genitalia of Opostegidae, particularly of the most speciose genus *Pseudopostega*, are usually more complex and more difficult to prepare and illustrate properly.

Recent collecting over much of the Neotropical Region during the past two decades has provided sufficient material to encourage the first species-level examination of this fauna. Although many problems still persist and remain unanswered, we believe that the present effort has significantly improved our understanding of this family and will greatly facilitate any future work on these moths.

#### ACKNOWLEDGMENTS

We thank several individuals who have assisted us during the course of this study by providing critical information, loans of specimens under their care, or other special assistance: Vitor O. Becker, Reserva Serra Bonita,

Camacan, Brazil; Richard L. Brown, Mississippi Entomological Museum, Mississippi State, Mississippi; John B. Heppner, Florida State Collection of Arthropods, Gainesville, Florida; Alvaro Herrera and José Montero, Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica; Edward C. Knudson, Houston, Texas; Bernard Landry, Muséum d'Histoire Naturelle, Genève, Switzerland; Jean-François Landry, Agriculture and Agri-Food Canada, Ottawa, Canada; Kenji Nishida, University of Costa Rica, San José, Costa Rica; Erik J. van Nieukerken, Nationaal Natuurhistorisch Museum, Leiden, The Netherlands; Phillip D. Perkins, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; Jerry A. Powell, University of California, Berkeley, California; John Rawlins, Carnegie Museum, Pittsburgh, Pennsylvania; Gaden S. Robinson and Kevin Tuck, The Natural History Museum, London, United Kingdom; Lazaro Roque, Charles Darwin Research Station, Santa Cruz Island, Ecuador; and Weiping Xie, Natural History Museum of Los Angeles County, Los Angeles, California. We are especially indebted to Vichai Malikul and Young Sohn of the Department of Entomology, Smithsonian Institution, for most of the artwork, as well as George Venable, formerly of the same department. Patricia Gentili Poole, also of the Department of Entomology, contributed greatly to this study by barcoding and recording specimen data and preparing the maps and plates for publication. Marc Epstein (formerly of the Department of Entomology, Smithsonian Institution), California Department of Agriculture, Sacramento, California, also assisted with data capture, and together with Joseph Scheer, Alfred University, Alfred, New York, scanned many of the color illustrations. The color illustrations were drawn principally by Jonas R. Stonis, with some added by Vichai Malikul. We are grateful for the genitalic illustrations provided by Mary Walter and Lina Jasiukonyté, and to Arūnas Diškus, Vilnius Pedagogical University, Vilnius, Lithuania, for his expert assistance with some of the dissections. Susann Braden, formerly of the Smithsonian Scanning Electron Microscope Laboratory, assisted with the SEM photographs. We are particularly thankful to Paul Hebert and his staff at the Biodiversity Institute of Ontario, University of Guelph, Guelph, Ontario, Canada, for providing their DNA sequencing results from several species of Opostegidae provided. The senior author (DRD) especially thanks Vitor Becker and Edward Knudson for the donation of holotype specimens to the National Museum of Natural History.

In addition, DRD also acknowledges the considerable contribution that the ALAS (Arthropods of La Selva) III and IV projects (supported by National Science Foundation

grants DEB-9706976 and DEB-0072702 and by National Geographic Society grant 7751-04) and co-principal investigator John Longino have made to this study, and especially the parataxonomists at La Selva working on this project, Danilo Brenes, Flor Cascante, Nelci Oconitrillo, Maylin Paniagua, and Ronald Vargas. We thank John Longino also for preparing the three diversity graphs (Figures 2–4). The trapping protocol for the 1998–1999 sampling period was designed by Jerry Powell. This procedure was augmented by blacklight collecting at sheets by Powell, John Brown, Eugenie Phillips, David Wagner, and DRD. The Directors and staff of the La Selva Biological Station have also been most helpful. Fieldwork from 1964 through 1966 on the island of Dominica was supported by the Bredin-Archbold Smithsonian Biological Survey of Dominica. Davis (DRD) also expresses gratitude to La Fundación para el Desarrollo de las Ciencias Físicas, Matemáticas y Naturales of Venezuela, and the Scholarly Studies Program of the Smithsonian Institution for their combined support of his fieldwork during 1984 at Cerro de la Neblina, Venezuela, and to the Smithsonian Institution for support of fieldwork in French Guiana through the Research Opportunity Fund. Davis (DRD) also acknowledges the American Philosophical Society for funding his field research in Mexico during the summer of 1963. Fieldwork on Guana and Tortola Islands by Scott Miller, Vitor Becker, and Michael Pogue was supported by the Conservation Agency through a grant from the Mocatta Metals Corporation. The second author (JRS) is particularly grateful to The Royal Society, London, the SYS-RESOURCE (EU-BMNH) program, Prof. M. Hering Memorial Research Fund, the Sladen Memorial Fund (London), and the Lithuanian State Science and Studies Foundation for funding support, and to Simon R. Hill, University of Westminster, UK, and Giovanni Onore, Pontificia Universidad Católica del Ecuador, for their very helpful assistance during expeditions to Belize and Ecuador in 1998, 2000, and 2001. Together we wish to thank the Smithsonian Institution Fellowship Program for a short-term visitors' grant that provided support for J. R. Stonis to study at the National Museum of Natural History during January–February 2002. We are especially thankful to R. Brown, B. Landry, and E. van Nieuwerkerken for their comments on the manuscript. Smithsonian Institution Scholarly Press provided the final editing and prepared the manuscript for publication.

Finally we acknowledge the cooperation of the individuals and institutions listed below and list their acronyms as used in this study.

ANSP Academy of Natural Sciences,  
Philadelphia, Pennsylvania, USA.

BMNH The Natural History Museum  
(formerly the British Museum  
(Natural History)), London, UK.

CAS California Academy of Sciences, San  
Francisco, California, USA.

CDRS Charles Darwin Research Station,  
Santa Cruz Island, Galápagos,  
Ecuador.

CMNH Carnegie Museum of Natural  
History, Pittsburgh, Pennsylvania,  
USA.

CNC Canadian National Collections of  
Insects, Arachnids, and Nematodes,  
Agriculture and Agri-Food Canada,  
Ottawa, Canada.

FSCA Florida State Collection of  
Arthropods, Gainesville, Florida,  
USA.

GSMNP Great Smoky Mountains National  
Park, Gatlinburg, Tennessee, USA.

INBIO Instituto Nacional de Biodiversidad,  
Santo Domingo, Costa Rica.

LACM Natural History Museum of Los  
Angeles County, Los Angeles,  
California, USA.

MGAB Muzeul de National Istorie Naturala  
“Grigore Antipa”, Bucharest,  
Romania.

MEM Mississippi State Entomological  
Museum, Mississippi State,  
Mississippi, USA.

MHNG Muséum d'Histoire Naturelle,  
Genève, Switzerland.

NHMV Naturhistorisches Museum Wien,  
Austria.

RMNH Nationaal Natuurhistorisch Museum,  
Leiden, The Netherlands.

TLS Texas Lepidoptera Survey Collection,  
Houston, Texas, USA.

UCB Essig Entomology Museum,  
University of California, Berkeley,  
California, USA.

UNAM Instituto de Biología, Universidad  
Nacional Autónoma de México,  
Mexico City, D.F.

USNM Collections of the former United  
States National Museum, now  
deposited in the National Museum  
of Natural History, Smithsonian  
Institution, Washington, D.C., USA.

VOB Vitor O. Becker, Reserva Serra  
Bonita, Camacan, Brazil.  
VPU Vilnius Pedagogical University,  
Vilnius, Lithuania.

#### MATERIALS AND METHODS

Nearly 1600 adults were examined, identified, and bar-coded during this study. Not included were more than 90 undetermined females that could not be associated with any male and about 20 specimens of unknown sex lacking abdomens. Because the genitalia provide the sole means for determining the sex of an adult of this family, the undetermined sex of those species examined that could be identified but which lacked abdomens are recorded in the material examined sections as UNK (sex unknown).

**ALAS SURVEYS.** The most thoroughly surveyed Neotropical site for Opostegidae was at the La Selva Biological Station near Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, at 50 to 150 meters (m) elevation in the province of Heredia, Costa Rica, where approximately 10% of all the specimens studied originated. At this site most specimens (~150) were collected during the ALAS (Arthropods of La Selva) III Microlepidoptera survey with 8-watt (W) Entotech blacklight traps during an 18-month period, from January 1998 through June 1999. This method was supplemented by sporadic mercury vapor light collecting at sheets between January 1993 and June 1996. More details relating to the quantitative blacklight sampling conducted during this survey were summarized by Davis (2003) and can be accessed through the ALAS website (<http://viceroy.eeb.uconn.edu/ALAS/ALAS.html>) under “collection data for ALAS quantitative samples.” Because several families of Microlepidoptera were the focal taxa for one portion of this survey, the traps were covered with a wire cage possessing a mesh size of 0.5 inch (1.27 cm) to exclude large insects that might otherwise damage the focal taxa. Traps were operated in pairs—one suspended in the canopy about 20–35 m high, and another on the ground beneath it. On each night of sampling, one trap pair was run. Trapping was conducted on two or three nights per week, rotating the paired traps among the six sites (7–18) listed below. For 14 of the 372 individual samples, the traps malfunctioned when the fluorescent light failed to operate. The data provided refer to the following information: e.g., 7 [site number], SOR [La Selva trail name “Sendero Oriental”] 750 [meters from main laboratory clearing], 778, 1618 [GIS (Geographic Information System) coordinates], canopy [trap location].

7, SOR [Sendero Oriental] 750, 778, 1618, canopy  
8, SOR 750, 789, 1642, ground  
9, CCC [Camino Circular Cercano] 550, 1019, 898,  
canopy  
10, CCC 550, 1035, 876, ground  
11, Arboleda [Arboretum], 896, 469, canopy  
12, Arboleda, 881, 461, ground  
13, CES [Camino Experimental Sur] 350, 566, 464,  
canopy  
14, CES 350, 529, 485, ground  
15, STR [Sendero Tres Rios] 650, 0, 0, canopy  
16, STR 650, 0, 0, ground  
17, STR 2000, 912, –675, canopy  
18, STR 1800, 901, –664, ground

All La Selva specimens collected from these sites bear a three-part label: e.g., “L [light trap]/14 [trap site]/411 [a unique sequential number for all blacklight samples commencing with the ALAS I survey of 1993].” Based on the data accumulated by the ALAS III survey, the species richness of Opostegidae for the area was computed with the assistance of J. Longino using R. Colwell’s EstimateS program (version 7.5, 2005), which can be downloaded from the website <http://purl.oclc.org/estimates>.

More recent collecting has been conducted on the ALAS IV Volcan Barva transect (2001–2005) following a protocol similar to that used in ALAS III, except that only ground-level collecting was performed. Because of the relative remoteness of the Barva sites, fewer nights of collecting were possible at any one of the five elevational stations than was accomplished during the 18 months sampled at La Selva during ALAS III. Only three species [*Pseudopostega dorsalis fasciata* (1 specimen, Finca Murillo), *P. saltatrix* (7 specimens, El Ceibo; 1 specimen, Finca Murillo), and *P. serrata* (2 specimens, El Ceibo; 1 specimen, Finca Murillo)] of Opostegidae were collected during ALAS IV. Poorer sampling results for Opostegidae are probably the consequence of not only the fewer nights sampled but also the lack of canopy sampling (and half as many trap samples), which produced the largest number of Opostegidae during ALAS III, as well as the higher elevation (300–2000 m) of the five ALAS IV sites. The El Ceibo site was located at approximately 500 m, with Opostegidae mostly collected from mercury vapor light sheets near the edge of primary forests; the Finca Murillo site was at 1500 m, with Opostegidae collected from light traps in primary forests.

**COLOR ILLUSTRATIONS.** Because the great majority of the moths examined in this study were unspread, or variably denuded of scales in some cases, photography

was usually unsatisfactory for adult illustrations. Instead, color illustrations of the adults were prepared by JRS and V. Malikul using Faber-Castell artists' watercolor pencils. To complete the accuracy of the species portrayed, composite drawings utilizing both forewings of a specimen, or even more than one conspecific specimen, were composed for a few illustrations when necessary.

**MEASUREMENTS.** Two comparisons of the relative development of the adult compound eye are provided: eye index (= vertical height of frons/vertical diameter of eye  $\times 100$ ); and interocular index (= vertical diameter of eye/minimum interocular distance across frons) ( $\sim$  midway between antennal bases and tentorial pits). Lengths measured for male genitalic comparisons are shown in Figure 44.

**GENITALIC PREPARATION.** As previously noted, the male genitalia of Opostegidae are typically quite small, with the length of the genital capsule (measured from the anterior apex of the vinculum to the caudal tip of the socii) being sometimes as small as 0.2 mm. Consequently, dissection and slide preparation of the smallest species can be difficult; this is particularly true for members of the genus *Pseudopostega* wherein the costal process (apodeme) of the valva is tightly connected to the gnathos, thereby restricting the opening of the valvae. After macerating the abdomen in 10% KOH and subsequent cleaning and staining (usually with chlorazol black or mercurochrome), the male genitalia and abdomen were mounted ventral side uppermost. Occasionally the genital capsule was left attached to the abdomen to stabilize the specimen in the mounting media (either euparal or balsam). For those specimens in which the genitalia were left attached, any tissue remaining within the capsule was removed through a small incision between abdominal segments 6 and 7. Either one (right side) or both valvae were opened for final mounting. Leaving one valva closed may still reveal diagnostic characters and minimizes possible damage. For consistency of morphological comparisons it is best to illustrate the open (mesal) view of the valva. In the case of male *Pseudopostega*, it is usually necessary to sever the spring-like connection of the costal process by separating the valva from the process; this may be done by using two minute probes fashioned from the smallest minuten pins with their tips bent at 45°. During this procedure, care must be taken to prevent severing the relatively large cucullar lobe, which may be attached to the base of the valva by a pedicel that can constrict to less than 15 micrometers ( $\mu\text{m}$ ) in diameter (see *P. galapagosae*, Figure 334). When at least partially sclerotized, the aedeagus

is removed and mounted ventral side up alongside the genital capsule. It is usually better to illustrate the genital capsule while it is temporarily stored in glycerin, not only to avoid any later depression artifact caused by mounting but also to be able to examine and draw a lateral view of the gnathos when necessary. Often the valva can also be illustrated in this manner. Female genitalia were similarly cleaned, stained, removed from the abdomen, and mounted either ventral side uppermost or dorsally to display the dorsal papillae anales better.

**PRELIMINARY GENETIC ANALYSIS.** Sixty specimens representing 51 species and 2 proposed subspecies of New World Opostegidae were sent to Paul Hebert, University of Guelph, for sequencing as part of the Barcode of Life project (Hebert et al., 2003) in which an approximately 648 base pair (bp) region of the mitochondrial gene, cytochrome *c* oxidase 1 (CO1-5'), is utilized. The standard protocol for DNA extraction, amplification, and sequencing of the barcoding region of the CO1 gene is provided in Hajibabaei et al. (2005, 2006). Sequences and voucher specimen data for the Opostegidae examined are included in the Basal Lepidoptera section of the Barcode of Life website ([www.barcodinglife.org](http://www.barcodinglife.org)). Unfortunately, because fresh material is difficult to acquire in this poorly sampled family, only dried specimens collected from 5 to approximately 20 years ago were available for DNA analysis. The oldest sample sequenced, *Pseudopostega latisaccula* new species (468 bp recovered), was collected in 1965. Also because of the inherent lack of study material, only hindlegs could be provided for a majority of the species, some of these from unique holotypes. Because the sequencing of this difficult material is still ongoing (sequences for only 28 species have been recovered thus far, 5 of which are  $<400$  bp), comments on only a few, better resolved taxa are mentioned in the present study.

## BIOLOGY OF THE OPOSTEGIDAE

### DISTRIBUTION AND DIVERSITY

A general world distribution for the family based on the type localities of 103 species as recognized at the time was summarized by Davis (1989). Of the 196 species currently known, approximately 87% occur in subtropical to tropical regions (Figure 1). Of these, 83 species (or 42% of the world fauna) are known to be restricted to the Neotropical Region. Four of the seven genera now recognized within Opostegidae occur in the New World. *Notiopostega* consists of a single species from the Valdivian forests

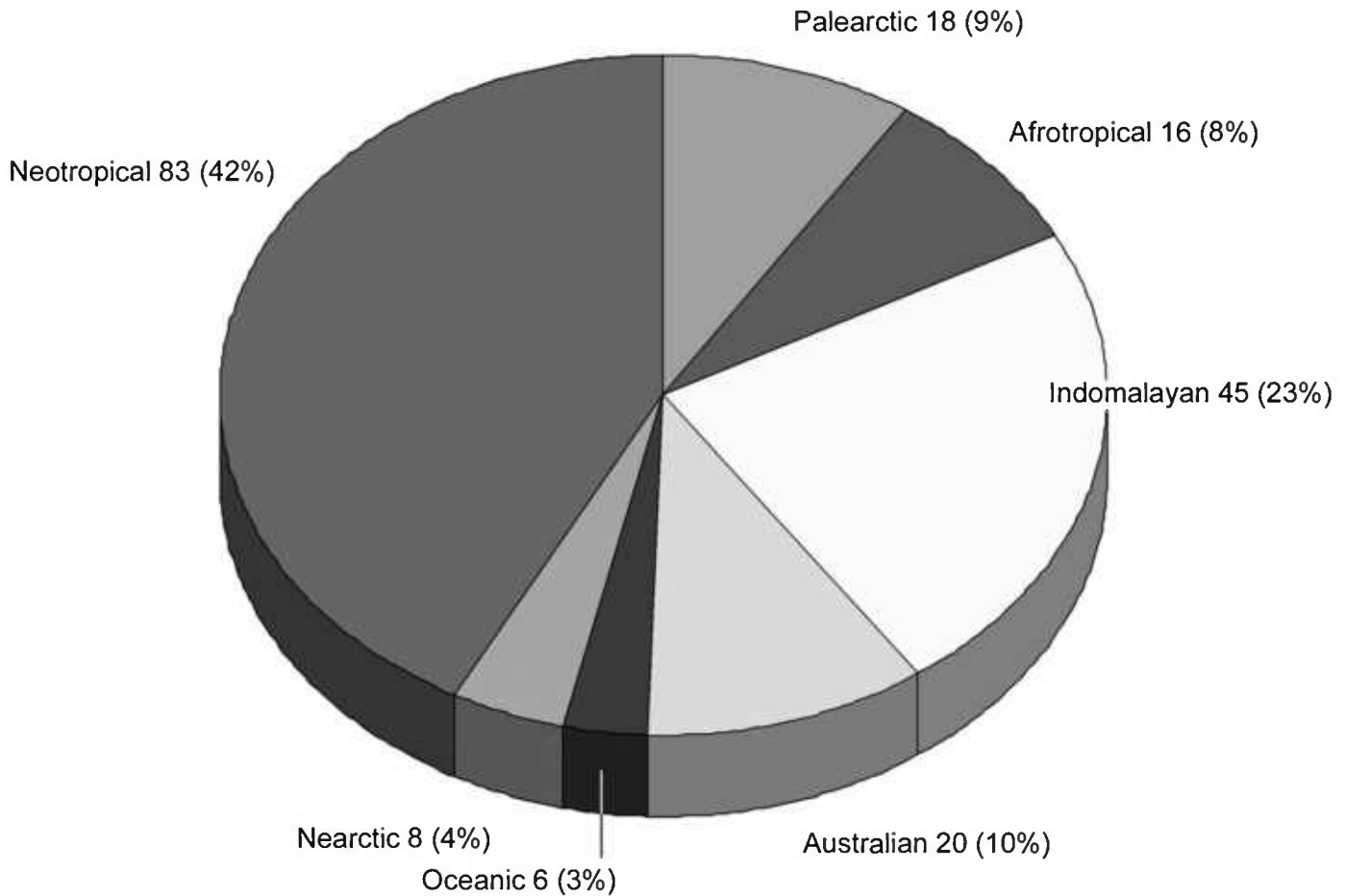
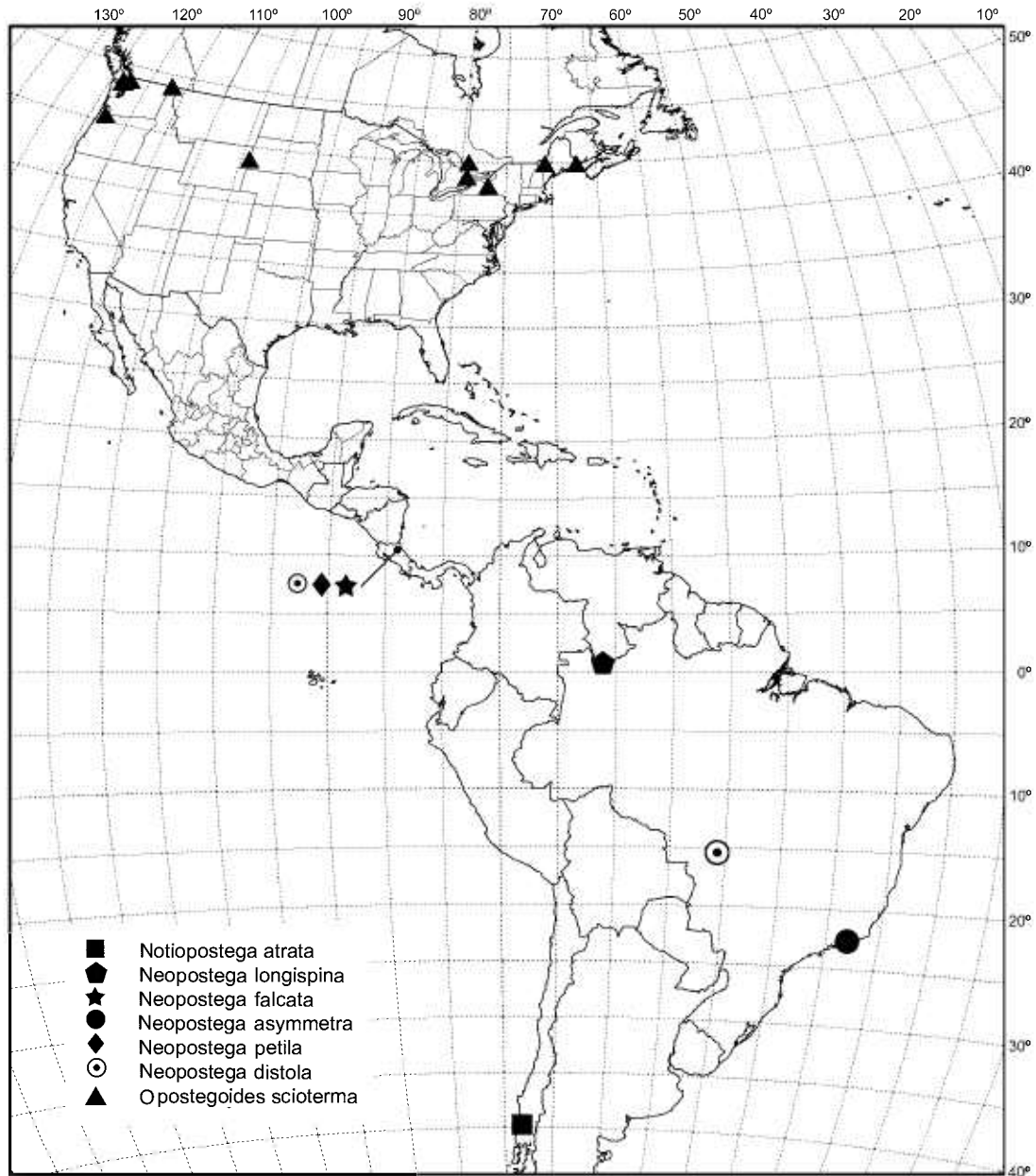


FIGURE 1. Relative species diversity of Opostegidae according to biogeographic region.

of southern Chile (Map 1). The new genus *Neopostega* is composed of five species endemic to the Neotropical Region (Map 1). The predominantly Palearctic/Indomalayan genus *Opostegoides* is represented in the New World by a single, widespread species, *O. scioterma*, across the northern USA and southern Canada (Map 1). It is possible that this species may have been an early introduction into North America, although no known Old World species appears conspecific. The highly apomorphic genus *Pseudopostega* is by far the most diverse genus in both hemispheres with 84 New World species now recognized (92% of the total fauna for this region). The Oceanic genus *Paralopostega* comprises six species endemic to the Hawaiian Islands. *Eosopostega*, originally described from southern Japan, is now known to include a second species from the Moluccas Islands of Indonesia (Puplesis and Robinson, 1999). The distributional limits of the Old World genus *Opostega* will continue to be uncertain until the remaining unstudied

species originally attributed to '*Opostega*' have been dissected. Currently it is believed that most of these species will be transferred to other genera, most probably *Pseudopostega*, with the primary center of true *Opostega* lying within the Palearctic Region. Although no records of Opostegidae have been reported for Madagascar, DRD will be describing a new genus and two species from that region as well as one new genus and species from Australia.

The global diversity of Opostegidae is obviously much greater than previously known, as shown by recent collecting, particularly during the ALAS III survey at the La Selva Biological Reserve, Costa Rica. The latter effort has clearly revealed the rich diversity of the family within a lowland rainforest habitat compared to more xeric or higher elevation habitats. Because of the logistics involved in operating the light traps, the area of the La Selva Preserve that was actually surveyed by systematic collecting was restricted to the most northern portion of the nearly 1600 hectare site.



MAP 1. Distribution of New World Opostegoidinae.

Although somewhat limited, the sampling was conducted in areas of diverse vegetation including both primary and secondary rainforests both at ground level and in the canopy. Of the 154 specimens of Opostegidae collected during the ALAS III sampling, 132 could be identified to species. Preliminary sorting by DRD resulted in seven supposed morphospecies. Upon dissection these were found to represent 17 species, of which only one (*Pseudopostega saltatrix*) had been named previously. This exercise clearly illustrated the

gross margin of error that can result in biodiversity analyses involving some microlepidoptera families when only morphospecies estimates are considered. Based on these data, a species accumulation curve (Figure 2) was calculated using the EstimateS version 7b1 program (Colwell, 2005), using 100 randomizations of sample order. Many samples were represented by either singletons or doubletons with the respective curves continuing relatively level and neither converging nor decreasing. The Sobs curve in

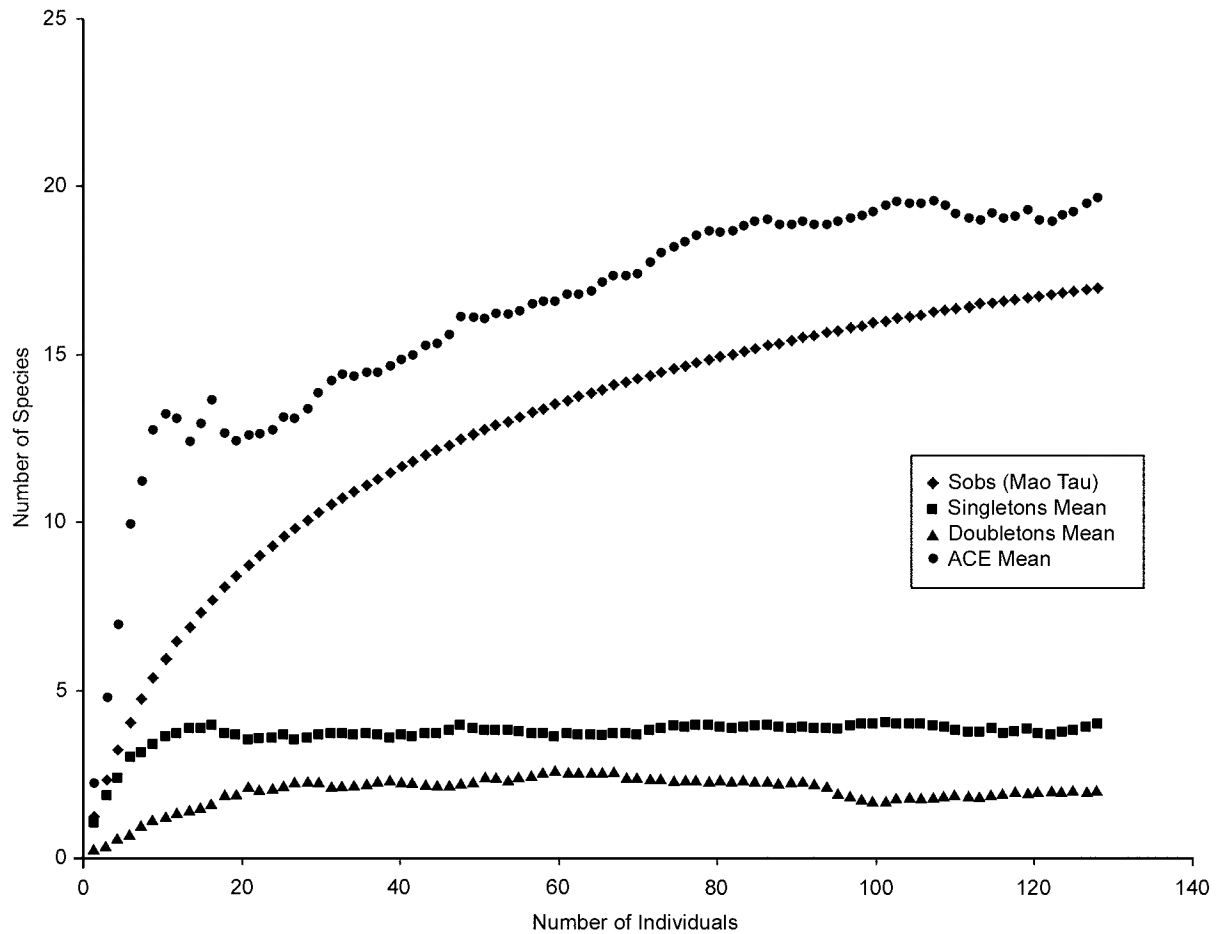


FIGURE 2. Estimate species accumulation curve for Opostegidae sampled during ALAS III survey, La Selva Biological Station, Puerto Viejo, Costa Rica. Sobs is the number of observed species in a sample; ACE (Abundance-based Coverage Estimator) is the species richness estimate based on the sampling protocol.

Figure 2 represents the number of species observed in a sample. Although the species richness estimate curve (ACE) is still ascending, it appears to be leveling at approximately 20 species. This finding suggests that the sampling effort represented a fair estimation of the species diversity for the area. Figure 3 shows the total species accumulation curve (all) and the species accumulation of the two component samples from ground level (G) and canopy (C) together with their respective 95% confidence intervals ( $G_{1,2}$ ;  $C_{1,2}$ ). The comparison of species richness from different data sets is discussed by Colwell et al (2004). The parallel, overlapping accumulation curves show no significant difference between the species communities of the ground and canopy samples, but only a lower abundance in the ground traps.

Figure 4 shows the proportion of individuals collected in canopy traps (gray bars) versus ground traps (white

bars), plotted against the rainfall recorded for the entire sampling period, January 1998 to June 1999. Rainfall recorded during December 1998 was unusually high in a period that normally marks the beginning of the dry season at La Selva. Adult Opostegidae were far more abundant in the canopy compared to near ground level. These results contrasted sharply with the collection data from the same survey for the principally mycophagous family Arrhenophanidae, for which no adults were reported from canopy traps (Davis, 2003).

#### LIFE HISTORY

Little is known about the biology of this family. Only 11 species, or approximately 6% of the 196 currently recognized species, have been reared. Their hosts represent a



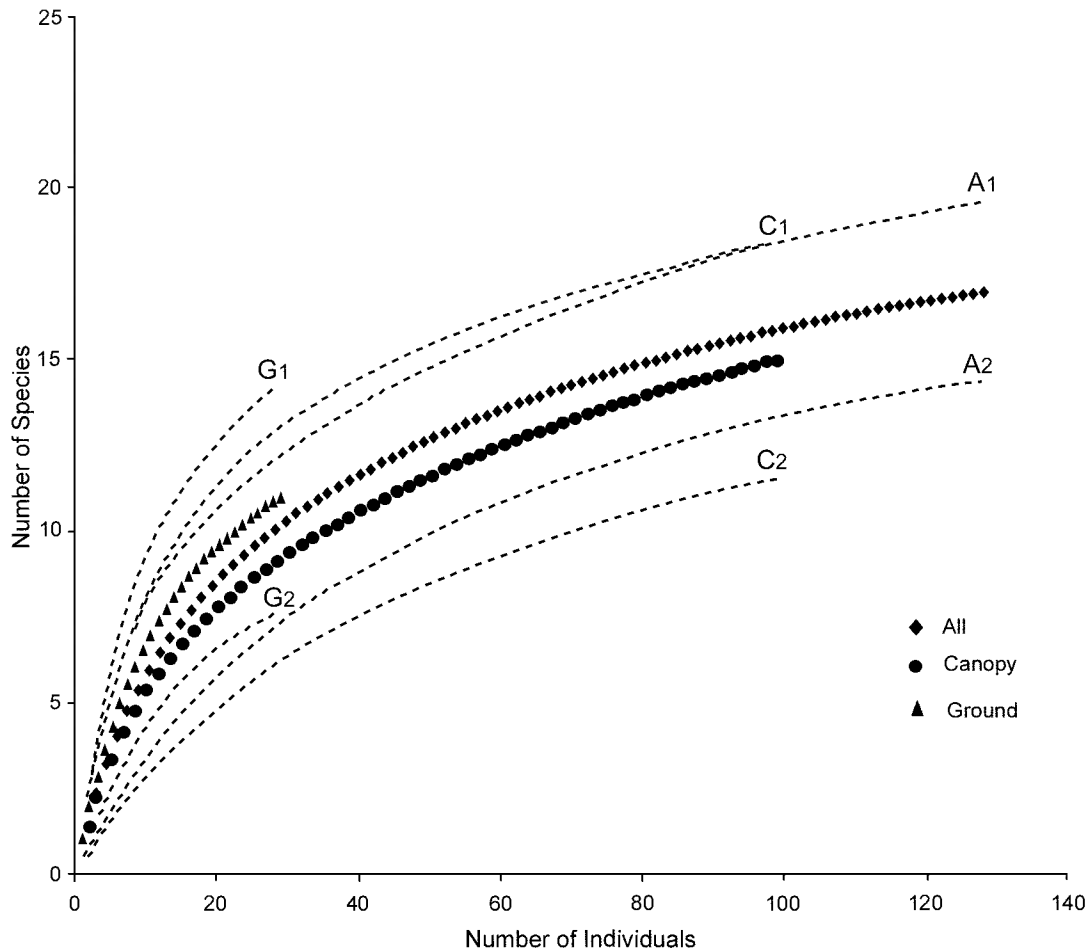


FIGURE 3. EstimateS species accumulation curve for data plotted in Figure 2 together with separate plots for both component samples from ground-level traps and canopy traps, including 95% confidence levels ( $A_{1,2}$ ;  $G_{1,2}$ ;  $C_{1,2}$ ) for all three curves.

broad spectrum of six plant families, including Betulaceae, Boraginaceae, Fagaceae, Polygonaceae, Rutaceae, and Saxifragaceae (Table 1). Six of the 11 reared species are members of the endemic Hawaiian genus *Paralopostega*, which mine the leaves of *Melicope* (= *Pelea*). Strong evidence exists suggesting that the Palearctic *Opostega spatulella* H.-S. may be a leaf-stem miner on *Salix* (Puplesis et al., 1996; Puplesis and Diškus, 2003), although Barrett (1877) observed it to be commonly associated with *Ulmus*. Similarly, van Nieukerken (1990) has reported evidence that *Pseudopostega auritella* (Hübner) is a miner in the stems of *Lycopus europaeus* L. (Lamiaceae). Varying circumstantial evidence has associated *Opostegoides menthinella* (Mann) and 2 Palearctic species of *Pseudopostega* with the plant families Cistaceae (*Cistus* sp.) and Lamiaceae, respectively. *Pseudopostega chalcopepla* (Wlsm.) has been associated

with *Rosmarinus* and *P. crepusculella* (Zell.) with *Mentha* (van Nieukerken et al., 2004, 2006). All known or suspected hosts represent nine plant families widely dispersed among eight orders of the subclass Dicotyledoneae.

Grossenbacher (1910) presented one of the earliest and, still, one of the few, detailed reports on the biology of an opostegid, *Opostegoides scioterma* (Meyrick). However, in his paper the subject species was misidentified by A. Busck as *Opostega nonstrigella* (= *albogaleriella* Clemens), a misnomer repeated by Heinrich (1918) and later authors. According to Grossenbacher (1910), the eggs are deposited on the bark of currants and gooseberries (Saxifragaceae: *Ribes* spp.) in New York's Hudson Valley from approximately the last week of April until mid-May. *Ribes grossularia* L., *R. nigrum* L., and *R. sativum* Syme (= *vulgare*) were listed as hosts. The larvae mine under the bark in the cambial

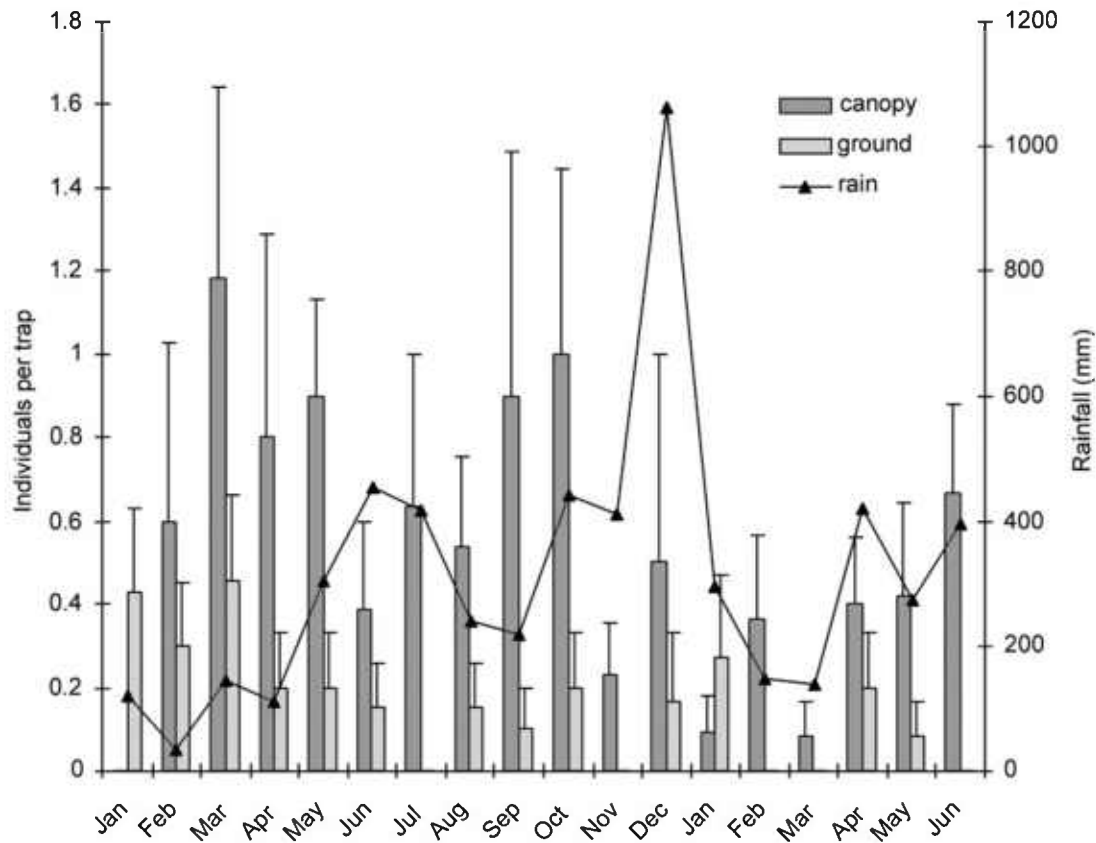


FIGURE 4. Total numbers of Opostegidae sampled each month during the ALAS III survey from ground traps and canopy traps with recorded rainfall for the period. The line extended above each bar represents the standard error of the mean for each sample.

cylinder for about four to six weeks until mid- to late June. Both new spring shoots and canes from the previous season's growth are attacked. The mine is a slender, linear tunnel that normally curves at both upper and lower ends to form a narrow ellipse approximately 7–20 cm in length. Grossenbacher observed 2–2¼ elliptical rounds by the larva before emerging to pupate. When the larva completes a circle, it normally reinvades the initial mine and continues feeding and enlarging it. Rosenstiel (1960) likewise reported a single ellipse involving two parallel mines from 10 to 25 cm long. Grossenbacher always found the crescent-shaped exit hole nearer the basal rather than the distal turn of a mine, generally within 1 or 2 cm of the former and usually after the basal turn had been passed.

It is not clear exactly how much host injury is caused by the larva of *Opostegoides scioterma*. Cross sections of infested stems show small dark spots or flecks, variously referred to as medullary spots, pith flecks, Markflecken, etc. (Kumata, 1984), in successive cambium rings. Grossenbacher (1910) observed that 15%–20% of the

mined shoots wilted and died shortly after larval emergence from one *Ribes* species. He encountered heavy infestations on some hosts with larvae present in 85%–95% of their canes. The most serious effect on the plants seems to be from the introduction and spread of pathogenic organisms, fungi in particular, through the exit holes.

After dropping to the ground, the larva eventually constructs a flattened, oval, densely woven, cream to brown cocoon in the upper soil layer. Grossenbacher was able to collect several cocoons by sifting the soil around the bases of infested plants. The pupal stage may last about two to three weeks, with the adults emerging before mid-July. Several questions remain concerning the life history and particularly voltinism of this and other nearctic species. Grossenbacher's assumption of a spring oviposition period for *Opostegoides scioterma*, coupled with his observations of a midsummer adult emergence period, presented major inconsistencies, which he attempted to answer. He assumed there to be a single generation but noted spring larvae of different sizes with the smallest larvae always mining the

TABLE 1. Host records of Opostegidae.

Opostegidae	Host	Family	Order
Reared			
1. <i>Notiopostega atrata</i> Davis	<i>Nothofagus dombeyi</i>	Fagaceae	Fagales
2. <i>Opostegoides minodensis</i> (Kuroko)	<i>Betula platyphylla</i>	Betulaceae	Fagales
3. <i>Opostegoides scioterma</i> (Meyrick)	<i>Ribes nigrum</i> , <i>R. sativum</i>	Saxifragaceae	Rosales
4. <i>Paralopostega callosa</i> (Swezey)	<i>Melicope lydgatei</i> , <i>M. rotundifolia</i>	Rutaceae	Sapindales
5. <i>Paralopostega dives</i> (Wlsm.)	<i>Melicope anisata</i>	Rutaceae	Sapindales
6. <i>Paralopostega filiforma</i> (Swezey)	<i>Melicope clusiifolia</i> , <i>M. elliptica</i>	Rutaceae	Sapindales
7. <i>Paralopostega maculata</i> (Wlsm.)	<i>Melicope volvanica</i> , <i>M. rotundifolia</i>	Rutaceae	Sapindales
8. <i>Paralopostega peleana</i> (Swezey)	<i>Melicope rotundifolia</i> , <i>M. samvicensis</i>	Rutaceae	Sapindales
9. <i>Paralopostega serpentina</i> (Swezey)	<i>Melicope clusiifolia</i> , <i>M. elliptica</i>	Rutaceae	Sapindales
10. <i>Opostega salaciella</i> (Treitschke)	<i>Rumex acetosella</i> , <i>R. crispus</i> , <i>R. scutatus</i>	Polygonaceae	Polygonales
11. <i>Pseudopostega myxodes</i> (Meyrick)	<i>Cordia myxa</i>	Boraginaceae	Polemoniales
Probable			
12. <i>Opostega spatulella</i> H.-S.	<i>Salix</i> sp.	Salicaceae	Salicales
13. <i>Pseudopostega auritella</i> (Hübner)	<i>Lycopus europaeus</i>	Lamiaceae	Lamiales
Possible			
14. <i>Opostegoides menthinella</i> (Mann)	<i>Cistus</i> sp.	Cistaceae	Violales
15. <i>Pseudopostega chalcopepla</i> (Wlsm.)	<i>Rosmarinus</i> sp.	Lamiaceae	Lamiales
16. <i>Pseudopostega crepusculella</i> (Zell.)	<i>Mentha</i> sp.	Lamiaceae	Lamiales

newest growth. Because Grossenbacher never found larvae or new mines after mid-July, he suggested that either the adults emerging in midsummer were long lived and overwintered, or that emergence from some pupae was delayed until the following spring. Adult records of *O. scioterma* do not support an early spring oviposition (i.e., flight) period, although it is uncertain as to how thorough the spring sampling of adults has been. The earliest record DRD has for this species is 18 June, with nearly all records occurring after 25 June and ceasing on 3 August ( $n = 43$ ). The flight periods of other North American opostegid species vary considerably. Of the species with ample collecting data, *Pseudopostega albogaleriella* demonstrates the greatest indication of a bivoltine life cycle. Adults of this species are encountered primarily during June and July into early August over the northern part of their range. Possibly two broods occur through the southern USA, with adults appearing from February to June and from August to as late as October.

Kumata (1984) has investigated the life history of *Opostegoides minodensis* in Japan. The larvae mine the cambium of *Betula platyphylla* var. *japonica*, creating slender elliptical mines similar to *O. scioterma*, but perhaps with more anastomosing occurring between the parallel mines. Kumata found evidence for only one generation a year with the adults emerging from the end of June to mid-July,

or approximately the same period as *O. scioterma*. Based upon the relative development of the mine as seen in cross-sectional views of infested birch stems, it was determined that *O. minodensis* overwinters as early- to mid-instar larvae. Mine traces, or pith flecks, were found on both sides of the winter ring layer, with the smaller, younger mines always on the inner side of the ring and the larger, more mature mines on the outside. In addition to other discrepancies, these observations indicate an early summer oviposition period for temperate *Opostegoides*, in contrast to the spring period hypothesized by Grossenbacher.

Other than the two preceding species of *Opostegoides*, the larvae of only two other Opostegidae have been reared. Warren (1888) reportedly reared two adult *Opostega salaciella* incidentally from *Rumex acetosella* L. (Polygonaceae) without observing any larvae or larval damage. In a similar situation, Pelham-Clinton (1976:269) mentions an incidental emergence of this species from a mixture of potted plants including *Rumex acetosella*. Müller-Rutz (1922) and Kaila and Kerppola (1992) have reported *salaciella* associated with *Rumex scutatus* and *R. crispus*, respectively. Meyrick (1916) reports the rearing of *Pseudopostega myxodes* (Meyrick) by Fletcher from a larva mining a leaf of *Cordia myxa* L. (Boraginaceae) in India. Possible hosts of other European opostegids are even more

tenuous. Warren (1888) lists possible hosts for *Opostega spatulella* as *Ulmus*, and *Mentha* for *Pseudopostega crepusculella*. The reports of Stainton (1868:132) and Sorhagen (1886:301) that the larva of *Pseudopostega auritella* mines the stems of *Caltha palustris* L. (Ranunculaceae) is suspect (van Nieuwerkerken, 1990).

The Hawaiian *Paralopostega* present an interesting divergence from the previously reported life histories in that all six species are leafminers on *Melicope* (Rutaceae). The leaf-mining habit may eventually be found to occur in other tropical Opostegidae. Not all the Hawaiian hosts listed in Table 1 may represent actual rearing records. The association of some hosts, consequently, is questionable. As illustrated by Swezey (1921), the mines appear characteristic for each species but are generally serpentine and occur on the upper leaf surface. The tortuous, lengthy, and extremely slender mine of *Paralopostega filiforma*, for example, is abundantly distinct from the shorter, more compact, sinuous mine of *P. serpentina*. Swezey also reports that the larva of *P. filiforma* eventually mines into the cambium of the petiole. The mines of *P. callosa* terminate in a peculiar, circular, callus-like structure about 12 mm in diameter. To form this the larva mines in a small perfect circle and continues to tunnel in a spiral pattern inside the outer ring until the center is reached. The upper epidermis of this area proliferates, and the larva feeds beneath it until maturity. Pupation is similar to other Opostegidae and occurs on the ground in a brownish, oval cocoon.

The most detailed study of any opostegid was conducted on a new genus and species, *Notiopostega atrata* Davis. Although much of the biological information on this Chilean moth resides in an unpublished thesis (Carey, 1975), summaries of that research have been published (Carey et al., 1978; Davis, 1989). A chronology of the life cycle is illustrated here in Figure 51. The eggs are deposited on the undersides of the leaves of *Nothofagus dombeyi* (Mirbel) Oersted, commencing in early September. Normally only one egg is laid per leaf, and most of the oviposition sites are concentrated in the upper one-third to one-half of the tree crown (Figure 52). Upon hatching, the larva bores into the leaf and continues mining into the petiole and cambium layer of the terminal branch, eventually reaching the main trunk. The larva continues in a characteristic zigzag course down the trunk (Figure 53)—sometimes all the way to the ground—a total distance of up to 7 m. Normally before reaching the tree base, the larva turns 180° and mines upward a short distance (Figure 53). There it forms a small aestivation chamber where it molts into the sixth and last instar. The feeding pause in *N. atrata* is probably directly associated with the rather abrupt morphological changes

that occur between the fifth and sixth instars. Such pauses may be characteristic for most, if not all, members of the family. Sometime between mid-March and early April, the larva leaves the chamber and continues down the old mine a short distance, where it then bores through the bark and drops to the ground. Pupation occurs in a flattened oval cocoon (Figure 55) amid the leaf litter and above the soil. Immediately before adult emergence, the pharate adult forces itself partway out through a large transverse slit in one end of the cocoon. Adults begin to emerge in late August, or whenever the daily ambient temperature approaches 18°C in the early spring (Carey et al., 1978).

Adult Opostegidae vary in activity from diurnal to nocturnal. Most species are readily attracted to light (gas lamps, incandescent, and ultraviolet), indicating a crepuscular to nocturnal activity. *Pseudopostega crepusculella* normally flies at dusk (hence its name) between 8 and 8:30 PM (Zeller, 1848), but on cloudy days it may fly earlier in the afternoon (Stainton, 1854). Banks (1890) observed *Opostega salaciella* swarming over low vegetation between 7 and 8 PM. This species has also been collected on one occasion in numbers at a gas light (Stainton, 1868). *Opostega spatulella* has been observed flying as early as 4 PM and as late as 6 to 8 PM (Barrett, 1877; Cransdale, 1877). In North America virtually all the species have been collected at ultraviolet (UV) lights, sometimes in large numbers. It is safe to assume, however, that little effort has been made to collect these species during the day and particularly at dusk. Perhaps the most diurnal member of the family is the southern Chilean *Notiopostega atrata*. The adults fly during the day in the early spring, but E. S. Nielsen (deceased, formerly of Division of Entomology, CSIRO, Canberra, Australia, personal communication) has collected the species in light traps. Their nearly black coloration is undoubtedly an adaptation toward this habit. It is interesting to note that the darkest of the Hawaiian *Paralopostega* is also diurnal (Perkins, 1913). However, melanic variation in otherwise normally white species is known to occur in this family (Eyer, 1966). Little is known about the activity of the other, more typically white Hawaiian species, and even less is known about the remaining tropical species.

Adult Opostegidae may be the most thigmotactic of any Lepidoptera. Live moths have been observed to burrow their way into small crevices for concealment. Certain aspects of their morphology, particularly the enlarged antennal scape (or eyecap) that can completely cover and thus protect the eye and the generally depressed body, are apparent adaptations for this behavior. The development of densely spinose setae on the hindlegs (a synapomorphy

of the Nepticuloidea) is probably a further adaptation for a burrowing type of behavior. Kenji Nishida photographed two species of adult Opostegidae resting completely exposed on leaves during the day in Costa Rica (Figure 127). All appendages are held tightly to their bodies, which are appressed against either the upper or lower leaf surface (Figure 128). In this position the resting moth might easily be mistaken for a small bird dropping.

Few natural enemies of Opostegidae have been reported. In Carey's rather extensive study (Carey, 1975), the only mortality observed was caused by spiders attacking larvae as they exited and descended to the ground for pupation. The only records of parasites involve Eulophidae (Swezey, 1921), including two Eulophidae rearings mentioned by Zimmerman (1978:241) of *Euderus metallicus* (Ashmead) by J. W. Beardsley and *Pauabiana lineata* Yoshimoto by Swezey—all from unidentified Hawaiian *Paralopostega*.

Pith flecks, or the injury produced by cambium miners as viewed in cross sections of woody stems or trunks, is similar in Opostegidae and certain Agromyzidae (e.g., *Phytobia*, Kumata, 1984). As a result, identifications based solely on larval mines can be difficult and unreliable. Even their larvae can be confused, as was done by Knigge and Bonnemann (1969), who illustrated the larva and attributed the injury caused by *Notiopostega atrata* to an "undetermined species of Agromyzidae."

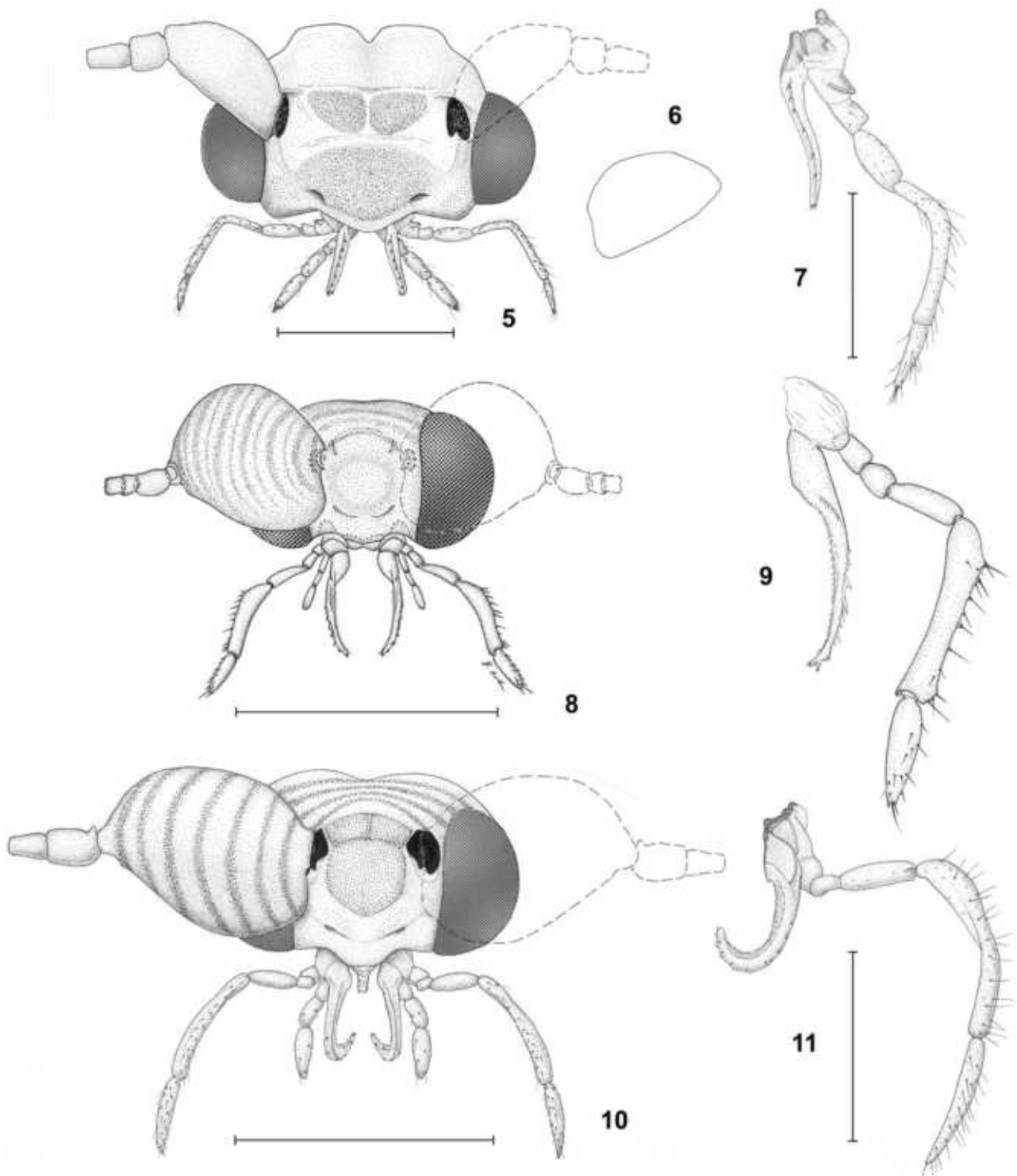
## MORPHOLOGY

Because this subject has been thoroughly reviewed previously (Davis, 1987, 1989; van Nieukerken, 1990; Puplesis and Robinson, 1999), little will be repeated here except to elaborate on the complexity of a few poorly studied structures. To supplement this section, illustrations are provided to show the general morphology of the head (Figures 5–14), the thorax and its appendages (Figures 15–33), some pregenital abdominal segments (Figures 34–43), and genitalia (Figures 44–47).

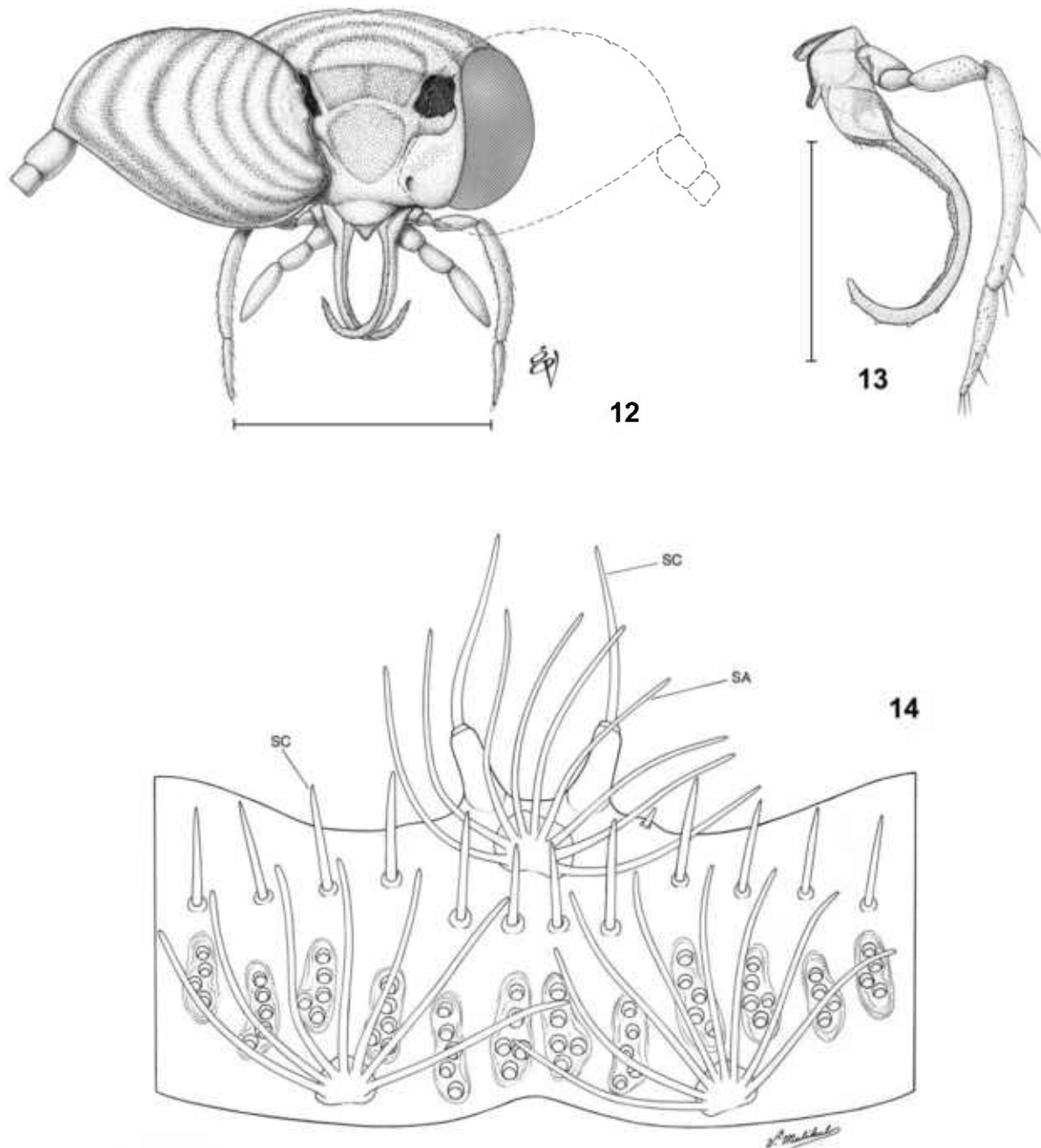
Diverse modifications of the male gnathos have been found to be of great significance in revealing species relationships, particularly within the most diverse genus, *Pseudopostega*. The gnathos is generally less complex within the basal genera of Opostegidae. In *Notiopostega* and *Opostegoides* it is represented only by a slender, ventral arch. The gnathos becomes more elongate in *Eosopostega*, *Paralopostega*, and *Opostega*, with a prominent caudal process or lobe often developing in the latter genus. Because greater development of the gnathos occurs in those genera lacking a sclerotized phallus (aedoeagus), possibly

this structure assists in sperm transfer during copulation. The gnathos attains its greatest development within the New World *Pseudopostega*, with three specializations appearing that are either absent or occur only rarely within the Old World members of the genus. These are as follows. (1) Development of a bifurcate caudal lobe (Figures 382–384). A divided caudal lobe appears in varying states within 5 of the 14 species groups recognized herein. Only one Old World species, *P. epactaea* from Southeast Asia, is known to possess a minutely bifurcate caudal lobe. (2) Spinose caudal margin (Figure 265). The caudal margin of the gnathos in the Neotropical *serrata* group, currently including only *P. serrata* and *ferruginea*, is lined with minute, blunt-tipped spines. This condition has not been observed in any Old World species. (3) Basal fold (Figures 44, 45). In many New World *Pseudopostega* the anterior margin of the gnathos curves ventrally and caudally to form a usually transverse basal fold. In the *duplicata* species group the fold develops a median elongation caudally that exceeds the caudal lobe in size (Figures 352, 353). In the *lateriplicata* and *latifurcata* groups a pair of lateral folds have developed (Figures 272, 273), probably as a result, in most cases, of the deep caudal invagination and medial separation of the basal fold. Folds within the gnathos have not been noted in any Old World *Pseudopostega*. In addition to the three specializations mentioned, an additional modification has appeared in some members of the New World *Pseudopostega divaricata* and *brachybasis* species groups involving a small sclerite positioned between the lateral margins of the gnathos and the tegumen. This sclerite is particularly evident in *P. quadristrigella* (Figures 382, 383) and *P. protomochla* (Figures 403, 404). Most likely the sclerite is a derivative of the ninth sternite (gnathos).

The spermatheca in Lepidoptera is a complex organ whose morphological components have been assigned a rather confusing array of names (Mitter, 1987; Kristensen, 2003). The homology and terminology of the various sacs and lobes anterior to the ductus spermathecae are particularly uncertain, largely because of the variable development of these structures between and within families of Lepidoptera, and their relative demarcation, as well as the often poorly preserved condition of the membranous components in slide-mounted preparations. The ductus spermathecae in most families of Lepidoptera is composed of two, distinct, typically intertwined ducts: a membranous, more enlarged, external (afferent, transport) canal and a very slender, sclerotized, internal (efferent, fertilization, fecundation) canal. In some females of *Pseudopostega* these ducts may be less closely associated, with the basal half of



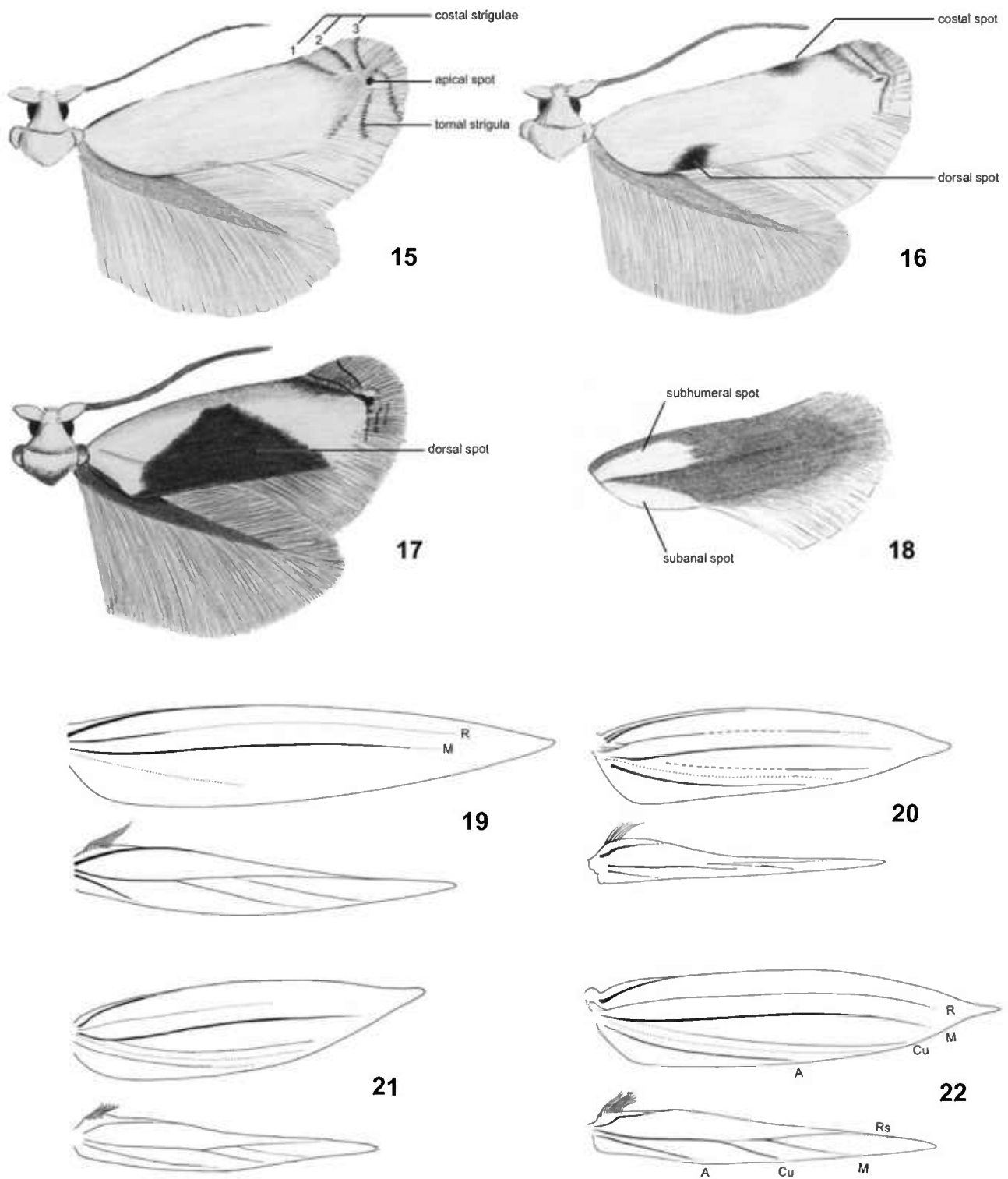
FIGURES 5–11. Adult head morphology. *Notiopostega atrata*: 5, anterior view (0.5 mm); 6, antennal scape, dorsal view; 7, maxilla (0.25 mm). *Neopostega petila*: 8, anterior view (0.5 mm); 9, maxilla. *Opostegoides scioterma*: 10, anterior view (0.5 mm); 11, maxilla (0.25 mm). (Scale lengths in parentheses.)



FIGURES 12–14. *Pseudopostega albogaleriella*, adult head morphology. 12, anterior view (0.5 mm); 13, maxilla (0.25 mm); 14, schematic distribution of antennal sensilla on a single flagellomere. (Scale lengths in parentheses.)

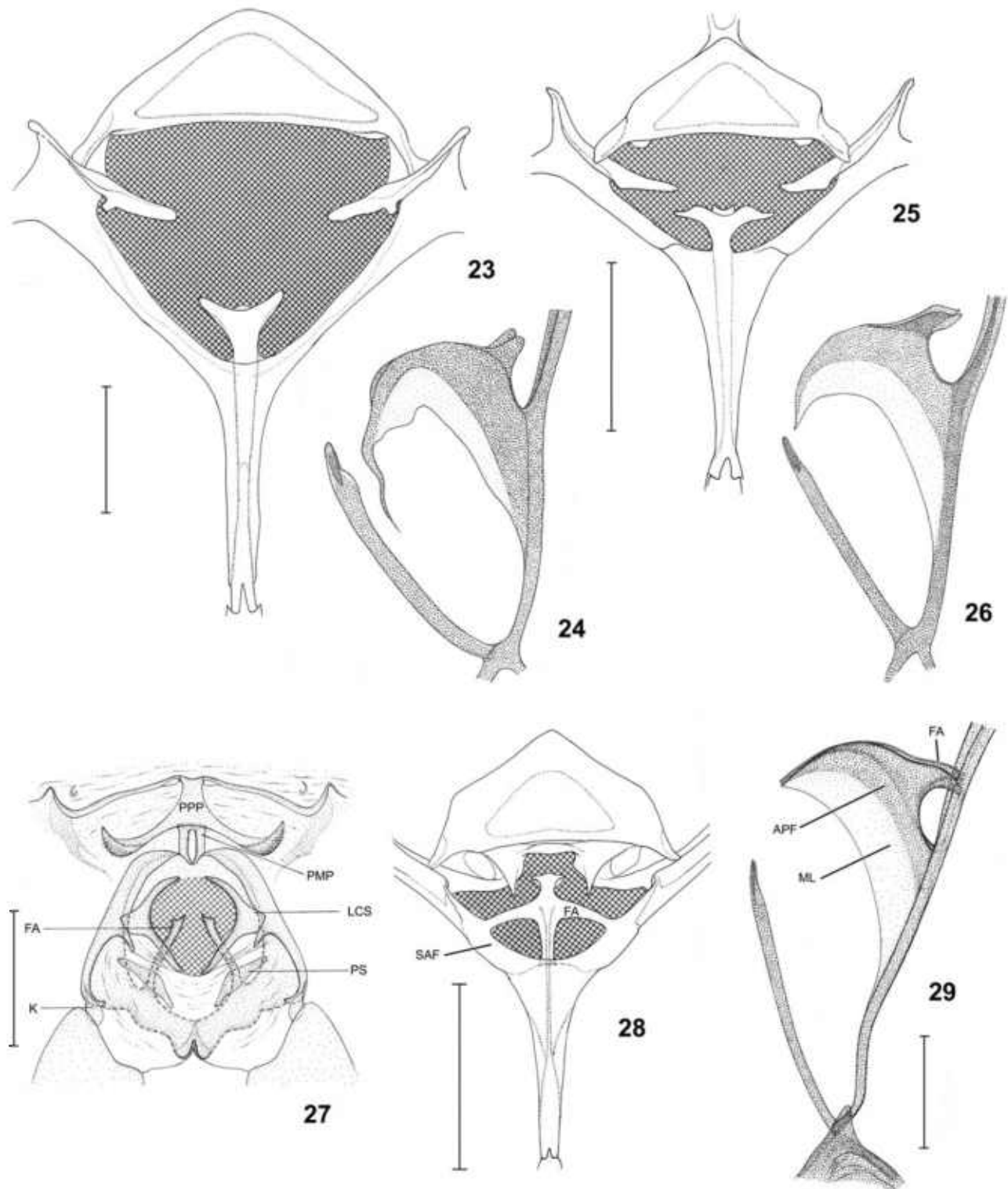
the internal canal arising from a small, membranous papilla on the wall of the vestibulum as a solitary duct that becomes intertwined distally with the external canal arising more anteriorly near the junction of the ductus bursae and corpus bursae (Figure 47). The internal canal terminates in a gradually enlarged, thickened, variably coiled, vesicle

and a membranous sac (variously referred to in the literature as utriculus, receptaculum seminis, vesicle), which may continue forward as a filamentous extension (Figures 46, 47). We have mostly followed the terminology of Dugdale (1974) in considering the vesicle as the terminal, enlarged, sclerotized portion of the internal canal and the

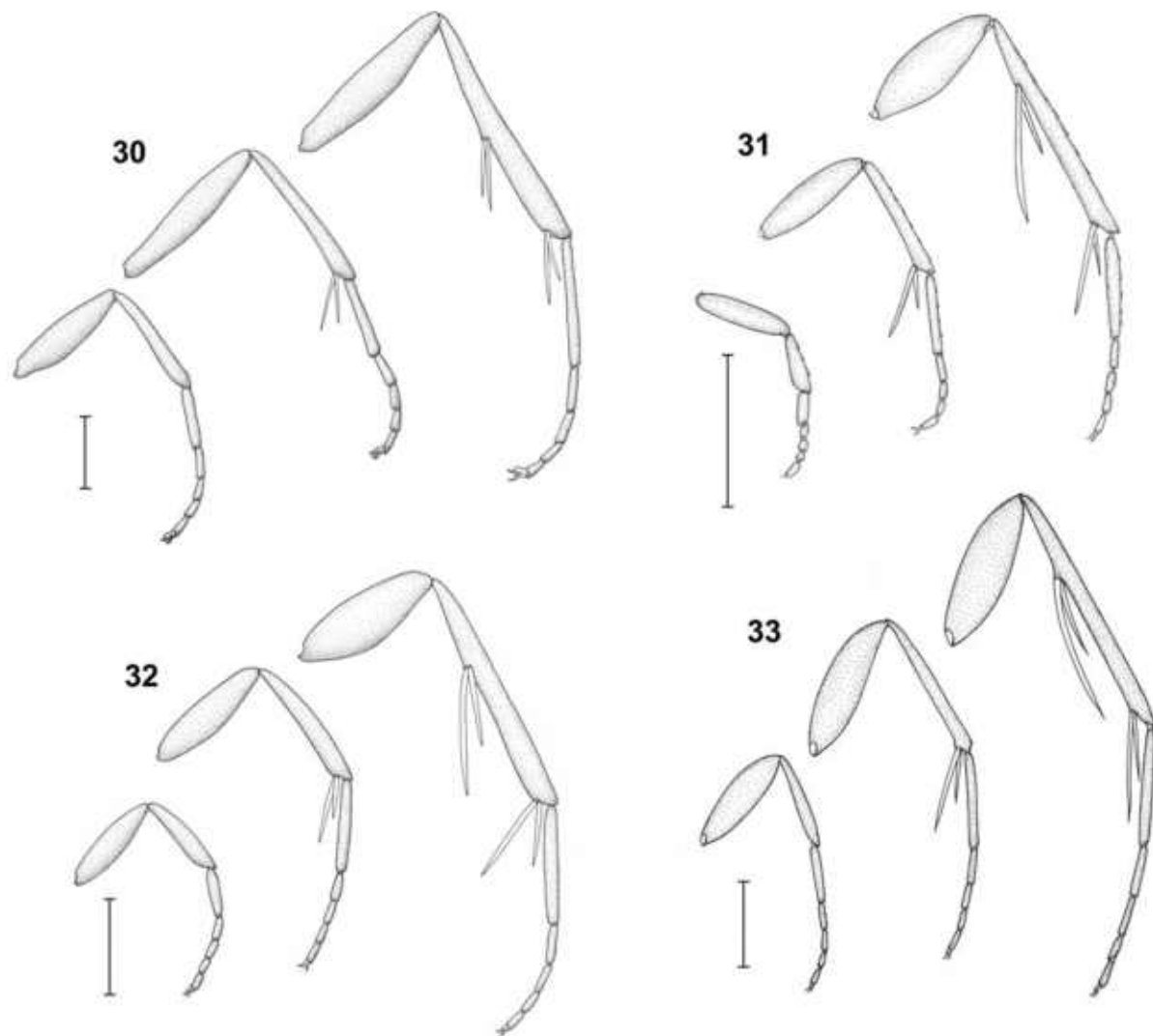


FIGURES 15–22. Wing morphology. 15–18, wing patterns: 15, *Pseudopostega acidata*, dorsal; 16, *P. adusta*, dorsal; 17, *P. dorsalis dorsalis*, dorsal; 18, *Neopostega distola*, forewing ventral. 19–22, wing venation: 19, *Notiopostega atrata*; 20, *Neopostega petila*; 21, *Opostegoides scioterma*; 22, *P. albogaleriella*. A: anal vein; Cu: cubitus; M: medius; R: radius; Rs: radial sector.





FIGURES 23–29. Thoracic morphology. *Notiopostega atrata*: 23, posterior view of metathorax (0.3 mm); 24, lateral view of metafurcasternum. *Opostegoides scioterma*: 25, posterior view of metathorax (0.3 mm); 26, lateral view of metafurcasternum. *Pseudopostega albogaleriella*: 27, anterior view of prothorax; 28, posterior view of metathorax (0.3 mm); 29, lateral view of metafurcasternum (0.3 mm). APF = anteriomedial process of furcasternum; FA = furcal apophysis; K = katepisternum; LCS = lateral cervical sclerite; ML = mesal lamella of metafurcasternum; PMP = pronotal medial plate; PPP = pronotal posterior plate; PS = precoxal sclerite; SAF = secondary arms of furcasternum. (Scale lengths in parentheses.)

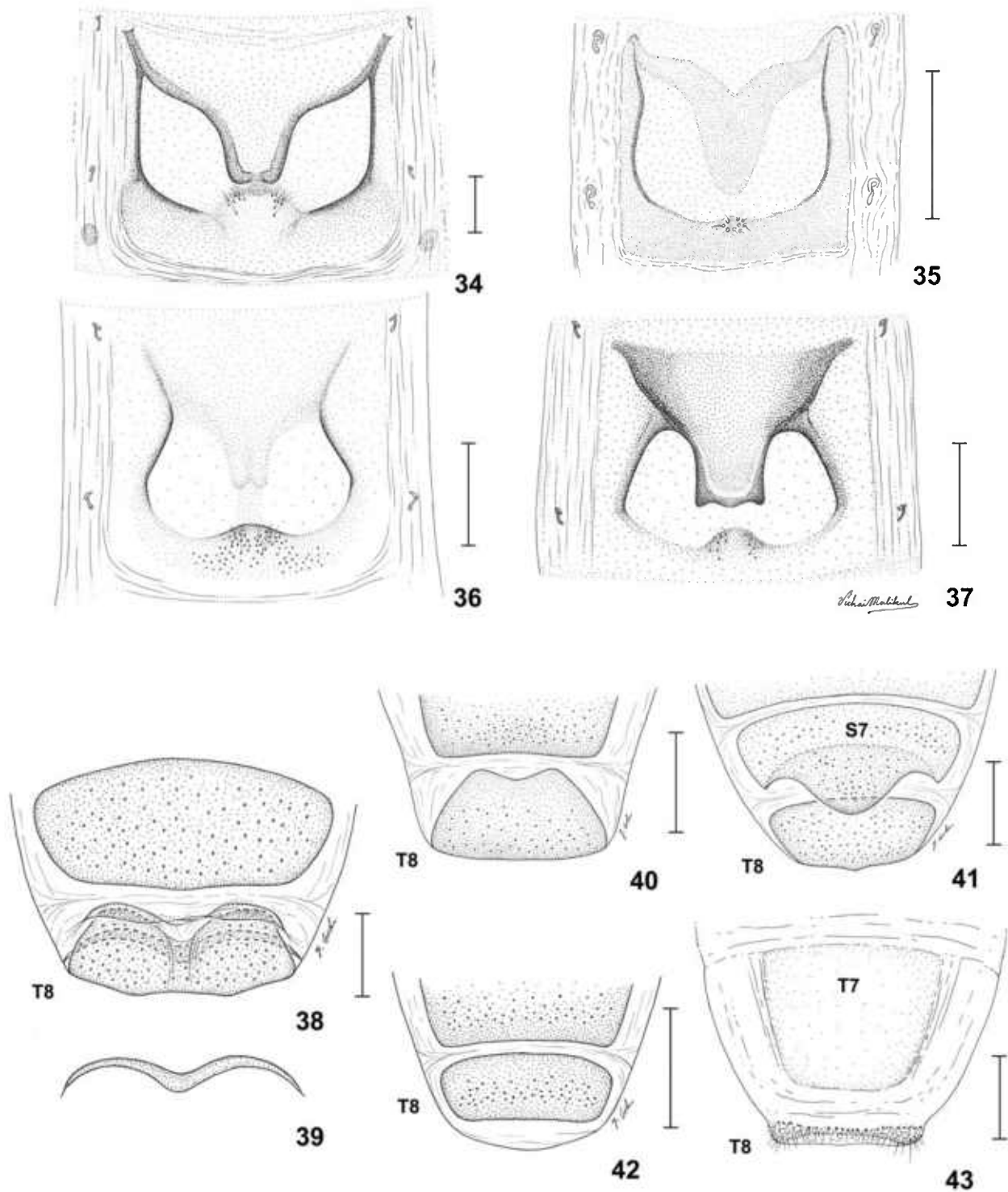


FIGURES 30–33. Leg morphology. 30, *Notiopostega atrata*; 31, *Neopostega petila*; 32, *Opotegoides scioterma*; 33, *Pseudopostega albogaleriella*. (All scale lengths = 0.5 mm.)

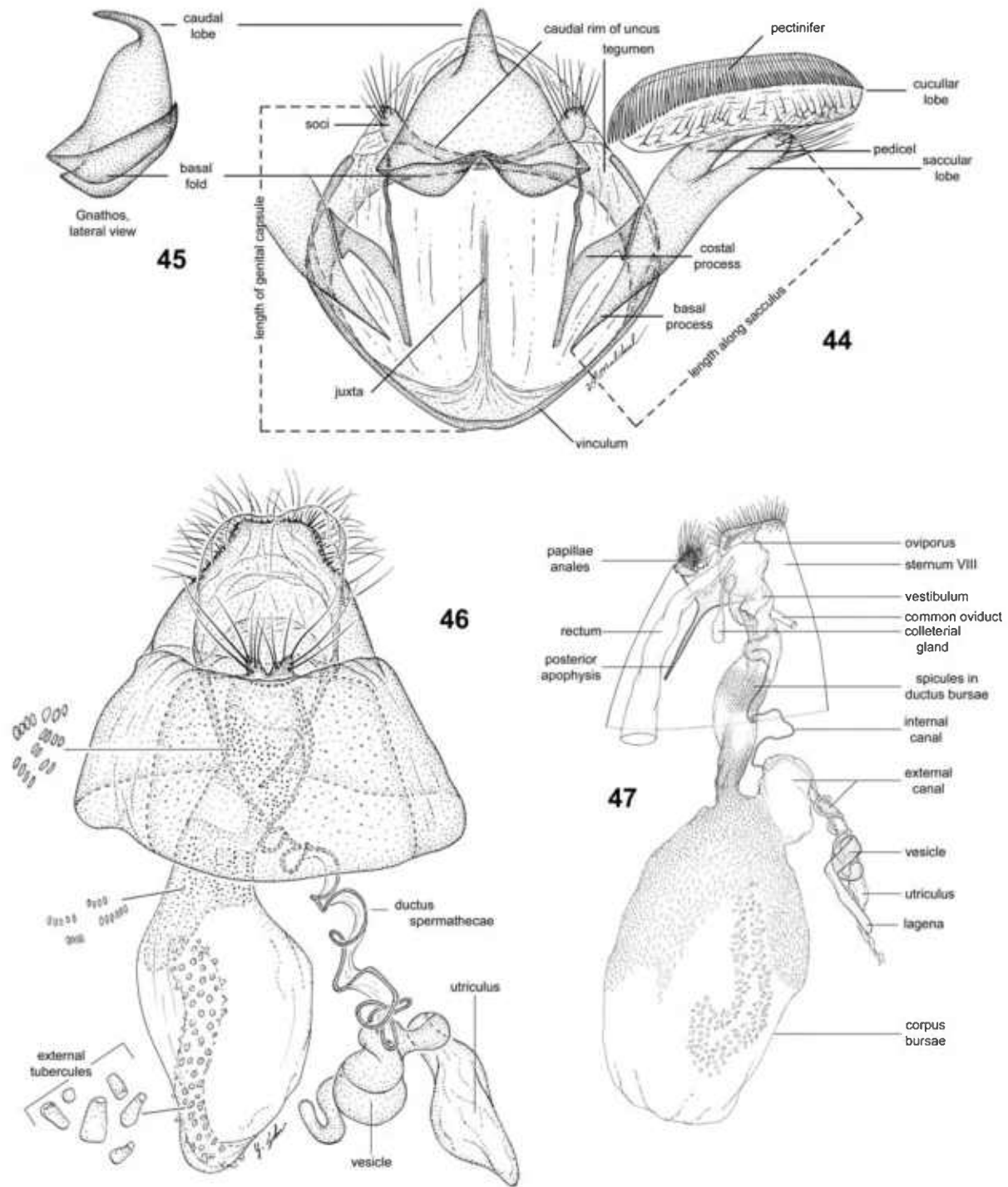
utriculus as a membranous sac extending anteriorly from the vesicle. The configuration of the vesicle is frequently of specific importance. However, these distinctions are usually difficult to resolve in slide preparations because of inconsistencies in viewing the vesicle in comparable positions. The vesicle in some *Pseudopostega* is unusual in possessing a variably developed, terminally closed, lateral tube (lagena) near the junction with the utriculus. The lagena varies from being absent (Figure 461), short and curved (Figure 434), coiled (Figures 46, 468), to straight and greatly extended (Figures 47, 491).

### SYSTEMATIC RELATIONSHIPS

Although the monophyly of Nepticuloidea and the two included families, Nepticulidae and Opotegidae, is well supported by several synapomorphies, the basal outgroup of the Nepticuloidea remains questionable. In a recent molecular analysis using the nuclear gene dopa decarboxylase (DDC), Friedlander et al. (2000) were not able to resolve the rather controversial basal divergences among the five major lineages of Heteroneura. One consistency from that analysis that did appear was that



FIGURES 34–43. Abdominal morphology. 34–37, second abdominal sternum (scales = 0.25 mm): 34, *Notiopostega atrata*. 35, *Neopostega petila*. 36, *Opostegoides scioterma*. 37, *Pseudopostega albogaleriella*. 38–43, male abdominal segments 7 and 8 (scales = 0.2 mm): 38, *Notiopostega atrata*, tergites (T) 7 and 8. 39, *Notiopostega atrata*, sternite (S) 8. 40, *Neopostega asymmetra*, tergites 7 and 8. 41, *Neopostega petila*, sternite 7 and tergite 8. 42, *Opostegoides scioterma*, tergites 7 and 8. 43, *P. albogaleriella*, tergites 7 and 8.



FIGURES 44–47. Genitalic morphology. 44–45, male *Pseudopostega mignoniae*: 44, ventral view; 45, lateral view of gnathos. 46, female *Pseudopostega clavata*, dorsal view. 47, female *Pseudopostega albogaleriella*, lateral view.

TABLE 2. Character coding for the outgroup, Nepticulidae, and the genera of Opostegidae.

Taxa	Characters																																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35			
Outgroup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Nepticulidae	1	0	0	1	1	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
Eospostega	1	?	?	?	1	1	2	0	1	2	0	1	1	1	1	0	1	1	1	?	0	3	1	1	0	1	1	1	1	2	0	0	0	?	?			
Neopostega	1	?	?	?	1	1	2	0	1	2	0	1	1	1	1	0	1	1	1	0	0	3	2	3	0	1	1	1	1	2	0	0	0	1	1	0		
Notiopostega	1	1	1	1	2	0	2	1	0	2	0	1	1	1	1	1	1	1	1	0	1	2	0	2	0	1	1	1	1	1	0	0	0	2	1	2	1	
Opostega	1	?	?	?	1	1	2	0	1	2	0	1	1	1	1	0	1	1	1	1	1	1	3	3	0	1	1	1	1	1	0	0	2	3	0	0	2	
Opostegoides	1	1	1	1	1	1	2	0	1	2	0	1	1	1	1	0	1	1	1	1	0	0	0	2	0	2	1	2	1	1	1	0	1	0	1	1	3	0
Paralopostega	1	1	1	1	1	1	2	0	1	2	0	1	1	1	1	0	1	1	1	?	1	1	0	2	0	1	1	1	1	2	0	1	3	1	0	2		
Pseudopostega	1	?	?	?	1	1	2	0	1	2	1	1	1	1	1	0	1	1	1	2	1	2	3	4	1	1	2	1	2	1	2	2	2	3	1	0	2	

Ditrysia and Nepticuloidea were the most basal lineages of the five, appearing in at least one optimal tree in nearly every analysis.

Cladistic analysis of the seven currently recognized genera of Opostegidae was performed using the “parsimony ratchet” within WINCLADA (Nixon, 2002). Because of the uncertainty of the basal relationships of Nepticuloidea, a hypothetical outgroup was used to root the cladogram. Thirty-five, mostly adult characters were used in the analysis (see list below and Table 2). Genital characters were scored based on all the species included in this revision as well as those studied by Puplesis and Robinson (1999). Larval and adult thoracic characters were scored from a few representative species within each genus. Because larvae are known for just three of the seven genera of Opostegidae, only four major larval characters were included (nos. 1–4). Several additional larval characters were discussed by Davis (1989). Because the presence of a single pair of stemmata (character 1) is believed ubiquitous throughout the Nepticuloidea, this was scored the same (apomorphic) for all genera of Opostegidae. The same may be true for the loss of crochets (character 4). The scoring of these two characters either as 1 or ? resulted in the same tree. The development of a single spinose mandibular seta (character 2) and cephalic apophyses (character 3) may also be characteristic for all opostegid larvae, but these assumptions require further examination involving more genera.

The ratchet function in WINCLADA produced a single most parsimonious tree (Figure 48) of 63 steps with a consistency index (CI) of 90 and a retention index (RI) of 80. The southern temperate genus *Notiopostega* was positioned basally within the family, with the globally widespread and most speciose genus *Pseudopostega* as the most derived. The comparative morphology of the characters used in this analysis have been discussed extensively by Davis (1989) and Puplesis and Robinson (1999) and are listed below.

CHARACTERS USED IN THE CLADISTIC ANALYSIS

Larva

1. Stemmata: 0 (2 or more pairs); 1 (1 pair).
2. Mandibular seta: 0 (simple); 1 (spinulate, Figures 76, 84).
3. Cephalic apophyses: 0 (undeveloped); 1 (well developed, slender).
4. Crochets: 0 (present); 1 (absent).

*Adult Head*

5. Antenna, scape: 0 (normal); 1 (enlarged); 2 (secondarily reduced, Figures 5, 6).
6. Antenna, vestiture of scape: 0 (random, Figure 5); 1 (in rows).
7. Antenna sensilla: 0 (generalized); 1 (sensilla vesiculoclada); 2 (sensilla ascoidea, Figure 14).
8. Occiput: 0 (rounded); 1 (transverse ridge, Figure 5).
9. Occipital scales (collar): 0 (narrow band, piliform); 1 (broadly laminate, widening caudally).

*Adult Thorax*

10. Prosternum: 0 (well developed); 1 (reduced); 2 (more reduced, precoxal bridge lost, Figure 27).
11. Metafurcal arms: 0 (free, Figures 23–26); 1 (fused, Figures 28, 29)
12. Epiphysis: 0 (present); 1 (absent).
13. Pretarsal scutes, transverse rows: 0 (divided); 1 (undivided, Figures 66, 124).
14. Metatibia: 0 (with few spines); 1 (densely spined).
15. Forewing, radial vein: 0 (branched); 1 (unbranched).
16. Forewing, cubital vein: 0 (present); 1 (absent).
17. Forewing, microtrichia: 0 (evenly distributed); 1 (restricted to isolated zones).
18. Hindwing, male frenulum: 0 (present); 1 (absent).
19. Hindwing, pseudofrenular setae: 0 (short); 1 (greatly elongated, Figures 62, 121).

*Adult Abdomen*

20. Male tergum VIII: 0 (slightly reduced, >0.5 width of VII); 1 (reduced, <0.5 width of VII); 2 (greatly reduced, often divided, Figure 43).

*Male Genitalia*

21. Vinculum, anterior margin: 0 (concave); 1 (rounded).
22. Juxta form: 0 (a broad, thin, membranous sheet, Figure 259); 1 (triangular plate, broadest caudally (in *Opostega*, *Paralopostega*, Davis 1989); 2 (greatly reduced, a slender, median appendage, Figures 269, 271); 3 (well-sclerotized, spinose rods, Figures 247, 250, 252, 254).
23. Uncus, caudal margin: 0 (subtruncate, Figures 245, 259); 1 (subacute, in *Eosopostega*, Davis 1989); 2 (bifid, Figures 247, 254); 3 (broadly concave, Figure 44).

24. Gnathos form: 0 (with lateral arms and spatulate median process); 1 (with lateral sclerotization, Figure 272); 2 (narrow transverse band, Figure 245); 3 (triangular, central region membranous, Figure 271); 4 (triangular, entirely sclerotized, Figures 308, 321, 326).
25. Gnathos, basal fold: 0 (absent); 1 (present, Figures 44, 352).
26. Valva, cucullar lobe: 0 (not constricted, without pedicel); 1 (greatly constricted, pedicel < length of cucullar lobe, Figure 44); 2 (pedicel elongate, > length of cucullar lobe, Figures 342, 344).
27. Valva, form of cucullar lobe: 0 (undeveloped); 1 (oval, without distinct apical lobe, Figures 44, 245); 2 (more elongate, usually with small apical lobe, Figure 269).
28. Valva, pectinifer: 0 (absent); 1 (usually >25 spines); 2 (reduced, <25 spines).
29. Valva, saccular lobe: 0 (broadly rounded, not produced, Figure 245); 1 (narrowly rounded, Figure 259); 2 (extended beyond pedicel as a slender lobe, Figures 44, 250, 271).
30. Valva, costal process: 0 (fused to valva, well developed, length of costal process > basal width of valva, Figures 245, 247); 1 (fused to valva, length reduced, < basal width of valva, Figure 259); 2 (articulated to valva, Figure 44).
31. Aedoeagus: 0 (well developed, length 0.7–1.2 × length genital capsule); 1 (reduced, length 0.5 × length of genital capsule); 2 (absent, phallus membranous).
32. Aedoeagus, cornuti: 0 (well developed, Figures 251, 253); 1 (a single long rod, Figure 260); (reduced in size, Figure 246); 3 (absent).

*Female Genitalia*

33. Anterior apophyses: 0 (present); 1 (absent).
34. Posterior apophyses: 0 (elongate, slender, Figures 47, 426); 1 (with enlarged ends, Figure 422); 2 (short, stout, Figures 419, 420); 3 (short, stout, bifid basally, Figures 424, 425).
35. Papillae anales: 0 (undifferentiated, Figure 424); 1 (superficially bilobed, Figure 419); 2 (paired lobes, Figures 46, 427).

**OPOSTEGIDAE**

*Opostegides* Meyrick, 1893:479.

**ADULT.** Extremely to moderately small, usually predominantly white moths, with forewings 1.8–8.3 mm in length.

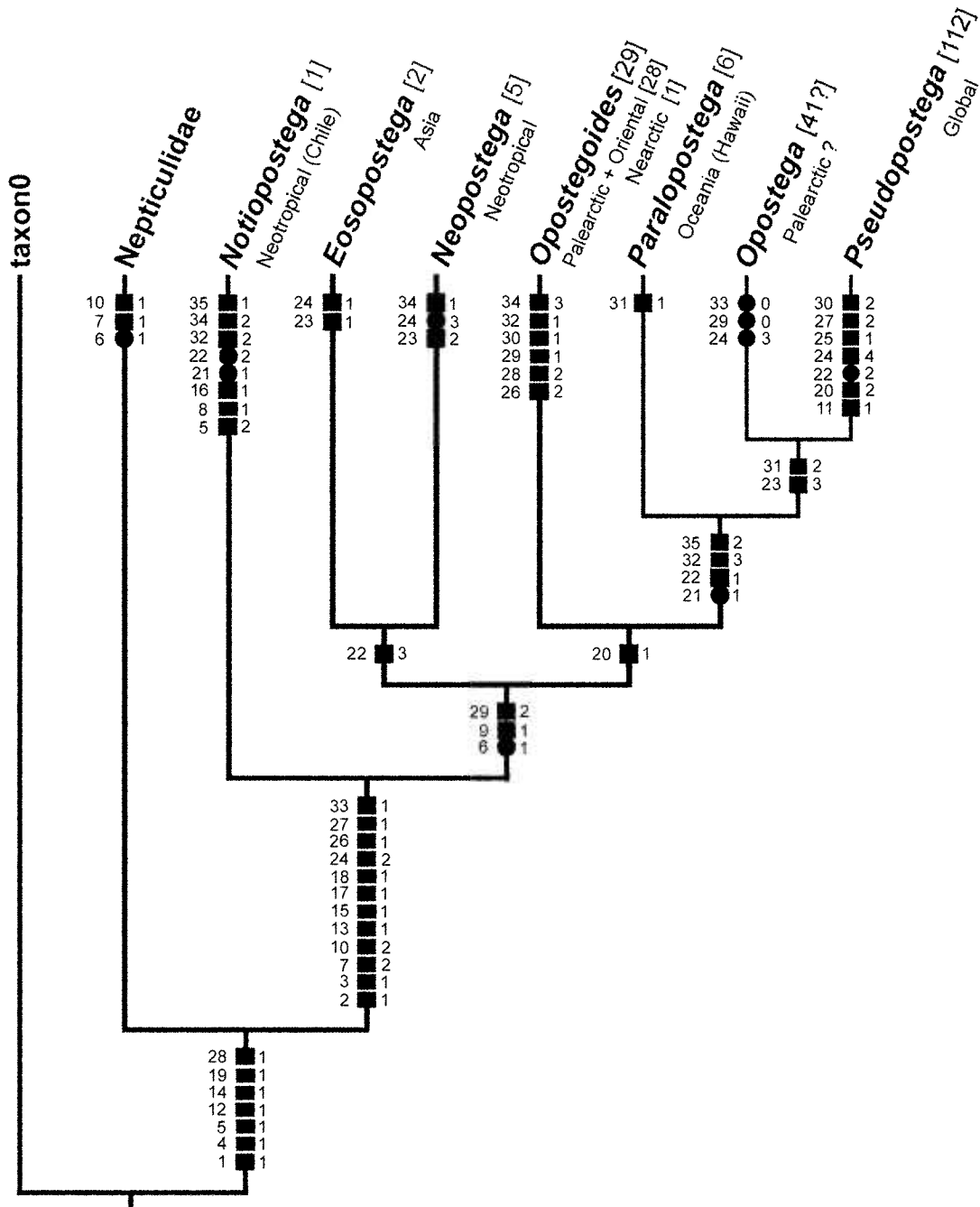


FIGURE 48. Cladogram of genera of Opostegidae with outgroup Nepticulidae based on 35 morphological characters (see Table 2) using Winclada Ratchet, resulting in 1 tree (length = 63, CI = 90, RI = 80). Squares = nonhomoplasious characters; circles = homoplasious characters.

**Head:** Figures 5–13. Vestiture variable; vertex typically rough with erect piliform scales possessing minutely bidentate apices; most of frons and cranium caudad to vertex covered with broad, lamellar scales with 3–5 dentate apices; lower frons naked. Ocelli absent. Eyes small to large; interocular index 0.5–1.2; cornea naked. Antennae

36–130-segmented, 0.7–0.9 × length of forewing; scape usually greatly enlarged; pecten absent; flagellum filiform, typically with 3 ascoid sensilla per segment (Figure 14) and one row of slender bidentate scales. Pilifers and mandibles absent. Haustellum short, 0.75–1.5× length of labial palpi. Maxillary palpi long, geniculate, 5-segmented. Labial palpi

3-segmented, moderately short, slightly drooping; lateral bristles absent.

**Thorax:** Depressed, relatively broad. Metafurca (Figures 23–26, 28, 29) variable, usually with furcal apophyses free; apophyses connected to secondary arms in *Pseudopostega*. Forewings (Figures 19–22) lanceolate, W/L index 0.2–0.23; apex sometimes upturned; venation extremely reduced, typically only 4 major veins present, without secondary branches or crossveins; microtrichia generally restricted to base of ventral forewing surface. Hindwing W/L index 0.14–0.17; a uniform series of 4–18 subcostal pseudofrenular setae (Figures 19–22, 62, 121) arising from base of hindwing in both sexes to couple with a subdorsal retinaculum consisting of a row of stiff scales on underside of Cu in forewing. Hindtibiae with rough spinose scales; pretarsus with unguitactor plate composed of several rows of undivided scutes (Figures 65, 66, 123, 124).

**Abdomen:** S2 (Figures 34–37) large, weakly sclerotized, usually with a large, central, partially or completely divided hyaline area. Coremata and corethrogynae absent.

**Male Genitalia:** Uncus (Figure 44) reduced, typically a slender bridge between a pair of widely separated setose lobes (socii), rarely in the form of a medium connate lobe (in *Eosopostega*). Tegumen reduced to a narrow dorsal ring. Vinculum usually a narrow, rounded ventral ring; anterior margin deeply concave in *Opostegoides*, *Eosopostega*, and in a few species of *Pseudopostega*. Gnathos (Figures 44, 45) fused, variable, usually a well-developed ventral arch or plate. Transtilla typically absent, rarely present as a slender, median bridge. Juxta highly variable, usually absent, or, if present, varying from a slender, midventral projection arising from the vinculum, to a broad membranous plate, or curved, spiniform rods connecting valvae. Valvae variable in outline, with a distinct costal process (apophysis) extending inward from base but articulated in *Pseudopostega* and some *Neopostega*; apex of valva (cucullus) an ovoid, pectinated lobe joined to basal half of valva by a slender to broad pedicel. Sclerotized aedoeagus present in varying degrees in *Notiopostega*, *Neopostega*, *Opostegoides*, *Paralopostega*, and *Eosopostega*; phallus entirely membranous in *Opostega* and *Pseudopostega*.

**Female Genitalia:** Ovipositor (Figures 46, 47) nonpiercing, short, barely extending beyond A7. Papillae

anales dorsal, usually paired and setigerous but occasionally fused, absent in *Opostegoides*. Anterior apophyses usually absent; posterior apophyses always present, either short or elongate and variably furcate caudally. Oviporus located terminally because of extreme reduction of A8, and A9+10. Ductus bursae usually membranous, often with minute, internal, sclerotized pectinations. Corpus bursae usually a large membranous sac, without a well-defined signum but often with inner walls variously covered with minute spicules and/or with an elongate, indistinct band bearing numerous, minute, tubercular outgrowths from wall of bursa (particularly in *Pseudopostega*).

**EGG.** Cylindrical, elongate-oval, up to 1.1 mm long. Chorion smooth and transparent, whitish to yellow. Laid singly on epidermal surface of plant host.

**LARVA.** Figure 70. Body whitish in color, extremely slender, 8–25 mm long, and apodal, with paired ventral callosities on T2–3. Head (Figures 67–77, 84, 86–90) depressed, triangular, with shallow epicranial notch and poorly defined sutures. One pair of stemmata. Mandible (Figures 76, 89) with a single, large, minutely spinulose seta. Cranium with a prominent pair of apophyses extending caudad into T1 and 3 pairs (dorsal, lateral, and ventral) of prominent, internal, longitudinal ridges (Figure 86). Development slightly hypermetamorphic with spinneret not fully formed until last (sixth) instar. Larvae known to be leaf miners in Melicope (=Pelea) (Rutaceae) and cambium miners in Betulaceae, Fagaceae, Salicaceae, and Saxifragaceae.

**PUPA.** Figures 49, 50, 54. Similar to that of Nepticulidae. Cuticle relatively smooth except for concentrations of minute tergal spines on A2–8. Antennal scape usually extremely broad. Wings, antennae, and forelegs usually extending to or slightly surpassing abdomen. All coxae flat and exposed (Figures 49). Pupation occurring in a tough, silken, lenticular cocoon (Figure 55) outside of mine, usually in leaf litter.

**DISCUSSION.** Two subfamilies have been recognized within this family (Kozlov, 1987). The Opostegoidinae include those genera that possess a sclerotized aedoeagus, which is lacking in the generally considered more derived clade Oposteginae. Because no synapomorphy has been found to support the Opostegoidinae, the validity of this subfamily is questionable (Puplesis and Robinson, 1999).

#### KEY TO THE GENERA OF THE NEW WORLD OPOSTEGIDAE

1. Aedoeagus present, variably sclerotized . . . . . 2  
    Aedoeagus absent (phallus entirely membranous) . . . . . *Pseudopostega*
2. Uncus of male genitalia prominently bifurcate (Figures 247, 252) . . . . . *Neopostega*  
    Uncus broadly subtruncate (Figures 245, 259) . . . . . 3



3. Predominantly dark fuscous moths with reduced antennal scape (Figures 5, 130); width of scape less than vertical eye diameter (Figure 6); anterior margin of male vinculum narrowly rounded (Figure 245); distribution Chile . . . . . *Notiopostega*  
Predominantly white moths with antennal scape wider than vertical eye diameter (Figure 10); anterior margin of vinculum broadly concave (Figure 259); distribution Holarctic/Indomalayan . . . . . *Opostegoides*

### ***Notiopostega* Davis**

*Notiopostega* Davis, 1989:30.—Davis, 1998:69.—Puplesis and Diškus, 2003:413.

**TYPE SPECIES.** *Notiopostega atrata* Davis, 1989, by monotypy and original designation.

**ADULT.** Small moths with lanceolate wings; length of forewing: 5.0–8.3 mm; antennal scape moderately enlarged. Male with partially sclerotized aedeagus; metafurcal apophyses free. Female with papillae anales reduced to a low, setigerous ridge.

**Head:** Figures 5–7. Vestiture mostly rough, consisting of piliform scales with acute apices; scales smooth from vertex to cranial ridge and irregularly arranged. Lower frons smooth and naked except for a sparse scattering of microtrichia. Cranial vertex produced to form a thin, bicrenulate ridge immediately anterodorsal to occiput. Antenna approximately 0.7–0.8 the length of forewing, 125–130-segmented (male) to 80–84-segmented (female); scape moderately enlarged, greatest width 0.76 the vertical diameter of eye; scales irregularly arranged; sensilla ascoidea with 5–10 branches (Figures 58, 59). Eye reduced, interocular index approximately 0.5, eye index 1.1. Maxillary palpus elongate, approximately 1.6× the length of labial palpus; ratio of segments from base approximately 0.5:0.5:0.9:2.3:1.0; segment I with a broad, acute process. Haustellum reduced, about 0.4× length of maxillary palpus. Labial palpus moderately short, exceeding length of haustellum; sensory pit (vom Rath's organ, Figure 60) at apex of third segment.

**Thorax:** Forewing (Figure 19) lanceolate; greatest width approximately 0.2× that of length; apex acute; microtrichia (Figure 61) generally reduced, extremely small and mostly concentrated over distal two-thirds of forewing (dorsal and ventral) and largely absent from basal regions; venation extremely reduced, with only vestiges of Sc, R, M, and A present; CuA and CuP absent; venter of forewing uniformly fuscous; subhumeral area without white scales, largely naked except for dense, light grayish microtrichia. Hindwing lanceolate, greatest width approximately 0.17 that of length; microtrichia greatly reduced, largely confined to anal area; approximately 18 pseudofrenular setae present; venation extremely reduced, with only Sc, Rs, M, Cu, and A present and unbranched. Metathoracic furca (Figures 23, 24) with apophyses moderately developed, free, terminating in

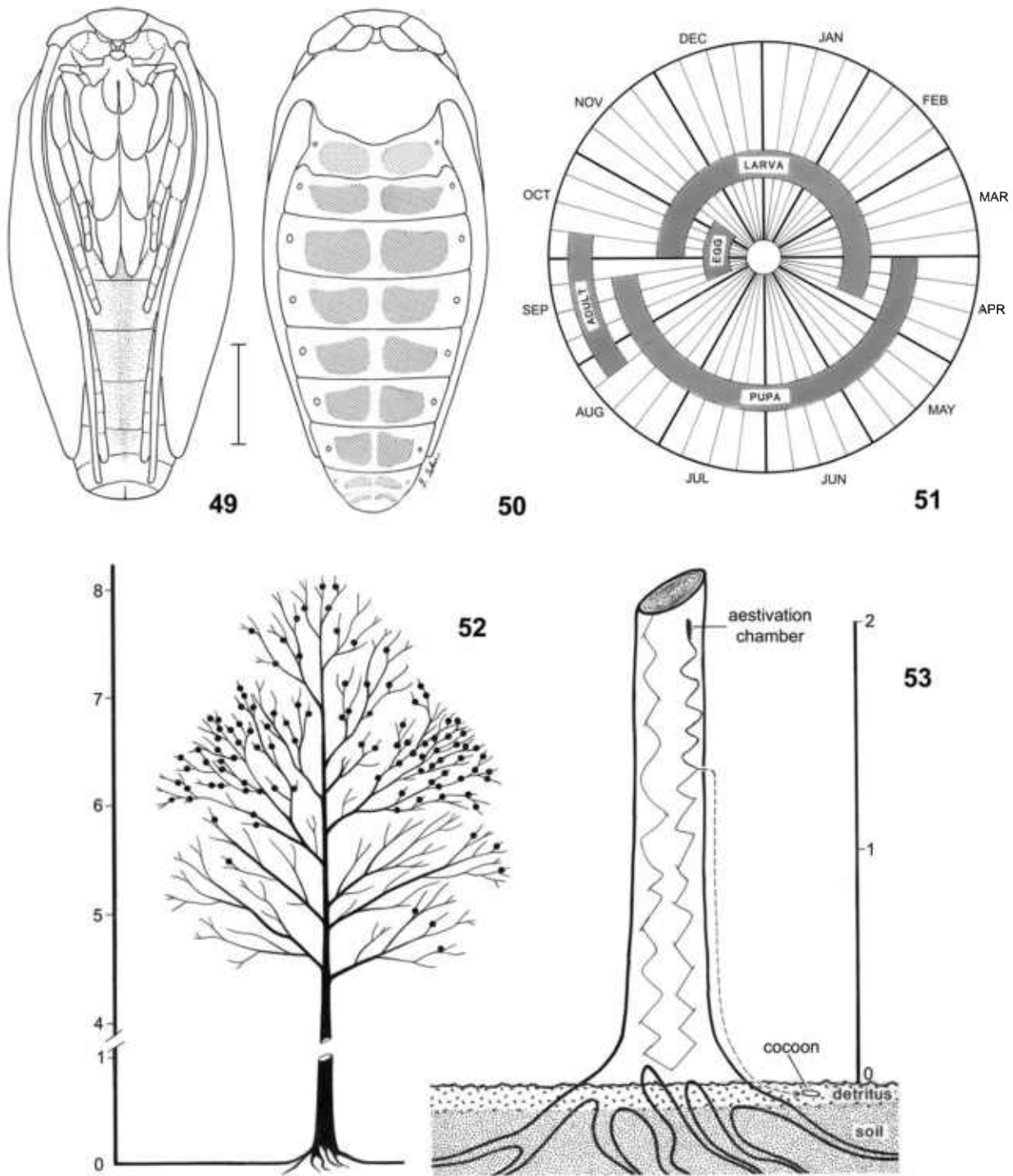
rounded knobs. Proleg (Figure 30) with tibia about 0.65 the length of tarsal segments. Midleg with apical spurs of nearly equal lengths, one being about 0.9 the length of other. Hindleg with two pairs of unequal spurs, one member of each pair about 0.7 the length of other; basal pair situated near middle of tibia; spurs relatively short; longest spur about 0.57 the length of first tarsal segment; hindtibia densely covered with long spinose setae, as is dorsum of tarsus I; tibial setae more appressed and tibia less spiny in appearance than in other genera.

**Abdomen:** Six functional pairs of spiracles present; spiracles of A7 vestigial, those of A8 absent. Sternum 2 as illustrated (Figure 34). Tergum 8 of male relatively well developed, consisting of two partially divided plates approximately half the length of tergum 7; anterior margin bilobed, with median concavity; caudal margin truncate (Figure 38). Sternum 8 reduced as shown (Figure 39).

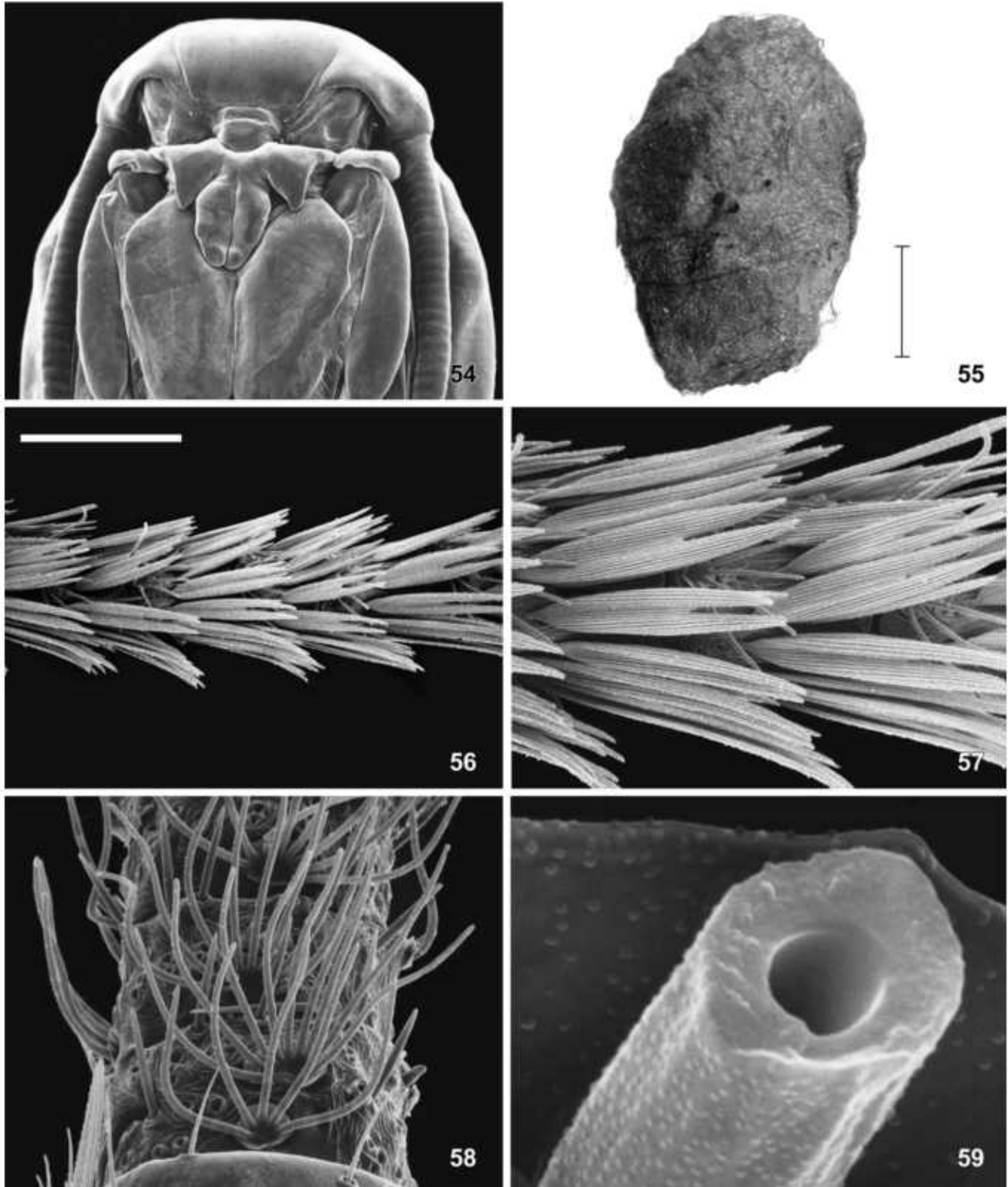
**Male Genitalia:** Figures 245, 246. Uncus reduced, consisting of a single, broadly truncate, setigerous lobe nearly 0.5× width of the genital capsule. Tegumen reduced to a narrow dorsal ring. Vinculum an ovoid, narrow ventral ring. Gnathos vestigial, reduced to an extremely narrow arch; basal fold absent. Valva with internal apophysis vestigial and fused to base of costa; main body of valva broad; cucullus arising from apical third of valva on a slender pedicel and then abruptly enlarging; cucullar lobe large, with distal margin bearing a densely spined pectinifer consisting of approximately 45 spines arranged in a single row. Juxta membranous, small, gradually constricted caudally. Aedeagus present, stout, nearly twice the length of valva.

**Female Genitalia:** Figures 419, 420. Papillae anales extremely broad, forming a slightly bilobed setigerous ridge on T9. Posterior apophysis well developed, relatively short and stout. Anterior apophysis absent. Anus and oviporus with separate external openings. Corpus bursae not examined (damaged in females examined). Spermatheca with enlarged, lenticular papilla; ductus spermathecae elongate; membranous external (afferent) canal slender, closely associated with internal (efferent) canal throughout their length; internal canal convoluted for most of length, comprising ~10 convolutions; vesicle consisting of a single, relatively large sac that then continues as a slender, gradually enlarged duct to a small membranous utriculus.

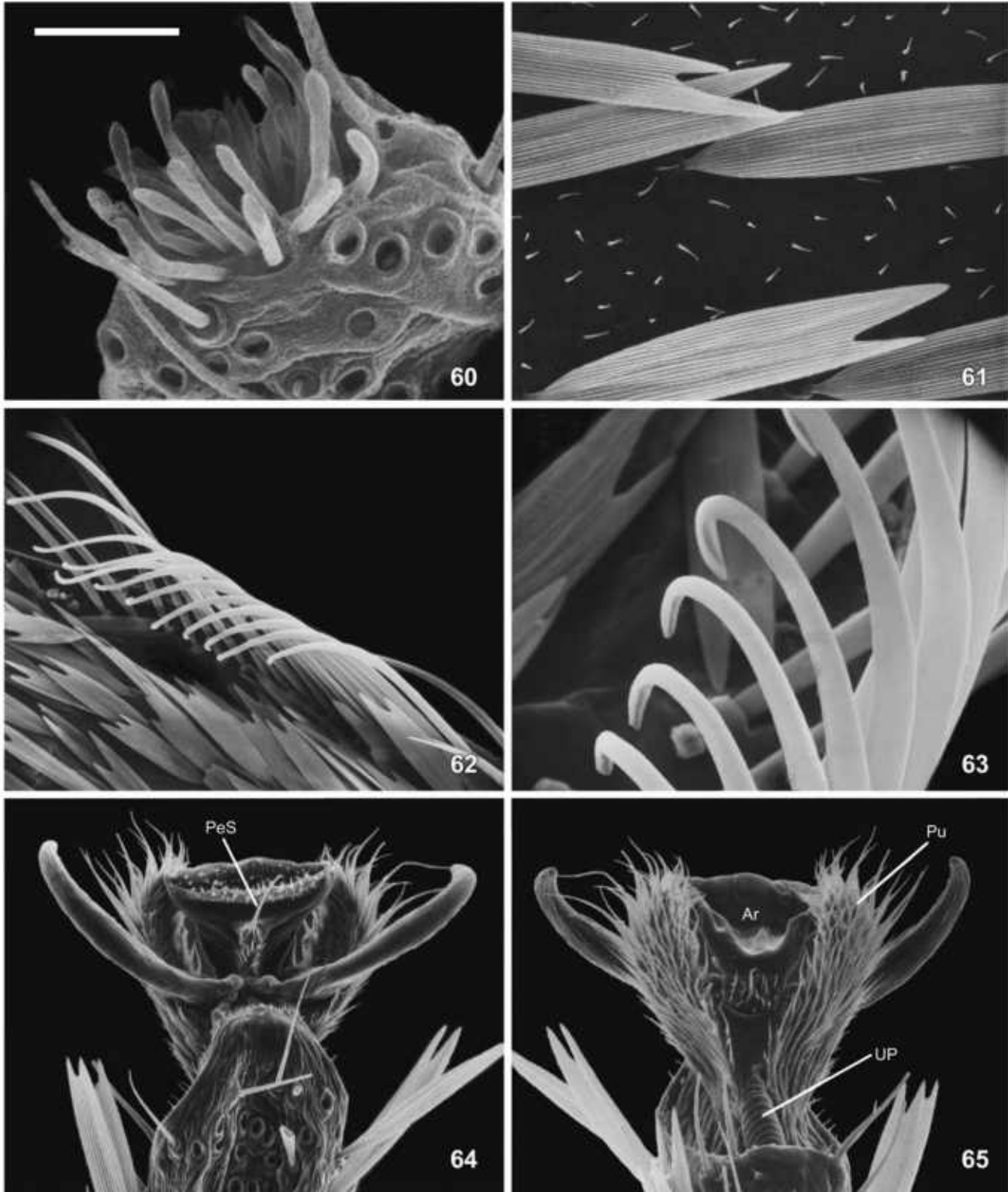
**LARVA.** Figures 67–90. Length of largest larva 20 mm; maximum diameter 1.1 mm (in alcohol).



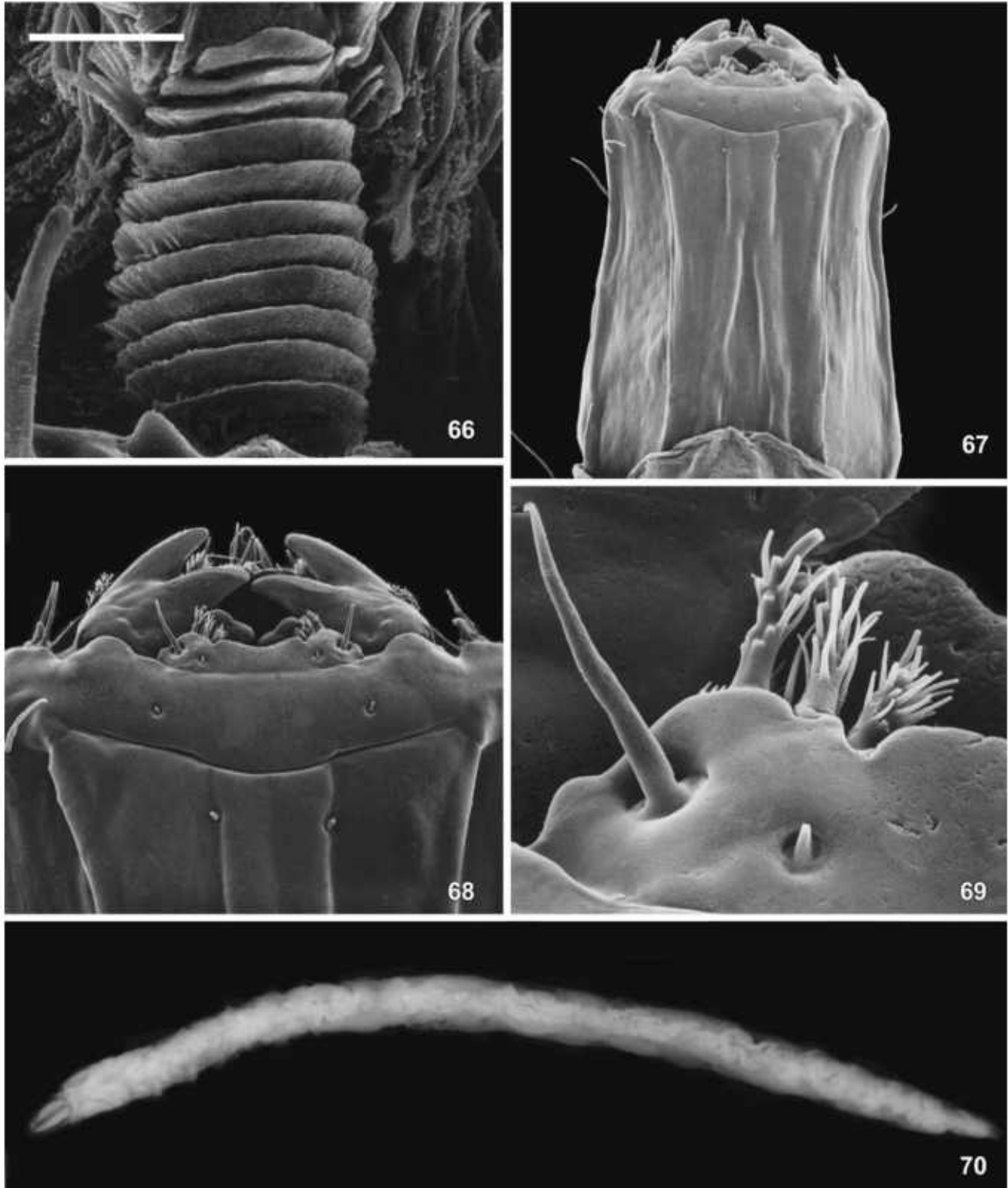
FIGURES 49–53. *Notiopostega atrata*. 49–50, pupa (scale = 1.0 mm): 49, ventral; 50, dorsal. 51–53, life history (scales in meters for 52, 53): 51, seasonal life cycle; 52, distribution of oviposition sites in crown of *Nothofagus dombeyi* (Mirbel) Oersted; 53, basal trunk of *Nothofagus dombeyi* showing final stages of larval/pupal biology. (All figures from Davis, 1989.)



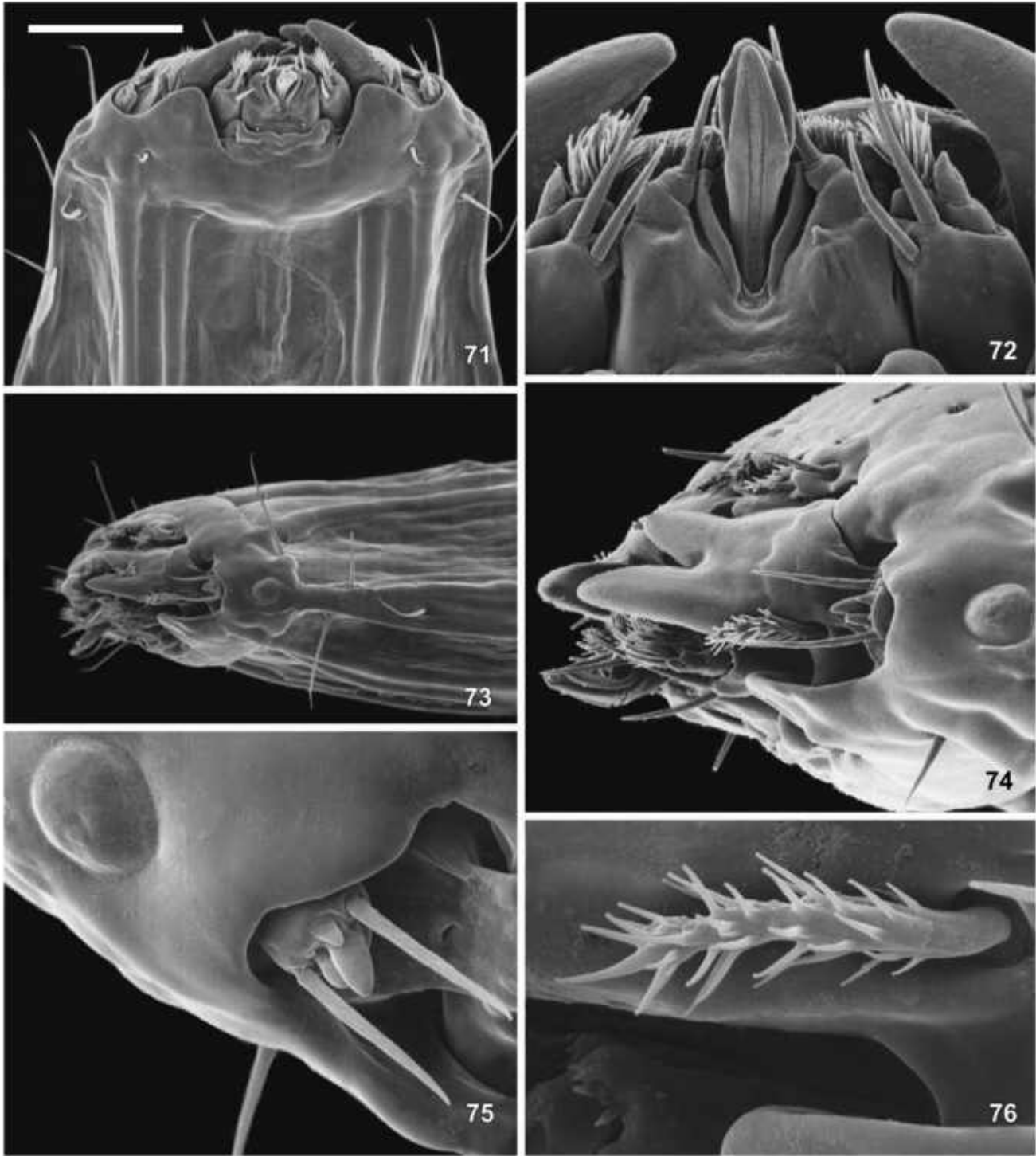
FIGURES 54–59. *Notiopostega atrata*. 54, pupa, enlarged detailed of head. 55, cocoon (1 mm). 56–59, adult antennal morphology: 56, scale vestiture near middle of antenna (75  $\mu\text{m}$ ); 57, detail of antennal scales (38  $\mu\text{m}$ ); 58, sensilla ascoidea near base of flagellum (38  $\mu\text{m}$ ); 59, cross-sectional view of a branch of sensillum ascoideum (1.2  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for Figures 56–59 shown in Figure 56.)



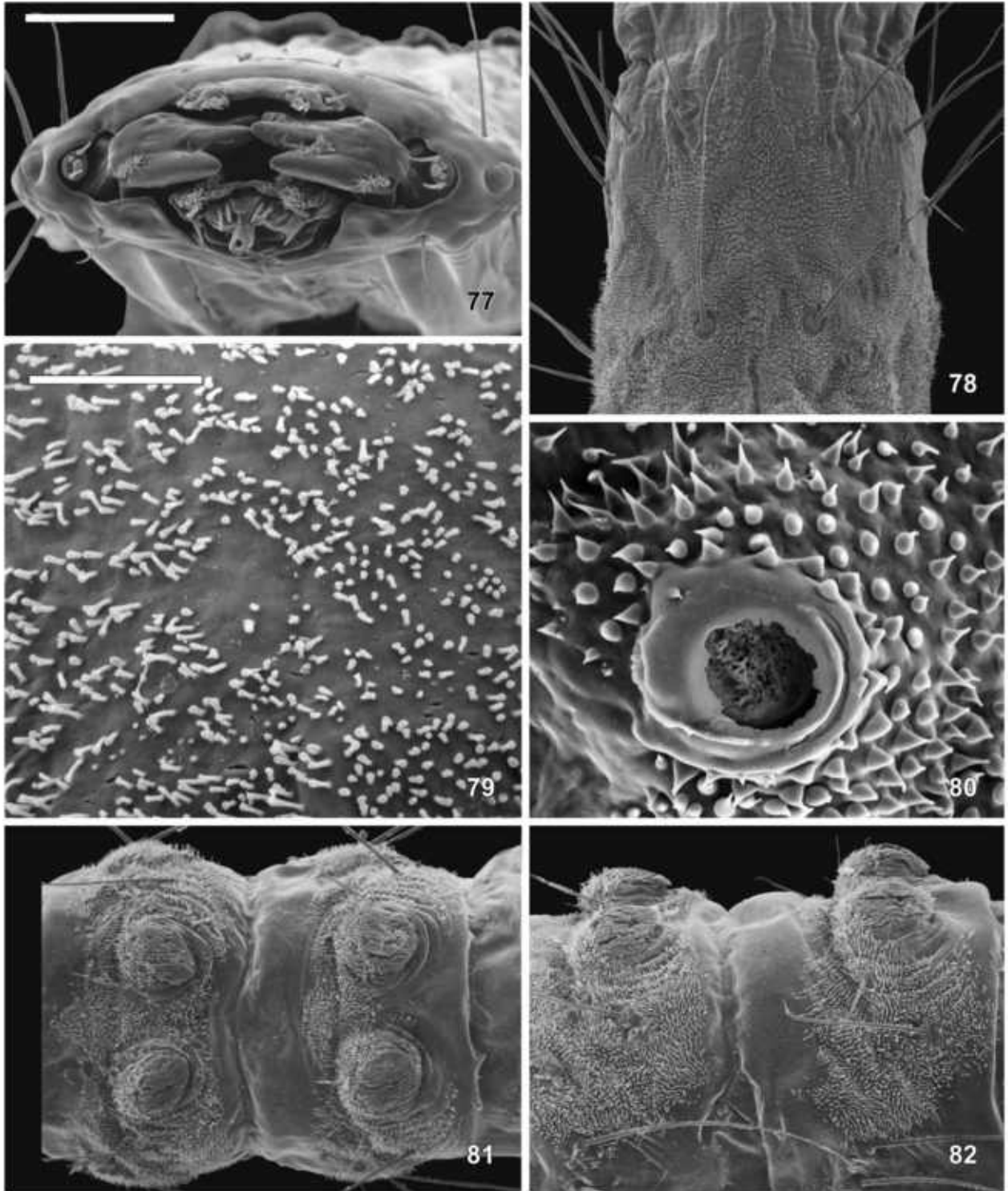
FIGURES 60–65. *Notiopostega atrata*, adult morphology. 60, sensory sensilla at apex of labial palpus (13  $\mu$ m); 61, microtrichia at distal third of dorsal hindwing (38  $\mu$ m); 62, pseudofrenular setae of hindwing (120  $\mu$ m); 63, apices of pseudofrenular setae (30  $\mu$ m); 64, dorsal view of metathoracic pretarsus (38  $\mu$ m); 65, ventral view of Figure 64 (38  $\mu$ m). (Ar = arolium; PeS = pseudempodial seta of pretarsus; Pu = pulvillus; UP = unguitractor plate; scale lengths in parentheses; bar scale for all figures shown in Figure 60.)



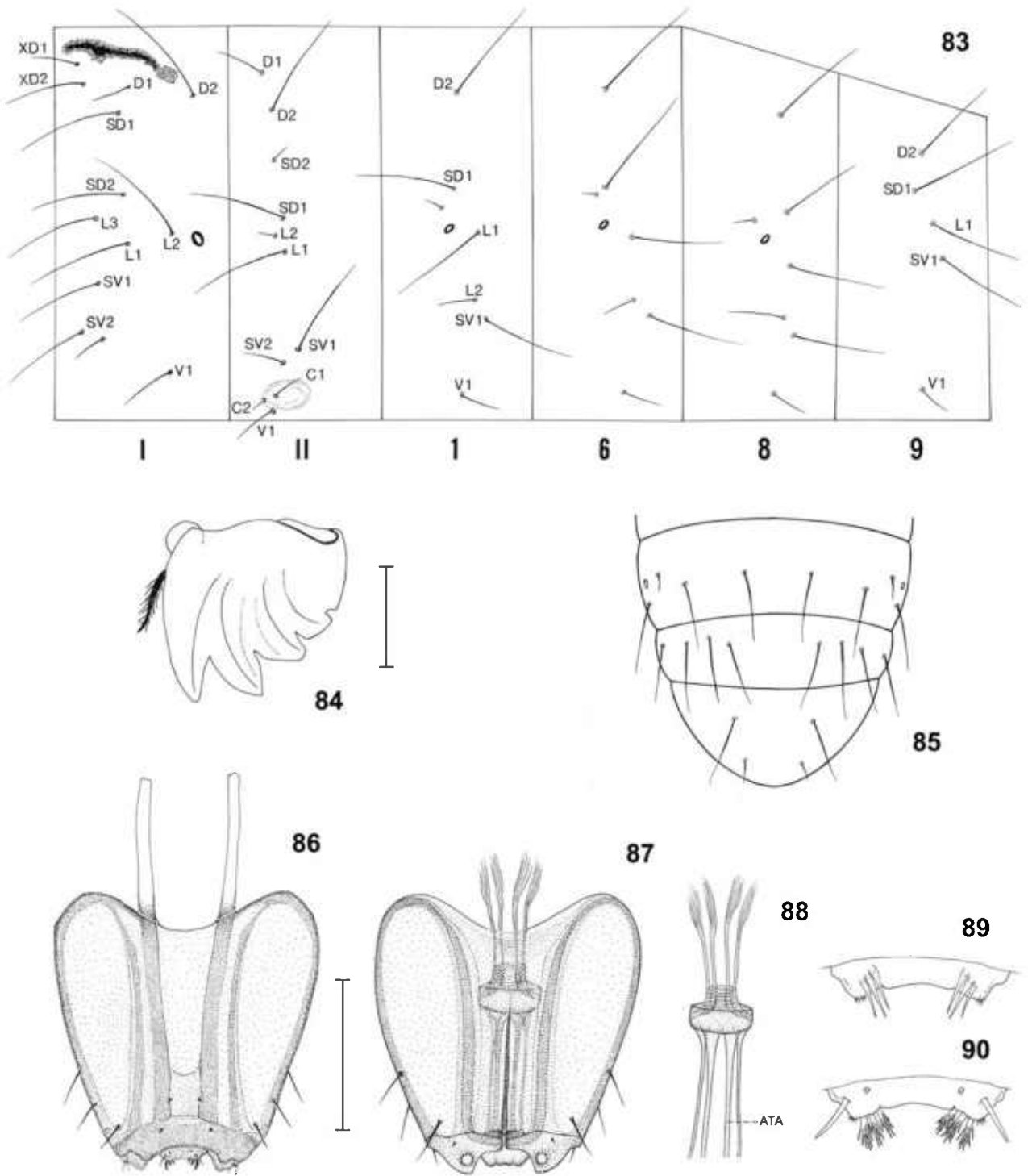
FIGURES 66–70. *Notiopostega atrata*, adult and larval morphology. 66, detail of unguitactor plate of Figure 65 (6  $\mu$ m); 67–70, last instar larva: 67, dorsal view of head (0.3 mm); 68, dorsal detail of fronto-clypeal area (136  $\mu$ m); 69, detail of labral setae (23.1  $\mu$ m); 70, lateral view of larva (specimen length = 20 mm). (Scale lengths in parentheses; bar scale for all figures shown in Figure 66.)



FIGURES 71–76. *Notiopostega atrata*, larval morphology. 71, ventral view of head (200  $\mu\text{m}$ ); 72, ventral detail of mouthparts (50  $\mu\text{m}$ ); 73, anterolateral view of head (200  $\mu\text{m}$ ); 74, lateral view of mouthparts (75  $\mu\text{m}$ ); 75, dorsolateral view of stemmata and antenna (41  $\mu\text{m}$ ); 76, lateral view of mandibular seta (23.1  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all figures shown in Figure 71.)



FIGURES 77–82. *Notiopostega atrata*, larval morphology. 77, frontal view of head (158  $\mu\text{m}$ ); 78, sternum of prothorax (250  $\mu\text{m}$ ); 79, microtrichia, midventral detail of Figure 78 (30  $\mu\text{m}$ ); 80, prothoracic spiracle (38  $\mu\text{m}$ ); 81, meso- and metathoracic ambulatory calli (0.4 mm); 82, lateral view of Figure 81 (0.33 mm). (Scale lengths in parentheses; bar scale for Figures 77, 78, 81, 82 shown in Figure 77; bar scale for Figures 79, 80 shown in Figure 79.)



FIGURES 83–90. *Notiopostega atrata*, chaetotaxy of last larval instar. 83, lateral diagram of prothorax (I), mesothorax (II), and abdominal segments 1, 6, 8, and 9; 84, left mandible (0.5 mm); 85, dorsal view of abdominal segments 8–10; 86, dorsal view of head (0.5 mm); 87, ventral view of head; 88, tentorium; 89, ventral view of labrum; 90, dorsal view of labrum. (Scale lengths in parentheses.)



**Head:** Maximum width 0.8 mm. Color white (in alcohol) with three pairs of dark reddish brown longitudinal lines corresponding to the internal ridges; a short median frontal ridge sometimes evident between frontal setae. Antenna with four sensilla basiconica of different sizes from large to minute, and two elongate sensilla chaetica of equal lengths. Setae F1 and C2 extremely short. Labrum reduced but of general quadrate form; M1 greatly reduced; L1–3 present and spinulate. Three pairs of elongate, epipharyngeal setae present. Mandible with four cusps; mandibular seta moderately spinulate.

**Thorax:** Prothorax with XD1 arising above XD2 and remote from D1. SV2 present on meso- and metathorax.

**Abdomen:** L2 reduced in length. Ninth segment with five pairs of primary setae; SV1 present. Tenth segment with two pairs of dorsal setae.

**PUPA.** Figures 49, 50, 54. Length of largest pupa 5.5 mm; greatest width 2.5 mm. Cuticle brownish fuscous (in alcohol), nearly transparent; abdomen pale buff. Body slightly depressed, smooth, without primary setae or spines but with two large patches of scattered minute spines dorsally on A1–8, densest concentration on A2–7, and with narrow, midventral concentration of similar minute spines on A2–8. Head broadly rounded; galea triangular. Antenna and hindlegs extending to caudal end of abdomen, sometimes slightly shorter or surpassing it. All coxae clearly exposed, flat. Abdomen without transverse rows of spines except for minute, serrated ridge visible on dorsum of A2 under higher (e.g., 200×+) magnification; A1–8 with scattered, minute spines concentrated along midventer; paired patches of slightly larger spines located dorsally on either side of midline from A1 to A9. A10 smooth, cremasteral spines absent.

**DISCUSSION.** *Notiopostega* exhibits the most divergent morphology of any genus of Opostegidae. The only known species, *N. atrata*, possesses the darkest coloration (except for a few melanic specimens of some *Pseudopostega* and an undescribed new genus from Madagascar) and largest size of any opostegid. The antennal scape is noticeably reduced as are the tibial spurs and venation. It shares a notable symplesiomorphy with *Opostegoides*, *Neopostega*, *Eosopostega*, and *Paralopostega* in the retention of an aedoeagus. The larva of *Notiopostega* appears to be the most generalized in the family, as indicated by its less modified labrum and more complete chaetotaxy.

### ***Notiopostega atrata* Davis**

FIGURES 5–7, 19, 23–26, 30, 34, 38, 39, 49–90, 130, 245, 246, 419, 420; MAP 1

*Notiopostega atrata* Davis, 1989:32; 1987:353 [nomen nudum].—Puplesis and Diškus, 2003:413.

*Opostega* species.—Carey, Cameron, Cerda, and Garda, 1978:151.

**ADULT.** Figure 130. Length of forewing: male 5.0–6.0, female 6.4–8.3 mm. Relatively large (for family), almost unicolorous, brownish fuscous moth.

**Head:** Vestiture mostly rough; frontal tuft composed mostly of brownish fuscous piliform scales, sometimes suffused with white to grayish scales; collar short, paired, fuscous brown. Scape mostly white, suffused with gray at margin; flagellum dark brown, segmentation sexually dimorphic with ~125–130 segments in male and 80–84 in female. Palpi from grayish cream to grayish brown.

**Thorax:** Brownish fuscous with some purple and bluish iridescence. Forewing uniformly brownish fuscous with slight purple iridescence (mostly at distal apex), relatively slender, elongate, with no pattern; cilia brownish fuscous; venter of forewing brown to brownish fuscous. Hindwing irrorated with brownish fuscous slender elongated scales on upperside and underside; cilia brown, sometimes pale brownish distally. Legs grayish fuscous, without banding, somewhat paler and more gray ventrally; hindtibia densely covered with long spinose setae.

**Abdomen:** Uniformly brownish fuscous dorsally and gray to pale gray ventrally.

**Male Genitalia:** Figures 245, 246. As described for genus.

**Female Genitalia:** Figures 419, 420. As described for genus.

**LARVA AND PUPA.** Figures 49, 50, 54, 67–90. As described for genus.

**HOLOTYPE.** ♀; CHILE: VALDIVIA: Valdivia: 28 Aug 1973, R. S. Cameron, slide USNM 17195 (USNM).

**MATERIAL EXAMINED.** CHILE: VALDIVIA: Valdivia: 1 ♂ (paratype), 22 Aug 1973, 1 ♀ (holotype), 1 ♂ (paratype), 28 Aug 1973, 1 ♀ (paratype), 1 Sep 1973, 1 ♀ (paratype), 5 Sep 1973, 2 ♂, 2 ♀ (paratypes), 19 Sep 1973, R. S. Cameron, slides USNM 16366, 16368 (SEM), 16372, 17194, 17530, 17561 (SEM), 17928, 21262, 21279 (SEM), 28693 (SEM), 33145 (USNM). 1 ♂, 19 Sep 1973 (MHNS). VALDIVIA: Fundo San Sabastian: 9 larvae, 12 Mar 1974, P. Carey (USNM); 5 pupae, 24 Apr 1974, P. Carey (USNM).

**FLIGHT PERIOD.** Late August to early October; univoltine.

**DISTRIBUTION.** (Map 1) Occurs along the coastal hills of Valdivia Province, Chile.

**DISCUSSION.** Being the only uniformly dark-colored species of Opostegidae (except for certain melanic individuals reported in a few *Pseudopostega* and an undescribed species from Madagascar), this species is truly unique and easily recognizable. The nearly black vestiture of the

diurnal adult moth is probably an adaptation associated with its late winter to early spring emergence period, which commences whenever the daily ambient temperature approaches 18°C (Carey, 1975; Carey et al., 1978). The degree of sexual dimorphism in antennal segmentation within *N. atrata* is highly unusual for the family, with the males (~125–130) possessing more segments than the females (~82–84).

The life history of this species, which is regarded as a significant pest of an important lumber tree, coigue (*Nothofagus dombeyi* (Mirb.) Oerst.), in the Valdivian forest of southern Chile, has been thoroughly investigated by Carey (1975) and Carey et al. (1978). One of the first references to the larval biology was by Knigge and Bonnemann (1969), who mistook *N. atrata* for a species of Agromyzidae (Spencer, 1981). These authors state that the larvae partly destroy the cambium and initiate the formation of callus rays of a characteristic appearance. The resulting rays, together with the excrements from the larvae, are responsible for the reddish brown color of the pith flecks, which substantially diminish the commercial veneer quality of the wood. The seasonal occurrence of the principal stages is summarized in Figure 51 (from Carey et al., 1978; Davis, 1989). Adults first appear during the last week of August and continue to fly until the first week in October. Commencing in early September, females deposit elongate eggs on the undersides of *Nothofagus* leaves. Carey described the newly deposited eggs as whitish in color, becoming yellowish as the embryo develops. They averaged ~0.5 mm in width and 1.1 mm in length. The egg is covered with a protective, transparent secretion from the rectal glands of the female. Approximately 90% of the oviposition sites examined by Carey were located in the upper third of the tree crown (Figure 52) and most often on the terminal, or youngest, branches. The oviposition site is almost always located near the leaf base with the developing larva oriented toward the pedicel. Rarely are more than one egg laid per leaf. Larval eclosion occurs from 28 to 36 days after oviposition. Leaving the egg, the larva bores into the leaf and from there through the petiole into the supporting branch, eventually reaching the main trunk. There it continues to mine the cambium layer, creating a sinuate, “zig-zag” trail down the trunk (Figure 53). Young trees damaged in this manner demonstrate a similar sinuate pattern externally visible on the bark because of a cortical response to larval damage. The mines are the longest of any known bark or stem miner, totaling approximately 7 m with a maximum width of 2.4 mm (Carey, 1975:15). At times they may extend all the way down the trunk to the roots.

Carey reports six larval instars with most of the feeding performed by the first five instars from October until March. Sometime during February through early March the larva turns 180° in the mine, and ascends the trunk a

short distance where it constructs a small aestivation chamber in which the fifth instar molts. The final, sixth instar differs from the earlier instars in possessing more distinct body segmentation and in having longer body setae. It rests, essentially immobile, for about two weeks inside the chamber. Between mid-March and early April the larva leaves the chamber, descending in the old mine and apparently feeding somewhat as it goes, to a point about 35 mm below the aestivating chamber. There it bores through the bark and drops to the ground where it pupates in a tough silken cocoon (Figure 55) among the leaf-litter above the soil. Overwintering (April–September) occurs in the pupal stage with the first adults starting to appear during the last week of August.

### ***Neopostega*, new genus**

**TYPE SPECIES.** *Neopostega petila* Davis and Stonis.

**ADULT.** Small, predominantly white moths with lanceolate wings; length of forewing: 2.1–3.5 mm. Antennal scape greatly enlarged; greatest width ~equal to vertical diameter of eye. Metafurcal apophyses free. Male with aedeagus present. Female with single, broad, truncate, anal papilla.

**Head:** Figures 8, 9. Vestiture of vertex rough, consisting of piliform to slender scales with minutely bidentate apices; posterior to vertex scales smooth, broad; lower frons naked except for scattered rows of microtrichia. Cranial vertex evenly rounded. Antenna approximately 0.7–0.8× length of forewing, 41–57-segmented; scape greatly enlarged, greatest width ~equal to vertical eye diameter; scales broad and flat over scape and densely arranged in 7 relatively uniform rows; sensilla ascoidea with usually 7–9 branches. Eye large, interocular index approximately 1.15; eye index ~0.66. Maxillary palpus elongate, about 2.6× length of labial palpus; ratio of segments from base approximately 0.4:0.35:0.7:1.75:1.0. Haustellum short, about 1.65× length of maxillary palpus. Labial palpus short, approximately 0.5× length of haustellum; apical segment broadest.

**Thorax:** Forewing (Figure 20) lanceolate; greatest width about 0.25× that of length; apex acute; microtrichia absent on all surfaces except for ventral base of forewing; venation similar to *Opostegoides*, with only unbranched vestiges of Sc, R, M, CuA, and A present; M and A best preserved; anal fold appearing in place of missing CuP; venter of forewing with a moderately large, patch of white scales near humeral area at base. Hindwing lanceolate, greatest width about 0.15× that of length; ~7–8 pseudofrenular setae present; venation extremely reduced, with only Sc + R1, Rs, M, Cu, and A present. Metathoracic furca similar to *Opostegoides* in morphology, with apophyses moderately developed, acute, free, and not connected to secondary furcal

arms. Proleg (Figure 31) with tibia about 0.5× length of tarsal segments. Midleg with tibial spurs of unequal lengths, shorter member of pair about 0.6× length of other. Hindleg with two pairs of unequal spurs; the basal pair situated slightly basal to middle and with shorter spur about 0.5× length of other; apical spurs shorter and more similar in length, the shorter member about 0.66× the length of other; longest spur (of basal pair) slightly less the length of first tarsomere; hindtibia densely covered with long spinose setae, as is dorsum of most of tarsal segments.

**Abdomen:** Six functional spiracles present on A1–6. Sternum 2 as illustrated (Figure 35). Tergum 8 of male relatively well developed, anterior margin either truncate or broadly concave, caudal margin either truncate or slightly rounded; sternum 7 variable, with strongly rounded, convex caudal margin in some species (e.g., *N. petila*; Figure 41).

**Male Genitalia:** Figures 247–258. Uncus prominent, consisting of a pair of slender to stout, narrow to widely separated, setigerous lobes and slender caudal rim fused to tegumen. Tegumen a narrow dorsal ring. Vinculum variously developed from a narrow ventral ring to a broad ventral plate, with anterior margin either rounded or broadly concave. Gnathos variably developed, either membranous (absent) or variously sclerotized; basal fold absent. Valva variable, often long and slender, 0.8–1.0× length of genital capsule; cucullar lobe bearing a relatively reduced pectinifer bearing a single, usually curved row of 20–32 blunt spines; cucullar lobe supported by a slender, sometimes curved pedicel arising from apex of costal margin; sacculus an elongate, slender, setose lobe extending well beyond attachment (pedicel) of cucullar lobe; costal process either fused or closely articulated to valva; basal process well developed, tapering basally to an elongate, acute apex. Juxta highly variable, ranging from a simple, lightly sclerotized and indistinct,

broad, ventral plate, with or without caudal processes, to well-sclerotized, variably U-shaped rods between the bases of the valvae. Aedoeagus present, variably sclerotized, usually containing prominent, spiniform cornuti.

**Female Genitalia:** Figures 421–423. Papillae anales fused into a broad, truncate, setose ridge. Posterior apophyses highly modified, consisting of a moderately sclerotized, continuous band extending dorsally across base of anal papilla (tergum 9 + 10), with a pair of anterolateral extensions that bend caudally around a bilateral pair of shallow invaginated pockets. Anus and oviporus opening very close together. Vestibulum broad, membranous. Ductus bursae with a zone of minute, pectinate spicules. Corpus bursae elongate, slender, with a long, indistinct, elliptical band bearing numerous small papillate outgrowths. Ductus spermathecae relatively short, extending only midway along corpus bursae; membranous outer canal reduced in diameter; inner canal with few convolutions; vesicle a small, abruptly enlarged, oval sac.

**LARVA AND PUPA.** Unknown.

**ETYMOLOGY.** The generic name is derived from the Greek *neos* (new) prefixed to the generic stem *Opostega*, in reference to the neotropical distribution of this taxon. It is feminine in gender.

**DISCUSSION.** The discovery of this genus now increases the number of described opostegid genera to seven. Five species with rather diverse male genital morphology now comprise *Neopostega*. Because no diagnostic features (e.g., relative development of gnathos and juxta) appear correlated, only one genus is recognized. Females are known only for *N. distola*. Until females of more species are available for study, the precise homology of the unusual structures now considered as comprising the posterior apophyses in *N. distola* will probably remain questionable.

#### KEY TO THE SPECIES OF NEOPOSTEGA

1. Anterior margin of vinculum concave; length of valva equal to or exceeding length of genital capsule (from vinculum to apex of uncus); juxta largely or entirely a flat, partially membranous plate extending to vinculum (Figures 254, 256) . . . . . 2  
Anterior margin of vinculum subtruncate to rounded; length of valva less than length of genital capsule; juxta spiniform, well sclerotized, and well separated from vinculum (Figures 247, 250) . . . . . 3
2. Aedoeagus with a bilateral pair of long cornutal rods; juxta a broad, elongate, largely membranous plate without laterocaudal processes (Figures 256, 258, 258a) . . . . . *N. distola*  
Aedoeagus usually with 4 slender, subapical cornuti; juxta a broad, short, moderately sclerotized plate with a bilateral pair of slender caudal processes longer than basal plate (Figures 254, 255) . . . . . *N. petila*
3. Juxta with asymmetrical caudal processes (Figure 247); vinculum a broad, ventral plate nearly half the length of entire genital capsule . . . . . *N. asymmetra*  
Juxta with stout symmetrical processes; vinculum a narrow ventral ring . . . . . 4
4. Largest cornutus straight and more than 0.5× length of aedoeagus (Figure 251); lobes of uncus short (~0.5× length of cucullar lobe) and narrowly separated (Figure 250) . . . . . *N. longispina*  
Largest cornutus strongly curved, less than 0.5× length of aedoeagus (Figure 253); lobes of uncus elongate and widely separated (Figure 252) . . . . . *N. falcata*

***Neopostega longispina*, new species**

FIGURES 131, 250, 251; MAP 1

**ADULT.** Figure 131. Length of forewing 2.8–3.0 mm. Small, mostly white moth with white forewings marked with 2 dark brown, subapical, costal strigulae, both converging obliquely toward darker brown to fuscous apical spot. Male genitalia with relatively short socii, valvae broad medially, and aedeagus with 3 dissimilar cornuti, the longest of which extends more than half the length of entire aedeagus (Figures 250, 251). Female unknown.

**Head:** Vestiture white. Scape white; flagellum white, becoming more cream apically, 42-segmented. Palpi white to cream; labial palpus faintly suffused with light brown laterally; apex white.

**Thorax:** White; tegula entirely white. Forewing almost entirely white with 2 dark brown, subapical costal strigulae, both converging obliquely toward darker brown to fuscous apical spot; terminal cilia white; venter of forewing light grayish cream, with basal white subhumeral and subanal spots barely discernible. Hindwing and cilia very light brown dorsally and ventrally. Legs mostly white to cream; foreleg with dorsal surfaces faintly suffused with brown; mid- and hindtarsi cream.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 250, 251. Socii a pair of relatively short, acuminate lobes, densely setose laterally and ventrally; caudal rim of uncus a V-shaped cleft between narrowly separated lobes. Gnathos mostly membranous, produced caudally to form a short, broad cone. Vinculum with anterior margin broadly rounded. Valva of complex form similar to *N. falcata*, relatively broad basally, elongate, length along sacculus ~0.8× length of genital capsule; cucullar lobe reduced in size, length approximately twice that of lobes of socii and ~0.15× length of genital capsule, bearing a pectinifer consisting of a single row of 28 blunt spines; pedicel very slender, with an acute, lateral process at middle; minimum diameter of pedicel less than 0.1× length of cucullar lobe; saccular lobe tapering to a slender, attenuated, rounded apex extending beyond cucullar lobe; basal process of valva elongate, ~twice the length of shortened costal lobe, tapering to acute base terminating at anterior margin of vinculum. Juxta a broad, elongate, U-shaped, heavily sclerotized band, weakly connected midventrally; lateral arms of juxta divided more than half their length into a relatively large, acute, spine, and a more dorsal, flattened, oblong, rounded lobe. Aedeagus elongate, stout, with two relatively large, straight, spinose cornuti arising

midventrally and one smaller cornutus arising subapically; largest cornutus ~half the length of the aedeagus.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; VENEZUELA: TERRITORIO FEDERAL DE AMAZONAS: Cerro de la Neblina, Basecamp, 0°50'N, 66°9'W, 155 m, 23–29 Feb 1984, D. Davis & T. McCabe, Canopy UV trap, slide USNM 31840 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** February (unique record).

**DISTRIBUTION.** (Map 1) Known only from the type locality, a lowland Amazonian rainforest in southern Venezuela near the Brazilian border.

**ETYMOLOGY.** The species name is derived from the Latin *longus* (long) and *spina* (thorn) in reference to the characteristic long, spinose cornutus present in the male aedeagus of this insect.

**DISCUSSION.** The broad valvae, the well-developed, laterally bifurcated juxta, and elongate cornuti are diagnostic for this species. The juxta of *N. longispina* most resembles that of *N. falcata*. Because the terminal cilia of the forewing is partially missing in the holotype, the color drawing and description are incomplete. The holotype was collected in a UV light trap placed near the canopy approximately 20 m above the ground.

***Neopostega falcata*, new species**

FIGURES 132, 252, 253; MAP 1

**ADULT.** Figure 132. Length of forewing 2.1 mm. Small, almost entirely white moth with white forewings marked with a minute apical spot consisting of a few dark brown scales. Male with uncus and socii fused into stout, horn-like lobes; valvae relatively broad, complex; aedeagus with two large exogenous cornuti, the largest of which is strongly curved (Figures 252, 253). Female unknown.

**Head:** Vestiture white. Scape white; flagellum white, 43-segmented. Palpi white; labial palpus with light brown suffusion laterally.

**Thorax:** White; tegula white. Forewing almost entirely white, marked with a minute apical spot consisting of a few dark brown scales; vestige of a faint, light brown terminal strigula present midway across costal cilia; terminal cilia otherwise white; venter of forewing white to cream, with a pair of indistinct subhumeral and subanal white spots. Hindwing and cilia white dorsally and ventrally. Legs mostly white; foreleg with dorsal surfaces faintly suffused with light brown; tarsi of all legs white to cream.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 252, 253. Paired lobes of socii stout, elongate, length equal to distance between their apices; socii broad at base, slightly curved inward and tapered to acute, sparsely setose apex; caudal rim of uncus forming a deep notch between lobes of socii. Vinculum with anterior margin broadly rounded to subtruncate. Gnathos indistinct, membranous, produced caudally to form a low, broad cone. Valva of complex form, relatively broad basally, elongate with length along sacculus  $\sim 0.9\times$  length of genital capsule; cucullar lobe reduced in size, length approximately equal to length of lobes of socii and  $\sim 0.25\times$  length of genital capsule; pectinifer bearing a single row of 32 blunt spines; pedicel minute, minimum diameter less than 0.1 the length of cucullar lobe; saccular lobe broad in middle, tapering distally as an elongate, slender, rounded lobe beyond apex of cucullar lobe; basal process of valva elongate,  $\sim$ twice the length of shortened costal lobe, tapering to acute base terminating at anterior margin of vinculum. Juxta a broad, U-shaped, heavily sclerotized band, weakly fused mid-ventrally. Aedoeagus stout, with two relatively large cornuti arising from distal half; largest cornutus strongly curved.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, 50–150 m, Arboleda, L/11/350: 14 Apr 1998, INBio-OET, slide DRD 4206 (INBio).

**PARATYPE.** COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, 50–150 m, L/09/336: 1 ♂, 18 Mar 1998, INBio-OET, slide USNM 33024 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected from March to April.

**DISTRIBUTION.** (Map 1) Known only from the type locality, a lowland rainforest in northeastern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Latin *falcatus* (sickle-shaped, curved) in reference to the diagnostic, large, curved cornutus in the male aedoeagus.

**DISCUSSION.** This species is easily recognized by the stout, horn-like lobes of the uncus and socii, the stout, broadly U-shaped juxta, and strongly curved cornutus of the aedoeagus. The color drawing and description are based on the somewhat imperfect holotype, whose forewing cilia are slightly denuded.

### ***Neopostega asymmetra*, new species**

FIGURES 40, 133, 247–249; MAP 1

**ADULT.** Figure 133. Length of forewing 3.0 mm. Small, almost entirely white moth with cream white

forewings marked with 2 faint, brownish, subapical costal strigulae and a minute apical spot consisting of a few dark brown scales. Male with stout, furcate uncus, relatively slender, partially folded (longitudinally) valvae, and a strongly sclerotized, serpentine, tubular, asymmetrical juxta; aedoeagus complex, with a single, large, straight spinose process lying obliquely across apical half (Figures 247–249). Female unknown.

**Head:** Vestiture entirely white. Scape white; flagellum cream, 45-segmented. Palpi cream white; labial palpus with light brown suffusion laterally on segments 1–2, a few, scattered, light brown scales on 3.

**Thorax:** White; tegula white. Forewing (slightly denuded) almost entirely white with a pale suffusion of cream over basal half, marked with 2 faint, light brown, subapical costal strigulae and a minute apical spot consisting of a few dark brown scales; a vestigial terminal strigula present across wing apex along base of costal cilia; terminal cilia cream to light brown beyond terminal strigula, mostly white around tornus, becoming cream to light brown along dorsal margin; venter of forewing light brown with a pair of indistinct subhumeral and subanal white spots. Hindwing and cilia light brown dorsally and ventrally. Foreleg cream; mid- and hindlegs more white.

**Abdomen:** Light golden brown dorsally, cream ventrally.

**Male Genitalia:** Figures 247–249. Uncus furcate, socii a pair of divergent, stout, slightly irregular, acute, setose lobes; lobes elongate, length equal to distance between their apices; base of uncus with distinct suture separating tegumen; anterior rim of tegumen moderately convex medially at juncture with uncus, expanded posteriolaterally as rounded lobes ventral to socii. Vinculum a broad, ventral plate with anterior margin broadly rounded to subtruncate. Gnathos a slender, transverse bar densely covered with short stout spines, expanding slightly laterally. Valva of complex form, moderately broad basally with margins partially folded over, tapering distally, moderately elongate, length along sacculus  $\sim 0.6\times$  length of genital capsule; cucullar lobe reduced in size, length approximately equal to length of lobes of uncus and  $\sim 0.15\times$  length of genital capsule; pectinifer bearing a single row of 28–29 blunt spines; pedicel curved, slender, minimum diameter less than 1/8 the length of cucullar lobe; saccular lobe slender, elongate, nearly as long as cucullar lobe; basal process of valva acute, elongate,  $\sim 0.25\times$  longer than slender costal process. Juxta a slender, sinuate, sclerotized, broadly V-shaped, tubular connection between lateral bases of gnathos; caudal margin of tube with 3 asymmetrical, curved spinose processes of different sizes extending

caudally; largest, most medial spine ~equal to length of cucullar lobe. Aedoeagus stout, with an irregular, inverted Y-shaped, sclerotized, dorsal plate; caudal end of plate with a spinose process extending obliquely across caudal half of aedoeagus.

FEMALE, LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; BRAZIL: [RIO DE JANEIRO]: Rio de Janeiro, Magé, 400 m.: 17 Jan 1985, V. O. Becker, slide DRD 4238 (VOB).

HOST. Unknown.

FLIGHT PERIOD. January (unique record).

DISTRIBUTION. (Map 1) Known only from the type locality, in the Atlantic coastal forest in southern Brazil.

ETYMOLOGY. The species name is derived from the Greek *asymmetros* (without symmetry) in reference to the asymmetrical structure of the juxta in the male genitalia.

DISCUSSION. This species differs from all other species of *Neopostega* by the sinuous, asymmetrical juxta, laterally setose gnathos, and distinctive valvae. The color illustration and description are based on an imperfect holotype with slightly denuded forewing cilia. Fresh specimens would probably show darker subapical strigulae.

### ***Neopostega petila*, new species**

FIGURES 8, 9, 20, 31, 35, 41, 134, 254, 255; MAP 1

ADULT. Figure 134. Length of forewing 2.3–2.6 mm. Small, mostly white moth with white forewings marked with 2 dark brown, subapical, costal strigulae, the most distal strigula usually terminating at dark brown apical spot. Male with elongate, slender socii and valvae, and 3 to usually 4 very slender, exogenous cornuti arising near the apex of the aedoeagus (Figures 254, 255). Female unknown.

Head: Vestiture white. Scape white; flagellum either white gradually becoming brown over distal third or almost entirely light golden brown, ~41–43-segmented. Maxillary palpus cream. Labial palpus white to cream, suffused with grayish brown laterally.

Thorax: White; anterior margin of tegula grayish brown. Forewing almost entirely white with 2 dark brown, subapical costal, strigulae and a short, dark brown terminal strigula; dark brown apical spot sometimes indistinct, usually confluent with costal strigula 2; basal costal strigula broadest along costa, strongly oblique; terminal strigula extending distad to apical spot; costal strigula 2 usually confluent with darker apical spot, occasionally bypassing spot and confluent with terminal strigula; an elongate, dark

brown dorsal spot sometimes present along basal third of hind margin; terminal cilia mostly white between strigulae, around tornus and along hind margin; brown beyond distal most costal and terminal strigulae; venter of forewing nearly white to medium brown, with basal pair of moderately large subhumeral and subanal white spots sometimes barely discernible. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base; apical cilia occasionally white. Legs mostly white; foreleg with dorsal surfaces suffused with brown, brown more diffused on tarsomeres; middle leg with usually brown bands dorsally on tarsomeres 3 and 4; tarsal banding paler to absent on hindleg.

Abdomen: Light golden brown dorsally, white ventrally, occasionally with brownish suffusion anteriorly.

Male Genitalia: Figures 254, 255. Socii a pair of extremely long, slender, acute setose lobes, narrowly separated by a distance less than their length; caudal rim of uncus smoothly concave. Vinculum broad; anterior margin slightly concave. Gnathos a lightly sclerotized, mostly membranous, broad, conical projection. Valva extremely slender; length nearly equal (~0.95×) to length of genital capsule; with a relatively reduced, elongate cucullar lobe ~0.15× length of genital capsule, bearing a pectinifer consisting of a single row of 20–24 blunt spines; saccular lobe elongate, slender, extending beyond apex of pectinifer; pedicel very slender, diameter less than 1/8 the length of cucullar lobe; basal process of valva slender, acute, extending beyond base of elongate costal lobe. Juxta consisting of a broad, well-sclerotized, strongly furcate plate; furcal arms very slender, acute, longer than undivided base of juxtal plate. Aedoeagus elongate, nearly equaling length of genital capsule, lightly sclerotized, cylindrical, with 3–4 slender, subapical cornuti ~as long as basal diameter of aedoeagus.

FEMALE, LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, 50–150 m, 10°26'N, 84°01'W, 20 Apr 1999, INBio-OET, bosque secundario, L/07/620, slide DRD 4207 (INBio).

PARATYPES. COSTA RICA: HEREDIA: Estación Biológica La Selva, 50–150 m., L/07/580: 1 ♂, 25 Feb 1998, INBio-OET, slide DRD 4277 (INBio); L/10/455: 1 ♂, 26 Aug 1998, INBio-OET, slide USNM 32425 (USNM); L/11/432: 1 ♂, 29 Jul 1998, INBio-OET, slide DRD 4272 (INBio); L/11/492: 1 ♂, 21 Oct 1998, INBio-OET, slide USNM 32435 (USNM); L/17/426: 2 ♂, 22 Jul 1998, INBio-OET, slides USNM 32250, 32784 (USNM).

HOST. Unknown.

FLIGHT PERIOD. This species probably flies throughout most of the year, with collections reported for February, April, July, and October.

**DISTRIBUTION.** (Map 1) Known only from the type locality, a lowland rainforest in northeastern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Latin *petilus* (thin, slender) in reference to the unusually slender form of the male valvae, socii, and exogenous cornuti.

**DISCUSSION.** *Neopostega petila* is easily recognized by the slender lobes of the socii, broad juxtal plate bearing elongate, slender bifurcations, and lightly sclerotized aedoeagus bearing 3–4 elongate, piliform, subapical cornuti. It shows no close affinity to any other member of the genus.

### ***Neopostega distola*, new species**

FIGURES 135, 256–258A, 421–423; MAP 1

**ADULT.** Figure 135. Length of forewing 3.1–3.5 mm. Small, almost entirely white moth with white forewings marked with 2 dark brown costal strigulae and a minute apical spot consisting of a few, even darker brown scales. Male genitalia with pectinate cucullar lobe of male supported by an extremely long, slender pedicel; anterior margin of vinculum deeply concave; juxta undeveloped, membranous; aedoeagus without cornuti but with a bilateral pair of long slender rods (Figures 256–258a). Female with papillae anales fused into a broad, truncate, trapezoidal, setose ridge.

**Head:** Vestiture white. Scape white; flagellum light brown dorsally, cream ventrally, 55–57-segmented. Palpi white to cream; labial palpus with brown suffusion dorsally.

**Thorax:** White; tegula white, with large, dark brown spot on anterior margin. Forewing white, marked with 2 dark brown costal strigulae and a minute apical spot consisting of a few darker brown scales; first strigula darker and more prominent, extending across base of cilia, usually fading at or before apical spot, with faint brown suffusion basally along most of strigula; strigula 2 extending across middle of cilia and slightly beyond apical dot; terminal cilia mostly light brown between and beyond strigulae, white around tornus, becoming light brown along dorsal margin; venter of forewing dark brown except for a pair of moderately large, basal cream spots, the larger along the subhumeral area and a slightly smaller spot along the hind margin. Hindwing and cilia brown dorsally and ventrally except for small white subhumeral patch. Legs mostly white; foreleg with dorsal surfaces faintly suffused with light brown to gray; tarsomeres 3 and 4 of mid- and hindlegs suffused dorsally with light brown, tibial spines cream.

**Abdomen:** Brown dorsally, white to cream laterally and ventrally. Tergite 8 broad, approximately equal in width to 7; anterior margin sinuate, broadly bilobed; caudal margin truncate.

**Male Genitalia:** Figures 256–258. Paired lobes of socii elongate, slender as viewed ventrally, moderately broad viewed laterally (Figure 257), bearing 3–4 long setae. Caudal rim of uncus forming a deep, smoothly curved concavity between socii; with a pair of short, bilateral, acute lobes from ventral bases of socii. Vinculum with anterior margin deeply concave. Gnathos a relatively flat, narrow lobe extending ventrally and caudally between ventral lobes of tegumen. Valva extremely slender, slightly twisted, elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; cucullar lobe reduced in size, oval, length approximately equal to distance between socii and  $\sim 0.15\times$  length of genital capsule; pectinifer bearing a single row of  $\sim 20$ – $22$  blunt spines; pedicel extremely slender (minimum diameter less than  $0.1\times$  length of cucullar lobe), elongate (length nearly equal to that of cucullar lobe), slightly curved and arising from slender projection of cucullus; saccular lobe reduced, terminating in a slender, setose knob well short of cucullus apex; basal process of valva elongate, terminating at anterior margin of vinculum. Juxta an extremely thin, flat, moderately broad, elongate, partially membranous plate, slightly constricted anteriorly at junction with vinculum; length  $\sim 2\times$  maximum width. Aedoeagus weakly sclerotized, elongate, equaling length of genital capsule; cornuti consisting of a bilateral pair of long, slender, internal rods extending the length of aedoeagus.

**Female Genitalia:** Figures 421–423. Abdomen tapering to a truncate apex. Papillae anales fused into a broad, truncate, trapezoidal, setose ridge. Posterior apophysis highly modified, consisting of a moderately sclerotized, continuous band extending dorsally across base of anal papilla (tergum 9 + 10), with a pair of anteriolateral extensions that bend caudally around a bilateral pair of shallow, invaginated pockets (Figure 422). Caudal end of vagina supported by a bilateral pair of slender, sclerotized rods and midventrally by a small sclerite with slender caudal and anterior furcations. Vestibulum moderately narrow, membranous. Ductus bursae of similar diameter, enlarging slightly to elongate, slender corpus bursae, with a dense patch of pectinate spicules composed of short rows of 2–4 spicules. Corpus bursae slender, elongate, with a long, faint, elliptical band bearing a dense array of irregular, external tubercles. Ductus spermathecae relatively short, extending only midway along corpus bursae; membranous outer canal reduced, barely distinct from moderately sinuate inner canal; latter terminating in 2–3 small convolutions; vesicle a small, abruptly enlarged, oval sac.

LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; BRAZIL: MATO GROSSO: Chapada dos Guimarães, 800 m: 20 Nov 1994, V. O. Becker, slide DRD 4132 (VOB).

PARATYPES. BRAZIL: MATO GROSSO: Chapada dos Guimarães, 800 m: 1 ♂, 1 ♀, 25–30 Nov 1997, 1 ♀, 20 Nov 1994, V. O. Becker, slides DRD 4215, USNM 32446, 33060 (USNM, VOB). COSTA RICA: ALAD [ALAJUELA?]: 2 mi [3.2 km] W. Dos Rios: 1 ♂, 22 May 1985, P. Opler, slide DRD 4370 (UCB).

HOST. Unknown.

FLIGHT PERIOD. November.

DISTRIBUTION. (Map 1). Known only from the type locality in southwestern Brazil and northern Costa Rica.

ETYMOLOGY. The species name is derived from the Greek *distolos* (in pairs, double) in reference to the paired, elongate cornuti in the male aedeagus.

DISCUSSION. *Neopostega distola* is the only known member of the genus to possess paired, elongate cornuti and a predominantly membranous juxta. Other male apomorphies involve the development of slender teguminal lobes immediately ventrad to the socii and the extreme extension of a slender pedicel on the valva. Superficially, the moth differs slightly from other *Neopostega* by its more brownish hindwings.

The rod-like cornuti are more distinct and the aedeagus more parallel-sided in the single male examined from Costa Rica (Figure 258a, slide 4370) than in the holotype from Brazil (Figure 258, slide 4132). All other features of the male genitalia between these widely dispersed populations agree.

### *Opotegoides Kozlov*

*Opotegoides* Kozlov, 1985:54.—Davis, 1989:42.—van Nieukerken, 1990:364; 1996:27.—Nye and Fletcher, 1991:211.—Robinson et al., 1994:22.—Nielsen, 1996:28.—Poole, 1996:796.—Davis, 1998:69.—Puplesis and Robinson, 1999:18.—Heppner, 2003:232.—Puplesis and Diškus, 2003:64, 410.

TYPE SPECIES. *Opotega minodensis* Kuroko, 1982, by original designation.

ADULT. Small, mostly whitish moths with lanceolate wings; antennal scape greatly enlarged; male with weakly sclerotized aedeagus; metafurcal apophyses free; length of forewing 2.2–5.9 mm.

Head: Figures 10, 11, 91. Vestiture rough over most of frons and vertex, consisting of relatively short, erect, piliform scales with minutely bidentate apices; oc-

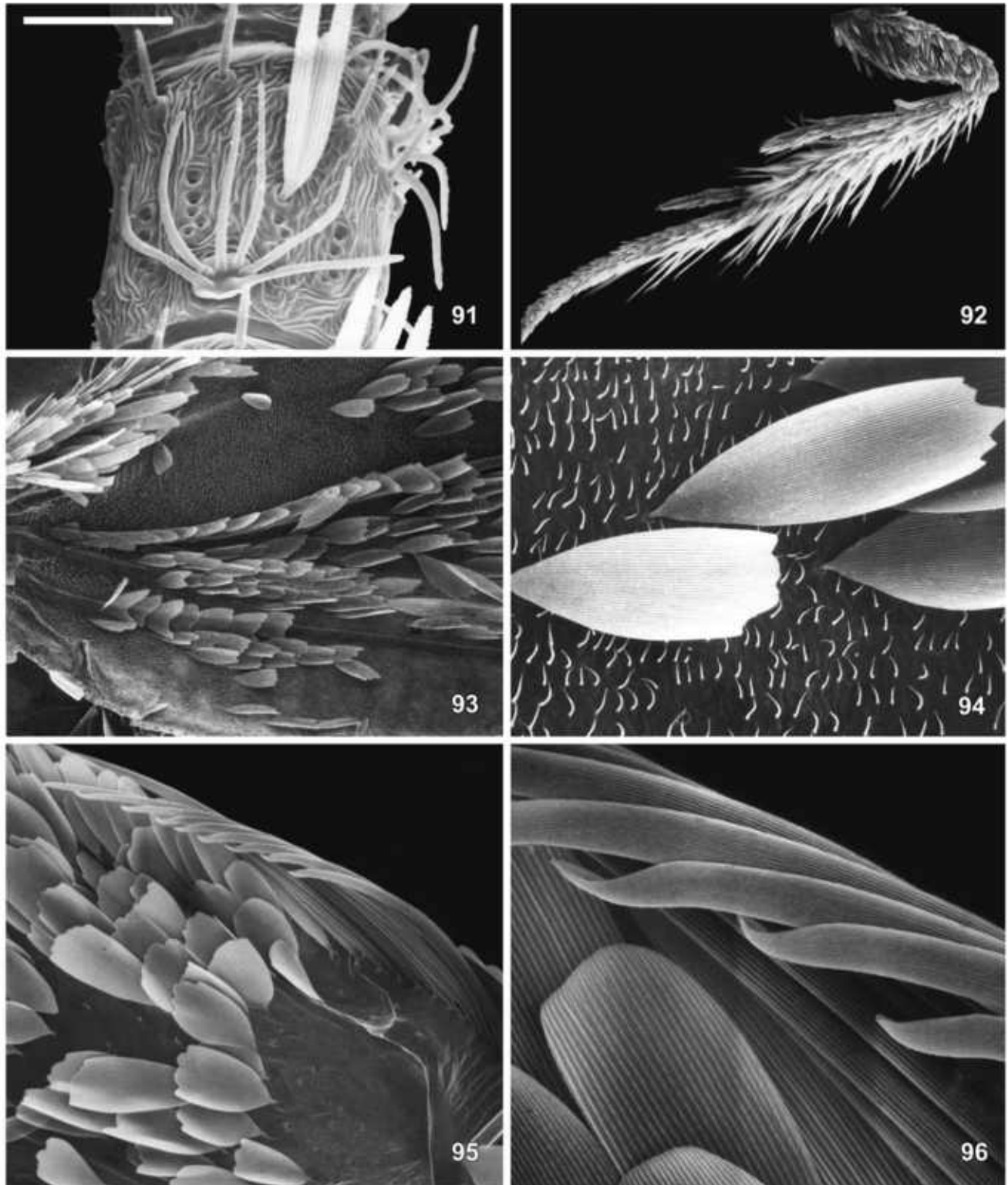
ciput posterior to vertex smooth, covered with broad flat scales densely arranged in ~4 compact rows. Lower frons naked except for a scattering of microtrichia. Antenna approximately 0.8–0.9× length of forewing, 46–56-segmented; scape greatly enlarged with greatest width approximately 1.1× vertical diameter of eye; scales broad and smooth over scape and densely arranged in ~7 relatively uniform, compound rows; sensilla ascoidea with 6–8 branches. Eye large, interocular index approximately 1.0, eye index 0.7. Maxillary palpus elongate, approximately 0.4× length of labial palpus; ratio of segments from base approximately 0.2:0.2:0.6:1.4:1.0; basal segment smooth, without any lobe. Haustellum reduced, about 0.32× length of maxillary palpus. Labial palpus moderately short, approximately equaling length of haustellum.

Thorax: Forewing (Figures 21, 92–96) lanceolate; greatest width about 0.25× length; apex acute; microtrichia absent over all wing surfaces except ventral base of forewing; venation similar to *Opotega*, with only unbranched vestiges of Sc, R, M, CuA, and A present; anal fold appearing in lieu of CuP. Hindwing lanceolate, greatest width approximately 0.16× length; approximately 10 pseudofrenular setae present; venation similar to *Opotega*, with only Sc, Rs, M, Cu, and A present. Metathoracic furca (Figures 25, 26) with apophyses moderately developed, terminating in acute knobs, free and not connected to secondary furcal arms. Proleg (Figure 32) with tibia about 0.7× length of tarsal segments. Midleg with apical spurs of very dissimilar lengths, one approximately 0.6× length of other. Hindleg with two pairs of unequal spurs, one member of each pair about 0.6–0.7× length of other; basal pair situated at basal two-fifths; longest spurs about 0.75× length of first tarsomere; hindtibia densely covered with long spinose setae, as is dorsum of first and sometimes second tarsomere.

Abdomen: Six functional spiracles present; spiracles of A7 and 8 absent. Sternum 2 as illustrated (Figure 36). Tergum 8 of male nearly as wide as tergum 7 and ~half its length, slightly curved with caudal margin moderately concave (Figure 42).

Male Genitalia: Uncus nearly indistinct, a low, slightly setigerous and nearly truncate ridge fused to tegumen. Tegumen a narrow dorsal ring. Vinculum short in length but broad, deeply concave. Gnathos reduced to a thin arch. Valva with costal apophysis reduced and fused to costa. Cucullus pedunculate, arising near apex of valve; distal margin bearing a densely spined pectinifer consisting of 12–36 blunt spines in a single row. Juxta often a lightly sclerotized plate, fused to vinculum. Aedeagus present, weakly sclerotized, elongate, 1.3–1.8× length of valva; cornutus present in the form of a single, usually elongate rod.





FIGURES 91–96. *Opostegoides scioterma*, adult morphology. 91, sensilla of antennal segment (25  $\mu\text{m}$ ); 92, hindleg showing spinose setae (0.71 mm); 93, ventral base of forewing (231  $\mu\text{m}$ ); 94, microtrichia of subcostal area of Figure 93 (38  $\mu\text{m}$ ); 95, pseudofrenular setae of hindwing (120  $\mu\text{m}$ ); 96, apices of pseudofrenular setae (23.1  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all figures shown in Figure 91.)

**Female Genitalia:** Papillae anales absent. Posterior apophysis short, stout; anterior apophysis absent. Anus and oviporus with separate external openings. Dorsum of vestibulum sclerotized to form a broad plate fused laterally to apices of apophyses. Corpus bursae highly variable, usually without accessory bursa; spicules either absent or present, if present then arranged in either a sinuate row or concentrated zone. Spermathecal papilla moderately developed, sometimes poorly defined; ductus spermatheca variable, usually with external (afferent) and internal (efferent) canals continuously intertwined.

**LARVA.** Figures 97–108. Length of mature larva 20–25 mm; maximum diameter 2 mm (in alcohol).

**Head:** Maximum width 0.5–0.72 mm. Color white (in alcohol) with three pairs of reddish brown longitudinal lines corresponding to the internal ridges. Antenna with three moderately large sensilla basiconica, often of different lengths, and three minute sensilla basiconica, likewise of varying sizes, and two elongate sensilla chaetica of equal lengths. Seta F1 moderately long; C1 extremely reduced in *O. minodensis*, absent in *O. scioterma*. Labrum highly modified, divided into two separate lobes, each bearing a pair of setae (M2 and 3) and a series of about six digitate lobes from outer margin in mature larva; apex of some lobes further subdivided; dorsal lobes probably represent La 1–3 and 3 epipharyngeal setae; labrum of pre-ultimate instars without M2–3 and with more slender, numerous marginal lobes. Mandible with 5–6 cusps. Maxilla of pre-ultimate instars less spinose than last instar; setae of stipes reduced or absent. Labium more developed in last instar, with well-developed spinneret, labial palpus, and labial seta; labium of pre-ultimate instars greatly reduced, without spinneret, labial palpus, and labial seta; operculum and opening to labial gland not observed.

**Thorax:** Prothorax with XD1 closely approximate to D1 and arising posterior to XD2. SV2 absent on meso- and metathorax. A pair of ventral ambulatory callosities on T2–3 in last instar but absent in pre-ultimate instars; latter with minute ridge-like spines on T2–3 and on A1–8.

**Abdomen:** L2 elongate; length equal to longest seta of segment. Ninth segment with four pairs of primary setae; SV1 absent. Dorsum of A10 devoid of setae. All body setae extremely long in last instar, greatly reduced in pre-ultimate instars.

**PUPA.** Not examined.

**COCOON.** Length 3.1–3.5 mm; width 1.8–2.0 mm; thickness 1.0–1.2 mm. An elongate flattened case; surface smooth, constructed entirely of densely woven, light brownish silk.

**DISCUSSION.** *Opostegoides* attains its greatest diversification in the eastern Palearctic and subtropical

Asia, with only one species known for the New World. The most recent catalogue (Puplesis and Diškus, 2003) lists 28 species (including 5 unnamed species), most from the eastern Palearctic and Oriental regions. This genus agrees with *Eosopostega*, *Neopostega*, *Notiopostega*, and *Paralopostega* in possessing a sclerotized aedeagus. The relative homogenous male genitalia exhibit several synapomorphies that easily distinguish the group. Most obvious among these are the concave anterior margin of the vinculum, reduced gnathos, juxta broad at base and fused to vinculum, and elongate pedicel of the cucullar lobe (pectinifer). The aedeagus is weakly sclerotized with a single, rod-like cornutus. The female genitalia are characterized by the absence of papillae anales, presence of a broad, sclerotized, roof-like dorsal wall over the vestibulum, and stout apophyses.

The larvae of only two members of this genus have been studied (*minodensis* and *scioterma*). Few, if any, differences have been observed between these two species, which suggests a general conservatism among species within genera. From *Notiopostega*, the larva of *Opostegoides* can be easily distinguished by the more specialized, divided labrum and generally more reduced chaetotaxy over the body (e.g., the absence of dorsal setae on A10). *Opostegoides* differs from the Hawaiian *Paralopostega* by the possession of more generalized antennal sensilla, the presence of L1, the absence of an operculum over the labial gland aperture, and possibly by the absence of the aperture itself in pre-ultimate instars.

### ***Opostegoides scioterma* (Meyrick)**

FIGURES 10, 11, 21, 25, 26, 32, 36, 42, 91–108, 136, 259, 260, 424, 425; MAP 1

*Opostega scioterma* Meyrick, 1920:358.—Forbes, 1923:161.—McDunnough, 1939:100.—Eyer, 1963:237.—Clarke, 1955:280.—Davis, 1983:3, no. 125.

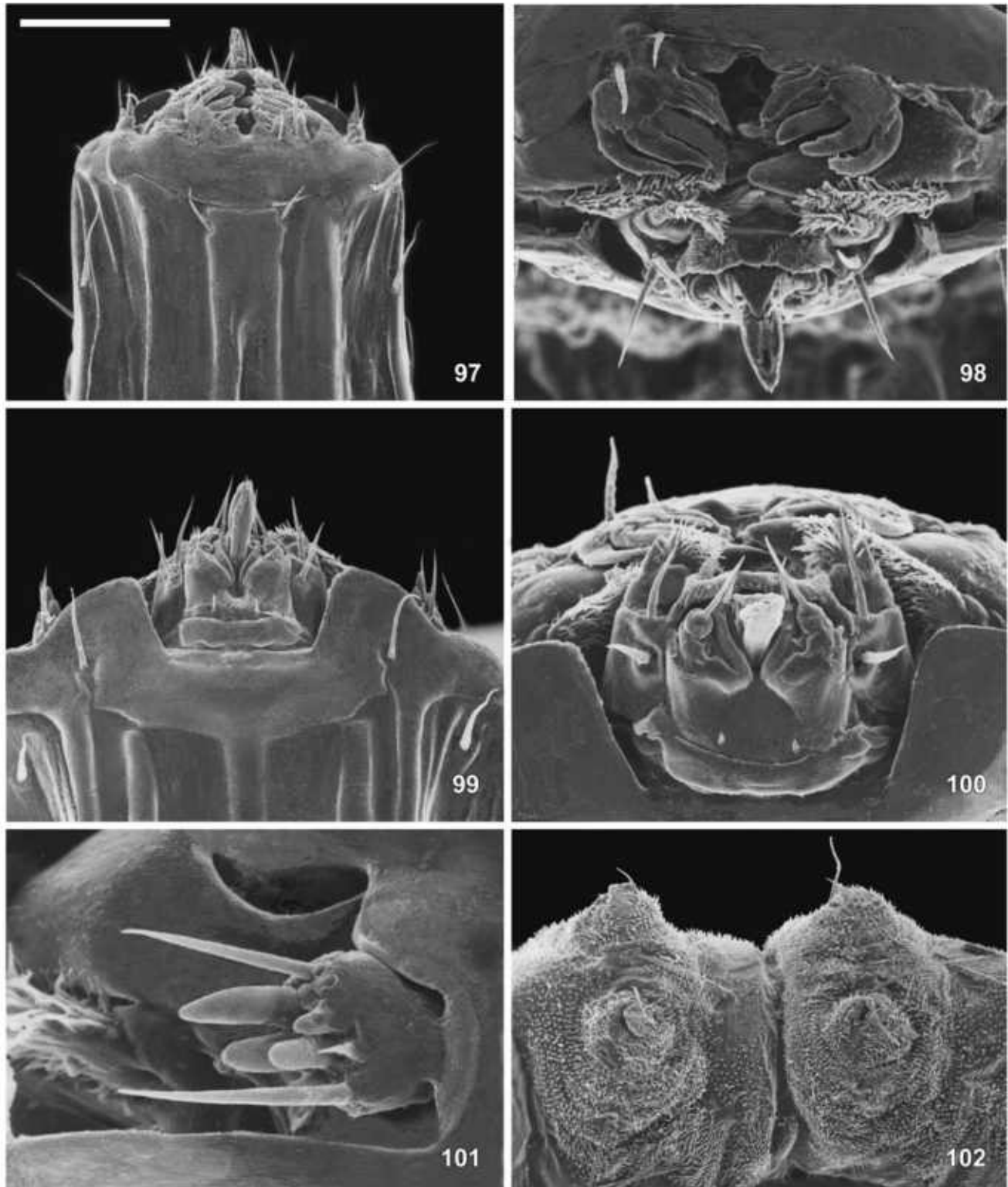
*Opostega nonstrigella* Chambers, 1881 [partim] [misidentification]; Grossenbacher 1910:50.—Heinrich, 1918:30.—Davis, 1983:3, no. 123.

*Opostega albogalleriella* [sic] var. *quadristrigella* Forbes [not Chambers] 1923:161.

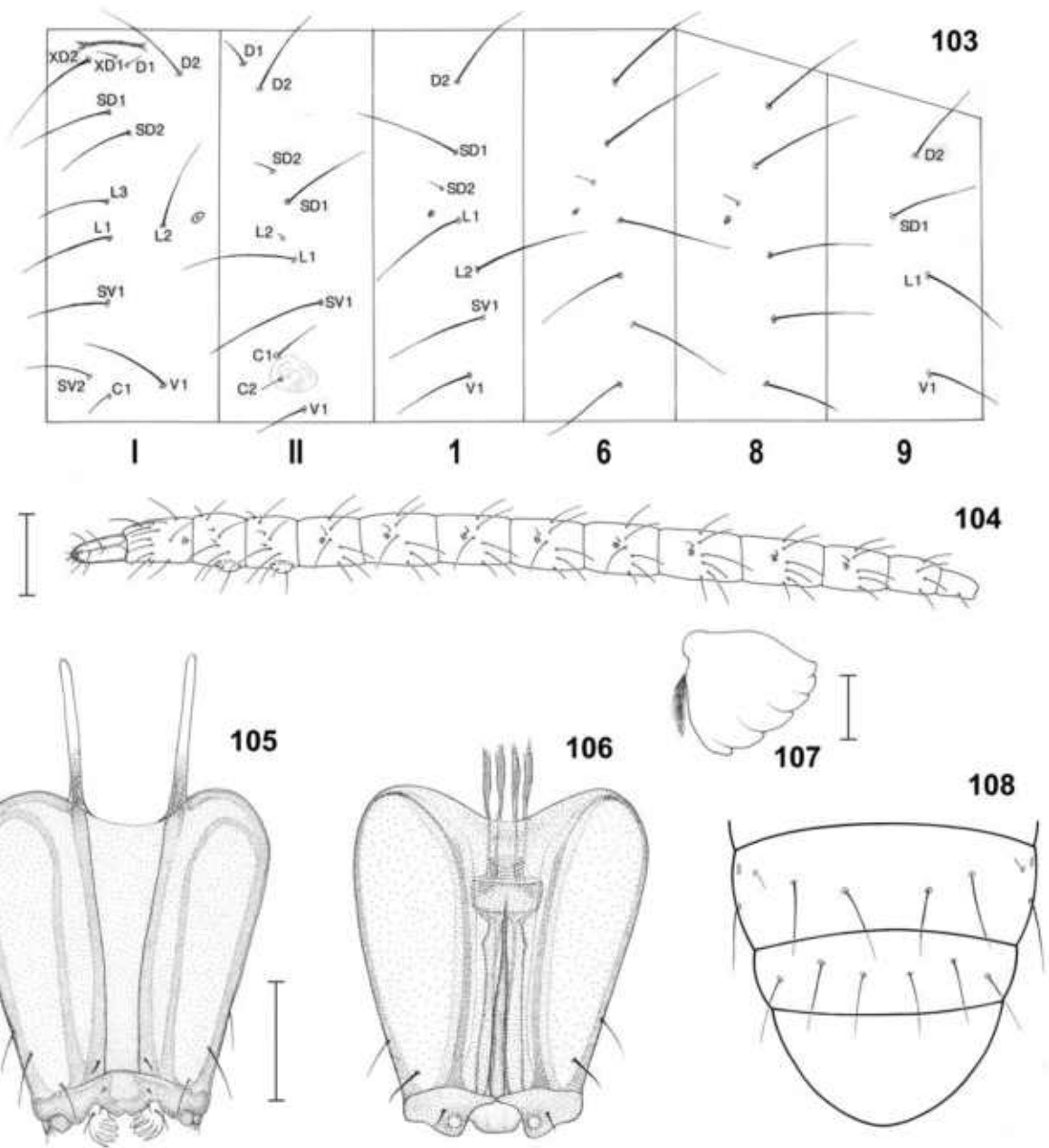
*Opostega* sp. near *nonstrigella* Rosenstiel [not Chambers], 1960:170.

*Opostegoides nonstriga* [sic], Heppner, 2003:232.

*Opostegoides scioterma* (Meyrick).—Davis, 1989:72.—Poole, 1996:796.—Heppner, 2003:232.—Puplesis and Diškus, 2003:411.



FIGURES 97–102. *Opostegoides scioterma*, larval morphology. 97, dorsal view of head (150  $\mu\text{m}$ ); 98, anterodorsal view of mouthparts (60  $\mu\text{m}$ ); 99, ventral view of head (94  $\mu\text{m}$ ); 100, anteroventral view of mouthparts (50  $\mu\text{m}$ ); 101, lateral view of antenna (23.1  $\mu\text{m}$ ); 102, ambulacary calli on venter of meso- and metathorax (250  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all figures shown in Figure 97.)



FIGURES 103–108. *Opostegoides scioterma*, chaetotaxy of last larval instar. 103, lateral diagram of prothorax, mesothorax, and abdominal segments 1, 6, 8, and 9; 104, lateral view of larva (1 mm); 105, dorsal view of head (1 mm); 106, ventral view of head, including tentorium; 107, right mandible (0.05 mm); 108, dorsal view of abdominal segments 8–10. (Scale lengths in parentheses.)

**ADULT.** Figure 136. Length of forewing 3.1–4.4 mm. Small white moth with an incomplete light brown fascia slightly beyond middle of forewing and a similar light brown suffusion at apex before small, dark brown apical spot. Male uncus truncate, with greatly reduced socii; gnathos reduced to a slender arch (Figures 259,

260). Female with apex of abdomen bluntly rounded; papillae anales absent (Figure 424).

**Head:** Vestiture white. Scape white; flagellum white or whitish cream, ~42–51-segmented. Palpi white to cream or grayish cream; labial palpus with light brownish suffusion laterally.

**Thorax:** White. Forewing gradually becoming broader distally, white with an incomplete, distally arched light brown fascia traversing wing slightly beyond middle; fascia typically broken near middle; apex and termen broadly bordered by light to ochreous brown suffusion before small, dark brown apical spot; a short, brown strigula usually evident within terminal cilia; terminal cilia brownish distally, otherwise white, sometimes cilia uniformly light brownish gray; venter of forewing uniformly whitish cream; basal white spots indistinct. Hindwing relatively broad, light brownish gray to cream or occasionally white; cilia same color as hindwing. Legs mostly white to cream; foreleg sometimes with suffusion of light brown dorsally.

**Abdomen:** Brown to cream dorsally, cream ventrally.

**Male Genitalia:** Figures 259, 260. Uncus broad, subtruncate; socii reduced to slightly setose lateral patches. Tegumen narrow. Anterior margin of vinculum slightly concave, forming broadly rounded, lateral lobes. Valva irregular in shape, elongate, length along sacculus  $\sim 0.9 \times$  length of genital capsule; cucullar lobe ovoid, reduced,  $\sim 0.3 \times$  length of genital capsule, bearing relatively short pectinifer consisting of  $\sim 16$ – $22$  blunt spines; pedicel slender, width  $\sim 0.22 \times$  length of cucullar lobe, slightly sinuate, greatly elongate, finely wrinkled; saccular lobe tapering to narrowly rounded, setose apex, not extended much beyond base of pedicel; basal process of valva weakly sclerotized and very short; costal process well sclerotized and twice as long. Juxta more or less quadrate, wrinkled anterolaterally. Aedoeagus with a long, slender cornutus extending length of aedoeagus; apex slightly broader than base; length of aedoeagus  $\sim 1.5 \times$  length of valva.

**Female Genitalia:** Figures 424, 425. Apex of abdomen bluntly rounded. Posterior apophyses short, usually not bifurcated distally. Antrum partially sclerotized, with parallel lateral margins. Corpus bursae constricted posteriorly, gradually broadening, becoming bulbous distally, with an elongate, ovoid signum consisting of an irregularly thickened sinuous band; no pectinations visible either inside of oval signum or on remaining part of corpus bursae. Ductus spermathecae very long,  $\sim 1.5 \times$  length of corpus bursae; outer canal relatively broad, slightly narrowing distally; inner canal sinuous, with  $\sim 4$ – $5$  distal convolutions, then gradually enlarging to a short, bulbous, partially coiled vesicle, which constricts to form a membranous, elongate, tubular utriculus.

**LARVA, COCOON.** As described for genus.

**HOLOTYPE.** ♀; CANADA: ONTARIO: Toronto, Jun [19]13, Parish, BMNH slide 19205 (BMNH).

**MATERIAL EXAMINED.** CANADA: BRITISH COLUMBIA: Goldstream: 1 ♂, 3 Jul 1923, 1 ♀, 7 Aug 1923,

E. H. Blackmore, slide USNM 17188 (USNM). Saanichton [Bay]: 1 ♂, 18 Jun 1922, J. G. Colville (USNM). Victoria: 1 ♀, 3 Jul 1929, J. F. Clarke, slide USNM 32450; 1 ♂, 1 ♀, 8 Jul 1923, 2 ♂, 1 ♀, 2 UNK, 14 Jul 1923, W. R. Carter, slides USNM 32917, 91872, 98289; 2 ♂, 21 Jul 1923, E. Blackmore, slide USNM 17178 (USNM). Wellington: 6 ♂, July, G. W. Taylor, slides USNM 28673 (SEM), 91874, 91873 (USNM). ONTARIO: Muskoka: 1 ♂, Dec [19]21, Parish, (BMNH). Toronto: 1 ♀ (holotype), Jun [19]13, Parish, BMNH slide 19205 (BMNH). USA: MAINE: Franklin Co.: Oquossoc: 1 ♂, 25 Jul, slide: USNM 33068 (USNM). Washington Co.: Dennysville: 1 ♂, 8 Jul, slide USNM 20350 (USNM). NEW YORK: Ontario Co.: Geneva: 1 ♂, 1 ♀, Jul 1910, J. G. Grossenbacher, slide USNM 28672 (USNM). OREGON: Linn Co.: Albany: 1 larva, slide USNM 20829 (USNM). Washington Co.: Forest Grove: 1 ♂, 1 ♀, 20 Jun 1959, 4 ♂, 4 ♀, 25–30 Jun 1959, R. J. Rosentiel, slides USNM 16355 (SEM), 16369 (SEM), 17182, 17929, 17932, 17935 (SEM), 18042 (SEM), 21278 (SEM) (USNM). WASHINGTON: Whatcom Co.: Morovitz R. S.: 1 UNK, 10 Aug 1931, J. F. G. Clarke (USNM). WYOMING: 6 mi [ $\sim 10$  km] NW Newcastle: 1 ♂, 1 ♀, 20 Jul 1965, R. W. Hodges, slides USNM 17179, 17193 (USNM).

**HOST.** Saxifragaceae: *Ribes grossularia* L., *Ribes nigrum* L., *Ribes sativum* Syme (= *vulgare*) (Grossenbacher, 1910).

**FLIGHT PERIOD.** Adults have been collected from June 18 to August 7. The single December record is most likely an error in labeling.

**DISTRIBUTION.** (Map 1) Probably widespread across most of the northern USA and southern Canada from western Oregon, Washington, and British Columbia east to Ontario and Maine.

**DISCUSSION.** *Opostegoides scioterma* is the only member of this predominantly Old World genus known to occur in the New World. Possibly this species represents an early introduction into North America. The male genitalia closely resembles *O. malaysiensis* Davis from Southeast Asia, but differs in possessing a more slender, well-defined juxta. *Opostegoides scioterma* also resembles *O. bicolorrella* Sinev (1990) from extreme eastern Russia (Primorsky Krai), but can be distinguished by the straighter pedicel in the male and more numerous setae on the uncus.

Grossenbacher (1910) presented one of the earliest and, still, one of the few detailed reports on the biology of an opostegid. Unfortunately, in his paper the subject species was misidentified by A. Busck as *Opostega nonstri-gella*, a misnomer repeated by Heinrich (1918) and later authors. Forbes (1923) misdetermined the same species as *Opostega albogalleriella* var. *quadristri-gella*. Genitalic

dissection of one of Grossenbacher's original specimens in the Smithsonian Institution clearly has shown the species to be *Opostegoides scioterma*, the same species reported by Rosenstiel (1960) as damaging gooseberry in Oregon and identified therein as *Opostega* sp. near *nonstrigella*. The biology of this species is summarized in the introduction of this paper and in Davis (1989).

### ***Pseudopostega* Kozlov**

*Pseudopostega* Kozlov, 1985:53 [as subgenus of *Opostega*].

*Pseudopostega* Kozlov.—Davis, 1989:62 [generic status].—van Nieukerken, 1990:369; 1996:27.—Nye and Fletcher, 1991:211.—Poole, 1996:796.—Davis, 1998:69.—Puplesis and Robinson, 1999:30.—Heppner, 2003:232.—Puplesis and Diškus, 2003:414.

**TYPE SPECIES.** *Tinea auritella* Hübner, original designation.

**ADULT.** Small, predominantly white moths with lanceolate wings; antenna scape greatly enlarged; phallus entirely membranous, without sclerotized aedoeagus; metafurcal apophyses fused to secondary arms of metafurcasternum; length of forewing: 1.8–5.6 mm.

**Head:** Figures 12, 13. Vestiture of vertex rough, consisting of slender to piliform scales with bidentate apices; posterior to vertex scales broad and arranged in rows; lower frons naked except for scattered rows of dense microtrichia (Figures 109–112). Cranial vertex evenly rounded. Antenna approximately 0.8–0.9× length of forewing, 36–90-segmented; scape greatly enlarged, greatest width 1.0–1.15× vertical eye diameter; scales broad and flat over scape and densely arranged in 7 relatively uniform rows; sensilla ascoidea with usually 7–9 branches (Figures 14, 114–118). Eye large, interocular index approximately 0.8; eye index 0.8–0.9. Maxillary palpus elongate, about 1.7× length of labial palpus; ratio of segments from base approximately 0.5:0.25:0.6:2.0:1.0. Haustellum (Figure 113) moderately long, about 0.8× length of maxillary palpus. Labial palpus moderately short, less than haustellum in length.

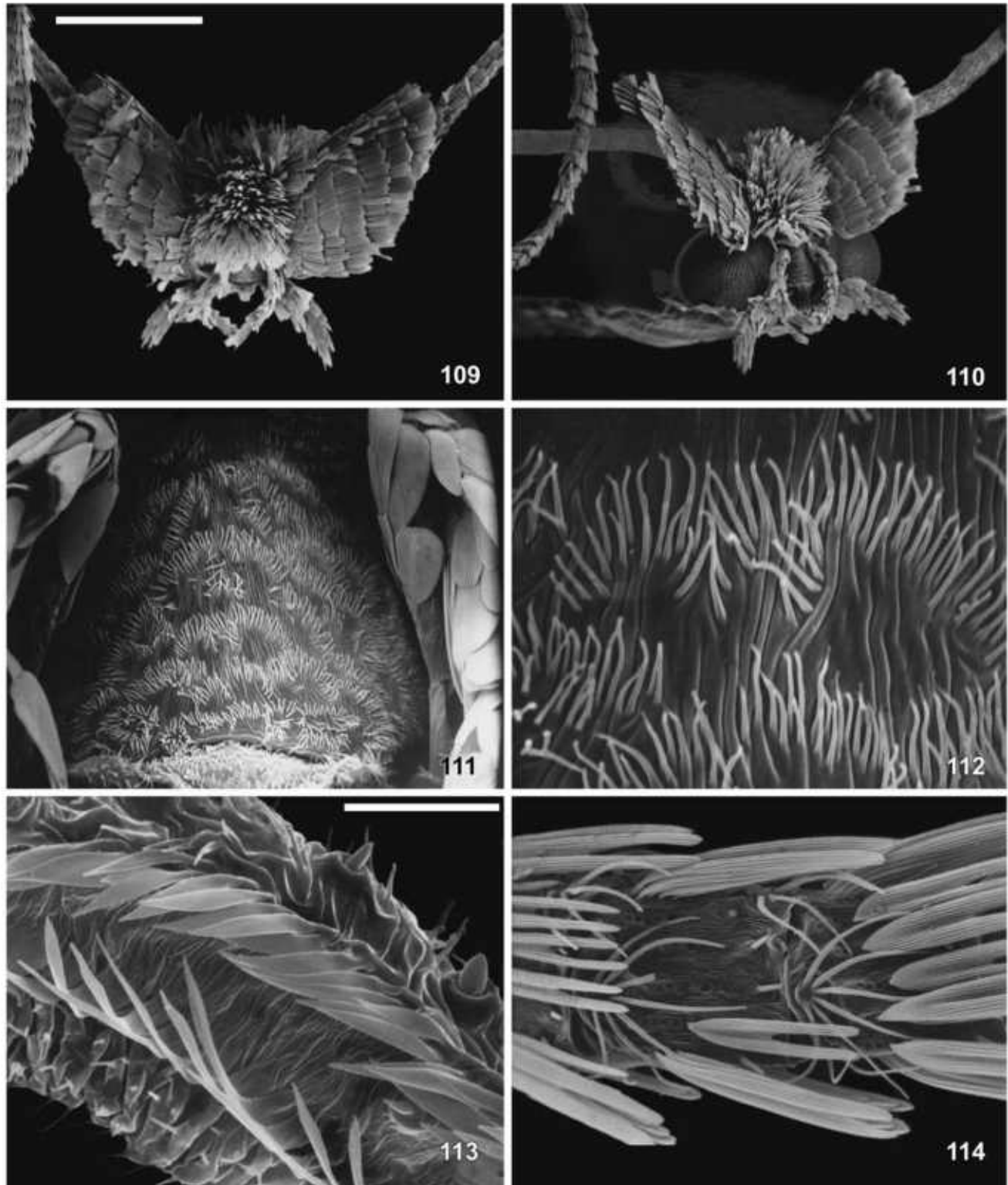
**Thorax:** Forewing (Figure 22) lanceolate; greatest width about 0.2 that of length; apex acute; microtrichia absent on all surfaces except for ventral base of forewing (Figures 119, 120); venation similar to *Opostega*, with only unbranched vestiges of Sc, R, M, CuA, and A present; A with only middle section faintly preserved; anal fold appearing in place of missing CuP; ventral surface of forewing usually with a moderately large, basal patch of white scales over subhumeral/humeral area; subanal white area usually reduced, indistinct. Hindwing lanceolate, greatest

width about 0.14 that of length; 5–11 pseudofrenular setae present (Figure 121,122); venation extremely reduced, with only Sc, Rs, M, Cu and A present; ventral surface typically brownish in color, with a relatively large, oval, subhumeral patch of cream to white scales. Metathoracic furcal apophyses fused to secondary arms of metafurcasternum (Figures 28, 29). Proleg (Figure 33) with tibia about 0.6× length of tarsal segments. Midleg (Figures 123, 124) with tibial spurs of unequal lengths, one member of pair about 0.65× length of other. Hindleg with two pairs of unequal spurs; the basal pair situated slightly basad to middle and with one spur about 0.6× length of other; apical spurs shorter and more similar in length, the shorter member about 0.7–0.75× length of other; longest spur (of basal pair) slightly exceeding first tarsomere; hindtibia densely covered with long spinose setae, as is dorsum of most of tarsal segments.

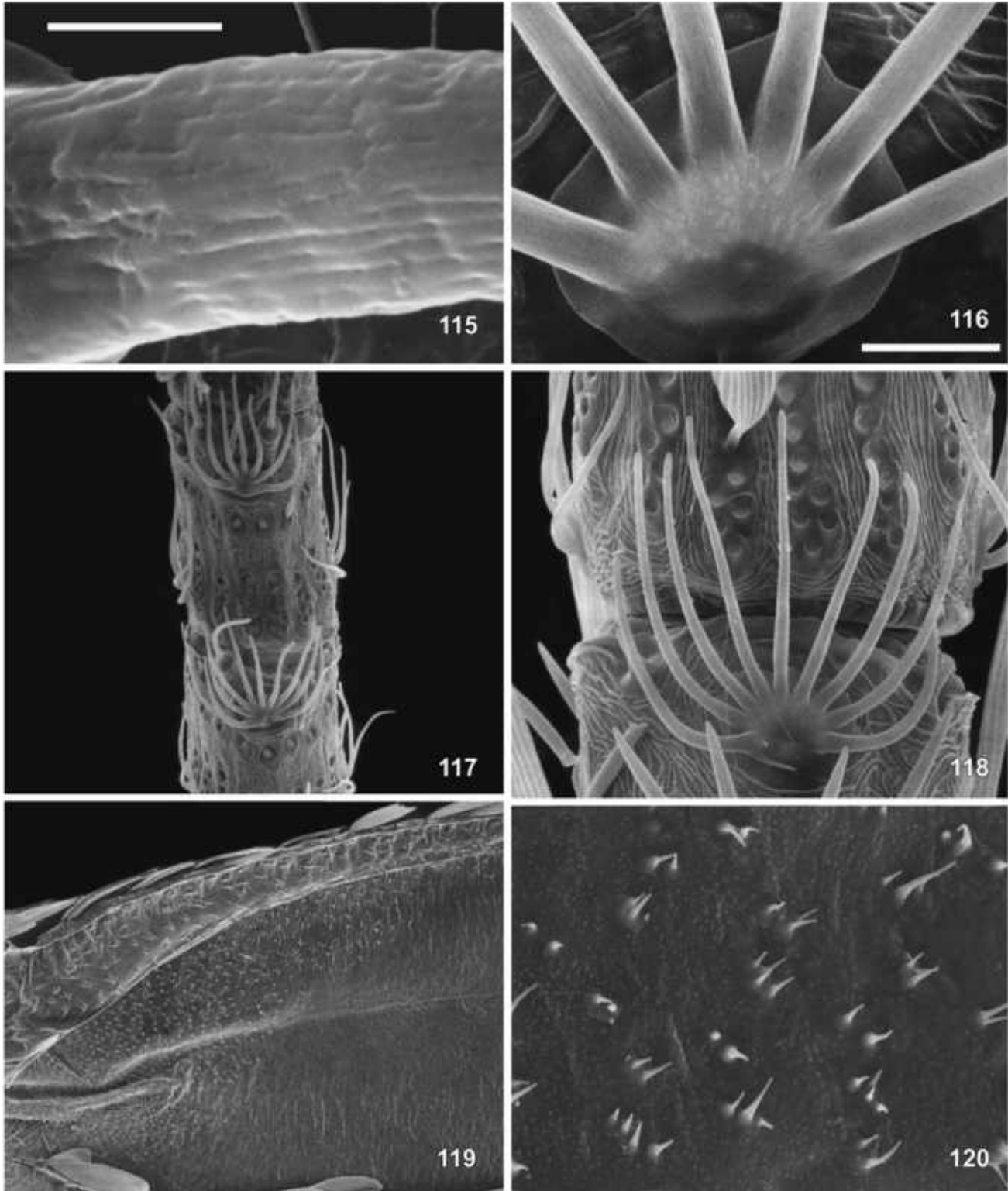
**Abdomen:** Six functional spiracles present; spiracles of A7 and 8 absent. Sternum 2 as illustrated (Figure 37). Tergum 8 reduced to a narrow, setigerous band that usually gradually becomes slightly broader and pad-like at lateral ends (Figure 43); sternum 8 membranous.

**Male Genitalia:** Uncus reduced, consisting of a pair of widely separated, setigerous lobes. Tegumen a narrow dorsal ring. Vinculum a narrow, ventral, often evenly rounded ring, occasionally with anterior margin variably concave or attenuated. Gnathos well developed, variable, typically consisting of a broad, often triangular basal plate that narrows to a slender, simple to furcate, caudal lobe. Valva with costal process borne on a basal sclerite separate but closely articulated to distal three-fourths of valve. Cucullar lobe (Figures 125,126) bearing pectinifer usually linear-elliptical in shape and supported by a slender to broad pedicel arising near middle of costal margin, pedicel sometimes extremely short with cucullar lobe nearly sessile; pectinifer with 18–62 blunt spines arranged in a single row. Juxta absent or developed as a slender, median process. Sclerotized aedoeagus absent; phallus entirely membranous.

**Female Genitalia:** Papillae anales present, usually paired and consisting of nearly contiguous, setose lobes situated dorsally and slightly anterior to caudal end of abdomen; lobes often variably fused. Posterior apophysis slender, elongate, caudal end of each apophysis variably divided; anterior apophysis absent. Alimentary canal and oviporus terminating very close together. Vestibulum mostly membranous; ductus bursae usually elongate, slender, with an elongate zone of typically pectinated spicules arranged in short, transverse rows. Corpus bursae slender to greatly enlarged, either with but usually without a dense array of isolated spicules over caudal half; an irregular, indistinct, slender band bearing relatively large, variably shaped, tubular outgrowths from

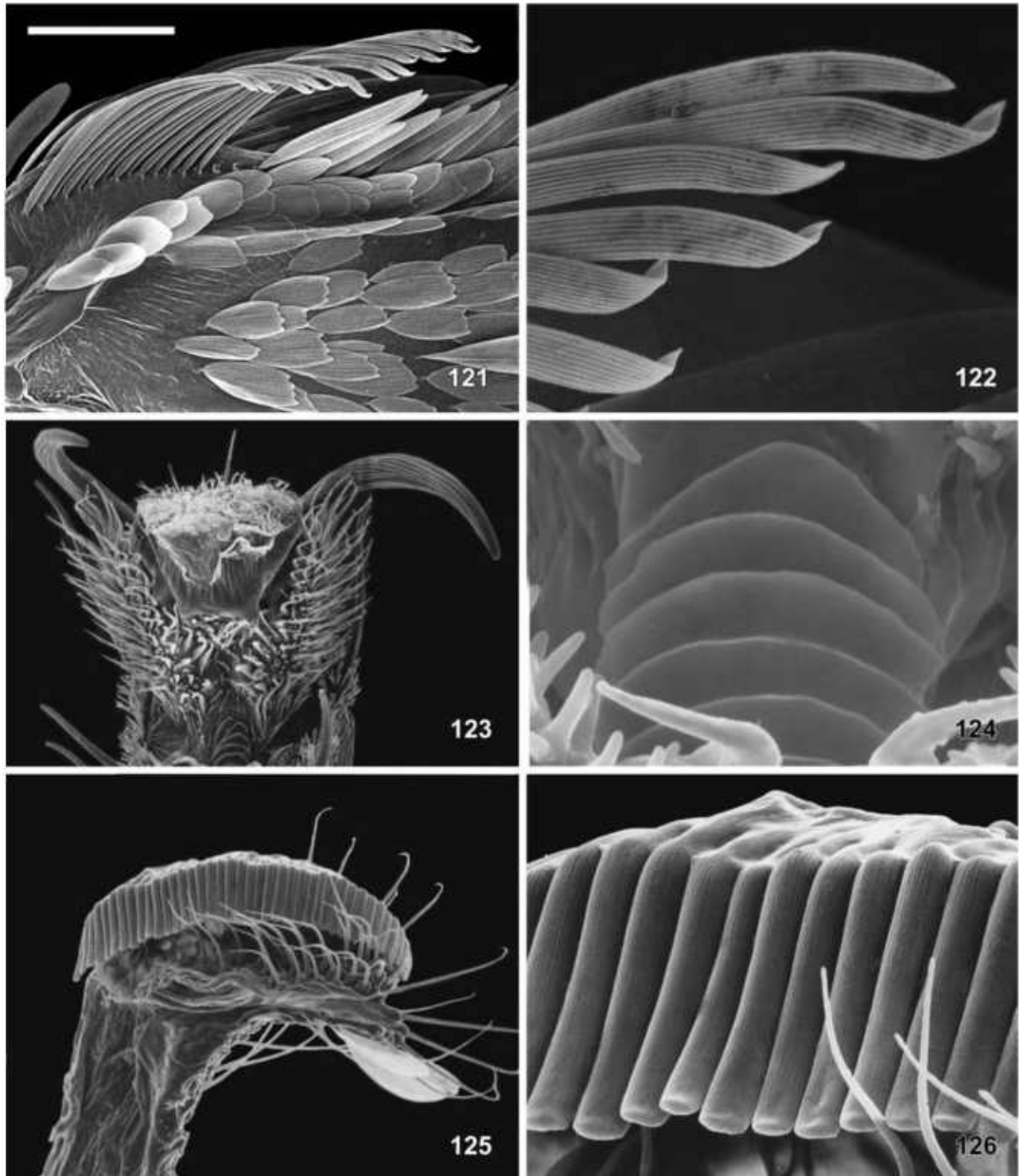


FIGURES 109–114. *Pseudopostega albogaleriella*, adult head morphology. 109, dorsal view of head (0.39 mm); 110, anterolateral view of head (0.39 mm); 111, anterior view of lower frontal area (60  $\mu$ m); 112, detail of microtrichia in Figure 111 (15  $\mu$ m); 113, mesal view of haustellum (12  $\mu$ m); 114, antennal scale vestiture (38  $\mu$ m). (Scale lengths in parentheses; bar scale for Figures 109–112 shown in Figure 109; bar scale for Figures 113, 114 shown in Figure 113.)



**FIGURES 115–120.** *Pseudopostega albogaleriella*, adult morphology. 115, surface detail of ascoid sensilla in Figure 118, showing pitted grooves (1.2  $\mu\text{m}$ ); 116, detail of Figure 118 showing base of sensillum ascoideum (3.8  $\mu\text{m}$ ); 117, dorsal view of flagellomeres 7–9 with sensilla ascoidea projecting distad (38  $\mu\text{m}$ ); 118, sensillum ascoidea on flagellomere 16; 119, ventral base of forewing showing reduction of subcostal microtrichia (150  $\mu\text{m}$ ); 120, subcostal microtrichia in Figure 119 (15  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for Figures 116–120 shown in Figure 116.)





FIGURES 121–126. *Pseudopostega albogaleriella*, adult morphology. 121, hindwing pseudofrenular setae (150  $\mu\text{m}$ ); 122, apices of pseudofrenular setae (23.1  $\mu\text{m}$ ); 123, ventral view of mesothoracic pretarsus (20  $\mu\text{m}$ ); 124, detail of unguitactor plate in Figure 121 (3  $\mu\text{m}$ ); 125, cucullar lobe of male valva with terminal pectinifer (60  $\mu\text{m}$ ); 126, detail of spines of pectinifer (12  $\mu\text{m}$ ). (Scale lengths in parentheses; bar scale for all figures shown in Figure 121.)

outer wall of bursa often partially encircling corpus bursae. Spermathecal papilla usually evident as a small membranous lobe; ductus spermathecae with a greatly lengthened, slender, partially coiled inner canal, and a variably developed, membranous outer canal.

LARVA AND PUPA. Unknown.

DISCUSSION. Kozlov (1985) recognized this group as a subgenus of *Opostega* on the basis of two features of the male genitalia—the presence of a more developed, apically broader transtilla (actually gnathos) and the absence of a juxta. In addition to those more variable characteristics, Davis (1989) further distinguished this large, cosmopolitan genus by two autapomorphies: the basal separation and articulation of the costal process from the male valva (Figure 44) and the fusion of the metafurcal apophyses to the secondary arms of the metafurcastermum (Figures 28, 29). Random examinations of metafur-

casterna in several *Pseudopostega* (e.g., *P. albogaleriella*, *P. latifurcata*, *P. protomochla*, and *P. serrata*) suggest that fusion of the apophyses is a synapomorphy for the genus.

A key to the currently recognized 84 species and 2 subspecies of New World *Pseudopostega* has not been provided largely because any key for such a poorly collected, speciose group would be of only ephemeral value and would apply only to male specimens. Instead, nearly all the species have been associated into 14 groups based on similar male genital morphology, and a key is provided for these groups. Species identifications for the known taxa should be readily achieved by simple comparisons of the male genitalic illustrations provided. Five previously named species are represented either only by female specimens or by specimens lacking abdomens and consequently could not be associated with any group. The treatments for these species have been placed at the end of the last species group.

#### KEY TO THE SPECIES GROUPS OF *PSEUDOPOSTEGA*, BASED ON CHARACTERS OF THE MALE GENITALIA

1. Socii consisting of a pair of low, broadly rounded to irregular, setose lobes separated by a narrow cleft less than 0.75× width of lobe (Figure 346) . . . . . *lobata* group  
Socii a pair of more slender, papilliform setose lobes separated by a broad, U- to V-shaped cavity much wider than width of lobe (Figure 44) . . . . . 2
2. Gnathos with caudal margin broadly rounded, nearly as broad as base (Figure 261) . . . . . 3  
Gnathos with caudal margin more slender, varying from conical, subacute, to bifurcate . . . . . 4
3. Caudal margin of gnathos smooth (Figure 261) . . . . . *rotunda* group  
Caudal margin of gnathos finely serrated (Figure 265) . . . . . *serrata* group
4. Basal fold of gnathos greatly extended into a slender process that exceeds length of main body of gnathos and approximately as long as slender caudal lobe (Figure 352) . . . . . *duplicata* group  
Basal fold of gnathos absent to moderately developed, never exceeding half the length of main body of gnathos . . . . . 2
5. Caudal apex of gnathos minutely to deeply bifurcate (Figures 364, 382) . . . . . 11  
Caudal apex of gnathos subacute to broadly rounded or faintly bilobed (Figures 269, 302, 344) . . . . . 6
6. Gnathos with a pair of variably developed lateral folds (Figures 269, 272) . . . . . *lateriplicata* group  
Gnathos without lateral folds . . . . . 7
7. Apex of sacculus subtruncate at base of pedicel; saccular lobe undeveloped (Figures 342, 344). Cucullar lobe long and slender, length > 3× maximum width . . . . . *longipedicella* group  
Apex of sacculus extended beyond base of pedicel (Figures 330, 332). Cucullar lobe relatively broader, length < 2.5× width . . . . . 8
8. Sacculus greatly developed; apex expanded as a broadly rounded lobe extending almost to distal margin of cucullar lobe (Figure 302) . . . . . *latisaccula* group  
Sacculus not expanded beyond base of cucullar lobe . . . . . 9
9. Valva elongate, arising near anterior margin of vinculum and equaling or surpassing genital capsule in length (Figure 336). Cucullar lobe greatly enlarged, broadly obovate . . . . . *saltatrix* group  
Valva arising more caudad of anterior margin of vinculum and not exceeding length of genital capsule (Figures 276, 306). Cucullar lobe usually more reduced, slender . . . . . 10
10. Gnathos narrowly to broadly triangular (ventral view), gradually tapering to a subacute apex or slender caudal process (Figures 44, 308) . . . . . *triangularis* group  
Gnathos more or less quadrate in ventral view, abruptly narrowing to a slender to stout caudal process or lobe (Figures 276, 285) . . . . . *spatulata* group
11. Valva short, length along sacculus approximately 0.4× length of genital capsule; valva arising midway along elongate vinculum (Figures 360, 362). Anterior margin of vinculum slightly to deeply concave . . . . . *tenuifurcata* group

- Valva  $>0.4\times$  length of genital capsule, arising more anteriorly along shorter vinculum (Figures 387, 391). Anterior margin of vinculum variable, usually broadly U- or V-shaped . . . . . 12
12. Gnathos slender, main body longer than wide, with a pair of slender lateral folds (Figure 391) . . . . . *latifurcata* group  
Gnathos broader, main body usually broader than long, without lateral folds (Figures 364, 387) . . . . . 13
13. Gnathos broadly triangular, without lateral lobes or expansion (Figures 364, 387) . . . . . *divaricata* group  
Gnathos more quadrate in outline, broadly expanded laterally, often forming lateral lobes (Figures 415, 417) . . . . .  
. . . . . *brachybasis* group

### The *rotunda* group

The two species recognized in this group agree in possessing a gnathos with the broadest, most rounded apex of any other group within *Pseudopostega*. The basal fold is well developed and triangular in ventral view. The valvae are relatively long (length of sacculus  $>0.6\times$  the genital capsule), with slender, elongate cucullar lobes ( $\sim 0.5\times$  the length of the genital capsule). The juxta is absent.

### *Pseudopostega rotunda*, new species

FIGURES 137, 261, 262; MAP 2

**ADULT.** Figure 137. Length of forewing 1.9–2.1 mm. Small, mostly white moth with white forewings marked with an elongate, slender, brown dorsal spot, 3 closely aligned, dark brown, subapical strigulae laying subparallel to costal margin, a curved, dark brown tornal strigula, and an elongate, dark brown apical spot. Male genitalia with apex of gnathal lobe broadly rounded; basal fold well developed (Figures 261, 262). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown,  $\sim 36$ – $39$ -segmented. Maxillary palpus cream. Labial palpus white suffused with dark brown laterally; apical segment mostly white.

**Thorax:** White; anterior margin of tegula light grayish brown. Forewing white marked with a elongate, slender, relatively faint, brown spot located  $\sim$ midway along dorsal margin; 3 closely aligned, dark brown, subapical strigulae laying subparallel to costal margin; strigula 1 the most pronounced, shadowed basally with dark brown, terminating before elongate, dark brown apical spot; strigula 2  $\sim$ half the length of 1 and terminating before or at apical spot; strigula 3 either terminating at spot or passing slightly distad to it; tornal strigula dark brown, curving from spot to tornus; area from basal costal and tornal strigulae sometimes suffused with light brown, terminal cilia grayish brown, abruptly becoming more white around tornus; venter of forewing light brown except for suffusion of white at base and along costal margin. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with lateral and dorsal surfaces dark brown; dorsal surfaces of tarsomeres with scattered mixture of cream and brown areas;

midleg with dark brown banding dorsally on tarsomeres 3 and 4; hindleg partially cream with lateral apex of tibia dark brown, tarsal banding paler, more scattered.

**Abdomen:** Golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 261, 262. Socii a pair of moderately long rounded, setose lobes, widely separated by distance slightly less than twice the length of cucullar lobe; caudal rim of tegumen shallowly concave. Vinculum moderately V-shaped, apical margin subacute. Gnathos a relatively simple, narrow, dome-shaped plate; anterior margin deeply convex; basal fold well developed,  $\sim$ one-third the length of entire gnathos, slightly separated from longer, posterior section; caudal apex of gnathos broadly rounded (Figures 261, 262). Valva with an elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule, bearing a pectinifer consisting of a single row of 38–40 blunt spines; pedicel very slender,  $<0.1\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe short, stout, rounded, bearing numerous long setae; basal process of valva attenuated, extending beyond apex of shortened costal lobe; connection between costal lobe of valva and base of gnathos elongate and tenuous. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biología La Selva, (OET), Puerto Viejo de Sarapiquí, Bosque primario, 50–150 m,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 18 Mar 1998, L/09/336, slide DRD 4248 (INBio).

**PARATYPES.** COSTA RICA: GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, P. N. Guanacaste, 700 m: 1 ♂, 19–23 Jun 1993, P. Rios, slide USNM 32806 (USNM). HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m, L/00/217: 1 ♂, 17 Apr 1996, INBio-OET, slide USNM 32816 (USNM); L/00/223: 1 ♂, 22 Apr 1996, INBio-OET, slide DRD 4163 (INBio); L/04/158: 1 UNK, 19 Feb 1998, INBio-OET, (INBio); L/09/336: 1 ♂, 18 Mar 1998, INBio-OET, slide DRD 4278 (INBio); L/11/660: 1 ♂, 9 Jun 1999, INBio-OET, slide USNM 32798 (USNM).

**OTHER MATERIAL EXAMINED.** ECUADOR: NAPO: SE Tena, nr. Rio Napo, Jatun Sacha and Misahualli, 400–500 m: 1 ♂, 26–31 Jan 2000, R. Puplesis, slide: AD 0453, (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** Collecting records for Costa Rica extend from mid February to mid June. A single January record is known for Ecuador.

**DISTRIBUTION.** (Map 2) Known primarily from the lowland forest of the La Selva Biological Reserve in northeastern Costa Rica, with solitary records from Guanacaste Province of northwestern Costa Rica and Napo Province of east-central Ecuador.

**ETYMOLOGY.** The species name is derived from the Latin *rotundus* (round) in reference to the diagnostic, broad, rounded apex of the gnathal lobe in the males of this insect.

**DISCUSSION.** On the basis of the broadly rounded apex of the male gnathos and relatively slender, elongate cucullar lobe and valva, this species appears most allied to *P. ovatula*. Their males are distinguished by the more slender gnathos and V-shaped vinculum of *P. rotunda*. The forewing of *rotunda* also bears a small, dark brown dorsal spot that is absent in *ovatula*.

### ***Pseudopostega ovatula*, new species**

FIGURES 138, 263, 264; MAP 2

**ADULT.** Figure 138. Length of forewing 2.1–2.3 mm. Small, mostly white moth with white forewings lacking spots but marked with 3, black, slender, subapical costal strigulae, and a short, black, curved, terminal strigula. Male genitalia with narrow, anteriorly rounded vinculum and large cucullar lobe; gnathos with caudal margin broadly rounded; basal fold triangular (Figures 263, 264). Female unknown.

**Head:** Vestiture white, with occasionally pale yellow tuft at vertex. Scape white; flagellum pale yellowish brown dorsally, white ventrally, ~52-segmented. Maxillary and labial palpi white.

**Thorax:** Entirely white. Forewing white, without spots but marked with 3 black, subapical costal strigulae; apical spot developed into a distinct, slender, curved terminal (fourth) strigula bordered basally with slight suffusion of yellow; cilia pale brownish distally, white on tornus; venter of forewing brown to dark gray-brown except for basal cream area. Hindwing pale brown both dorsally and ventrally except for basal cream area ventrally; cilia pale ochre. Legs white; foreleg with lateral and dorsal surfaces light gray.

**Abdomen:** Dark gray dorsally, white ventrally.

**Male Genitalia:** Figures 263, 264. Socii consisting of a pair of slender setose lobes widely separated a distance ~0.42× length of cucullar lobe; caudal rim of uncus broadly truncate. Vinculum relatively elongate, slightly constricted immediately anterior to valva, with round,

anterior margin. Gnathos moderately broad with lateral margins subparallel; caudal margin smoothly rounded, nearly as broad as base of gnathos; basal fold large and triangular (Figure 263). Valva with a large, elongate cucullar lobe ~0.5× length of genital capsule, bearing a pectinifer consisting of 56–58 blunt spines; pedicel strongly sclerotized, slender, curved; valva elongate, length along sacculus ~0.65× length of genital capsule; sacculus lobe long, stout, tapering slightly to relatively broadly rounded, setose apex; basal process of valva tapering to acute apex, slightly exceeding length of slender costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: NAPO: SE of Coca, near Rio Tiputini, Yasuni Research Station, 76°36'W, 00°38'S, Amazon rainforest at 230 m, 15–25 Jan 2000, R. Puplesis, VPU ♂ slide AD 0455 (VPU).

**PARATYPES.** ECUADOR: NAPO: SE of Coca, near Rio Tiputini, Yasuni Research Station, 76°36'W, 00°38'S, Amazon rainforest at 230 m, 2 ♂, 15–25 Jan 2000, R. Puplesis, VPU ♂ slide AD 0457 (VPU); SE of Tena, near Rio Napo, Jatun Sacha and Misahualli, 77°36'W, 01°04'S, Amazon premontane tropical forest, 400–500 m, 4 ♂, 26–31 Jan 2000, R. Puplesis & S. Hill, VPU ♂ slides AD 0454, AD 0456 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January.

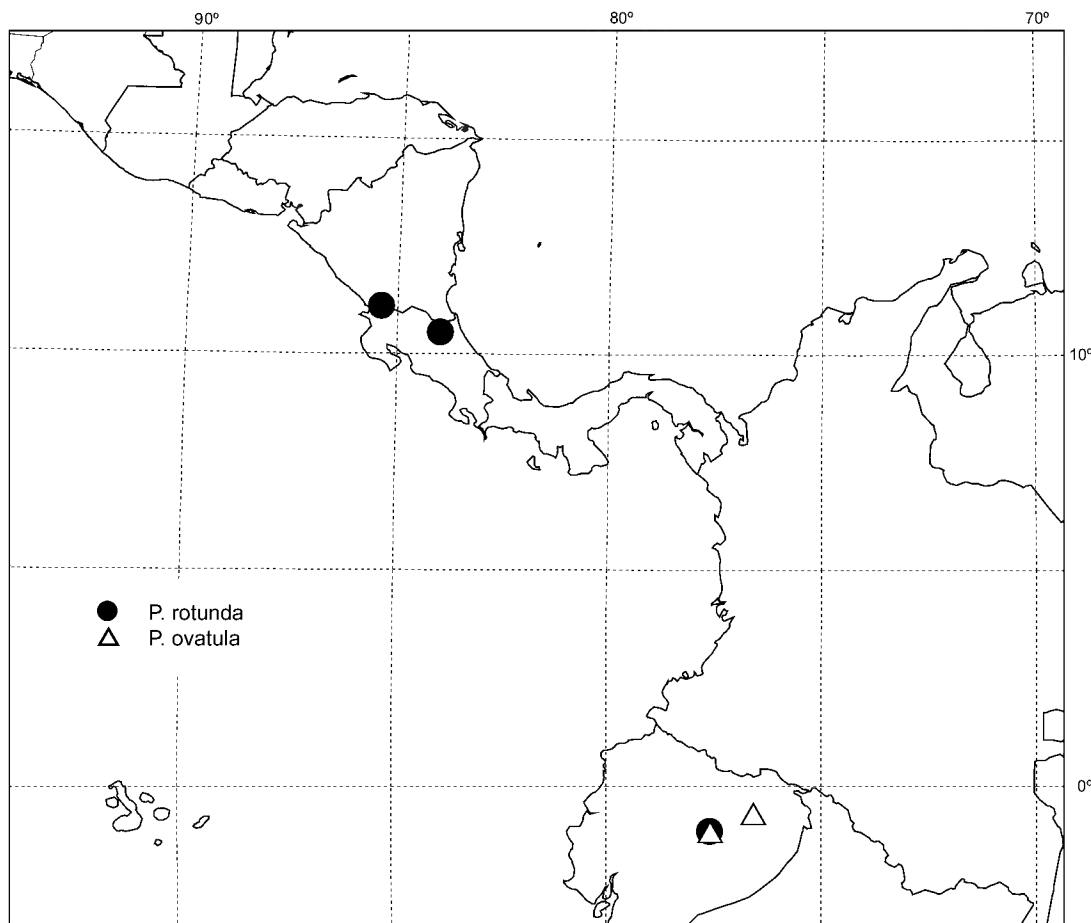
**DISTRIBUTION.** (Map 2) Known from lowland and premontane Amazonian rainforest of east-central Ecuador.

**ETYMOLOGY.** The species name is derived from the Latin *ovata* (ovally rounded) in reference to the ovally rounded vinculum and the same rounded gnathal lobe of the male, and the distinctive semi-ovally shaped terminal strigula on forewing.

**DISCUSSION.** Males of this species are easily distinguished from those of sister species *P. rotunda* by the relatively broader gnathos and more attenuated, U-shaped vinculum. The forewings of *ovatula* also lack the small, dark brown dorsal spot present in *rotunda*.

### **The serrata group**

The two species comprising this distinctive group are characterized by the broadly rounded, bluntly serrated caudal margin of the male gnathos. The males of both species possess a thickened basal fold, with that of *P. ferruginea* extending sharply caudad. The valvae are of moderate length (length along sacculus ~0.5–0.6× length of genital capsule), with a prominent sacculus lobe. The juxta varies from poorly developed to absent.



MAP 2. Distribution of New World *Pseudopostega rotunda* species group.

### *Pseudopostega serrata*, new species

FIGURES 139, 265, 266, 426, 427; MAP 3

**ADULT.** Figure 139. Length of forewing 2.3–3.4 mm. Small, mostly white moth with white forewings marked with 3 brown, subapical costal strigulae, a vestige of a short, brown tornal strigula sometimes present, and an elongate, dark brown apical spot. Male with caudal margin of gnathos broad, minutely serrated with blunt spines; basal fold narrow, forming a broad arch (Figures 265, 266). Papillae anales of female consisting of a pair of short, broadly rounded and divergent, setose lobes (Figures 426, 427).

**Head:** Vestiture white. Scape white; flagellum light golden brown, ~54–58-segmented. Maxillary and labial palpi white; lateral surfaces of labial palpus with light brownish suffusion.

**Thorax:** White; anterior margin of tegula with light brownish suffusion. Forewing white marked with 3 brown, subapical costal strigulae, an elongate, dark brown apical spot, and sometimes with a vestige of a short, brown tornal strigula; basal most costal strigula the shortest, converging and fading with second toward base of dark brown apical spot; terminal cilia variable, either curved around apical spot or converging toward apex of spot; terminal cilia mostly white between strigulae, becoming more brown beyond terminal strigula to tornus and hind margin where cilia become white; venter of forewing light brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at wing base. Legs mostly white to cream; foreleg with lateral and dorsal surfaces suffused with light brown; midleg with usually brown bands dorsally on tarsomeres 4 and 5; hindleg cream with faint brownish dorsal suffusion on tarsomeres 4 and 5.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 265, 266. Socii a pair of prominent, widely separated, rounded, setose lobes; caudal rim of tegumen forming a broad, shallow, V-shaped concavity. Vinculum broad; anterior margin slightly concave. Gnathos broad basally, tapering only slightly to broadly rounded, minutely serrated caudal apex consisting of ~55–60 rounded serrations of similar size; anterior margin of gnathos broadly concave, with a slender, broadly arched, thickened, basal fold (Figure 265). Valva with an elongate cucullar lobe ~0.5× length of entire genital capsule, bearing a pectinifer consisting of a single row of 41–44 blunt spines; pedicel broad, width ~0.5× length of cucullar lobe; valva elongate, length along sacculus ~0.7× length of entire genital capsule; sacculus moderately slender, rounded, extending to apex of pedicel; basal process of valva slender, acute, approximately equaling length of costal lobe. Juxta consisting of a slender, acute, median projection from vinculum.

**Female Genitalia:** Figures 426, 427. Abdomen tapering to a narrowly rounded, minutely cleft apex. Posterior apophyses elongate, each apophysis fused for most of its length. Papillae anales consisting of a pair of broadly rounded and divergent lobes (Figure 427); lobes short, length ~1.5× width, bearing ~8–10 moderately long setae. Vestibulum moderately narrow, membranous. Ductus bursae approximately same diameter to corpus bursae; inner walls densely lined with 2 concentrations of pectinations consisting of 3–6 minute spicules arranged in short, transverse rows; pectinations terminating at separation of ductus spermathecae. Corpus bursae elliptical, enlarging anterior to separation of ductus spermathecae; a narrow, elliptical, faint band of minute, external tubercles extending most of the length of bursa. Ductus spermathecae elongate, ~0.6× length of bursa copulatrix; membranous outer canal slender, elongate; inner canal terminating in 4–5 convolutions; vesicle composed of an enlarged, single coiled tube terminating in a slightly smaller, trumpet-shaped, tubular appendage.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva (OET), Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, 50–150 m, 25 Aug 1998, Bosque secundario, L/08/453, slide DRD 4138 (INBIO).

**PARATYPES.** COSTA RICA: CARTAGO: Paraíso, Parque Nacional Tapantí, 300 m N and 100 m S of Mirador, 1350 m: 1 ♂, 1 ♀, Jun 2002, R. Delgado, slides USNM DRD 4317, 33072 (INBIO, USNM). Santa Cruz, Turrialba, 1500 m: 1 ♂, Aug 1981, V. O. Becker, slide DRD 4232 (VOB). Turrialba, 600 m: 1 ♂, Jul 1981, V. O. Becker, slide USNM 32766 (USNM). HEREDIA: El Ceibo,

10 km SW La Virgen, 500 m: 1 ♂, 23 Jan 2003, K. Nishida, slide USNM 32907 (USNM); 450–550 m, 05/L/00/033: 1 ♂, 15 Mar 2003, M. Epstein, slide DRD 4287 (INBIO). Estación Biológica La Selva, 10°26'N, 84°01'W, 50–150 m, L/11/636: 1 ♂, 11 May 1999, INBio-OET, slide DRD 4193 (INBIO); L/12/339: 2 ♂, 24 Mar 1998, INBio-OET, slides DRD 4184, USNM 32812 (INBIO, USNM); L/12/375: 1 ♂, 14 May 1998, INBio-OET, slide DRD 4171 (INBIO); L/14/459: 1 ♂, 1 Sep 1998, INBio-OET, slide USNM 32810 (USNM); L/16/379: 1 ♂, 20 May 1998, INBio-OET, slide DRD 4185 (INBIO). Finca Murillo, 9 km NE Vara Blanca, 1500 m: 1 ♂, 10 Apr 2005, K. Nishida, 15/L02/055 trap, slide 4352 (INBIO). LIMÓN: R. B. Hitoy Cerere, Sector Calavera Danta, 400–500 m: 1 ♂, 14 Mar 2002, M. Moraga & L. Chavarria, slide DRD 4320 (INBIO). PUNTARENAS: Estación La Casona, Reserva Biológica Monteverde, 1520 m: 1 ♂, Mar 1992, N. Obando, slide DRD 4182 (INBIO). ECUADOR: NAPO: SE Tena, nr. Rio Napo, Jatun Sacha and Misahualli, 400–500 m: 1 ♂, 26–31 Jan 2000, R. Puplesis & S. Hill, slide AD 0356 (VPU). PANAMA: Trinidad River: 1 ♂, Mar 1912, A. Busck, slide USNM 31968 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults probably can be encountered through much of the year in Costa Rica, with known records occurring in January, March, April, May, and July to September. A single January record reported for Ecuador and a March record for Panama.

**DISTRIBUTION.** (Map 3) Relatively widespread in Costa Rica to 1520 m. A single lowland locality reported for Ecuador and southern Panama.

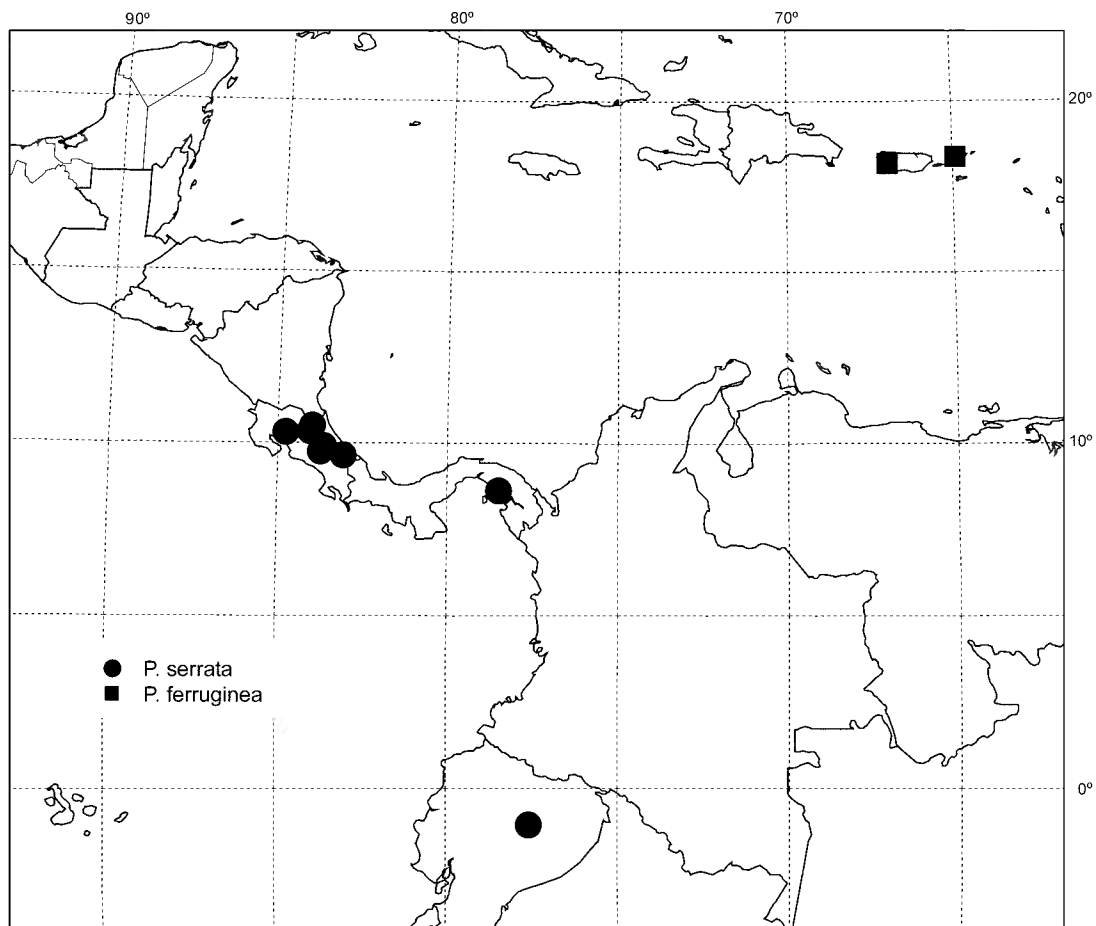
**ETYMOLOGY.** The species name is derived from the Latin *serratus* (toothed like a saw) in reference to the minutely serrated caudal margin of the male gnathos.

**DISCUSSION.** Possessing nearly immaculate forewings, this species differs markedly from its nearest relative, the West Indian species *P. ferruginea*, which possesses forewings with ferruginous apices. The basal fold of the gnathos of *P. serrata* also differs in being more transverse and not extended caudally as in *ferruginea*.

### ***Pseudopostega ferruginea*, new species**

FIGURES 140, 267, 268, 428, 429; MAP 3

**ADULT.** Figure 140. Length of forewing 2.1–2.9 mm. Small, mostly white moth with distal third of forewing ferruginous and a black dorsal spot present near basal third; subapical strigulae absent. Male genitalia with caudal margin of gnathos broadly round, minutely serrated



MAP 3. Distribution of New World *Pseudopostega serrata* species group.

with blunt spines; subapical-lateral margins of plate sharply flared; basal fold deeply cleft, inverted V-shaped (Figures 267, 268). Papillae anales of female bilobed; lobes short, broadly truncate (Figure 429).

**Head:** Vestiture white. Scape white. Flagellum golden brown, ~50–54-segmented. Maxillary and labial palpi white, with dark suffusion of fuscous laterally.

**Thorax:** White, anterior margin of tegula faintly suffused with dark brown. Forewing mostly white, with a roughly triangular black spot along basal third of dorsal margin; distal third of wing uniformly ferruginous except for small, dark brown apical spot and dark brown basal margin of apical fascia, which is slanted obliquely inward toward costa; terminal cilia ferruginous, fading to pale brown along tornus and dorsal margin; venter of forewing brown except for large patch of white over basal half of discal cell area. Hindwing and cilia brown both dorsally and ventrally. Legs mostly white; forelegs and midlegs with

lateral margins of femora and tibiae suffused with brown; tarsi much paler, often with scattered brown scales; hindleg with cream suffusion laterally; tarsi white.

**Abdomen:** Brown dorsally, cream to white laterally and ventrally.

**Male Genitalia:** Figures 267, 268. Socii consisting of short, narrowly rounded, widely separated, setose lobes; caudal rim of uncus sclerotized as a evenly rounded excavation between socii. Vinculum broad; anterior margin slightly truncate. Gnathos complex, consisting of a broad basal plate extending laterally nearly to apices of socii, which terminates in a broad caudal lobe with a subtruncate to slightly convex caudal, serrated margin bearing a dense row of more than 40 short, blunt spines and several, smaller, more scattered spines midventrally; anterior margin of gnathos with a deep, midventral groove that narrows caudally and extends most of length of gnathos; groove bordered by basal fold that projects as an elongate conical process which terminates caudally

in a narrow, rounded lobe. Valva with a relatively large cucullar lobe  $\sim 0.45\times$  length of genital lobe, bearing a pectinifer consisting of 27–30 blunt spines; pedicel elongate, relatively broad, width  $\sim 0.2\times$  length of cucullar lobe; valva relatively short, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe moderately stout, extending halfway along pedicel; basal process of valva relatively short, less than length of elongate costal process. Juxta undeveloped.

**Female Genitalia:** Figures 428, 429. Abdomen tapering to a narrow, rounded apex. Each posterior apophysis divided  $\sim$ half its length, short, slender. Papillae anales bilobed; lobes divergent, short, slightly broader than long, broadly truncate; bearing numerous long setae. Vestibulum with minute, broadly dentate spicules extending mostly into ductus bursae. Ductus bursae moderately slender, elongate, with a zone of dense, broadly pectinate, mostly 4–6-dentate spicules. Corpus bursae relatively small, elliptical, with a zone of broad pectinated spicules consisting of fused, transverse rows of 4–6 minute spicules at junction with ductus; a faint, partially U-shaped band of numerous, irregular, exterior tubercles extending most of length of bursa. Ductus spermathecae relatively short,  $\sim 0.3\times$  length of bursa copulatrix; outer membranous canal bulbous at bursa, then narrowing distally; inner canal with 3–4 distal convolutions and slightly enlarging to small, bulbous vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: VIRGIN ISLANDS: St. Thomas, 300 m: 25–30 Jul 1987, V. O. Becker 67213 (USNM).

**PARATYPES.** PUERTO RICO: Centro Vacacional, Monte del Estado, near Maricao, 650 m: 5 ♂, 7 ♀, 5 UNK, 1–9 Mar 1971, C. P. Kimball, slides USNM 31847, 32745, 32744, 32746, 32963, 32962 (USNM). U.S. VIRGIN ISLANDS: St. THOMAS, 300 m: 1 ♂, 25–30 Jul 1987, V. O. Becker (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in March and July.

**DISTRIBUTION.** (Map 3) West Indies: Puerto Rico and St. Thomas, U.S. Virgin Islands.

**ETYMOLOGY.** The specific name is derived from the Latin *ferruginus* (reddish brown, rust-colored), as suggested by the reddish brown, forewing apical band diagnostic for this species.

**DISCUSSION.** The conspicuous ferruginous apex of the forewing easily distinguishes this species from all other New World Opostegidae. The pronounced, caudally extended basal fold of the male gnathos and proportionately broader caudal lobe further distinguishes *P. ferruginea* from its nearest relative, *P. serrata*.

### The lateriplicata group

The members of this group are characterized primarily by the variable development of a pair of lateral folds on the male gnathos. A basal fold may be present (in *P. abrupta*) or absent. The length of the valvae along the sacculus ranges from  $\sim 0.5$  to  $0.7\times$  the length of the genital capsule. The juxta may be present or absent.

### *Pseudopostega abrupta* (Walsingham)

FIGURES 141, 269, 270, 430, 431; MAP 4

*Opostega abrupta* Walsingham, 1897:139.—Forbes, 1930:149.—Davis, 1984:18.

*Pseudopostega abrupta* (Walsingham).—Davis, 1989:75.—Puplesis and Diškus, 2003:417.

**ADULT.** Figure 141. Length of forewing 2.5–3.0 mm. Small white moth with white forewings marked by a small, dark brown apical spot, 2–3 light to dark brown subapical, costal strigulae, and rarely with faint brownish middorsal spot. Male with caudal lobe of gnathos stout, apex broadly round; basal fold deeply incised, thickened laterally (Figures 269, 270). Papillae anales of female consisting of a pair of extremely short, tuberculate lobes divided for less than half their length (Figure 431).

**Head:** Vestiture white. Scape white; flagellum light brown,  $\sim 49$ –56-segmented. Maxillary palpus white. Labial palpus white to cream, suffused with brown laterally.

**Thorax:** Entirely white. Forewing white marked by a small, dark brown apical spot (lacking in many specimens), 2–3 light to dark brown subapical, costal strigulae, and rarely with a faint, light brown middorsal spot; first strigula the shortest and barely separated from strigula 2; terminal strigula sinuate, curving around apical spot; terminal cilia and venter of forewing brown except for basal white area. Hindwing and cilia golden brown dorsally and ventrally except for white subhumeral suffusion. Legs mostly cream; foreleg with lateral and dorsal surfaces brown; mid- and hindlegs white to cream.

**Abdomen:** Light golden brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 269, 270. Socii a pair of moderately large, elongate, rounded, setose lobes, widely separated by a distance  $\sim$ equal to length of cucullar lobe; caudal rim of uncus slightly concave. Vinculum broad; anterior margin subtruncate. Gnathos weakly sclerotized, broad at base, gradually tapering to broadly rounded, often slightly enlarged, dorsally recurved, caudal lobe;



anterior margin with a narrow, deep incision extending  $\sim 0.7\times$  length of gnathos; basal fold broad laterally, gradually narrowing caudally along medial incision; a pair of slender, secondary lateral folds extending nearly the entire length of gnathos. Valva with small cucullar lobe  $\sim 0.3\times$  length of genital capsule, bearing short pectinifer consisting of  $\sim 26\text{--}33$  blunt spines; terminal apex of cucullar lobe prominently extended as a small, setose, rounded lobe; pedicel moderately stout, width  $\sim 0.14\times$  length of cucullar lobe; valva elongate,  $\sim 0.7\times$  length of genital capsule; saccular lobe moderately broad, with irregularly setose, rounded apex; basal process of valva short, acute; costal process of valva stout, relatively short but slightly longer than basal process. Juxta well developed, broad basally, tapering to an elongate rod-like sclerite.

**Female Genitalia:** Figures 430, 431. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophysis fused most of its length, slender, elongate. Papillae anales consisting of a pair of extremely short, tuberculate lobes divided for less than half their length; length of entire papilla  $\sim 0.33\times$  maximum width; each lobe bearing  $\sim 6$  elongate setae, the longest  $\sim 0.5\times$  length of posterior apophyses (Figure 430). Vestibulum relatively broad, membranous with a dense zone of minute pectinate spicules at anterior end extending into ductus bursae; spicules arranged usually 5–8 per transverse row; ductus bursae broad, mostly joined with broad spermathecal canal, with an elongate, relatively narrow zone of minute, pectinate spicules arranged in long transverse rows of 7–9 spicules at anterior end. Corpus bursae relatively large, broad, with a faint, irregular U-shaped band bearing numerous, minute, blunt to acute, external tubercles partially encircling anterior half of the bursae (Figure 430). Spermathecal duct  $\sim 0.75\times$  length of bursa copulatrix; membranous outer canal broad, elongate, nearly as long as inner canal; inner canal long, sinuous, terminating in  $\sim 3\text{--}4$  convolutions; vesicle relatively short, curved.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: VIRGIN ISLANDS: St. Thomas: 19 Mar 1914, Hedemann, slide 2362 (MGAB).

**MATERIAL EXAMINED.** BRITISH VIRGIN ISLANDS: Guana Island, 0–80 m: 1 ♂, 1–14 Jul 1984, S. E. & P. M. Miller, slide USNM 32723; 3 ♂, 6 ♀, 1 UNK, 10–25 Jul 1988, S. E. Miller & C. O. Connell, slide USNM 32487; 25 ♂, 30 ♀, 1 UNK, 9–23 Jul 1987, V. O. Becker & S. E. Miller, slides USNM 32921, 31845, 32722; 6 ♂, 9 ♀, 10 UNK, Oct 1989, V. O. Becker, slide USNM 32485 (USNM, VOB); 1 ♀, 24–31 Oct 1990, 4 ♂, 12 ♀, 1–5 Nov 1990, S. E. Miller & T. M. Kuklenski, slide USNM 33147 (USNM). Guana Island, Clubhouse,

40–60 m: 2 ♀, 1 UNK, 13–26 Jul 1986, S. E. Miller & M. G. Pogue.

Pogue, slide USNM 32724 (USNM). North Bay, 0 m: 1 ♀, 13–26 Jul 1986, S. E. Miller & M. G. Pogue (USNM). U.S. VIRGIN ISLANDS: St. Thomas: 1 ♂ (holotype), 19 Mar 1914, Hedemann, slide 2362 (MGAB); St. Thomas, 300 m: 4 ♂, 1 ♀, 25–30 Jul 1987, V. O. Becker, slide USNM 32726 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in March, July, October, and November.

**DISTRIBUTION.** (Map 4) West Indies: Guana Island (British Virgin Islands) and St. Thomas (U.S. Virgin Islands).

**DISCUSSION.** Previously *P. abrupta* was known only from the male holotype collected in 1914 and now lacking its head. One result of the Guana Island survey (see Acknowledgments) was the collection of a large series of this (and other) species together with associated females. Males of *abrupta* differ from other members of the group in the gnathos possessing a well-developed, deeply incised basal fold and are similar to *P. floridensis* in the broadly rounded caudal lobe of the gnathos and presence of a relatively well developed juxta.

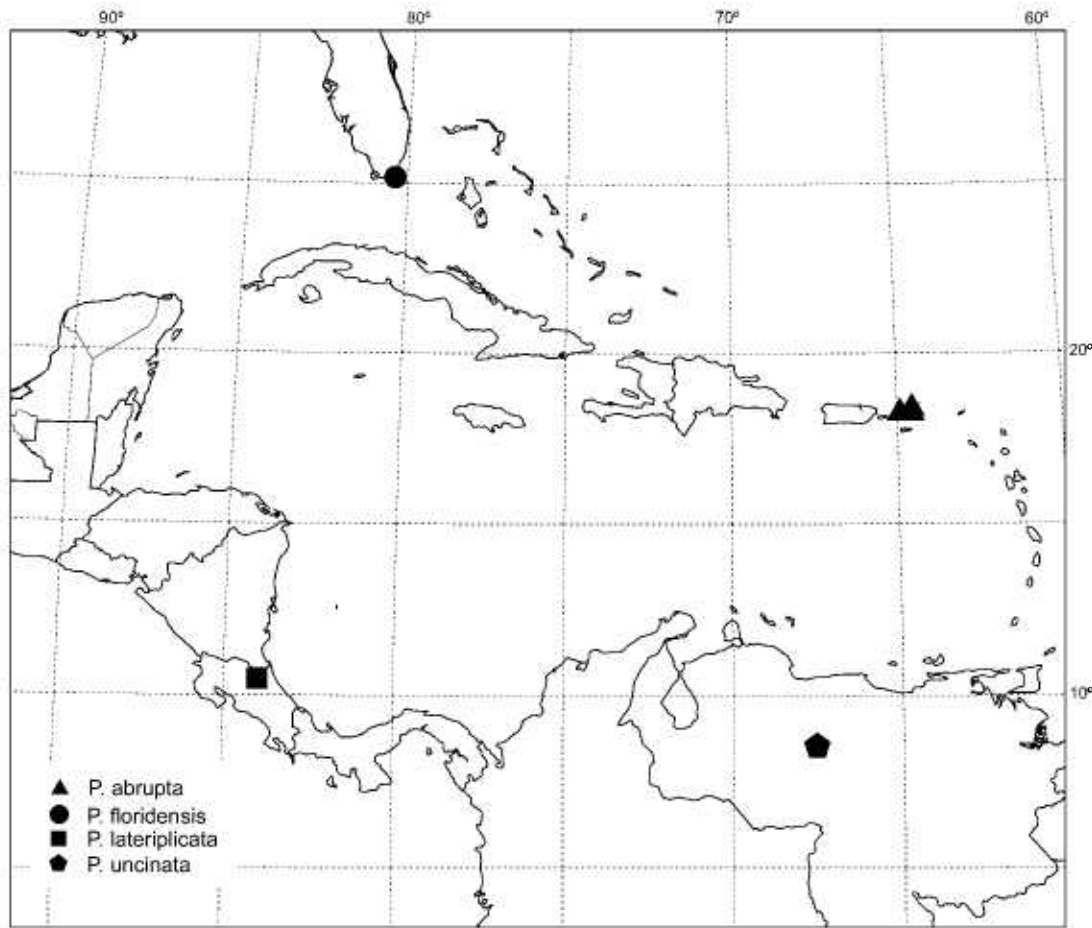
### ***Pseudopostega floridensis*, new species**

FIGURES 142, 271, 432, 433; MAP 4

**ADULT.** Figure 142. Length of forewing 2.4 mm. Small white moth with a variably distinct dark brown dorsal spot on forewing and dark brown apical spot, 2 brownish costal and 1 tornal strigulae. Male gnathos with slender lateral folds and deep median cleft extending to broadly rounded apex (Figure 271). Papillae anales of female consisting of a pair of relatively long, slender, widely divergent lobes (Figure 433).

**Head:** Vestiture white. Scape white; flagellum dark cream,  $\sim 52$ -segmented. Palpi cream to ochreous cream; labial palpus with brownish suffusion dorsolaterally.

**Thorax:** White. Forewing white in holotype without distinct dorsal spot except for a few brownish scales present along middle of dorsal margin on right wing; female with a small, more distinct, dark brown dorsal spot; 2 brown, subapical, costal strigulae present; first strigula fading to light ochreous yellow, triangular area before dark brown apical spot; strigula 2 elongate, curving distally around apical spot; a faint, tornal strigula continuing a short distance below ochreous yellow area; terminal cilia light brown between costal strigulae, becoming white around tornus, then light brown along dorsal



MAP 4. Distribution of New World *Pseudopostega lateriplicata* species group.

margin; venter of forewing dark cream. Hindwing uniformly ochreous cream dorsally and ventrally. Legs mostly ochreous cream; foreleg suffused with brown dorsally.

**Abdomen:** Ochreous cream dorsally, whitish cream ventrally.

**Male Genitalia:** Figure 271. Socii a pair of elongate, setose lobes widely separated by  $\sim 0.9\times$  length of cucullar lobe; caudal rim of uncus extremely narrow, subtruncate. Vinculum broad; anterior margin subtruncate. Gnathos broad at base, gradually tapering caudally to broadly rounded apex; anterior margin of gnathos deeply divided to apex of broad caudal lobe; a pair of slender lateral folds present; basal fold absent. Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 30$  blunt spines; pedicel moderately stout, nearly  $0.2\times$  length of cucullar lobe; valva elongate,  $\sim 0.9\times$  length of genital capsule; saccular lobe slender, width less than that of pedicel, tapering to narrowly rounded, setose apex; basal process gradu-

ally tapering to slender, acute apex; costal process relatively short, less than length of basal process. Juxta an elongate, slender, membranous projection from vinculum.

**Female Genitalia:** Figures 432, 433. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophysis fused nearly its entire length, slender, elongate. Papillae anales consisting of a pair of short, slender, widely separated lobes; length of each lobe  $\sim 2.0\times$  maximum width; each lobe bearing  $\sim 5\text{--}6$  elongate setae, the longest  $\sim 0.5\times$  length of posterior apophyses; lobes extremely divergent, with axis of each lobe directed nearly lateral (Figure 433). Vestibulum relatively broad, membranous with a dense zone of minute pectinate spicules at anterior end extending over into ductus bursae; spicules arranged usually  $5\text{--}10$  per transverse row; ductus bursae broad, constricted slightly at juncture with corpus bursae, mostly joined with slender spermathecal canal, completely lined with minute, pectinate spicules as above. Corpus bursae relatively slender,

elongate; a sparse scattering of minute, short, slender spines present internally over anterior half; external tubercles apparently absent (Figure 432). Spermathecal duct  $\sim 0.5\times$  length of bursa copulatrix; membranous outer canal slender, elongate, as long as inner canal; inner canal long, sinuous, without convolutions, terminating as a semicircular curve inside a relatively short, circular vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: FLORIDA: Monroe Co.: Key Largo: 28 Jun 1965, S. Kemp, slide USNM 32433 (USNM).

**PARATYPE.** USA: FLORIDA: Monroe Co.: Key Largo: 1 ♀, 20 Nov 1964, S. Kemp, slide USNM 32463 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in June and November.

**DISTRIBUTION.** (Map 4) Known only from the type locality in southern Florida (USA).

**ETYMOLOGY.** The species name is derived from the general type locality, Florida, and *-ensis*, a suffix denoting place, locality.

**DISCUSSION.** The type series of *P. kempella* (Eyer) was found to include two other species, *P. floridensis* and *parakempella*, in addition to *kempella*. The holotype specimen of *floridensis* is lacking the right forewing and shows slight damage at the apex of the left forewing, which leaves some doubt as to the complete development and subsequent description of the apical strigulae. This specimen also possesses only a faint indication of a forewing dorsal spot, which is much more distinct in the female paratype. The two specimens are believed to be conspecific on the basis of their very similar subapical forewing strigulae. The slender, extremely divergent papillae anales present in the paratype are also distinct from any other female *Pseudopostega* currently known to occur in Florida, in particular *P. kempella* and *parakempella*. Both specimens were collected in a blacklight trap.

### ***Pseudopostega lateriplicata*, new species**

FIGURES 143, 272, 273; MAP 4

**ADULT.** Figure 143. Length of forewing 1.9 mm. Small, mostly white moth with white forewing marked with a small, pale brown, dorsal spot just below middle of dorsal margin, 3 dark brown, subapical costal strigulae, 1 short, dark brown tornal strigula, and a fuscous apical spot. Male gnathos narrowly triangular, with relatively prominent, nearly convergent, lateral folds (Figure 272). Female unknown.

**Head:** Vestiture white. Scape white; flagellum brown dorsally, light golden brown ventrally; segments missing (broken) distal to 35. Palpi white to cream; labial palpus with light brown suffusion dorsally.

**Thorax:** White; anterior margin of tegula with faint trace of light brown suffusion. Forewing almost entirely white with a small, pale brown, dorsal spot just below middle of dorsal margin, 3 dark brown, subapical costal strigulae, 1 short, dark brown tornal strigula, and a fuscous apical spot; strigula 1 faintly preserved, narrowly separated and slightly convergent with 2, both fading before dark fuscous apical spot; 3 curving slightly around apical spot then fading at tornus; tornal strigula faint; terminal cilia mostly light brown, white between strigulae; venter of forewing brown except for basal white area. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces of femur and tibia mostly suffused with brown, less so on basal 3 tarsomeres; mid- and hindleg with lighter brown bands dorsally at apices of tarsomeres 1–3.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 272, 273. Socii a pair of moderately small, rounded, setose lobes, widely separated a distance  $\sim 0.9\times$  length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad; anterior margin  $\sim$ concave. Gnathos moderately narrow, triangular, elongate, gradually narrowing to form an elongate, subacute, dorsally slanted, caudal lobe; apex of lobe subacute; anterior margin membranous, slightly concave; basal fold modified to form a prominent pair of lateral folds, well separated caudally; length of folds  $\sim 0.7\times$  length of entire gnathos (Figure 273). Valva with cucullar lobe reduced,  $\sim 0.3\times$  length of genital capsule, bearing a pectinifer consisting of a single row of 18–20 blunt spines; distal apex of cucullar lobe moderately extended, slender; pedicel broad, width  $\sim 0.33\times$  length of cucullar lobe; valva short, length along sacculus  $\sim 0.6\times$  length of genital capsule; sacculus lobe tapering to a slender, setose, minutely rounded apex; basal process of valva tapering to acute base, approximately equaling length of slender costal lobe. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, 10°26'N, 84°01'W, 50–150 m, Bosque secundario, L/17/590, 11 Mar 1999, INBio-OET, slide DRD 4281 (INBio).

**HOST.** Unknown.

**FLIGHT PERIOD.** March (unique record).

**DISTRIBUTION.** (Map 4) Known only from the La Selva Biological Reserve, a lowland rainforest area in northeastern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Latin *lateris* (side) and *plica* (fold) in reference to the prominent, lateral folds on the male gnathos.

**DISCUSSION.** The male of this species can be recognized by having the lateral folds of the gnathos the most developed in the group. The caudal lobe of the gnathos is also the most attenuated and straight of the other three species.

***Pseudopostega uncinata*, new species**

FIGURES 144, 274, 275, 434, 435; MAP 4

**ADULT.** Figure 144. Length of forewing 2.5–3.1 mm. Small, mostly white moth with white forewings marked by a moderately large, dark brownish fuscous spot near base of hind margin; two variable, short, dark brown, subapical costal stigulae and a single elongate, sinuate terminal strigula extending to apex; a short, dark brown, indistinct tornal strigula usually evident. Male genitalia with a strongly recurved, subacute gnathos and elongate cucullar lobe; basal fold restricted to lateral margins of anterior third of gnathos (Figures 274, 275). Papillae anales of female consisting of a pair of small, short, slender setose lobes divided to base (Figure 435).

**Head:** Vestiture white. Scape white. Flagellum golden brown, ~49–53-segmented. Maxillary palpus white. Labial palpus white with brown suffusion dorsolaterally.

**Thorax:** White; anterior margin of tegula dark brown; pronotum with a few scattered brownish scales across middle. Forewing mostly white with a moderately large, dark brownish fuscous spot near base of hind margin; a pale brownish suffusion and scattered brownish scales extending along median third of wing; two pairs of dark brown, closely parallel, subapical costal strigulae present; first strigula light brown, short, relatively broad; strigula 2 indistinct, dark brown, extremely slender, extending to area of apical spot; terminal strigula dark brown, elongate, slender, sinuate, extending to apex; apical spot indistinct, largely confluent with terminal strigula; a short, indistinct tornal strigula extending toward tornus from area of apical spot; terminal cilia cream to light brown; venter of forewing light brown with whitish subhumeral area. Hindwing and cilia light golden to silvery brown both dorsally and ventrally. Foreleg mostly white, with dorsolateral surface of femur suffused with brown; mid- and hindlegs whitish cream.

**Abdomen:** Light golden brown dorsally; whitish cream ventrally.

**Male Genitalia:** Figures 274, 275. Socii a pair of slender, relatively long, setose lobes, widely separated a distance

~0.8× length of cucullar lobe; caudal rim of uncus moderately concave, broadly V-shaped. Vinculum slender; anterior margin narrowly rounded. Gnathos triangular, broad at base, tapering gradually to moderately long, slender, strongly recurved, subacute caudal lobe; anterior margin indistinct, slightly convex; basal fold restricted to lateral margins of anterior third of gnathos (Figure 275). Valva with greatly elongate cucullar lobe ~0.55× length of genital capsule, bearing pectinifer consisting of ~54–56 blunt spines; distal apex of cucullar lobe reduced, rounded; pedicel moderately stout, width ~0.2× length of cucullar lobe; valva moderately short, length along sacculus ~0.6× length of genital capsule; saccular lobe moderately broad, tapering slightly to moderately broad, irregular, subacute, setose apex; basal process of valva gradually tapering to moderately slender, subacute apex; costal process of valva relatively long and slender, approximately equal to length of basal process. Juxta undeveloped.

**Female Genitalia:** Figures 434, 435. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophyses fused most of its length, slender, elongate. Papillae anales bilobed, consisting of a pair of small, short, slender lobes divided to base and bearing ~6, moderately long setae, the longest ~0.33× length of posterior apophyses; length of each lobe ~2.0× width (Figure 434). Vestibulum broad, membranous. Ductus bursae broad, with a dense patch of minute, irregularly rounded spicules concentrated along left side near caudal end; also with elongate zone of indistinct spicules arranged in transverse rows of usually 4–9 minute spines near junction with corpus bursae. Corpus bursae broadly oval, with an irregular U-shaped band of numerous, relatively elongate, blunt, external tubercles (Figure 434) partially encircling most of length of the bursa. Spermathecal duct ~0.8–0.9× length of bursa copulatrix; membranous outer canal relatively narrow; inner canal long, sinuous, terminating in ~3–4 elongate convolutions; vesicle a small rounded sac, with a short, curved lagena.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; VENEZUELA: GUARICO: Hato Masaguaral, 45 km S. Calabozo, 75 m, 6–8 May 1988, malaise trap near dried lake, M. Epstein & R. Blahnik, slide USNM 33030 (USNM).

**PARATYPES.** VENEZUELA: GUARICO: Hato Masaguaral, 45 km S. Calabozo, 75 m: 1 ♀, 6–8 May 1988, 3 ♀, 9–11 May 1988, malaise trap, savanna, M. Epstein & R. Blahnik, slide USNM 33031 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** May.

**DISTRIBUTION.** (Map 4) Known only from the type locality, a general savanna habitat with some adjacent gallery forests in north-central Venezuela.

**ETYMOLOGY.** The species name is derived from the Latin *uncinatus* (hooked), in reference to the diagnostic, dorsally recurved apex of the male gnathos.

**DISCUSSION.** The gnathos of this species is characteristic in possessing a relatively broad base that tapers abruptly to form a strongly recurved caudal lobe. The slender lateral folds of *uncinata* are the most reduced of any member of the *lateriplicata* group.

### The *spatulata* group

The males within the *spatulata* group are distinguished by the broad, usually quadrate base of the gnathos, which abruptly constricts to form a slender to stout caudal process or lobe. The apex of the lobe varies from subacute to broadly spatulate or faintly bilobed. A basal fold is usually present but may be absent. The valvae are moderately long (length along the sacculus usually ranges from  $\sim 0.6$ – $0.7\times$  the length of the genital capsule), with well-developed saccular lobes. Some vestige of a juxta is typically present.

### *Pseudopostega microacris*, new species

FIGURES 145, 276, 277, 436, 437; MAP 5

**ADULT.** Figure 145. Length of forewing 2.2–2.4 mm. Small, mostly white moth with white forewings marked with a small brown dorsal spot at basal third, 2 dark brown, subapical costal strigulae, a short, faint brown tornal strigula, and a dark brown to fuscous, elongate apical spot. Male gnathos tapering to short, slender, dorsally upturned, caudal lobe; basal fold absent (Figure 276). Papillae anales of female consisting of a pair of short, irregular lobes, each bearing a smaller, secondary lobe from basal inner margin (Figure 437).

**Head:** Vestiture white. Scape white; flagellum brown, 39-segmented. Maxillary palpus cream; labial palpus white with brown suffusion dorsally.

**Thorax:** White; anterior margin of tegula with faint light brown suffusion. Forewing almost entirely white, sometimes with yellowish brown suffusion along distal third of costa and over distal fourth of wing, becoming more brown near inner margin of first costal strigula; 2 dark brown, subapical costal strigulae present, first strigula fading toward elongate, dark brown apical spot; strigula 2 extending through terminal cilia around apical spot to tornus; one short, brown, tornal strigula either poorly preserved or absent; an elongate, brown dorsal spot approximately equal to length of scape present at basal third of dorsal margin; terminal cilia mostly white between strigulae, predominantly brown beyond strigula 2, becoming paler brown to white along dorsal margin; venter

of forewing light brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally. Legs white to cream; foreleg with dorsal surfaces brown, tarsomeres predominantly white; midleg with light brown bands dorsally on tarsomeres 3 and 4; tarsal banding absent on hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 276, 277. Socii a pair of broad, low rounded, setose lobes, narrowly separated a distance less than  $0.3\times$  length of cucullar lobe; caudal rim of tegumen smoothly concave. Vinculum broad; anterior margin subtruncate. Gnathos with a broadly rounded base that constricts abruptly to form a slender, moderately reduced, subacute caudal lobe; apex of lobe dorsally upturned; anterior ventral margin broadly rounded, without basal fold. Valva with an elongate cucullar lobe  $\sim 0.35\times$  length of entire genital capsule, bearing a pectinifer consisting of a single row of  $\sim 31$  blunt spines; terminal apex of cucullar lobe slightly extended as a setose, rounded lobe; pedicel broad, approximately  $0.33\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.6\times$  length of entire genital capsule; saccular lobe slender, tapering, terminating in two small, setose lobes, one situated more subapical; basal process of valva slender, acute, exceeding length of slender costal lobe, with both terminating at half the length of valva from anterior margin of vinculum. Juxta undeveloped.

**Female Genitalia:** Figures 436, 437. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophyses fused most its length, slender, elongate. Papillae anales bilobed, consisting of a pair of short, irregular lobes, each bearing a smaller, secondary lobe from basal inner margin (Figure 437) and bearing 4 long setae from main lobe and 2 long setae from smaller secondary lobe; length of primary lobe  $\sim$ equal to basal width. Vestibulum moderately broad, membranous. Ductus bursae broad, gradually enlarging to moderately elongate corpus bursae; with a dense patch of minute spicules concentrated at caudal end of ductus bursae and anterior end of vestibulum; spicules variable, arranged in short, transverse rows of 2–3 spicules caudally, gradually increasing in length anteriorly to rows of 4–10 spicules. A larger concentration of spicules located at caudal end of corpus bursae, consisting of numerous, elongate rows of 6–10 spicules. Corpus bursae membranous except for a faint, curved band of small, irregular tuberculate outgrowths extending along the anterior  $2/3$  of the bursa. Spermathecal duct [partially broken]  $\sim 0.7\times$  length of bursa copulatrix; membranous outer canal relatively narrow; inner canal long, sinuous, terminating in  $\sim 2$ – $3$  short convolutions; [vesicle missing, not examined].

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, bosque secundario, L/15/496: 27 Oct 1998, INBio-OET, slide DRD 4210 (INBIO).

**PARATYPES.** COSTA RICA: CARTAGO: R. F. Pacuare, Turrialba, P. N. Barbilla, Estación Barbilla, 500 m: 1 ♂, 1 ♀, Jan 2002, L. Chavarria, slides DRD 4266, USNM 33073 (INBIO, USNM). HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, arboleda, 10°26'N, 84°01'W, 50–150 m, L/05/087: 1 ♂, 16 Nov 1993, INBio-OET, slide USNM 32788 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in January and October to November.

**DISTRIBUTION.** (Map 5) Northeastern Costa Rica in lowland rainforest from 50–500 m elevation.

**ETYMOLOGY.** The species name is derived from the Greek *mikros* (small, little) and *akron* (top, tip, end)

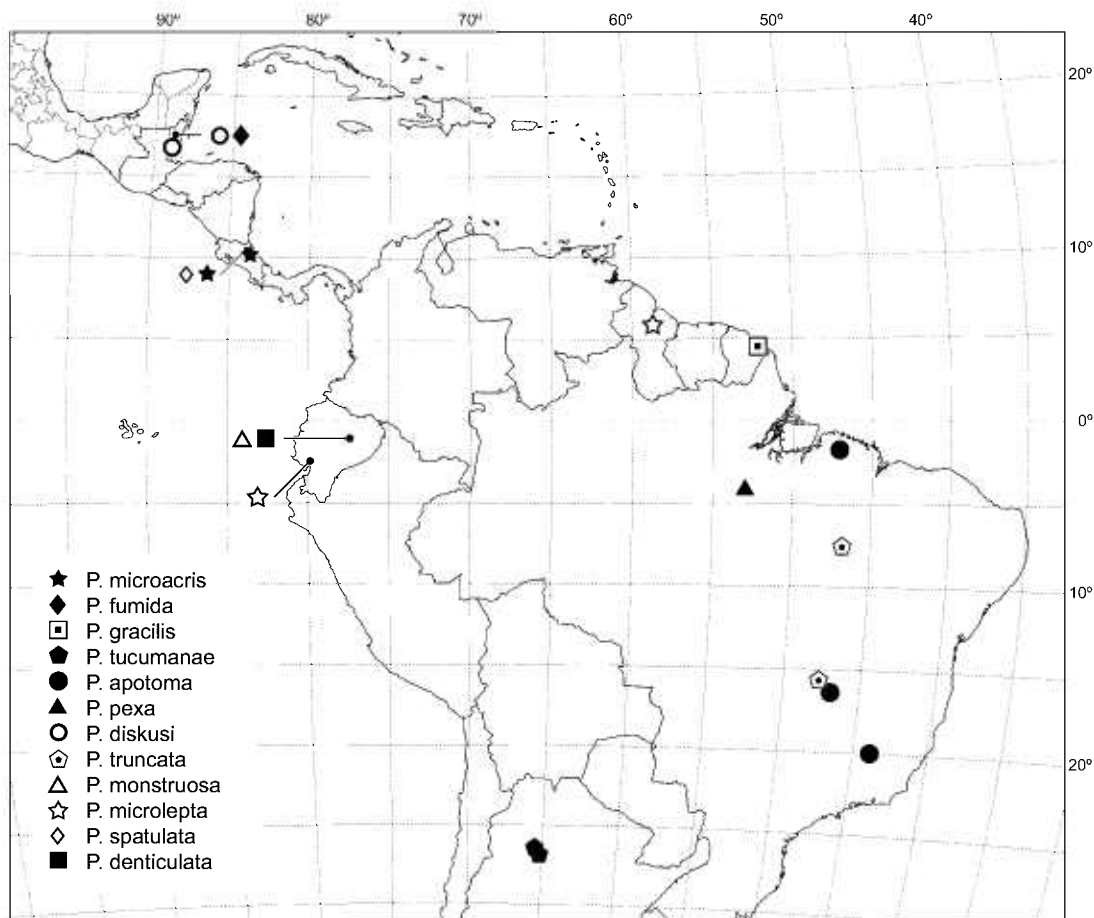
in reference to the diagnostic slender, reduced apex of the caudal lobe of the male gnathos.

**DISCUSSION.** The caudal lobe of the gnathos is diagnostic for this species in being the most reduced and sharply recurved of the *spatulata* group. The socii are also distinctive in being relatively broad and short.

### *Pseudopostega fumida*, new species

FIGURES 146, 278, 279; MAP 5

**ADULT.** Figure 146. Length of forewing 2.1 mm. Small, predominantly glossy gray moth with a largely white head and forewing with a small indistinct, fuscous costal spot near distal third, two fuscous, subapical costal strigulae, and a small fuscous apical spot. Gnathos of male genitalia with broad, rectangular base abruptly narrowing to elongate, slender caudal lobe; basal fold triangular,



MAP 5. Distribution of New World *Pseudopostega spatulata* species group.

relatively indistinct from ventral view (Figures 278, 279). Female unknown.

**Head:** Vestiture white except cream frontal tuft. Scape white; flagellum glossy pale brown, ~32-segmented. Maxillary and labial palpi glossy pale brown.

**Thorax:** Coppery grayish brown, glossy. Forewing coppery grayish brown, with small fuscous spot on distal third of costa; two fuscous, subapical costal strigulae present; strigula 1 terminating at small fuscous apical spot; strigula 2 less developed; cilia brown; venter of forewing brown. Hindwing and cilia brown both dorsally and ventrally. Legs mostly brownish gray.

**Abdomen:** Color not observed.

**Male Genitalia:** Figures 278, 279. Socii consisting of a pair of stout, elongate, rounded, setose lobes broadly separated a distance ~0.75× length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum gradually narrowed anteriorly; anterior margin subtruncate. Gnathos with broad, laterally thickened, rectangular base abruptly narrowing to elongate, slender, acute caudal lobe; anterior margin of gnathos relatively membranous, truncate; basal fold triangular, relatively short and indistinct from ventral view (Figure 278). Valva with a relatively large cucullar lobe ~0.3× length of genital capsule, bearing a pectinifer consisting of a single row of 32–34 slender, blunt spines; distal apex of cucullar lobe well developed, terminating in a conical tuberculate, setose apex; pedicel short and broad; width ~0.3× length of cucullar lobe; length of valva along sacculus ~0.6× length of genital capsule; saccular lobe moderately stout, short, subacute; basal process of valva long, acute, exceeding length of costal process. Juxta poorly developed as a rudimentary, sinuous rod.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BELIZE: CAYO DISTRICT: S. of Teakettle Village, Pook's Hill Nature Reserve: 28–29 Apr 1998, secondary tropical forest, R. Puplesis, slide AD 0447 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** April (unique record).

**DISTRIBUTION.** (Map 5) Known only from the type locality in secondary, tropical forest of central Belize.

**ETYMOLOGY.** The specific name is derived from the Latin *fumida* (smoked-colored, darkened), as suggested by the unusual dark color of the moth.

**DISCUSSION.** This species is easily recognized by the combination of its unusually dark grayish wing color and pale head. The caudal lobe of the male gnathos is long, slender, and dorsally recurved more than any other member of the *spatulata* group.

## *Pseudopostega gracilis*, new species

FIGURES 147, 280, 281, 438, 439; MAP 5

**ADULT.** Figure 147. Length of forewing 2.3–2.5 mm. Small, mostly white moth with white forewings marked with 3 dark brown, subapical costal strigulae, 2 dark brown, terminal strigulae, a small, elongate, dark brown apical spot, and a faint vestige of a light brown tornal strigula. Male with gnathos abruptly constricting to a slender, rod-like caudal lobe; basal fold strongly arched into a pair of short, lateral folds broadly separated at midline (Figures 280, 281). Papillae anales of female bilobed, consisting of a pair of short, truncate, widely separated, setose lobes (Figure 439).

**Head:** Vestiture white. Scape white; flagellum brown dorsally, cream ventrally, 44–46 segmented. Palpi white; labial palpus with suffusion of light gray to brown dorsally and laterally.

**Thorax:** White; tegula white with faint brownish suffusion along anterior margin. Forewing almost entirely white with 3 dark brown, subapical costal strigulae, 2 dark brown, terminal strigulae, a small, elongate, dark brown apical spot, and a faint vestige of a light brown tornal strigula; first strigula the most distinct, extending along distal costal margin a short distance; strigula 2 the most slender, faint, terminating near or slightly beyond apex of first; strigula 3 elongate, slightly curved, ending at slender, dark brown apical spot; area immediately caudad to spot lightly suffused with pale yellowish brown; 2 terminal strigulae approximately equal in length and sinuate, curving around apical spot to tornus; a faint, brown tornal strigula sometimes present, extending down from apical spot; terminal cilia mostly light brown, white between strigulae 1–3 and between terminal strigulae, white along tornal area, becoming cream to very light brown along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing white to cream dorsally and ventrally, usually more cream to light brown along costal margin ventrally; cilia cream to light brown. Legs mostly white to cream; foreleg with dorsal surfaces partially suffused with light brown, tarsomeres mostly dark cream; midleg with dark brown suffusion dorsally on tarsomeres 3 and 4; very faint brownish tarsal suffusion on tarsomeres 3 and 4 of hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 280, 281. Socii a pair of large, triangular, setose lobes, widely separated a distance ~equal to length of cucullar lobe; caudal rim of uncus a

broad, relatively shallow concavity. Vinculum relatively elongate, noticeably constricted slightly anterior to basal articulation of valvae, with more narrow anterior margin truncate. Base of gnathos broad, short, abruptly constricted to form an elongate, slender caudal lobe; anterior margin membranous; basal fold strongly arched into a pair of short, lateral folds broadly separated at midline; with a pair of triangular sclerites immediately anterior to gnathos and a second pair of small triangular sclerites laterally between base of gnathos and socii and immediately caudad to anterior pair of sclerites. Valva with cucullar lobe reduced,  $\sim 0.3\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 22$  blunt spines; distal apex of cucullar lobe rounded, not extended; pedicel broad, width  $\sim 0.3\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe elongate, slender, extending beyond apex of pedicel; basal process of valva slender, attenuated, slightly exceeding length of costal process. Juxta undeveloped.

**Female Genitalia:** Figures 438, 439. Abdomen tapering to a narrowly rounded, slightly cleft apex. Each posterior apophyses elongate, fused for most of length. Papillae anales consisting of a pair of relatively slender, slightly divergent lobes (Figure 439); lobes moderately elongate, length  $\sim 2\times$  maximum (apical) width, bearing  $\sim 5$  relatively short setae slightly longer than lobes; apex of lobe obliquely subtruncate; lobes widely separated a distance  $\sim$ equal to their lengths by a relatively deep, smoothly concave excavation. Vestibulum moderately broad, membranous. Ductus bursae approximately same diameter as corpus bursae; inner walls densely lined with an elongate concentration of pectinations consisting of 3–11 minute spicules arranged in variable, transverse rows; pectinations terminating caudad to separation of membranous portion of ductus spermathecae. Corpus bursae elliptical, beginning to enlarge near separation of membranous ductus spermathecae; anterior third encircled by a dense zone of minute spicules similar to those around ductus bursae. Ductus spermathecae elongate,  $\sim 0.6\times$  length of bursa copulatrix; membranous outer canal moderately broad, short; inner canal slender, terminating in 1–2 convolutions; vesicle composed of a slightly enlarged, simple tube.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; FRENCH GUIANA: Montagne de Kaw, Piste de Kaw, km 40, 4°33'N, 52°10'W, 350 m, 21 Jan 1985, 1200 W mercury vapor light and 15 W UV in pristine primary rainforest, J.-F. Landry, slide USNM 31962 (USNM).

**PARATYPES.** FRENCH GUIANA: Montagne de Kaw, Piste de Kaw, km 40, 350 m: 1 ♂, 2 ♀, 1 UNK,

21 Jan 1985, J.-F. Landry, slides USNM 32842, 32840 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** January.

**DISTRIBUTION.** (Map 5) Known only from the type locality in primary rainforest of northeastern French Guiana. The site was on a 200-m hill located near the middle of the relatively flat coastal lowlands.

**ETYMOLOGY.** The species name is derived from the Latin *gracilis* (slender) in reference to the extremely slender caudal process of the male gnathos.

**DISCUSSION.** Several features of the male gnathos distinguish *P. gracilis* from all other *Pseudopostega*. Principal among these are the extremely slender caudal lobe of the gnathos and the small triangular sclerites immediately anterior to the paired, very reduced, lateral folds. Homology of the triangular sclerites is unknown. There appear to be some papillose sclerotizations within the corpus bursae of the female. However, because some material residue within the corpus obscuring these structures could not be removed by the clearing process, more females need to be examined before this detail can be resolved.

### *Pseudopostega tucumanae*, new species

FIGURES 148, 282–284; MAP 5

**ADULT.** Figure 148. Length of forewing 3.1–4.0 mm. Small, mostly white moth with white forewings largely suffused with light brown over much of basal 2/3 of dorsal area; 2 brown, subapical costal strigulae present, usually a faint brown tornal strigula, and a small, dark brown to fuscous apical spot. Male gnathos moderately broad basally, abruptly constricted to form slender, simple caudal lobe; basal fold absent (Figures 282, 283). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, occasionally darker brown over basal half dorsally, 56–59-segmented. Palpi white to cream; labial palpus with suffusion of brown dorsally.

**Thorax:** White; tegula white, faintly suffused with light brown. Forewing white, largely suffused with light brown over much of basal 2/3 of dorsal area; subapical area of wing basal to first strigula usually suffused with light brown; 2 brown, subapical costal strigulae present; strigula 1 usually darker brown, short, fading into subapical brown area; strigula 2 directed toward dark brown to fuscous apical spot, usually interrupted from adjacent, short brown terminal strigula; a faint brown tornal strigula usually extending obliquely from apical spot; terminal and dorsal



cilia mostly white with light brown suffusion occasionally at apex, becoming light brown along dorsal margin; venter of forewing light brown with basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly cream; foreleg with dorsal surfaces suffused with brown; tarsi of midlegs lightly banded with brown dorsally; banding paler on hind tarsi.

**Abdomen:** Dark grayish brown dorsally, with slight grayish suffusion laterally, white ventrally.

**Male Genitalia:** Figures 282–284. Socii a pair of relatively long, rounded, setose, lobes, widely separated by a distance ~equal to length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad, gradually tapering to rounded or sometimes narrowly subconcave anterior margin. Base of gnathos moderately broad with lateral, lobiform expansions; anterior margin convex, without basal fold; gnathos abruptly narrowing anteriorly to form a moderately long, slender, caudal process (Figure 282). Valva with an elongate cucullar lobe ~0.3× length of genital capsule, bearing a pectinifer consisting of a single row of ~41–43 blunt spines; terminal apex of cucullar lobe rounded, not extended; pedicel moderately broad, approximately 0.3× length of cucullar lobe; valva elongate, length along sacculus ~0.7× length of genital capsule; saccular lobe moderately slender, apex narrowly rounded, elongate, extending almost to distal end of cucullar lobe; basal process of valva tapering to acute apex, exceeding length of costal lobe by half its length. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ARGENTINA: TUCUMÁN: Cerro San Javier, 800 m, 18 Feb 1959, J. F. G. Clarke, slide USNM 32897 (USNM).

**PARATYPES.** ARGENTINA: TUCUMÁN: 11 km S Tacanas, 28 km WSW Trancas, sta. 28, 800 m: 3 ♂, 16–17 Dec 1995, Neth. Ent. Exp. N-Arg., slides DRD 4154, 4131 (RMNH). Cerro San Javier, 800 m.: 2 ♂, 18 Feb 1959, 1 ♂, 19 Feb 1959, J. F.G. Clarke, slide USNM 31848 (USNM). Tucumán: 1 ♂, R.Schreiter, slide USNM 16376 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in December and February.

**DISTRIBUTION.** (Map 5) Known only from the province of Tucumán, in northern Argentina at an elevation of 800 m.

**ETYMOLOGY.** The specific epithet is derived from Tucumán, the province in Argentina from whence the type series was collected.

**DISCUSSION.** The brownish suffusion over much of the dorsal half of the forewings of *P. tucumanae* is diag-

nostic for the species. Males of *tucumanae* are unusual in possessing a pair of lateral, lobiform expansions of the base of the gnathos more characteristic of the *brachybasis* group, but with an elongate, attenuated caudal lobe more similar to several members of the *spatulata* group.

### ***Pseudopostega apotoma*, new species**

FIGURES 149, 285, 286; MAP 5

**ADULT.** Figure 149. Length of forewing 3.4–3.7 mm. Small, mostly white moth with white forewings marked with a small, dark brown dorsal spot along basal third of dorsal margin, 2 dark brown to gray, subapical costal strigulae, a small, fuscous apical spot, and a short, faint terminal strigula. Male with caudal lobe of gnathos moderately short and blunt; basal fold broadly transverse, slender (Figures 285, 286). Female unknown.

**Head:** Vestiture white. Scape white; flagellum brown dorsally, lighter brown ventrally, 54-segmented. Palpi white to cream; labial palpus dark grayish brown laterally and dorsally.

**Thorax:** White; tegula all white. Forewing white marked with a small, dark brown dorsal spot along basal third of dorsal margin, 2 dark brown to gray, subapical costal strigulae, and a short, faint terminal strigula; strigula 1 broad at costa, tapering to inner edge of dark brown apical spot; inner edge of first strigula lighter brown, nearly forming another distinct strigula; strigula 2 more narrow and diffused, terminating before small, fuscous apical spot; terminal strigula light brown, very faint, short, beginning immediately distad of apical spot and ending near tornus; terminal cilia mostly light brown beyond first strigula, white around tornus, becoming light brown again along dorsal margin; venter of forewing brown except for basal, subhumeral white area. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces suffused with brown; midleg with brown suffusion dorsally on tarsomeres 2–5; faint brownish tarsal suffusion on tarsomeres 3 and 4 of hindleg; tibiae of mid and particularly hindlegs with elongate, dark brown scales scattered among cream dorsal spines.

**Abdomen:** Brown dorsally, white ventrally.

**Male Genitalia:** Figures 285, 286. Socii a pair of small rounded, setose lobes, moderately separated by a distance ~0.5× length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broad; anterior margin subtruncate to concave. Base of gnathos broad, abruptly narrowing posteriorly to short, stout, caudal lobe curved slightly

dorsad and possessing a blunt apex; anterior margin slightly concave, with a slender, transverse, basal fold. Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of 39–41 blunt spines; base of pedicel broad,  $\sim 0.2\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe moderately slender, tapering to a rounded to minutely lobed apex extending to apex of pedicel; basal process of valva slender, attenuated, approximately equal to length of slightly stouter costal lobe. Juxta present as a slender, rod-like extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MINAS GERAIS: Nova Lima, 850 m: 1 ♂, 30 Dec 1988, V. O. Becker, slide DRD 4242 (VOB).

**PARATYPES.** BRAZIL: MINAS GERAIS: Nova Lima, 850 m: 1 ♂, 1–10 Jan 1985, V. O. Becker, slide DRD 4240 (VOB). Unaí, 700 m: 1 ♂, 7 Nov 1982, V. O. Becker, slide DRD 4225 (VOB). PARÁ: Capitaó Poco: 1 ♂, 25–31 Jan 1984, V. O. Becker, slide USNM 32849 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in January and November.

**DISTRIBUTION.** (Map 5) Reported only from the states of Minas Gerais and Para in southeastern and northeastern, respectively, Brazil.

**ETYMOLOGY.** The species name is derived from the Greek *apotomos* (cut off, abrupt) in reference to the blunt, stubby form of the caudal lobe of the male gnathos.

**DISCUSSION.** The male gnathos of this species resembles that of *P. pexa* and *P. truncata* in possessing a stout caudal lobe and narrow basal fold. The lobe is more truncated in the latter, and the socii of *pexa* are the most developed. Both species possess broader valvae and lack the dark dorsal spot present on the forewing of *apotoma*.

### ***Pseudopostega pexa* (Meyrick)**

FIGURES 150, 287; MAP 5

*Opostega pexa* Meyrick, 1920:358.—Clarke, 1955:243.—Davis, 1984:18.

*Pseudopostega pexa* (Meyrick).—Davis, 1989:77.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 150. Length of forewing 3.2 mm. Small white moth with mostly white forewings marked by two, dark brown, subapical costal strigulae and small, fuscous

apical spot. Male gnathos approximately quadrate, abruptly constricted to form a stout, broadly rounded caudal lobe; basal fold undeveloped (Figure 287). Female unknown.

**Head:** Vestiture white. Scape white; flagellum ochreous cream dorsally, cream ventrally,  $\sim 53$ – $55$ -segmented. Palpi cream.

**Thorax:** White. Forewing white with 2 dark brown, subapical strigulae; first strigula well developed, strongly oblique, extending to small, fuscous apical spot; area immediately around apical spot suffused with pale yellowish brown; strigula 2 relatively faint, fading before apical spot; terminal cilia white, otherwise ochreous cream; venter of forewing brown. Hindwing brown dorsally and ventrally; cilia yellowish brown. Legs uniformly ochreous cream.

**Abdomen:** Brown dorsally, white ventrally.

**Male Genitalia:** Figure 287. Socii a pair of moderately large, setose lobes widely separated by a distance  $\sim 0.4\times$  length of cucullar lobe. Caudal margin of uncus moderately concave. Tegumen relatively broad. Vinculum broad, anterior margin rounded. Base of gnathos a large, broad, and approximately quadrate plate with slightly thickened, lateral margins, abruptly constricted to form a stout caudal lobe with broadly rounded apex; anterior margin of gnathos slightly concave, sinuate; basal fold undeveloped. Valva with a large cucullar lobe bearing an elongate pectinifer  $\sim 0.5\times$  length of genital capsule, consisting of  $\sim 46$ – $48$  blunt spines; outer apex of cucullar lobe moderately extended, broadly rounded; pedicel very slender at base, expanding toward cucullar lobe; minimum width  $\sim 0.4\times$  length of cucullar lobe; valva elongate,  $\sim$ length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe broad basally, gradually tapering to broadly rounded, setose apex; basal process of valva relatively short, tapering to acute apex; costal process of valva well sclerotized, slender,  $\sim$  equal in length to basal process. Juxta greatly reduced, represented by a short, slender, median, rod-like extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: PARA: Jul 1919, Parish, 3/3 of Meyrick Collection, BMNH ♂ slide 29633 (BMNH).

**MATERIAL EXAMINED.** Holotype ♂.

**HOST.** Unknown.

**FLIGHT PERIOD.** July (unique record).

**DISTRIBUTION.** (Map 5) Known only from the type locality in northeastern Brazil.

**DISCUSSION.** Meyrick described this species from a single male currently in fair condition. No other specimens have since been associated with it. *Pseudopostega pexa* can be distinguished from two morphologically

similar species by characters discussed under the preceding species, *P. apotoma*.

***Pseudopostega diskusi*, new species**

FIGURES 151, 288, 289; MAP 5

**ADULT.** Figure 151. Length of forewing 2.8–3.1 mm. Small, white moth with forewings marked by a subapical, dark brown costal spot and a basal, light brown dorsal spot, 2 dark brown, subapical costal strigulae, and 1 dark brown, tornal strigula; dark brown apical spot reduced. Male gnathos broadly rhomboid, abruptly constricted to form a broad, apically rounded caudal lobe; basal fold short, slightly arched at middle (Figures 288, 289). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum cream to ochre, ~66-segmented. Maxillary and labial palpi cream to white.

**Thorax:** Entirely white. Forewing white, with a dark brown costal spot immediately basal of the costal strigulae, a lighter brown dorsal spot at basal  $\frac{1}{4}$ – $\frac{1}{5}$  of forewing and 2 dark brown, subapical costal strigulae; strigula 1 very short, well separated from costa and terminating into indistinct, dark brown apical spot; strigula 2 well developed, curving around apical spot to tornus; short, dark brown tornal strigula extending from apical spot to tornus; venter of forewing dark brown with basal discal area cream. Hindwing and cilia gray brown dorsally and ventrally except for cream base. Legs mostly cream to white; foreleg fuscous over lateral and dorsal surfaces.

**Abdomen:** Fuscous dorsally, cream ventrally.

**Male Genitalia:** Figures 288, 289. Socii a pair of large, broad, setose lobes, narrowly separated by a distance ~0.2× length of cucullar lobe by deep, V-shaped indentation. Vinculum well sclerotized, broad, gradually narrowing to rounded, anterior margin. Gnathos broadly rhomboid, broadest across truncate caudal margin; abruptly constricted to form a broad, apically rounded, caudal lobe; anterior margin of gnathos strongly sclerotized, with short basal fold slightly arched at middle (Figure 288). Valva with very large cucullar lobe ~0.55× length of genital capsule, bearing ~56 blunt spines; distal apex of cucullar lobe evenly rounded, not extended; pedicel short, broad; valva long, length along sacculus ~0.7× length of genital capsule; sacculus lobe broadly rounded; basal process of valva short but acute; costal process of valva large, terminating near anterior margin of vinculum near basal process of valva. Juxta absent.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** BELIZE: CAYO DISTRICT: Chiquibul Forest Reserve, Las Cuevas Research Station: 1 ♂, 3–16 Apr 1998, secondary tropical forest, R. Puplesis, slide AD 0450 (VPU).

**PARATYPES.** BELIZE: CAYO DISTRICT: Same data as holotype: 2 ♂, 3–16 Apr 1998 (VPU). South of Teakettle Village, Pook's Hill Nature Reserve: 2 ♂, 28–29 Apr 1998, secondary tropical forest, R. Puplesis, slide AD 0451 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** April.

**DISTRIBUTION.** (Map 5) Known only from the Cayo District of central Belize.

**ETYMOLOGY.** This species is named in honor of Arūnas Diškus, Vilnius Pedagogical University, Vilnius, Lithuania, a specialist on the Nepticuloidea and Tischerioidea.

**DISCUSSION.** The male of this species is characterized by the broad base of the gnathos with its stout caudal lobe, relative broad socii, and valvae with enlarged cucullar lobes (length of lobe ~0.55× length of genital capsule).

***Pseudopostega truncata*, new species**

FIGURES 152, 290, 291; MAP 5

**ADULT.** Figure 152. Length of forewing 3.8 mm; female unknown. Small, mostly white moth with almost entirely white forewings marked with 2 short, brown, subapical costal strigulae and a dark brown apical spot. Male gnathos moderately long, stout, with broad, truncate apex; basal fold extremely slender, transverse (Figures 290, 291). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, ~61-segmented. Palpi white; labial palpus dark brown laterally.

**Thorax:** White; tegula with dark brown spot on anterior margin. Forewing white marked with two short, brown, subapical costal strigulae and a dark brown apical spot; first strigula faint, converging slightly toward second, which terminates well before apical spot; a third strigula barely evident across apex of white terminal cilia; cilia becoming more light brown along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs white to cream; foreleg with dorsal surfaces suffused with light brown; protarsi partially cream; midleg with tarsal segments 3–4 faintly suffused with light brown; tarsomeres of hindleg cream.

**Abdomen:** Light golden brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 290, 291. Socii a pair of relatively small, rounded, setose lobes widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal rim of uncus broadly concave. Vinculum broad, tapering slightly to truncate anterior margin. Base of gnathos broad, abruptly narrowing posteriorly to a moderately long, stout, dorsally curved, caudal lobe with a slightly widened, truncate apex; anterior margin of gnathos truncate; basal fold extremely slender, transverse (Figure 290). Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 44\text{--}46$  blunt spines; distal apex of cucullar lobe extended slightly as a small, narrowly rounded lobe; pedicel broad, width  $\sim 0.3\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe moderately slender, tapering slightly to rounded apex; basal process of valva relatively slender, tapering to acute apex, exceeding length of shortened costal lobe by nearly one-half. Juxta developed as a long, slender, rod-like extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: DISTRITO FEDERAL: Planaltina,  $15^{\circ}35'S$ ,  $42^{\circ}47'W$ , 1000 m, 3 Dec 1988, V. O. Becker, 59329, slide DRD 4220 (VOB).

**PARATYPE.** BRAZIL: MARANHAO: Balsas, 400 m; 1 ♂, 15 Jan 1996, V. O. Becker, slide USNM 32815 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in December and January (two records).

**DISTRIBUTION.** (Map 5) Known from only two localities in central Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *truncus* (cut off) in reference to the truncate apex of the caudal lobe of the male gnathos.

**DISCUSSION.** The base of the male gnathos is similar in relative size and form in this species and *P. apotoma*. *Pseudopostega truncata* may be distinguished by the absence of a forewing dorsal spot present in *P. apotoma* and in possessing a more truncate apex on the caudal lobe of the gnathos and longer valvae.

### ***Pseudopostega monstruosa*, new species**

FIGURES 153, 292, 293; MAP 5

**ADULT.** Figure 153. Length of forewing 3.0 mm. Small, mostly white moth with white forewings marked with 3 brown to dark fuscous, subapical costal strigulae. Male with relatively large, oval genital capsule; gnathos broadly triangular, gradually narrowing to a broad, stout

apical lobe with slightly expanded apex; basal fold moderately short, broadly arched (Figures 292, 293). Female unknown.

**Head:** Vestiture white, glossy. Scape white, very glossy; flagellum ochreous cream,  $\sim 56$ -segmented. Maxillary palpus ochreous cream, labial palpus white.

**Thorax:** Entirely white. Forewing white marked with 3 brown to dark fuscous, subapical costal strigulae; strigula 1 short, basally shadowed with ochreous brown; strigula 2 terminating at indistinct apical spot; strigula 3 elongate, curving around spot to tornus; venter of forewing light ochre brown except for basal cream area. Hindwing and cilia light pale brown dorsally and ventrally except for cream suffusion at base. Legs white to cream.

**Abdomen:** Color not examined.

**Male Genitalia:** Figures 292, 293. Socii relatively slender, elongate, widely separated by a distance  $\sim 0.84\times$  length of cucullar lobe; caudal rim of uncus broad, shallowly V-shaped. Vinculum very broad, anterior margin rounded. Gnathos broadly triangular, strongly wrinkled (ventral view), gradually narrowing to a broad, stout apical lobe with slightly expanded and dorsally curved apex; anterior margin of gnathos concave; basal fold moderately short, broadly arched, well separated from gnathal base. Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 52$  blunt spines; terminal apex of cucullar lobe slightly extended as a minute lobe; pedicel unusually large, horn-like, curved, width  $\sim 0.2\times$  length of cucullar lobe; valva moderately short, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe short, stout, tapering to relatively bluntly rounded, tuberculate, setose apex; basal process of valva tapering to almost acute apex, strongly exceeding length of short costal process. Juxta relatively well developed as a straight, long, median rod.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: NAPO: SE of Tena, near Rio Napo, Jatun Sacha and Misahualli,  $77^{\circ}36'W$ ,  $01^{\circ}04'S$ , Amazon premontane tropical forest, 400–500 m, 26–31 Jan 2000, R. Puplesis & S. Hill, VPU ♂ slide AD 0440 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January (single record).

**DISTRIBUTION.** (Map 5) Known only from the type locality in Amazonian premontane rainforest of east-central Ecuador.

**ETYMOLOGY.** The species name is derived from the Latin *monstruosa* (weird, unusual, prodigious, frightening) in reference to the unusually large pedicel and large, wrinkled gnathos in the male genitalia.

**DISCUSSION.** The male of this species differs from other members of the *spatulata* group in the extremely broad basal fold of the gnathos and enlarged pedicel.

***Pseudopostega microlepta* (Meyrick)**

FIGURES 154, 294, 295, 440; MAP 5

*Opostega microlepta* Meyrick, 1915:239.—Clarke, 1955:206.—Davis, 1984:18.

*Pseudopostega microlepta* (Meyrick).—Davis, 1989:76.—Puplesis and Diškus, 2003:418.

**ADULT.** Figure 154. Length of forewing ~2.2 mm. Small white moth with no forewing pattern except for 3 brown, subapical costal strigulae, 1 brown tornal strigula, and a minute fuscous apical spot. Male gnathos with a large, broadly bilobed caudal lobe; basal fold narrow, arched (Figure 294). Papillae anales of female bilobed; lobes slender and widely separated (Figure 440).

**Head:** Vestiture white. Scape lustrous white; flagellum cream to ochreous cream, ~46-segmented. Palpi cream.

**Thorax:** White. Forewing white, immaculate except for following relatively indistinct pattern: 3 brown, subapical costal strigulae; first strigula light brown, terminating in small, yellowish suffused area basal to minute, fuscous apical spot; strigula 2 brown, terminating before apical spot; strigula 3 light brown, extending across terminal cilia and terminating immediately distad of apical spot; tornal spot faint, light brown, extending a short distance down from apical spot; cilia entirely white; venter of forewing cream. Hindwing whitish cream dorsally and ventrally; cilia cream to ochreous cream. Legs whitish cream to cream.

**Abdomen:** Brown (male) or ochreous cream (female) dorsally, lustrous white ventrally.

**Male Genitalia:** Figures 294, 295. Socii a pair of slender, subacute, setose lobes widely separated by a distance ~ equal to length of cucullar lobe. Tegumen relatively broad. Vinculum broad, gradually narrowing to subtruncate anterior margin. Gnathos of unusual form, with a relatively narrow base expanding caudally to form two large triangular lobes; caudal lobe very stout, apex broadly bilobed; basal fold arched caudally with anterior margin deeply incised. Valva with large cucullar lobe ~0.35× length of genital capsule, bearing an elongate pectinifer consisting of ~26 blunt spines; pedicel broad, width ~0.3× length of cucullar lobe; valva moderately long, ~0.6× length of genital capsule; saccular lobe tapering to slender,

setose apex; basal process of valva relatively short, tapering to acute apex; costal process well sclerotized, 2–3× length of basal process. Juxta an oblique, elongate, rod-like process from vinculum.

**Female Genitalia:** Figure 440 (identification ?). Apex of abdomen relatively weakly sclerotized, quickly tapering caudally, with two weakly developed lateral lobes bearing moderately long, terminal setae. Each posterior apophyses fused most its length, very slender and long, subacute. Papillae anales consisting of two, slender, widely separated, papillose, setosae lobes; concavity between lobes smoothly curved. Vestibulum narrow, membranous. Ductus bursae with a dense patch of minute, pectinate spicules that continue for most of its length. Corpus bursae relatively small, elongated; without either spinose or pectinate spicules, but with a faint band bearing numerous external tubercles partially encircling length of bursa; tubercles variable in form, usually moderately elongate with subacute, rounded, or bifurcate apices. Ductus spermathecae nearly as long as bursa copulatrix; proximal half of membranous outer canal very broad, bulbous; distal half more slender, ~1/3 the diameter; inner canal slightly sinuous, gradually broadening distally with ~5 large, compact convolutions terminating in moderately enlarged vesicle.

**LARVA AND PUPA.** Unknown.

**LECTOTYPE.** ♂; GUYANA: MAZARUNI-POTARO: Bartica, Feb 1913, Parish, slide BMNH 29646, Lectotype designated by Davis and Stonis [present designation] (BMNH).

**MATERIAL EXAMINED.** GUYANA: MAZARUNI-POTARO: Bartica: 1 ♂ (lectotype), Feb 1913, Parish, slide BMNH 29646, (BMNH). ECUADOR: Duran: 1 ♀ (paralectotype), Jun 1914, Parish, slide BMNH 29645 (BMNH).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in February (Guyana, unique record) and June (Ecuador, unique record).

**DISTRIBUTION.** (Map 5) Known from two disjunct localities in western Ecuador and lowland, north-eastern Guyana.

**DISCUSSION.** *Pseudopostega microlepta* was described from two syntypes, and no additional specimens have been collected since. Because they represent different sexes, originate from disjunct areas, and are in relatively poor condition, it is not possible to determine if the specimens are conspecific. They agree superficially in size and appearance, but their partially denuded forewing pattern (especially in the female paralectotype) makes diagnostic comparison impossible. The unusual form of the gnathos, particularly the greatly enlarged, bilobed caudal lobe, easily distinguishes the males of this species.

***Pseudopostega spatulata*, new species**

FIGURES 155, 296; MAP 5

**ADULT.** Figure 155. Length of forewing 2.0–2.4 mm. Small, mostly white moth with white forewing marked by 3 dark brown, subapical costal strigulae—the most basal one very shortened and sometimes absent, a short, brown tornal strigula, and a dark fuscous apical spot. Male with apex of gnathal lobe spatulate; basal fold undeveloped (Figure 296). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, ~43–45-segmented. Maxillary palpus white to cream. Labial palpus white, suffused with grayish brown laterally.

**Thorax:** White; anterior margin of tegula grayish brown. Forewing almost entirely white, marked primarily by a dark brown subapical costal strigulae, a dark brown apical, costal strigula, a short, brown tornal strigula, and a dark fuscous apical spot; a vestige of an extremely short, more basal, dark brown costal strigula 1 usually present; area proximal to strigula 2 and apical spot suffused with light yellowish brown; strigula 3 extending in a gradual curve around apical spot to tornus; shorter tornal strigula more basal than apical strigula, extending from apical spot to tornus; terminal cilia mostly white, pale brown beyond strigula 3; venter of forewing brown except for short, basal white streak. Hindwing and cilia golden brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with lateral and dorsal surfaces light grayish brown; midleg with usually dark grayish brown bands dorsally on terminal 2–3 tarsomeres; hindleg white to cream, tarsal banding absent.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figure 296. Socii a pair of short, broad, rounded, setose lobes, widely separated by a distance ~0.7× length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad; anterior margin slightly concave. Gnathos a single, broad, triangular plate strongly tapering to a narrow constriction, then slightly enlarging to a spatulate apex with a subtruncate distal margin; anterior margin slightly concave; basal fold undeveloped. Valva with an elongate cucullar lobe ~0.5× length of genital capsule, bearing a pectinifer consisting of a single row of 33–37 blunt spines; pedicel moderately broad, width ~0.25× length of cucullar lobe; valva relatively short, length along sacculus ~0.6× length of genital capsule; sacculus lobe relatively slender, terminating in a narrow, subtruncate, minutely bilobed apex bearing two elongate

setae; basal process of valva acuminate, extending slightly longer than base of costal lobe. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva (OET), Puerto Viejo de Sarapiquí, 50–150 m, 10°26'N, 84°01'W, 24 Sep 1998, Bosque secundario, L/17/474, slide DRD 4349 (INBIO).

**PARATYPE.** COSTA RICA: HEREDIA: Estación Biológica La Selva, 50–150 m, Puerto Viejo de Sarapiquí, L/15/574: 1 ♂, 19 Feb 1999, INBio-OET, slide USNM 32167 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in February and September.

**DISTRIBUTION.** (Map 5) Known only from the type locality of the La Selva Biological Station, a lowland rainforest area in northeastern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Latin *spatha* (a broad paddle) in reference to the broad, spatulate apex of the gnathal lobe in the male genitalia.

**DISCUSSION.** The male of this species differs from that of the morphologically similar *P. albogaleriella* in the shorter, more stocky caudal lobe of the gnathos, broader socii, and less extended sacculus lobe. From *P. latiapicula*, this species may be distinguished by the broader socii, shorter valvae (sacculus ~0.5× length of genital capsule compared to 0.65 in *latiapicula*), and broader pedicel.

***Pseudopostega albogaleriella* (Clemens)**

FIGURES 12–14, 22, 27–29, 33, 37, 43, 47, 109–126, 156–159, 297, 298, 441–443; MAP 6

*Opostega albogaleriella* Clemens, 1862:131.—Dyar: 1903:547, no. 6228.—McDunnough, 1939:100, no. 9402.—Kimball, 1965:295.—Davis, 1983:3, no. 121.—Brower, 1984:47.

*Opostega albogaleriella* [sic], Forbes, 1923:161.—Eyer, 1963:241.—Davis, 1989:76.

*Pseudopostega albogaleriella* [sic], Knudson and Bordelon, 1999:1.—Heppner, 2003:232.

*Pseudopostega albogaleriella* (Clemens).—Davis, 1989:76.—Poole, 1996:796.—Landry, 1999:67.—Heppner, 2003:232.—Puplesis and Diškus, 2003:417.

*Opostega napaeella* Clemens, 1872:42.—Davis, 1983:3, no. 121 [synonym of *albogaleriella*]; 1989:76.—Poole, 1996:796.—Heppner, 2003:232.—Puplesis and Diškus, 2003:417.

*Opostega nonstrigella* Chambers, 1881:296.—Dyar, 1903:547, no. 6230.—Forbes, 1923:161 (synonym of *albogalleriella* [sic]).—McDunnough, 1939:100, no. 9403.—Davis, 1983:3, no. 123.

*Pseudopostega nonstrigella* (Chambers).—Eyer, 1963:237.—Davis, 1989:76.—Poole, 1996:796.—Knudson and Bordelon, 1999:1.—Puplesis and Diškus, 2003:417.

*Opostega bistrigulella* Braun, 1918:245.—McDunnough, 1939:100, no. 9407.—Eyer, 1963:239.—Davis, 1983:3, no. 120.—[New synonymy].

*Pseudopostega bistrigulella* (Braun).—Davis, 1989:76.—Puplesis and Diškus, 2003:415.

**ADULT.** Figures 156–159. Length of forewing in both sexes varying from 3.0 mm to 5.3 mm, occasionally to 6.0 mm. Moderately small, white moth with variable forewing patterns; a dark brown spot midway along dorsal margin present or absent, usually with 2–3 dark brown, subapical costal strigulae, 1–2 pale to dark brown tornal strigulae, and a small, black apical spot. Male gnathos terminating in a spatulate lobe; basal fold narrow, caudal margin transverse to slightly arched (Figure 297). Papillae anales of female consisting of a pair of small, approximately oval to slightly elongate, setose, papillose lobes arising from a common base (Figure 442).

**Head:** Vestiture white. Scape white; flagellum pale yellowish ochreous to brown 58–64-segmented. Palpi from whitish to cream; apical segment of maxillary palpus sometimes irrorated with brown; labial palpus with suffusion of light brown dorsally.

**Thorax:** White; tegula occasionally with brownish suffusion on anterior margin. Forewing mostly white, sometimes with grayish or brownish tinge beyond middle over distal area; median dorsal spot variable, absent to strongly developed, usually pale brownish, flattened along dorsum; apical spot black and always distinctive; subapical strigulae variable in color from yellowish brown to fuscous, and in number from usually three costal and two tornal to two costal and one tornal; the most distal costal and tornal strigulae sometimes joined into a common (single) outwardly curved strigula; first costal and first tornal strigulae occasionally shadowed along proximal margins with a suffusion of yellowish brown or grayish; some specimens with a suffused area of yellowish brown just before apical spot; terminal cilia mostly white, becoming cream to light brown beyond distal strigula; dorsal cilia white; venter of forewing yellowish brown to brown, with subhumeral white area. Hindwing usually brownish, sometimes pale yellowish brown or distinctly yellowish cream dorsally and ventrally;

cilia light brown to cream or occasionally white. Legs from white to light yellowish brown; forelegs with brown suffusion dorsolaterally; dorsal surfaces of mid- and hindlegs usually with less suffusion, more cream; tarsomeres of midleg mostly brown dorsally.

**Abdomen:** Usually cream to yellowish cream laterally; usually yellowish brown to grayish brown dorsally and paler, yellowish cream ventrally; venter of abdomen sometimes reflecting brown at a certain angle.

**Male Genitalia:** Figures 125, 126, 297, 298. Socii a pair of short, setose lobes, widely separated by a distance  $\sim 0.8\times$  length of cucullar lobe; excavation between the lobes deep and distinctly triangular; caudal rim of uncus along excavation strongly sclerotized. Vinculum broad, tapering to rounded or subtruncate anterior margin. Gnathos with broad base, abruptly constricted to form prominent, slender, caudal lobe with spatulate apex; caudal margin of lobe variable, either truncate to shallowly excavated; anterior margin of gnathos variable within populations, truncate to slightly excavated; basal fold usually present but weakly developed, slender, transverse to slightly arched. Valva with relatively large cucullar lobe bearing moderately long pectinifer  $\sim 0.35\text{--}0.45\times$  length of genital lobe, consisting of about 38–40 blunt spines; pedicel relatively broad; distal lobe of cucullus gradually narrowed and usually slightly bifid; valva elongate, length along sacculus  $\sim 0.75\text{--}0.85\times$  length of genital capsule; sacculus elongate, moderately stout, and setose; basal process of valva moderately long, straight and acute; costal process of valva longer than basal one, well sclerotized and slightly narrowing distally. Juxta usually undeveloped or present as a relatively short, acuminate or very weak, slender rod-like extension from vinculum (latter condition variably present only in some western specimens).

**Female Genitalia:** Figures 47, 441–443. Apex of abdomen superficially acute, but minutely bilobed. Each posterior apophysis fused for most of its length, slender, elongate, acute. Papillae anales consisting of a pair of small, approximately oval to moderately elongate, setose, papillose lobes on a common base; length of lobe  $\sim 1.0\text{--}1.5\times$  width. Vestibulum narrow, membranous. Ductus bursae moderately broad, with a dense patch of minute pectinate spicules which enlarge (but still pectinate) on caudal portion of corpus bursae. Corpus bursae large, suboval; covered internally with a relatively large zone of numerous, very slender, elongate, densely arranged spicules; a faint, approximately elliptical band of minute, external tubercles extending over much of anterior half of corpus bursae. Ductus spermathecae approximately  $2/3$  the length of bursa copulatrix; proximal part of membranous outer canal very short and broad, saccate; remainder of outer canal slender

and 2× length of basal third; inner canal sinuous, terminating in ~4–4.5 moderately large convolutions; convolutions less compact than in most *Pseudopostega*; vesicle terminating in an elongate, tubular lagena and a slender membranous utriculus of ~equal lengths.

LARVA AND PUPA. Unknown.

TYPES. Holotype ♂; *Opostega albogaleriella* Clemens, labeled as Type 7498 [USA: PENNSYLVANIA: ?Easton], “collected on the table under my gas light”, 9 Jul 1861, Clemens, ♂ slide 3321, photograph on file USNM (ANSP). Holotype ♂; *Opostega napaeella* Clemens 1872 [USA: PENNSYLVANIA: ?Easton] ANSP. Lectotype (designated by Davis, 1989) ♂; *Opostega nonstrigella* (Chambers), [locality not stated, (ANSP); USA: ?MASSACHUSETTS: Amherst], slide USNM 16371 (USNM). Lectotype (designated by Davis, 1989) ♂; *Opostega bistrigulella* Braun, USA: CALIFORNIA: Loma Linda, 23 Apr, G. R. Pilate, photograph on file USNM (ANSP).

MATERIAL EXAMINED. CANADA: NOVA SCOTIA: Petite-Rivière: 1 ♂, 20 Jul 1925, J. McDunnough, MIC slide 3514 (CNC). ONTARIO: Bobcaygeon: 1 ♂, 16 Jun 1931, 1 ♀, 29 Jun 1932, J. McDunnough, MIC slide 3514, ♀ slide 3513 (CNC). QUEBEC: La Sarre, Abitibi-Ouest: 1 ♂, 13 Jul 1998 (CNC). USA: ALABAMA: Baldwin Co.: Bon Secour National Wildlife Refuge: 1 ♂, 17 Apr 1993, 3 ♂, 11 May 1994, 5 ♂, 11–16 May 1994, 3 ♂, 12 May 1994, 1 ♂, 7 Aug 1994, 4 ♂, 8–9 Aug 1994, R. Brown & D. M. Pollock, slides USNM 32717, 32715 (MEM, USNM); 1 ♂, 5 Sep 1988, 1 ♂, 5–6 Sep 1988, R. L. Brown & J. McGown (MEM); 1 ♂, 3 Apr 1994, 1 ♂, 14 Jun 1994, D. M. Pollock (MEM); 5 ♂, 11 May 1994, 2 ♂, 1 ♀, 11–16 May 1994, 1 ♂, 12 May 1994, 1 ♂, 14 May 1994, R. W. Hodges, slides USNM 32445, 33310; 1 ♀, 11 Oct 1993, D. R. Davis (USNM). ARIZONA: Coconino Co.: West Fork, 16 mi SW Flagstaff, 6500 ft [~1980 m]: 1 ♂, 19 Jul 1961, 13 ♂, 7 Aug 1961, 9 ♂, 3 ♀, 10 Aug 1961, 21 ♂, 13 Aug 1961, 1 ♂, 20 Aug 1961, slides USNM 16623(SEM), 16628, 16444, 16445 (SEM), 16347 (SEM), 16348, 16569 (SEM), 17177, 17930, 17931, 18364 (SEM), 28601 (SEM), 28731, 28799, 32442, R. W. Hodges (USNM). ARKANSAS: Washington Co.: Devil’s Den St. Park: 1 ♂, 4 Jun 1966, R. W. Hodges, slide USNM 17184 (USNM). CALIFORNIA: Los Angeles Co.: Los Angeles, Mt. Washington District, 840 ft [~256 m]: 1 UNK, 25 May 1976, J. P. & K. E. Donahue (LACM). Monterey Co.: Big Creek Reserve: 1 ♂, 11–13 Apr 1985, J. Powell, slide DRD 4373 (UCB). Placer Co.: Colfax: 2 ♂, Apr, A. H. Vachell, (USNM). Riverside Co.: Bautista Canyon: 7 mi SE Hemet: 5 ♂, 24 May 1995, D. C. Frack (LACM). Baustista Canyon, San Jacinto: 3

♂, 1 UNK, 10 Apr 1971, D. C. Frack (LACM, USNM). Bundy Canyon, 9 mi S Perris, 1660 ft: 1 ♂, 25 May 1976, R. J. Ford (LACM). San Bernardino Co.: Loma Linda: 1 ♂ (lectotype, *Opostega bistrigella* Braun), 23 Apr, G. R. Pilate, photograph on file USNM (ANSP); 1 ♂, 16–23 Mar 1997, (USNM). San Diego Co.: Del Mar: 1 ♂, 4 Apr 1943, J. A. Comstock (LACM). Naval Air Station Miramar, 3: 1 ♂, 13 Mar 1997, N. Bloomfield (USNM); Naval Air Station Miramar, 4: 1 ♂, 29 Mar 1997, 1 ♂, 13 Apr 1997, N. Bloomfield (USNM); Naval Air Station Miramar, 5: 1 ♂, 26 Mar 1997, N. Bloomfield, slide USNM 32451 (USNM); Naval Air Station Miramar, 7: 1 ♂, 14 Feb 1997, 3 ♂, 26 Mar 1997, N. Bloomfield (USNM); Naval Air Station Miramar, 9: 1 ♂, 22 Mar 1997, N. Bloomfield (USNM). San Diego: 1 ♂, 11–22 May, 1 ♂, 13–22 May, K. R. Coolidge, slide USNM 17175 (USNM); 1 ♂, 8–15 Apr, 16 ♂, 16–23 Apr, 37 ♂, 24–30 Apr, slides USNM 16448, 16449, 17183, 28600, 28691, 28730, 28799, 28692 (SEM), 28800, 32440 (USNM). San Diego: 1 ♂, 11 Feb 1924, 1 ♂, 3 Mar 1924, 1 ♂, 5 Mar 1924, 1 ♂, 11 Mar 1924, 2 ♂, 27 Apr 1924, 2 ♂, 5 Aug 1924, slides 60–11, 60–12, 60–13 (LACM). San Luis Obispo Co.: Dune Lakes, 3 mi S Oceano, 1 ♂, 11 Jul 1973, J. Powell, black light trap (UCB). Paso Robles, 3 mi W: 1 ♂, 28 Apr 1968, P. Opler (UCB). Ventura Co.: Little Sycamore Canyon: 1 ♂, 21 Mar 1993, D. M. Pollock, slide DRD 4152 (MEM). CONNECTICUT: New Haven Co.: East River: 1 ♂, 1 ♀, Jul 1912, C. R. Ely, slide USNM 17180 (USNM). FLORIDA: Alachua Co.: 10 mi NW Gainesville, University of Florida Horticulture Unit: 1 ♂, 1–5 Apr 1977, J. B. Heppner, slide DRD 4330 (FSCA). Escambia Co.: Big Lagoon State Recreation Area: 1 ♂, 28–31 Jul 1999, J. B. Heppner (FSCA). Pensacola: 1 ♂, 2 Jul 1961, 1 ♂, 27 Sep 1961, S. Hills, slides USNM 32439, 33269 (USNM). Highlands Co.: Lake Placid, Archbold Biol. Sta.: 1 ♂, 4 Apr 1959, 3 ♂, 8–15 May 1964, 1 ♂, 16–22 May 1964, R. W. Hodges, slides USNM 32441, 32443, 17181 (USNM). Sarasota Co.: Siesta Key: 1 ♂, 19 Mar 1952, C. P. Kimball, (USNM). ILLINOIS: Pope Co.: Burden Falls, 4 km SW Delwood: 1 ♀, 22 Jul 1985, J. Powell (UCB). LOUISIANA: Bossier Par: Barksdale A.F.B.[Air Force Base]: 1 ♂, 6 May 1996, slide USNM 33147 (USNM); 1 ♂, 3 Jun 1996, 1 ♂, 21 Aug 1996, DNA D-163, D. M. Pollock (MEM). Calcasieu Par: 6 mi ESE Buhler: 4 ♂, 20–21 May 1993, R. L. Brown & D. M. Pollock, slides USNM 32714, 32118 (MEM, USNM). Natchitoches Par: Vowells Mill: 1 ♂, Apr 1902, slide 4369 (MCZ). MAINE: [county unknown]: Camp Colby: 1 ♀, 31 Jul (USNM). Aroostook Co.: Allagash: 2 ♂, 27 Jul (USNM). Ashland: 1 ♂, 16 Jul, 1 ♂, 29 Jul (USNM). Franklin Co.: Oquossoc: 1 ♂, 12



Jul, slide USNM 33066 (USNM). Penobscot Co.: Lincoln: 2 ♂, 17 Jul, slide USNM 20352 (USNM). Millinocket: 1 ♂, 5 Aug, slide USNM 20345 (USNM). Patten: 1 ♂, 26 Jul (USNM). Piscataquis Co.: Chesuncook: 1 ♂, 10 Aug, slide USNM 20349 (USNM). Greenville: 1 ♂, 8 Jul, slide USNM 20354 (USNM). Kokadjo: 1 ♂, 19 Jul (USNM). Somerset Co.: Dennistown: 1 ♂, 19 Jul, 5 ♂, 22 Jul, 2 ♂, 29 Jul, 3 ♂, 5 Aug, 4 ♂, 5 Aug, 7 ♂, 6 Aug, 3 ♂, 8 Aug (USNM). Washington Co.: Topsfield: 1 ♂, 27 Jul (USNM). MARYLAND: Montgomery Co.: Plummer's Island: 1 ♂, 1 Jun 1903, 1 ♂ 1 Jul 1903, A. Busck, slide USNM 33118, (LACM, USNM). MISSISSIPPI: Holmes Co.: Holmes Co. State Park: 2 ♂, 3 Jun 2001, R. L. Brown (MEM). Jackson Co.: I-10 at Escatawpa River: 2 ♂, 1 ♀, 13 Apr 1991, D. R. Pollock, slide USNM 32918, 32711; 1 ♂, 21 Apr 1990, R. L. Brown (MEM, USNM). Winston Co.: Noxube N.W. Refuge: 1 ♂, 14 Jun 1992, T. L. Schiefer (MEM). Tombigbee National Forest: 2 ♂, 10 Aug 1999, J. MacGown (MEM). MISSOURI: Washington Co.: Washington St. Park: 1 ♂, 7 Jun 1973, J. R. Heitzman, slide USNM 23643 (USNM). NEW YORK: Herkimer Co.: Big Moose, Adirondack Pk.: 1 ♂, 19 Jul 1973, E. Jäckh, slide Jäckh 10411 (USNM). Madison Co.: Tuscarora Lake: 1 ♀, 28 Jun 1975, E. Jäckh, slide Jäckh 10430 (USNM). PENNSYLVANIA: Philadelphia Co.: [?Easton]; 1 ♂ (holotype, *Opostega albogaleriella* Clemens, labeled as Type 7498), "collected on the table under my gas light," 9 Jul 1861, Clemens, slide 3321, photograph on file USNM (ANSP); 1 ♂; (holotype, *Opostega napaeella* Clemens) ANSP. TENNESSEE: Greene Co.: 11 mi S Greeneville: 1 ♀, 1 Jul 1982, J. Whitfield, slide 4371 (UCB). Wilson Co.: Cedars of Lebanon S.F.: 1 ♂, 9 Jun 1997, R. L. Brown & J. MacGown (MEM). TEXAS: Fort Bend Co.: Brazos Bend State Park: 1 ♂, 7 May 1989, E. C. Knudson (TLS). Harris Co.: Bellaire: 1 ♂, 23 Apr 1988, E. C. Knudson (TLS). Hidalgo Co.: Sal de Rey NWR: 1 ♂, 23 Apr 2000, E. C. Knudson (TLS). San Jacinto Co.: Coldspring, Sam Houston National Forest: 1 ♂, 1 May 1988, E. C. Knudson, slide USNM 32489 (USNM). Double Lake Campground, Sam Houston National Forest: 1 ♂, 29 Jul 1990, E. C. Knudson (TLS). San Patricio Co.: R & B Welder Refuge: 1 ♂, 15–19 Aug 1985, J. E. Gillaspay (TLS). Tyler Co.: BITH Ranch HS., Turkey Creek Unit: 1 ♂, 21–22 Apr 1996, E. C. Knudson (TLS).

HOST. Unknown.

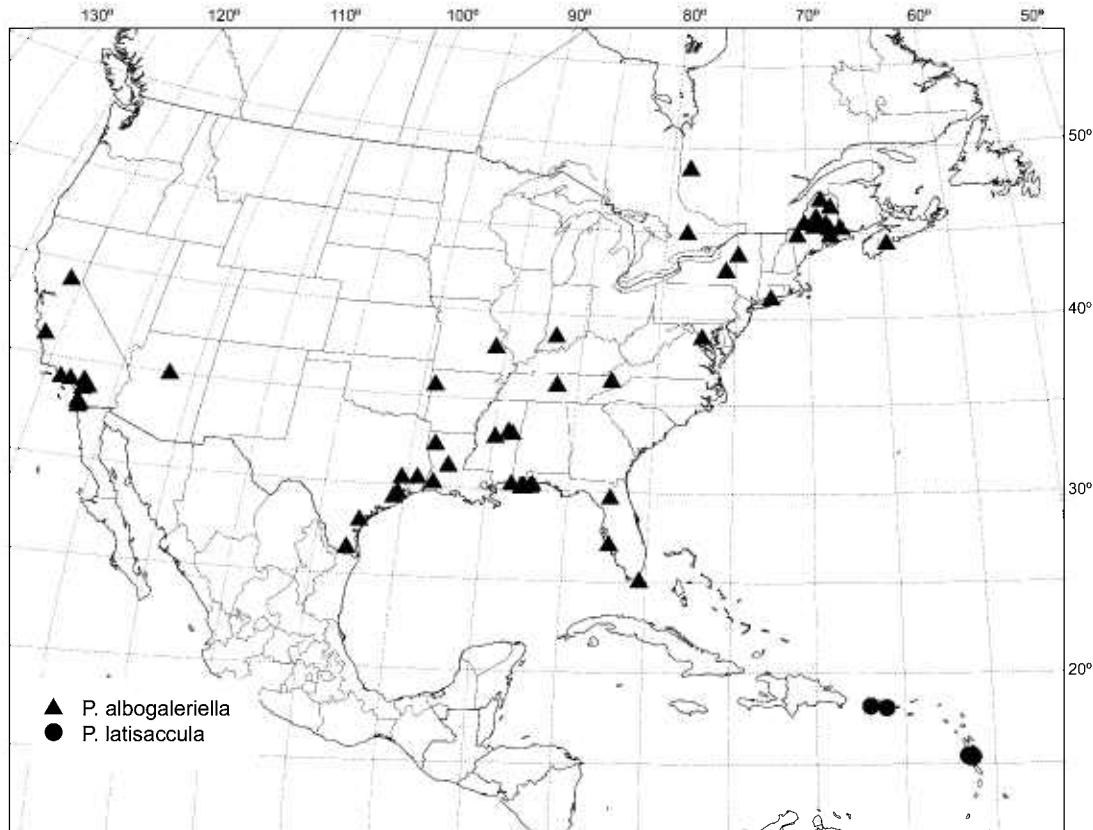
FLIGHT PERIOD. Adults of this species are encountered primarily during June and July into early August over the northern part of their range. Possibly two broods occur through the southern USA, with adults appearing from February to June and from August to as late as October.

DISTRIBUTION. (Map 6) Widely distributed through eastern North America from Nova Scotia to central Florida and southeastern Texas, and in the southwestern USA through areas of California and Arizona.

DISCUSSION. This is the most common, widespread species of Opostegidae in North America and was the first species discovered for the New World. Externally the species is quite variable. Unfortunately, the species originally was described from a single, imperfect specimen as a moth with entirely white forewings and possessing only a black apical spot. Examination of the type revealed faint remnants of brownish strigulae, which indicate a partially denuded specimen. The holotype currently possesses only the right forewing and hindwing, and its head is contained in a glycerin vial (formerly glued to a specimen mount). Other material of *P. albogaleriella* examined in the course of this study displayed great variability in forewing pattern and hindwing color. Normal within-population variation includes specimens exhibiting different numbers of apical strigulae and presence or absence of the dorsal spot. *Pseudopostega bistrigulella*, described by Braun (1918) from California, also varies significantly in forewing pattern. No consistent characters distinguishing *P. bistrigulella* from *albogaleriella* were found, and consequently *bistrigulella* has been synonymized. The forewing dorsal spot may be absent to strongly developed within populations, or occasionally even between the right and left wings of a single specimen. Examination of the lectotype of *Pseudopostega nonstrigella*, a species described by Chambers (1875) on the basis of the absence of the costal and tornal strigulae, also revealed no consistent distinction from *albogaleriella*. The lectotype of *nonstrigella* is now in very poor condition, partially denuded, and lacking the right forewing and abdomen.

The type localities of *albogaleriella* and *nonstrigella* are somewhat in doubt. In his original description Clemens (1862) implies that he collected the type of *albogaleriella* in his home (Easton, Pennsylvania). Similarly, Chambers (1881) did not actually mention the type locality for *nonstrigella*, although he did state under nearly every species proposed in that paper that he received the specimens from L. W. Goodell of Amherst, Massachusetts.

The gnathos of *P. albogaleriella* most resembles that of *P. latiapicula* in possessing a spatulate caudal lobe borne on a relatively slender stalk. In addition to being restricted to a more temperate region, *albogaleriella* differs in having the base of the gnathos more evenly rounded laterally and the saccular lobe of the valva more developed. The corpus bursae of female *albogaleriella* is unusual for the genus and similar to that of *P. quadristrigella* in possessing



MAP 6. Distribution of *Pseudopostega albogaleriella* (*spatulata* species group) and *P. latisaccula* (*latisaccula* species group).

a dense concentration of slender spicules lining much of the internal surface of the caudal half. Males of *P. quadristrigella* with the bifurcation of the apical lobe reduced (Figure 384) may also sometimes be confused with *albogaleriella*. Sequence data amplified from the gene CO1 by the Hebert Laboratory indicate a much closer relationship between *albogaleriella* and *quadristrigella* than we have proposed in this study. The relationships of these two taxa should be reevaluated once better preserved specimens for DNA analysis over a greater portion of both species' broad distribution can be examined. Their genetic relationship within *Pseudopostega* should also be based upon a better sample of more species than was possible for this study.

### ***Pseudopostega denticulata*, new species**

FIGURES 160, 299–301; MAP 5

**ADULT.** Figure 160. Length of forewing 2.3 mm. Small white moth with little forewing pattern other than

three subapical costal strigulae and small apical spot. Male gnathos broadly triangular, dentate laterally, abruptly constricted to form broadly spatulate caudal lobe; basal fold undeveloped (Figures 299, 300). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum cream, ~52-segmented. Maxillary and labial palpi cream.

**Thorax:** Entirely white. Forewing white with three brown, subapical costal strigulae and a small, black apical spot; terminal strigula 3 extending distally around apical spot and twice as long as strigulae 1 and 2; terminal cilia very light brown; venter of forewing light brown with basal portion of discal area cream. Hindwing and cilia very pale brown. Legs mostly cream; foreleg with fuscous suffusion over lateral and dorsal surfaces.

**Abdomen:** Light brown dorsally, cream ventrally.

**Male Genitalia:** Figures 299–301. Socii a pair of short narrow setose lobes, separated a distance ~equal to length of cucullar lobe. Caudal rim of uncus nearly truncate. Vinculum with anterior margin broadly rounded. Gnathos with broad base, dentate laterally and caudally, tapering to

short but abruptly broad, spatulate caudal lobe; anterior margin of gnathos weakly sclerotized, indistinct, without a basal fold (Figures 299, 300). Valva with elongate, relatively slender cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing  $\sim 42$  blunt spines; distal apex of cucullar lobe evenly rounded, not extended; pedicel short, moderately narrow, width  $\sim 0.15\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe short and broad; basal process of valva long and narrow, gradually tapering to acute end; costal process of valva very slender and elongate, terminating near anterior margin of vinculum near basal process of valva. Juxta absent.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: NAPO: SE of Tena, near Rio Napo, Jatun Sacha and Misahualli,  $77^{\circ}36'W$ ,  $01^{\circ}04'S$ , 400–500 m: 1 ♂, 26–31 Jan 2000, Amazon pre-montane tropical forest, R. Puplesis & S. Hill, slide AD 0439 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January (?? single record).

**DISTRIBUTION.** (Map 5) Known only from two ?? localities in eastern and western Ecuador.

**ETYMOLOGY.** The specific name is derived from the Latin *denticulata* (covered with small denticles, pointed) as suggested by the laterally dentate gnathos diagnostic for this species.

**DISCUSSION.** The gnathos of this species is unique in the development of dentate ridges caudally and laterally. The caudal lobe terminates in the broadest, most spatulate apex in the group.

### The *latisaccula* group

The sole member of this group, *P. latisaccula*, is distinguished by the greatly enlarged male sacculus that extends nearly to the caudal margin of the cucullar lobe, a development exceeding that of any other known opostegid. The gnathos is narrowly triangular, subacute, and lacks a basal fold. The vinculum is elongate and extends almost half the length of the genital capsule beyond the base of the valvae. A juxta is absent. The ovipositor, including abdominal segments 7 and 8, is unusually long in *P. latisaccula*. The paired pseudapophyses in tergum 7 and sternum 7 of the female are unique for the family.

Sequence data from the CO1 gene of *latisaccula* were amplified from a specimen collected in 1965, which was the oldest material used in Hebert's opostegid analyses. Based on 469 base pairs recovered, the preliminary results associated *latisaccula* between *brevifurcata* + *brevivalva* (*divaricata* group) and *attenuata* (*triangularis* group).

### *Pseudopostega latisaccula*, new species

FIGURES 161, 302, 303, 444, 445; MAP 6

**ADULT.** Figure 161. Length of forewing 2.0–2.4 mm. Small, mostly white moth with white forewings typically marked by a small, elongate, dark brown to fuscous dorsal spot midway along hind margin, an elongate, dark brown to fuscous spot near apex of costa obliquely slanted to termen, and a single, fuscous, subapical costal strigula; apical spot absent. Male with saccular lobe of valva broadly expanded, round; gnathos narrow, tapering slightly to an indistinct, stout, subacute caudal lobe; basal fold absent (Figure 302). Papillae anales of female a reduced, widely separated pair of setose lobes; eighth abdominal segments with elongate dorsal and ventral paired pseudapophyses (Figures 444, 445).

**Head:** Vestiture white. Scape white; flagellum pale brown to brown,  $\sim 44$ – $52$ -segmented. Maxillary palpus white to cream. Labial palpus white, suffused with brown laterally.

**Thorax:** White; tegula entirely white. Forewing white, marked by a small, elongate, dark brown to fuscous dorsal spot midway along hind margin, an elongate, dark brown to fuscous subterminal spot near apex of costa obliquely slanted to termen, and a single, fuscous, subapical strigula extending across base of cilia from costa often to tornus; apical spot absent; terminal cilia brown beyond strigula, then lighter brown along tornus and outer dorsal margin; venter of forewing brown except white at base over humeral area. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly cream; foreleg with lateral and dorsal surfaces brown; midlegs with terminal three tarsomeres mostly brown.

**Abdomen:** Light brown dorsally, white to cream ventrally. Sternum 7 of female relatively elongate, extending well caudad of papillae anales; both tergum 7 and sternum 7 with a pair of long, slender, flattened pseudapophyses; tergal pseudapophyses with anterior end strongly curved mesad.

**Male Genitalia:** Figures 302, 303. Socii a pair of very small, rounded, setose lobes, narrowly separated a distance about equal to width of gnathos base; caudal rim of uncus subtruncate. Vinculum elongate, rather abruptly constricted anteriorly beyond bases of valvae; anterior margin narrow, slightly round to subtruncate. Gnathos elongate, narrow, tapering slightly to a slender, round apex; anterior margin slightly concave; basal fold undeveloped. Valva with a large, semicircular shaped cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer consisting of 42–46

blunt spines; pedicel strongly curved mesad, slender, elongate, width  $\sim 0.08\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe greatly enlarged as a broad, flattened, rounded lobe, extending well beyond apex of pedicel and either completely or nearly across cucullar lobe (Figure 302); basal process of valva relatively short, acute, terminating near apex of costal process. Juxta indistinct, membranous.

**Female Genitalia:** Figures 444, 445. Abdomen tapering to a slender, slightly cleft, setose apex. Each posterior apophysis fused for most its length, very slender and long. Papillae anales a pair of widely separated, small, rounded lobes connected by a slender, broadly U-shaped ninth tergite. Vestibulum membranous. Ductus bursae elongate, equaling length of corpus bursae, densely covered internally with pectinations consisting of short rows of 2–5 minute spicules; these becoming more fused into longer, dentate, transverse pectinations near junction with the corpus bursae; beyond this typically curved junction zone, pectinations gradually disappearing further into elongate corpus bursae; signum consisting of a long, slender, inverted U-shaped, nearly circular band of minute, conical to truncate, external tubercles. Ductus spermathecae short, approximately the length of ductus bursae; outer membranous canal reduced in diameter, closely adhering to tubular inner canal; latter usually undergoing 4–5 convolutions before enlarging to form a terminal, sigmoid vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; DOMINICA: 2 mi [3.2 km] NW Pont Casse, 16 May 1965, D. R. Davis (USNM).

**PARATYPES.** DOMINICA: 0.4 mi [0.64 km] NW Pont Casse: 2 ♂, 2 ♀, 6 May 1964, O. S. Flint (USNM). 1.5 mi [2.4 km] NW Pont Casse: 7 ♂, 13 ♀, 1 UNK, 3 Apr 1965, D. R. Davis, slides USNM 16351, 16352 (SEM), 16353, 16354 (SEM), 32424, 32483 (USNM). 2 mi [3.2 km] NW Pont Casse: 3 ♀, 1 UNK, 20 Apr 1965, 4 ♀, 2 May 1965, 1 ♀, 5 May 1965, 1 ♀, 16 May 1965, 1 UNK, 17 May 1965, 2 UNK, 18 May 1965, 1 UNK, 25 May 1965, D. R. Davis, slides USNM 28764, 28765 (USNM). 5 mi [8 km] E Pont Casse: 1 ♂, 27 Jan 1965, J. F. G. & T. M. Clarke (USNM). Central Forest Reserve: 1 ♂, 3 ♀, 6 UNK, 3 May 1965, D. R. Davis, slide USNM 28763 (USNM). Clarke Hall: 2 ♂, 2 ♀, 23 Apr 1964, 1 ♂, 25 Apr 1964, O. S. Flint (USNM). Pont Casse: 1 ♂, 3 ♀, 6 Apr 1965, D. R. Davis (USNM). Rosalie: 1 UNK, 15 Jun 1965, D. R. Davis (USNM). Trafalgar: 1 ♂, 21 May 1965, D. R. Davis (USNM). PUERTO RICO: Carite, 500 m: 1 ♂, 17 Aug 1987, V. O. Becker, slide USNM 32478 (USNM). Centro Vacacional, Monte del Estado, nr. Maricao, 650 m: 2 ♂, 1–9 Mar 1971, C. F. Kimball, slide USNM 32738 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** This species probably flies throughout most of the year with records for January, March–June, and August reported.

**DISTRIBUTION.** (Map 6) Probably widespread in the Greater Antilles but currently known only from Dominica, where it was found to be common, and Puerto Rico.

**ETYMOLOGY.** The species name is derived from the Latin *latus* (broad, wide) and *sacculus* (little sac) in reference to the diagnostic, greatly enlarged saccular lobe of the male valva.

**DISCUSSION.** *Pseudopostega latisaccula* was the most common opostegid encountered during the three-year Bredin-Archbold Smithsonian Biological Survey of Dominica. The females are unusual in possessing the most slender, elongate ovipositor (including abdominal segments 7 and 8) known for the Opostegidae. This specialization suggests a modification in oviposition behavior that may involve depositing eggs in a more concealed site than normal. The paired pseudopophyses within segment 7 may have developed as additional support for this prolongation.

### The *triangularis* group

Males of the *triangularis* group are characterized by a generally triangular gnathos (viewed ventrally), which gradually tapers caudally to either an acute apex, or to a more attenuated, slender, caudal lobe. The valvae are moderately long (length along the sacculus ranging from  $\sim 0.5$ – $0.7\times$  the length of genital capsule), with well-developed saccular lobes. A juxta is usually absent.

### *Pseudopostega attenuata*, new species

FIGURES 162, 306, 307, 446, 447; MAP 7

**ADULT.** Figure 162. Length of forewing 1.8–2.2 mm. Small, mostly white moth with white forewings marked by 2 dark brown, subapical, costal strigulae and an elongate, slightly darker, fuscous apical spot. Male with conical gnathal lobe and relatively elongate, attenuated vinculum; basal fold well developed, caudal margin slightly arched (Figure 306). Papillae anales of female consisting of a pair of very small, contiguous lobes (Figure 447).

**Head:** Vestiture white. Scape white; flagellum light golden brown,  $\sim 47$ – $51$ -segmented. Maxillary palpus white to cream. Labial palpus white, suffused with dark brown laterally.

**Thorax:** White; extreme anterior margin of tegula grayish brown. Forewing almost entirely white with 2 dark brown subapical costal strigulae, the basal most relatively

broad along costa; an elongate, darker apical spot trailing off apically as a short tornal strigula; the area immediately adjacent to spot light brown; terminal cilia light brown beyond strigulae and along dorsal margin, white in between (tornal area); venter of forewing brown except for short, basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with lateral and dorsal surfaces dark grayish brown; midleg with distal two tarsomeres dark brown dorsally; distal tarsomeres light brown dorsally on hindleg.

*Abdomen:* Light golden brown dorsally, mostly white ventrally, occasionally with grayish brown suffusion laterally.

*Male Genitalia:* Figures 306, 307. Socii a pair of relatively long, slender, setose lobes, narrowly separated by a distance  $\sim 0.25\times$  length of cucullar lobe; caudal rim of uncus narrow, truncate. Vinculum elongate, moderately broad at juncture with tegumen, then tapering anteriorly to narrow, rounded, anterior apex. Gnathos narrow, with well-developed, slightly arched basal fold distinctly set off from caudal half, the latter gradually tapering to subacute apex; anterior margin of gnathos usually strongly convex. Valva with an elongate cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer consisting of 54–58 blunt spines; pedicel relatively narrow, minimum width  $\sim 0.17\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe slender, tapering, extending halfway to apex of pedicel; basal process of valva relatively stout, approximately equaling length of costal process. Juxta undeveloped.

*Female Genitalia:* Figures 446, 447. Abdomen tapering to a slender, slightly cleft apex. Each posterior apophysis fused most of its length, moderately long, slender. Papillae anales a pair of very small, contiguous lobes, each bearing  $\sim 6$  setae of variable lengths; longest setae about  $0.75\times$  length of apophyses; maximum length of lobes  $\sim 0.2\times$  width of entire base (Figure 447). Vestibulum relatively narrow, membranous. Ductus bursae slender, moderately elongate, with a dense, elongate zone of pectinations composed of rows of usually 2–5 minute spicules. Corpus bursae elongate, slender, with an extremely dense zone of mostly broad, pectinate to serrate spicules completely lining walls from caudal separation of bursa with ductus spermathecae and extending anteriorly to large oval zone containing irregularly shaped external tubercles near anterior third of bursa; caudal most spicules of bursa commencing as 1–5 minute spines arranged first in rows, which almost immediately become larger and more fused. Ductus spermathecae elongate,  $\sim 0.5\times$  length of bursa copulatrix; membranous outer canal short, slender; inner canal sinuate, terminat-

ing in 3–4 convolutions; vesicle composed of two, small, rounded lobes.

*LARVA AND PUPA.* Unknown.

*HOLOTYPE.* ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m, L/17/380, 26 May 1998, INBio-OET, slide DRD 4198 (INBIO).

*PARATYPES.* BRAZIL: CEARA: Guaramiranga, 1000 m: 2 ♂, 9 Apr 1994, V. O. Becker, slide DRD 4227 (USNM, VOB). COSTA RICA: CARTAGO: Turrialba, 600 m: 6 ♂, 2 ♀, Jul 1981, V. O. Becker, slides: DRD 4197, 4246, USNM 31935, 32780, 32819 (INBIO, USNM, VOB). GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, P. N. Guanacaste, 700 m: 1 ♂, 31 Mar–15 Apr 1992, P. Rios, slide USNM 32807 (USNM). HEREDIA: El Ceibo, 10 km SW La Virgen, 05/L/00/033, 450–550 m: 1 ♂, A.Kawahara, slide DRD 4315 (INBIO). Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m., L/00/191: 1 ♂, 19 Mar 1996, INBio-OET, slide DRD 4187 (INBIO); L/00/197: 1 ♂, 25 Mar 1996, INBio-OET (USNM); L/00/223: 1 ♂, 22 Apr 1996, INBio-OET (USNM); L/00/256: 1 ♂, 19 May 1996, INBio-OET, slide DRD 4164 (INBIO); L/07/358: 1 ♂, 22 Apr 1998, INBio-OET, slide: DRD 4166 (INBIO); L/07/370: 1 ♂, 1 ♀, 12 May 1998, INBio-OET, slide DRD 4172 (INBIO); L/07/382: 1 ♂, 27 May 1998, INBio-OET, slide DRD 4195 (INBIO); L/07/656: 1 ♂, 3 Jun 1999, INBio-OET, slide DRD 4180 (INBIO); L/09/372: 1 ♂, 13 May 1998, INBio-OET, slide DRD 4192 (INBIO); L/09/634: 2 ♂, 6 May 1999, INBio-OET, slides DRD 4194, 4196 (INBIO); L/10/349: 1 UNK, 7 Apr 1998, INBio-OET (INBIO); L/10/623: 1 ♂, 22 Apr 1999, INBio-OET (INBIO); L/11/350: 1 ♂, 1 ♀, 14 Apr 1998, INBio-OET, slides DRD 4197, 4246 (INBIO, USNM); L/11/374: 1 ♂, 14 May 1998, INBio-OET, slide USNM 32803 (USNM); L/13/388: 1 ♀, 3 Jun 1998, INBio-OET (INBIO); L/13/422: 1 ♀, 15 Jul 1998, INBio-OET, slide USNM 32959 (USNM); L/13/494: 1 ♀, 22 Oct 1998, INBio-OET (INBIO); L/07/608: 1 ♀, 30 Mar 1999, INBio-OET, slide USNM 32779 (USNM); L/13/614: 1 ♀, 8 Apr 1999, INBio-OET (INBIO); L/13/650: 1 ♂, 27 May 1999, INBio-OET (INBIO); L/14/639: 1 ♂, 12 May 1999, INBio-OET (INBIO); L/15/306: 1 ♂, 3 Feb 1998, INBio-OET, slide DRD 4283 (INBIO); L/15/390: 2 ♂, 4 Jun 1998, INBio-OET, slide DRD 4269 (INBIO, USNM); L/15/402: 1 ♂, 18 Jun 1998, INBio-OET, slide USNM 32778 (USNM); L/15/496: 1 ♀, 27 Oct 1998, INBio-OET (USNM); L/15/508: 1 UNK, 11 Nov 1998, INBio-OET (INBIO); L/15/652: 1 ♀, 1 Jun 1999, INBio-OET (INBIO); L/17/344: 1 ♂, 1 Apr 1998, INBio-OET

(INBIO); L/17/344: 2 ♀, 1 Apr 1998, INBio-OET, slides DRD 4267, USNM 32814 (USNM, INBIO); L/18/535: 1 ♂, 15 Dec 1998, INBio-OET, slide DRD 4280 (INBIO). Estación Biológica La Selva, Lab. Area, 50–150 m, L006: 1 ♂, 10–17 Jan 1993, INBio-OET, slide USNM 32846 (USNM). ECUADOR: 80 km E Guayaquil, Bucay (= Cumanda), 700 m: 1 ♂, 2 ♀, 16–19 Jan 2001, R. Puplesis & S. Hill, slide AD 0576, (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** Records range from February to June in Costa Rica and Brazil, and January in Ecuador.

**DISTRIBUTION.** (Map 7) Probably a rather widespread species in the American, lowland tropics. The species was common at the La Selva Biological Station in northeastern Costa Rica, with records also known for Cartago and Guanacaste Provinces, Costa Rica, Ceara in northwestern Brazil, and near Guayaquil in southwestern Ecuador.

**ETYMOLOGY.** The species name is derived from the Latin *attenuatus* (drawn out, tapered) in reference to the relatively elongate, tapered vinculum characteristic of the male genitalia of this species.

**DISCUSSION.** *Pseudopostega attenuata* was the most common species of Opostegidae encountered during the ALAS III survey at the La Selva Biological Station, Costa Rica. The gnathos of this species resembles that of *P. conicula* in possessing a well-developed basal fold and in being narrowly triangular (viewed ventrally), but is much more slender in lateral view. The vinculum of *attenuata* is diagnostic in being strongly tapered and extended anteriorly well beyond the base of the valvae.

### ***Pseudopostega conicula*, new species**

FIGURES 163, 304, 305; MAP 7

**ADULT.** Figure 163. Length of forewing 2.3–2.6 mm. Small, mostly white moth with white forewings marked with a dark brown, subapical, costal strigulae with internal suffusion of light brown along its length and a usually less prominent dark brown, terminal, costal strigula midway through cilia; dark brown apical spot distinct, usually contiguous with inner margin of strigula 1. Male with gnathos projecting as an elongate conical lobe, basal fold triangular (Figure 304). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light brown, ~54–56-segmented. Palpi white to cream; labial palpus with suffusion of brown dorsally and laterally.

**Thorax:** White; tegula entirely white. Forewing white with a dark brown, subapical, costal strigulae with internal suffusion of light brown along its length and a usually

less prominent, dark brown, terminal, costal strigula midway through cilia; dark brown apical spot distinct, usually contiguous with inner margin of strigula 1; a few brown scales sometimes present on dorsal margin near basal third; terminal cilia white between strigulae and at tornus, light brown distal of terminal strigula and along dorsal margin; venter of forewing light to medium brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces brown; midleg with dark brown bands dorsally on tarsomeres 3 and 4; tarsal banding paler on hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 304, 305. Socii a pair of relatively broad, rounded, setose lobes, moderately widely separated by a distance ~0.4 the length of cucullar lobe; caudal rim of uncus concave. Vinculum broad; anterior margin rounded. Gnathos relatively narrow at base, gradually tapering to a conical, stout, subacute, dorsally recurved, caudal lobe; anterior margin concave; basal fold triangular, relatively broad at middle, becoming more narrow laterally (Figure 304). Valva with an elongate cucullar lobe ~0.55× length of entire genital capsule, bearing a pectinifer consisting of 36–39 blunt spines; length of lobe over 0.8× length of remainder of valva; distal apex of cucullar lobe rounded, not extended; pedicel moderately broad, ~0.2× length of cucullar lobe; valva relatively short, length along sacculus ~0.65× length of entire genital capsule; sacculus lobe relatively short, stout, broadly rounded; basal process of valva tapering to an acute apex, slightly less than length of broad, elongate, costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: GUANACASTE: Estación Santa Rosa, P. N. Guanacaste, 300 m: 1 ♂, Jul 1990, I Curso Lepidopterología, slide DRD 4178 (INBio).

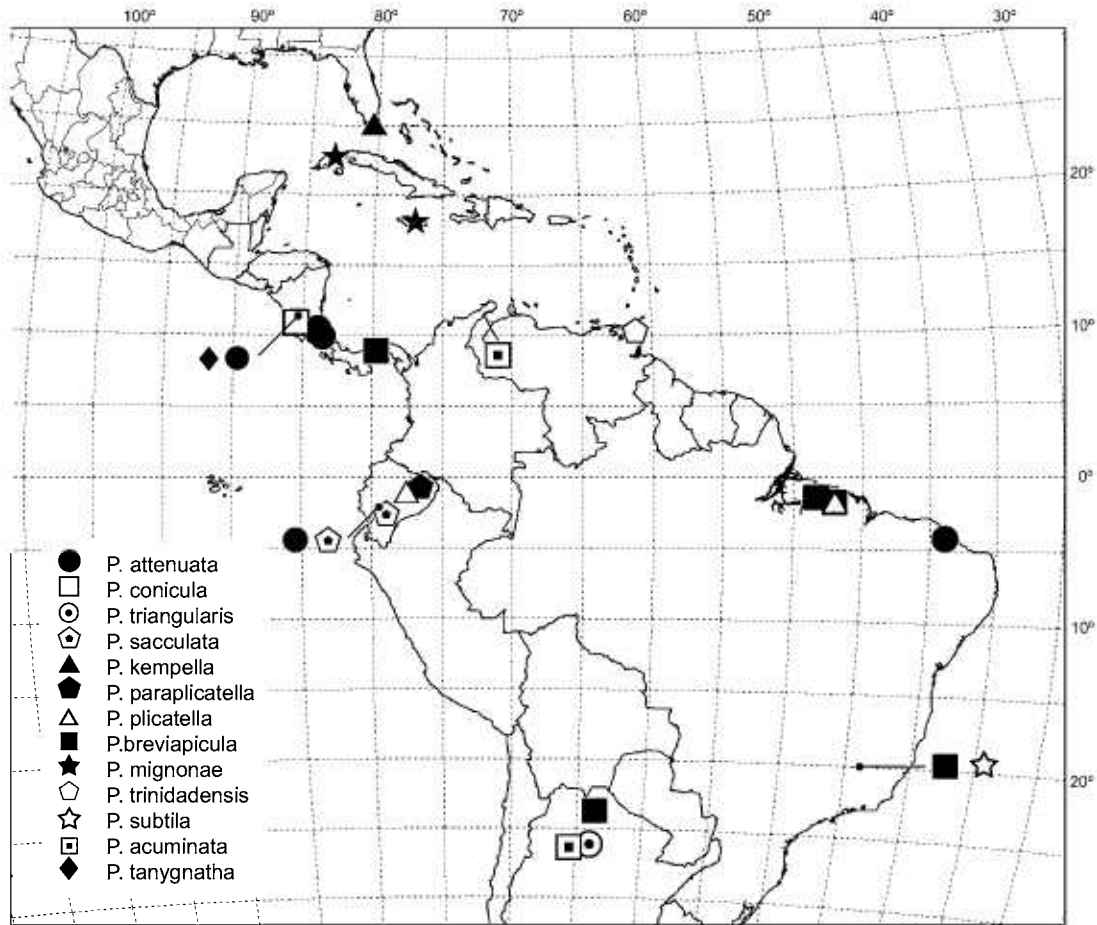
**PARATYPES.** COSTA RICA: GUANACASTE: Estación Santa Rosa, P. N. Guanacaste, 300 m: 1 ♀, Aug 1990, C. Chaves (INBIO); 1 ♂, 21 Jul 1988, M. Scoble, slide USNM 33261 (USNM). Finca Jenny, 30 km N Liberia, P. N. Guanacaste, 300 m: 1 ♂, Jul 1991, R. Espinoza, slide USNM 32257 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in July and August.

**DISTRIBUTION.** (Map 7) Known only from Guanacaste Province in northwestern Costa Rica in lowland, seasonal dry forests.

**ETYMOLOGY.** The specific name is derived from the Latin *coniculus* (cone-like, conical) in reference to the conical elongation of the male gnathos.



MAP 7. Distribution of New World *Pseudopostega triangularis* species group.

**DISCUSSION.** The gnathos of this species and *P. triangularis* from Argentina is somewhat similar in its basic triangular form but differs with that of *conicula* in being much stouter as viewed laterally. *Pseudopostega conicula* is also distinct in possessing broader socii and a more rounded, less extended saccular lobe.

### ***Pseudopostega triangularis*, new species**

FIGURES 164, 308, 309; MAP 7

**ADULT.** Figure 164. Length of forewing 2.6 mm. Small, mostly white moth with white forewings marked with 3 light to dark brown, subapical costal strigulae, and a small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to an acute caudal apex; basal fold slender, deeply arched (Figure 308). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light brown, 46-segmented. Palpi white; labial palpus with suffusion of dark brown dorsally.

**Thorax:** White; tegula white, with slight suffusion of brown on anterior margin. Forewing white marked with 3 light to dark brown, subapical costal strigulae; strigula 1 dark brown at costal margin, gradually fading toward pale yellowish, subapical area immediately basal to dark fuscous apical spot; strigula 2 converging to termination of 1; strigula 3 directed toward apical spot, then curving around spot to tornus (median section of strigula 3 interrupted in holotype); terminal cilia mostly white, light brown beyond apex, mostly white around tornus, becoming light brown along dorsal margin; venter of forewing light brown, white along costa and at basal, subhumeral area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white; foreleg with dorsal surfaces partially suffused with light brown; tarsi faintly banded dorsally with cream to light brown; mid

and hindlegs cream dorsally, white ventrally; tarsomeres 3–4 of midleg dorsally banded with light brown.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 308, 309. Socii a pair of relatively small, round, setose, lobes, widely separated by a distance nearly equal to length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broad; anterior margin broadly but shallowly concave. Base of gnathos broad, gradually narrowing to subacute apex; anterior margin deeply concave, with narrow, medially arched basal fold extending across base. Valva with elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of a single row of  $\sim 26$  blunt spines; distal apex of cucullar lobe rounded, not extended; pedicel moderately stout, width  $\sim 0.2\times$  length of cucullar lobe; valva long, length along sacculus  $\sim 0.8\times$  that of genital capsule; saccular lobe elongate, nearly reaching apex of cucullar lobe, tapering slightly to irregularly rounded, setose apex; basal process of valva tapering to acute apex, approximately equaling length of moderately stout, apically rounded costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ARGENTINA: SALTA: 1 km NW Senda, along RN 34, 500 m, 25 Nov 1995, transitional forest, Sta 17, Neth. Ent. Exp. N-Arg., slide DRD 4133, (RMNH).

**HOST.** Unknown.

**FLIGHT PERIOD.** November (unique record).

**DISTRIBUTION.** (Map 7) Known only from type locality, in north-central Argentina.

**ETYMOLOGY.** The species name is derived from the Latin *triangulus* (having three angles) in reference to the general triangular shape of the male gnathos.

**DISCUSSION.** The male genitalia of this species are similar to those of *P. conicula* but differ in possessing a more slender caudal lobe from the gnathos, more slender socii, more extended saccular lobes, and the anterior margin of the vinculum concave.

### ***Pseudopostega sacculata* (Meyrick)**

FIGURES 165, 310; MAP 7

*Opostega sacculata* Meyrick, 1915:240.—Davis, 1984:18.

*Pseudopostega sacculata* (Meyrick).—Davis, 1989:77.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 165. Length of forewing 2.6 mm. Small white moth with white forewings marked with a large,

brown, triangular spot slightly beyond middle of costal margin, two brown, subapical costal strigulae, one brown tornal strigula, and a small fuscous apical spot. Male gnathos broad basally, tapering to moderately slender, dorsally recurved caudal lobe; basal fold broad, short, with caudal projection at middle (Figure 310). Female unknown.

**Head:** Vestiture white. Scape white; flagellum cream, 56-segmented. Palpi not examined (broken in holotype).

**Thorax:** White. Forewing white, with a few yellowish brown scales scattered over wing, and a large, brown, triangular spot slightly beyond middle of costal margin; two, relatively short, brown, subapical costal strigulae present, both terminating well above small fuscous apical spot; a small, ochreous area of suffusion present immediately basal to apical spot; a brown tornal strigula extending a short distance down from apical spot; apical cilia white, otherwise cream; venter of forewing yellowish brown. Hindwing and cilia ochreous cream dorsally and ventrally. Legs uniformly pale ochreous.

**Abdomen:** Brown dorsally, cream ventrally.

**Male Genitalia:** Figure 310. Socii a pair of short, relatively broad, setose lobes widely separated by a distance  $\sim 0.5\times$  length of cucullar lobe; caudal rim of uncus broadly concave. Tegumen narrow. Vinculum broad, gradually narrowing to truncate, slightly sinuate anterior margin. Gnathos with a broad, laterally thickened, triangular base, gradually tapering to form stout, dorsally recurved, caudal lobe; basal fold broad, short, with caudal projection at middle (Figure 310). Valva with large cucullar lobe  $\sim 0.35\times$  length of genital capsule, with elongate pectinifer bearing 32–34 blunt spines; pedicel broad, with a circular thickened area at base, narrowest width  $\sim 0.2\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe elongate, stout, extending almost to outer apex of cucullar lobe, with densely papillose, setose apex; basal process tapering to an elongate, acuminate apex; costal process of valva well sclerotized and equal to basal process in length. Juxta a weakly sclerotized, bluntly lobed process from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: CHIMBORAZO: Huigra: Jun [19]14, Parish, slide BMNH 29636 (BMNH).

**MATERIAL EXAMINED.** ECUADOR: CHIMBORAZO: Huigra: 1 ♂ (holotype), Jun [19]14, Parish, slide BMNH 29636 (BMNH). GUAYAS: 80 km E Guayaquil, Bucay (= Cumanda), 700 m: 1 ♂, 16–19 Jan 2001, R. Puplesis & S. Hill, slide AD 0473 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in January and June.



**DISTRIBUTION.** (Map 7) Known only from southwestern Ecuador.

**DISCUSSION.** The male of this species appears most similar to that of the preceding species, *P. triangularis*, but differs in the development of a median projection with less arch in the basal fold of the gnathos. The vinculum is also more tapered anterior to the base of the valvae than in *triangularis*.

### ***Pseudopostega kempella* (Eyer)**

FIGURES 166, 311, 312, 448, 449; MAP 7

*Opostega kempella* Eyer, 1967:39.—Davis, 1983:3, no. 124.

*Pseudopostega kempella* (Eyer).—Davis: 1989:76.—Poole, 1996:797.—Heppner, 2003:232.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 166. Length of forewing 1.8–2.5 mm. Small white moth; forewings marked with small brown dorsal spot, 2 strongly oblique, brownish, subapical, costal strigulae, and a small black apical spot. Male gnathos with a stout, simple, caudal lobe; basal fold extremely narrow (Figures 311, 312). Papillae anales of female a pair of small, oval, closely set lobes (Figure 449).

**Head:** Vestiture white. Scape white; flagellum cream to dark cream, ~59–60-segmented. Palpi white to cream; labial palpus with faint brownish suffusion dorsally.

**Thorax:** White. Forewing white, with small brownish to dark brown, irregularly shaped spot on dorsum near middle; forewing with 3 subapical, costal strigulae; the first 2 strigulae dark brown, closely subparallel, strongly oblique; strigula 1 shadowed with dark yellowish brown, terminating before and below small black apical spot; strigula 2 shorter, terminating at apical spot; strigula 3 faint, brown, curving slightly beyond and around apical spot; a short toral strigula sometimes evident and extending below apical spot toward strigula 1; terminal cilia brownish to brown, otherwise cream to white; venter of forewing densely irrorated with brown scales, except for small elongated cream area along subhumeral area. Hindwing light to dark cream (depending on viewing angle); cilia light to brownish cream. Legs white ventrally; forelegs with grayish brown suffusion dorsally and laterally; mid- and hindlegs mostly cream dorsally; midleg with slight brownish irroration dorsally.

**Abdomen:** Uniformly white.

**Male Genitalia:** Figures 311, 312. Socii a pair of short, setose lobes widely separated by a distance ~0.5 the length of cucullar lobe. Uncus with a deep triangular concavity, strongly sclerotized along caudal margin and at middle.

Tegumen relatively narrow. Vinculum broad, tapering anteriorly to a moderately narrow, subtruncate, anterior margin. Gnathos broad at base, tapering to a stout, elongate, rod-like lobe; apex of lobe bluntly rounded; anterior margin subtruncate, with transverse, narrow basal fold. Valva with large cucullar lobe, ~0.6× length of genital capsule, bearing an elongate pectinifer consisting of ~33–36 blunt spines; pedicel moderately stout, width ~0.2× length of saccular lobe; valva moderately long, ~0.65× length of genital capsule; saccular lobe with broad, subacute apex; basal process of valva tapering to acute apex, approximately equal in length to moderately stout costal process. Juxta absent.

**Female Genitalia:** Figures 448, 449. Apex of abdomen narrowly truncate, with two poorly defined setose lobes. Each posterior apophysis fused for most of its length, slender and long. Papillae anales a pair of small, oval, closely set lobes bearing short setae. Vestibulum narrow, membranous. Ductus bursae narrowing slightly to corpus bursae, with a patch of minute pectinate spicules arranged in faint linear rows of ~6–10 spines; pectinations fading before bursa. Corpus bursae relatively large, oval to spherical, with a faint, slender band of numerous, minute, external tubercles extending for most of length of bursa. Ductus spermathecae ~1.0–1.5× length of corpus bursae; membranous outer canal very broad at junction with corpus bursae, becoming abruptly narrow over distal half; inner canal very long, slightly sinuous, with about 3 terminal convolutions. Vesicle a single coiled tube.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: FLORIDA: Monroe Co.: Key Largo, 10 Oct 1964, S. Kemp, slide USNM 21264 (USNM).

**MATERIAL EXAMINED.** USA: FLORIDA: Monroe Co.: Key Largo: 1 UNK, 4 Nov 1964, 1 ♀, 7 Nov 1964, 1 ♂, 8 Nov 1964, 1 ♀, 9 Nov 1964, S. Kemp, slides USNM 33044, 32427, DRD 3325 (MCZ, USNM), 1 ♂ (holotype), 10 Oct 1964, S. Kemp, slide USNM 21264 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in October and November.

**DISTRIBUTION.** (Map 7) Currently known only from the type locality in southern Florida (USA).

**DISCUSSION.** The type series of *P. kempella* was found to comprise three distinct species. In addition to the holotype, Eyer (1967) listed eight male and four female paratypes in the type series of *P. kempella*. Nine of these paratypes were examined in this study, resulting in the discovery of two new species, *P. parakempella* and *P. floridensis*. The current deposition of the remaining two paratypes listed by Eyer is not known. On the basis of male

genital morphology, all three species have been placed in different species groups. *Pseudopostega kempella* is characterized by the shorter valvae, smooth, triangular base of the gnathos, and moderately stout caudal lobe. The short, globular papillae anales of *kempella* are also distinct from those of *parakempella* and *floridensis*.

### ***Pseudopostega paraplicatella*, new species**

FIGURES 167, 313; MAP 7

**ADULT.** Figure 167. Length of forewing 3.0 mm. Small, mostly white moth with white forewings marked with 3 dark brown, subapical costal strigulae and a pale brown spot on dorsum. Male gnathos with apex of caudal lobe slender, elongate, and simple; basal fold slender, broadly arched (Figure 313). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light ochre-brown, ~55–57-segmented. Palpi cream to white; labial palpus with dark brown suffusion laterally.

**Thorax:** White; tegula white. Forewing white with 3 oblique, long, dark brown, subapical costal strigulae; strigula 1 the shortest, 2/3 the length of 2; strigula 2 fading to elongate, blackish brown apical spot; strigula 3 faint, slightly extending distally around apical spot to short, faint, brown ternal strigula; terminal cilia white; venter of forewing brown except for basal, subhumeral cream area. Hindwing and cilia light ochreous brown dorsally and pale brown ventrally (the same color as venter of forewing) except for cream suffusion at base. Legs mostly cream to white; foreleg with dorsal surfaces suffused with dark brown; tarsomeres of all legs with dark brown or fuscous suffusion dorsally over apical segments.

**Abdomen:** Color not recorded.

**Male Genitalia:** Figure 313. Socii a pair of relatively long, slender, distally rounded, setose lobes, widely separated by a distance ~1.2× length of cucullar lobe. Vinculum V-shaped, anterior margin extended into slender, subacute process. Base of gnathos broadly trapezoid, abruptly narrowing posteriorly to a moderately long, very slender, caudal lobe; apex of lobe simple, rounded, distinctly curved dorsally; basal fold slender, broadly arched. Valva with an oval, elongate cucullar lobe ~0.3× length of genital capsule; bearing a pectinifer consisting of about 36 blunt spines; pedicel thickened, width ~1/3 length of cucullar lobe; valva moderately short, length along sacculus ~0.6× length of genital capsule; sacculus lobe small and slender, tapering to an irregularly rounded, setose apex; basal process of valva tapering to acute apex, exceeding length of short costal process. Juxta absent.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: NAPO: SE of Coca, near Rio Tiputini, Yasuni Research Station, 230 m 76°36'W, 00°38'S, Amazon rainforest, 15–25 Jan 2000, R. Puplesis, slide AD 0444 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January (unique record).

**DISTRIBUTION.** (Map 7) Known only from the type locality in Amazonian rainforest of eastern Ecuador.

**ETYMOLOGY.** The species name is derived from Latin, *para* (beside, near), and the species name *plicatella*, in reference to the close morphological similarities of these two species.

**DISCUSSION.** Males of *P. paraplicatella* are easily distinguished from those of the closely related *P. plicatella* by the more acute anterior end of the vinculum, broader basal fold of the gnathos, and shorter sacculus lobe.

### ***Pseudopostega plicatella*, new species**

FIGURES 168, 314; MAP 7

**ADULT.** Figure 168. Length of forewing 2.5–3.2 mm. Small, mostly white moth with white forewings marked with 3 brown to dark brown, subapical costal strigulae, a short, faint, brown ternal strigula, and a small, dark brown apical spot. Male gnathos with apex of caudal lobe slender, elongate, subacute; basal fold narrow, steeply arched (Figure 314). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 50–57-segmented. Palpi cream to white; labial palpus with dark brown suffusion laterally.

**Thorax:** White; tegula white. Forewing white with 3 subapical costal strigulae; strigula 1 the broadest, half the length of 2; strigula 2 fading to elongate, dark brown apical spot; strigula 3 faint, extending distally around apical spot to short, faint, brown ternal strigula; terminal cilia white between strigulae, mostly brown beyond strigula 3 and white along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces suffused with dark brown; tarsomeres of all legs with dark brown suffusion dorsally over apical segments.

**Abdomen:** Brown dorsally, white ventrally.

**Male Genitalia:** Figure 314. Socii a pair of relatively large, rounded, setose lobes, widely separated by a distance ~ equal to length of cucullar lobe; caudal rim of uncus smoothly concave. Vinculum moderately broad; anterior margin rounded to subtruncate. Base of gnathos broadly triangular, gradually narrowing posteriorly to a

moderately long, slender, caudal lobe; apex of lobe simple, rounded, slightly curved dorsally; anterior margin of gnathos with median indentation and a narrow, short, steeply arched basal fold. Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 47\text{--}49$  blunt spines; terminal apex of cucullar lobe evenly rounded; pedicel broad, over one-third the length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe elongate, moderately slender, tapering to an irregularly rounded, setose apex; basal process of valva tapering to acute apex, exceeding length of moderately short costal process. Juxta a slender, filamentous, caudal extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: PARÁ: Capitaio Poco: 25–31 Jan 1984, V. O. Becker, slide DRD 4348 (VOB).

**PARATYPES.** BRAZIL: PARÁ: Capitaio Poco: 1 ♀, 25–31 Jan 1984, V. O. Becker, slide USNM 31797 (USNM). ECUADOR: Napo: SE Tena, near Rio Napo, Jatun Sacha and Misahualli, 400–500 m: 2 ♂, 26–31 Jan 2000, R. Puplesis, slides AD 0357, 0443 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January.

**DISTRIBUTION.** (Map 7) Known from two disjunct localities in northeastern Brazil (Pará) and east-central Ecuador (Napo).

**ETYMOLOGY.** The species name is derived from the Latin *plico* (fold) added to the diminutive suffix *ella* (little) in reference to the small, median fold at the anterior margin of the male gnathos.

**DISCUSSION.** The gnathos of this species is diagnostic in possessing an extremely reduced, caudally arched basal fold restricted to the median area of the anterior margin. It is further distinguished from the related species, *paraplicatella*, in possessing a more rounded vinculum with a vestigial juxta and longer saccular lobes.

### ***Pseudopostega cretea* (Meyrick)**

FIGURES 169–171, 315, 316, 450–452; MAP 8

*Opostega cretea* Meyrick, 1920:358.—Forbes, 1923:161.—McDunnough, 1939:100, no. 9406.—Eyer, 1963:239; 1966:237.—Clarke, 1955:103.—Davis, 1983:3, no. 119.—Brower, 1984:47.

*Pseudopostega cretea* (Meyrick).—Davis, 1989:76.—Poole, 1996:796.—Puplesis and Diškus, 2003:419.

**ADULT.** Figures 169–171. Length of forewing 3.9–4.6 mm. Small, white to pale yellowish brown moth

(or uniformly dark brown in case of melanic form); forewings variably marked with large, brown distinctly oblique dorsal spot, 2–3 brown, subapical, costal strigulae, 2 similar tornal strigulae, and a small brown to fuscous apical spot. Male gnathos triangular, with a single, stout, acute caudal lobe; basal fold reduced, narrow (Figure 315). Papillae anales of female consisting of a pair of small, moderately elongate, rounded, setose lobes (Figure 451).

**Head:** Vestiture usually white to grayish yellow; melanic form with frontal tuft cream-white, and most of collar, except grayish brown over proximal 1/5. Scape white, sometimes distally darkened with grayish yellow or brown (particularly in melanic form); flagellum cream to brown (always brown in melanic form),  $\sim 66\text{--}72$ -segmented. Palpi white to cream or brown to gray; labial palpus sometimes with brownish suffusion laterally and dorsally.

**Thorax:** White to grayish yellow (or grayish brown in melanic form). Forewing usually white dorsally but sometimes pale grayish to yellowish brown distally or entirely; a large, brown to fuscous, distinctly outwardly oblique spot present midway along dorsal margin; at least 2 brown, subapical, costal strigulae and 2 tornal strigulae present; strigula 1 strongly oblique extending to a small brown to fuscous apical spot; strigula 2 terminating at apical spot; sometimes an additional (third) costal strigula developed; terminal and dorsal cilia white to light brown; venter of forewing cream to brown; melanic form (see discussion) with entirely dark grayish brown forewing, usually displaying slight to bluish iridescence and no dorsal spot; only 1 (costal), subapical, fuscous strigula and brownish fuscous apical spot visible; cilia and forewing underside of melanic form brown except for small, elongate, subhumeral, brownish cream area. Hindwing (including melanic form) light brown to brown dorsally and ventrally; cilia light brown to brown in melanic form. Legs (including melanic form) ochreous cream to gray, without or with distinctive, brown to fuscous shading laterally and dorsally.

**Abdomen:** Grayish brown dorsally, cream to gray ventrally (including melanic form).

**Male Genitalia:** Figures 315, 316. Socii a pair of slender, setose lobes, widely separated by a distance nearly  $0.9\times$  length of cucullar lobe. Tegumen extremely narrow. Vinculum broad, anterior margin usually slightly concave, occasionally narrowly rounded. Gnathos broad at base, tapering abruptly to form elongate, moderately stout, acute, caudal lobe; lobe sharply curved dorsally from base, with lateral apical margins serrulate (Figures 315, 316); anterior margin of gnathos with narrow basal fold and variably developed median cleft; occasionally base of gnathos reduced, and only an enlarged caudal lobe with deep

anterior indentation visible. Valva with elongate cucullar lobe  $\sim 0.55\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 38\text{--}40$  blunt spines; pedicel broad, width  $\sim 0.2\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe moderately stout, tapering slightly to a rounded, setose apex; basal process of valva tapering to slender, acuminate apex; costal process of valva stout, tapering, terminating just before or at apex of basal process. Juxta usually absent but sometimes developed as a narrow long rod-like sclerite from vinculum.

**Female Genitalia:** Figures 450–452. Apex of abdomen slightly bilobed, with long setae. Each posterior apophysis fused  $\sim 0.33\times$  its length, moderately long and slender. Papillae anales a pair of small, moderately elongate, rounded, setose lobes; length of lobes  $\sim 0.3\times$  length of posterior apophyses. Vestibulum moderately broad, with a central region containing a thickened (tending to stain dark), elongate region. Ductus bursae moderately broad, with a relatively large area of pectinate spicules arranged in mostly short, transverse rows of usually 3–5 spicules. Corpus bursae relatively broad, elongate, with a patch of pectinate spicules in short transverse rows near caudal end; two faint bands bearing numerous, minute, external tubercles extending most the length of corpus; ductus spermathecae nearly as long as corpus bursae; membranous outer canal broad only over distal half; inner canal long, slightly sinuous, terminating in  $\sim 4\text{--}5$  small, tightly coiled convolutions; vesicle coiled at basal half, terminating in a slender, elongate lagena.

**LARVA AND PUPA.** Unknown.

**LECTOTYPE.** ♂; CANADA: ONTARIO: Lake Muskoka: Jul [19]18, Parish, slide 9527 (BMNH).

**MATERIAL EXAMINED.** CANADA: BRITISH COLUMBIA: Fraser Mills: 2 ♂, 1 UNK, 30 Jun 1925, L. E. Marmont, slide USNM 32701 (USNM). ONTARIO: Locality not stated: 1 UNK, Jul [19]21, Parish (BMNH). Lake Muskoka, 1 ♂ (lectotype): Jul 1918, Parish, slide 9527; 2 ♀ (paralectotypes), slide 29639 (BMNH). Toronto: 1 ♂, Jun 1921 (USNM), 1 ♂, Jul [19]23, 5 ♂, 1 ♀, Jun [19]23–24?, Parish, (BMNH). USA: CONNECTICUT: New Haven Co.: East River: 1 ♂, 2 UNK, Jul, 1 UNK 4 Jul 1910, 1 UNK 8 Jul 1910, 1 UNK 9 Jul 1910, 1 ♂, 11 Jul 1910, 1 ♂, 19 Jul 1908, 1 ♂, 23 Jul 1908, 1 ♂, 24 Jul 1908, 1 ♂, 29 Jul 1908, 1 ♂, 30 Jul 1910, 1 ♂, Aug, 1 UNK, 3 Aug 1915, 1 ♂ 5 Sep 1908, C. R. Ely, slides USNM 17187, 17936, 33121, 33126 (SEM) (LACM, USNM). FLORIDA: Alachua Co.: Austin Carey Forest: 1 ♀, 11 Jun 1975, G. B. Fairchild, slide USNM 32720 (USNM). LOUISIANA: Bossier Par: Barksdale A.F.B. [Airforce Base]: 1 ♂, 6 May 1996, 1 ♂, 24 Apr 1996, D. M. Pollock (MEM). Calcasieu

Par: S. H. Jones State Park: 1 ♂, 19–23 May 1993, R. L. Brown & D. Pollock, slide DRD 4151 (MEM). MAINE: Franklin Co.: Rangeley: 1 ♂, 5 Aug 1961, slide USNM 20353 (USNM). Oquossoc: 2 ♂, 24 Jul (USNM). Hancock Co.: Bar Harbor: 1 ♂, 1 ♀, 22 Jul, 1 ♂, 30 Jul 1938, A. E. Brower, slides USNM 20346, 20348 (USNM). Kennebec Co.: Augusta: 1 ♂, 23 Jul 1942, A. E. Brower, slide USNM 33064 (USNM). Penobscot Co.: Lincoln: 1 ♂, 14 Jul, 1 ♂, 16 Jul, 1 ♀, 17 Jul, 1 ♀, 19 Jul, 1 ♀, 30 Jul, 2 ♂, 5 Aug (USNM). Piscataquis Co.: Chesuncook: 1 ♂, 29 Jul (USNM). Somerset Co.: Dennistown: 4 ♂, 22 Jul, 1 ♂, 26 Jul, 1 ♂, 28 Jul 1959, 2 ♂, 5 Aug, 3 ♂, 6 Aug, 3 ♂, 8 Aug (USNM). Washington Co.: Dennysville: 1 ♂, 12 ♀, 4 UNK, 7 Jul, 1 ♂, 16 Jul, slides USNM 20347, 32444, 32914, 32915, 32961 (USNM). MICHIGAN: Presque Isle: Ocqueoc Lake: 1 ♂, 2 ♀, 25–26 Jul 1970, R. W. Hodges, slides USNM 17186, 17192 (USNM). MISSISSIPPI: Franklin Co.: Tributary of McGehee Creek: 1 ♂, 29 Jun 1992, T. Schiefer & B. Fontenot (MEM). George Co.: 4.5 mi [ $\sim 7.2$  km] NNW Lucedale: 1 ♂, 24–25 Jul 1999, T. L. Schiefer (MEM). Oktibbeha Co.: T18N, R14E, Sec.33 SE: 1 ♂, 18 Jun 1992, R. L. Brown, slide USNM 32716 (MEM). Smith Co.: 1 mi [0.63 km] N Raleigh: 1 ♂, 14–15 Jun 1985, R. Brown & G. Burrows, slide USNM 32713 (MEM). Winston Co.: Tombigbee National Forest: 1 ♂, 10 Aug 1999, J. A. MacGown (MEM). NEBRASKA: Cherry Co.: Valentine, NWR Hackberry Lake: 1 ♂, 24 Jun 1983, R. W. Hodges, slide: USNM 32700 (USNM). NEW YORK: Onondaga Co.: Radisson: 1 ♂, 19 Jul 1977, E. Jäckh, slide Jäckh 10416 (USNM). Tompkins Co.: Dryden, Ringwood Reserve: 1 UNK, 23 Jul 1933, J. G. Franclemont (USNM). McLean Bogs Reserve: 1 ♂, 20 Jul 1957, 1 ♂, 28 Jul 1954, J. G. Franclemont, slides USNM 32499, 32702 (USNM). NORTH CAROLINA: Haywood Co.: Purchase Knob: 3 ♂, 1 ♀, 1 UNK 19 Jun 2004, H. Hayden, slide USNM 33110 (GSMNP, USNM). Macon Co.: Highlands, 3865 ft [ $\sim 1180$  m]: 1 ♀, 30 Jul 1958, 1 ♂, 6 Aug 1958, 1 ♀, 8 Aug 1958, 1 ♀, 10 Aug 1958, 2 ♀, 12 Aug 1958, 1 ♂, 22 Aug 1958, R. W. Hodges, slides USNM 16439, 17172, 17173, 17207, 21265, 91862, 91863 (USNM). PENNSYLVANIA: Beaver Co.: New Brighton: 1 ♀, 21 Aug 1907, slide USNM 17209 (USNM). Luzerne Co.: Hazleton: 1 ♂, 27 Jul 1897, Dietz (LACM). TEXAS: Jasper Co.: Martin Dies State Park: 1 ♂, 8 May 1986, E. C. Knudson, slide USNM 32490 (TLS). WASHINGTON: Clarke Co.: 1 ♂, 14 Jul 1931, J. F. Clarke, slide USNM 33140 (USNM). WISCONSIN: Burnett Co.: [locality not stated]: 1 ♂, 26 Jul 1999, slide USNM 32719 (USNM). Ozaukee Co.: 4 mi [ $\sim 6.4$  km] SSE Newburg: 3 ♂, 1 UNK, 7 Jul 1992, D. & M. Hildebrandt, slide USNM 32712 (MEM).

**HOST.** Unknown.

**FLIGHT PERIOD.** This species usually flies from May to July (with one early August record) in the southern USA and from June to August across the northern part of its broad range.

**DISTRIBUTION.** (Map 8) Known predominantly from the eastern half of North America from southern Canada south to northern Florida, west to southeastern British Columbia and Texas.

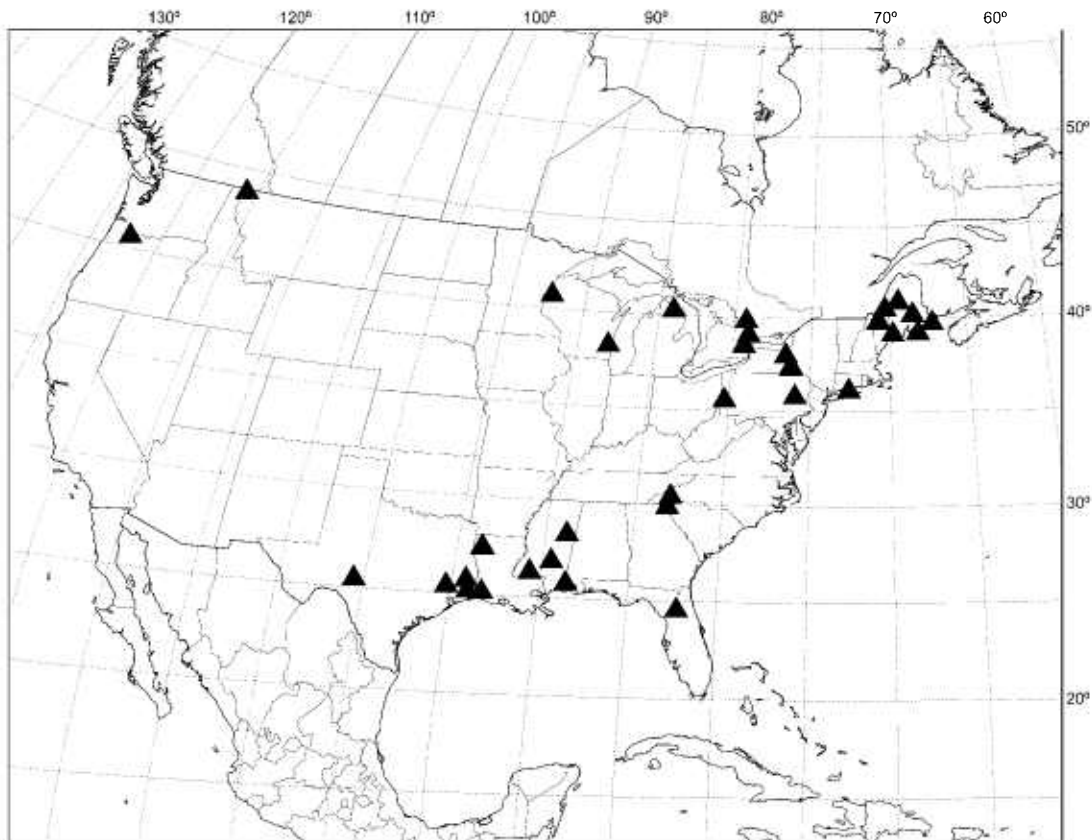
**DISCUSSION.** The occurrence of melanism in this species, first reported by Eyer (1966), appears more common than in any other species of *Pseudopostega*. Melanic individuals are known from Maine and Michigan but none from the southern part of the range. Other than color, no significant morphological differences were observed between the nonmelanic and melanic forms. Moreover, both forms (including melanics of varying degrees of pigmentation) have been collected at the same time and location. Eyer (1966) reported melanic specimens from both industrial and nonindustrial areas of the USA.

Within North American Opostegidae, the prominent caudal lobe of the gnathos is characteristic for this species. The anterior margin of the gnathos is similar to that of *P. plicatella* in usually being slightly cleft and possessing a reduced, narrowly arched, median, basal fold.

### ***Pseudopostega breviapicula*, new species**

FIGURES 172, 317, 318; MAP 7

**ADULT.** Figure 172. Length of forewing 2.9–3.0 mm. Small, mostly white moth with white forewings marked with a small, dark brown costal spot along distal 2/3, a similar, small, dark brown spot beyond basal third of dorsal margin, 2–3 brown, subapical costal strigulae, a brown tornal strigula, and a small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to a short, acute, uncinuate apex; basal fold broad and short, arched at middle (Figures 317, 318). Female unknown.



MAP 8. Distribution of *Pseudopostega cretea* (*triangularis* species group).

**Head:** Vestiture white. Scape white; flagellum light golden brown, 49–54-segmented. Palpi white to cream; labial palpus with dorsolateral margins dark brown.

**Thorax:** White; tegula with dark brown suffusion on anterior margin. Forewing white with brown suffusion along basal anterior margin of costa; a small, dark brown costal spot along distal 2/3, a similar, small, dark brown spot beyond basal third of dorsal margin; costal strigulae variable, usually some vestige of 2–3 brown, subapical strigulae present; basal strigula faint; strigula 2 usually terminating just before dark brown to fuscous apical spot; area immediately basal to apical spot suffused with pale yellow; strigula 3 indistinct in most specimens examined, typically curving around apical spot; tornal strigula brown, extending down from apical spot; terminal cilia mostly white, light brown along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white to cream; foreleg with dorsal surfaces suffused with light to dark brown; midleg either mostly cream or with light brownish suffusion dorsally over tibia; tarsomeres with brown dorsal banding; banding paler on tarsomeres of hindleg.

**Abdomen:** Variable, dark to light brown dorsally, cream to gray laterally, and white to cream ventrally.

**Male Genitalia:** Figures 317, 318. Socii a pair of small, low rounded, setose lobes widely separated by a distance 0.6× length of cucullar lobe; caudal margin of uncus broadly concave. Vinculum broad, tapering to relatively narrow, slightly concave anterior margin. Base of gnathos broadly triangular, gradually narrowing posteriorly to a short, broadly acute, dorsally recurved caudal lobe; anterior margin of gnathos with shallow, median indentation; basal fold broad and short, arched at middle, with free margin (Figure 317). Valva with an elongate cucullar lobe ~0.5× length of genital capsule; bearing a pectinifer consisting of ~40 blunt spines; terminal apex of cucullar lobe extended slightly as a setose, broadly acute lobe; pedicel broad, ~0.2× length of cucullar lobe; valva moderately long, length along sacculus ~0.65× length of genital capsule; sacculus lobe moderately elongate, slender, tapering to rounded, setose apex; basal process of valva tapering to acute apex, exceeding length of costal lobe by nearly one-third its length. Juxta developed as an elongate, median rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: PARÁ: Belém: Jan 1984, V. O. Becker, slide DRD 4229 (VOB).

**PARATYPES.** ARGENTINA: JUJUY: Parque Nacional Calilegua, Mesada Las Colmenas, sta. 15, 1150 m: 1 ♂, 21–23 Sep 1995, Neth. Ent. Exp. N-Arg., slide DRD 4155

(RMNH). BRAZIL: MINAS GERAIS: Nova Lima, 850 m: 1 ♂, 8 Oct 1985, 1 ♂, 30 Dec 1988, V. O. Becker, slides DRD 4231, 4234 (VOB). Capitao Poco: 1 ♂, 25–31 Jan 1984, V. O. Becker, slide DRD 4219 (VOB). PANAMA: La Chorrera: 1 ♂, May 1912, A. Busck, slide USNM 31967 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** This species has been collected throughout much of the year over its broad range, including October, December, January (Brazil), September (Argentina), and May (Panama).

**DISTRIBUTION.** (Map 7) This species ranges widely across the Neotropical Region from Panama south to northeastern and southeastern Brazil and north-central Argentina.

**ETYMOLOGY.** The species name is derived from the Latin *brevis* (short) and *apiculus* (diminutive of apex) in reference to the short, acuminate apex of the male gnathos.

**DISCUSSION.** The broadly triangular gnathos with a short, recurved caudal lobe and narrow, medially cleft, basal fold characterizes the males of this rather widely distributed Neotropical species.

### ***Pseudopostega mignoniae*, new species**

FIGURES 44, 45, 173, 319, 320; MAP 7

**ADULT.** Figure 173. Length of forewing 3.8–4.3 mm. Small, mostly white moth with almost immaculate forewings except for broadly triangular, dark fuscous costal spot at distal third, fuscous to black discal spot, a prominent, brown to black, terminal costal strigula, and a second, usually faint, short, light brown costal strigula slightly distal to costal spot. Male with apex of gnathos slender, acute; basal fold transverse, moderately broad, constricted at middle (Figure 319). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum light golden brown, ~58–65-segmented. Maxillary palpus cream. Labial palpus white to cream, with brownish suffusion laterally and dorsally.

**Thorax:** White; anterior margin of tegula dark brown. Forewing almost entirely white, with a broadly triangular, dark fuscous costal spot at distal third, a fuscous to black apical spot, a prominent brown to black, nearly straight, terminal costal strigula, curving slightly from apex of costal margin through terminal cilia around apical spot to tornus, and a second, usually faint, short, light brown costal strigula slightly distal to costal spot; terminal cilia variable, white between strigulae and then brown apically, white along termen, then becoming light brown along dorsal mar-

gin; venter of forewing light brown to gray, with white patch over base of wing. Hindwing and cilia pale brown to gray both dorsally and ventrally. Foreleg cream ventrally, dark brown to fuscous dorsally and laterally; midleg cream with light brownish suffusion dorsally; hindleg paler cream with brown banding sometimes dorsally on tarsal segments.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 44, 45, 319, 320. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal margin of uncus shallowly concave. Vinculum broad, consisting of a narrow ventral ring; anterior margin broadly rounded. Gnathos broadly conical; apex abruptly constricted to form a moderately short, approximately  $0.3\times$  length of entire gnathos, slender, dorsally upturned caudal lobe; anterior margin deeply notched; basal fold moderately narrow, approximately  $0.2\times$  length of entire gnathos and slightly separated from larger posterior section. Valva with an elongate cucullar lobe  $\sim 0.75\times$  length of genital capsule, bearing a pectinifer consisting of 52–54 blunt spines; length of cucullar lobe almost equal to that of main body of valva; pedicel broad, width nearly  $0.4\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.95\times$  length of genital capsule; saccular lobe moderately stout, elongate,  $\sim 0.4\times$  length of cucullar lobe, rounded, with numerous, elongate setae; basal process of valva attenuate, approximately equal in length to costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; JAMAICA: St. CATHERINE PARISH: Hollymount, Mt. Diablo, 2754 ft [840 m], 21–24 Apr 1973, D. & M. Davis, UV light trap, slide USNM 32749 (USNM).

**PARATYPES.** CUBA: PINAR DEL RIO: Sierra Rosario, 1 ♀, 5–15 Jun 1990, V. O. Becker, slide DRD 4156 (VOB). JAMAICA: St. CATHERINE PARISH: Hollymount, Mt. Diablo, 2754 ft [840 m], 2 ♂, 1 UNK, 21–24 Apr 1973, D. & M. Davis, UV light trap, slides USNM 32747, 32748, 32749 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in April and June.

**DISTRIBUTION.** (Map 7) West Indies (Cuba and Jamaica).

**ETYMOLOGY.** This species is named in honor of the senior author's wife, Mignon Marie Davis, who helped to collect the type series and who has assisted him with nearly all his fieldwork for more than 30 years.

**DISCUSSION.** The male of this West Indian species is similar to *P. trinidadensis* in possessing a broadly

triangular gnathos, moderately well-developed basal fold, vestigial juxta, and elongate cucullar lobes. *Pseudopostega mignonae* differs in possessing a dark forewing costal spot, more slender apical lobe, basal fold with a concave anterior margin, distally rounded cucullar lobes, and more slender costal processes on the valvae.

### ***Pseudopostega trinidadensis* (Busck)**

FIGURES 174, 321, 322, 453, 454; MAP 7

*Opostega trinidadensis* Busck, 1910:245.

*Pseudopostega trinidadensis* (Busck).—Davis, 1989:77.—Puplesis and Diškus, 2003:418.

**ADULT.** Figure 174. Length of forewing 4.3–4.8 mm. Small white moth with immaculate forewings except for 2 dark brown, subapical costal strigulae, a dark brown tornal strigula, and a small, black apical spot. Male gnathos broadly triangular, tapering to a relatively stout, dorsally curved, caudal lobe; basal fold transverse, narrow (Figures 321, 322). Papillae anales of female a pair of small rounded lobes (Figure 454).

**Head:** Vestiture white. Scape white; flagellum ochreous cream, 66–70-segmented. Palpi mostly white to whitish cream; labial palpus with brown suffusion dorsally.

**Thorax:** White. Forewing white, immaculate except for 2 dark brown, subapical costal strigulae, a dark brown tornal strigula, and a small, black apical spot; first costal strigula short, ending well before apical spot; strigula 2 terminating above apical spot, interrupted from short terminal strigula slightly distad of apical spot; tornal strigula extending down from apical spot; cilia mostly white except cream around tornus; venter of forewing light brown except for elongate, whitish cream, subhumeral area. Hindwing yellowish brown to dark cream; cilia mostly cream with whitish suffusion distally, or entirely cream. Legs mostly ochreous cream to whitish cream, with pale suffusion of light golden brown dorsally on foreleg.

**Abdomen:** Dark ochreous cream dorsally, whitish cream ventrally.

**Male Genitalia:** Figures 321, 322. Socii a pair of short, setose lobes widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal rim of uncus moderately concave. Tegumen narrow, reduced to a slender bridge mid-dorsally. Vinculum broad, gradually tapering to rounded, anterior margin. Gnathos broadly triangular gradually narrowing to form a moderately slender, strongly recurved, caudal lobe; anterior margin slightly concave, with narrow

basal fold extending most of width. Valva with large cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a long pectinifer consisting of  $\sim 45$  blunt spines; pedicel broad, width  $\sim 0.15\times$  length of cucullar lobe; distal apex of pectinifer produced as a short triangular lobe; valva elongate, length along sacculus  $\sim 0.8\times$  length of genital capsule; saccular lobe slender, elongate, with a subacute, setose apex; basal process tapering to elongate, acuminate apex; costal process of valva approximately equal in length to basal process, with acute apex. Juxta a short, slender, rod-like process from vinculum.

**Female Genitalia:** Figures 453, 454. Abdomen tapering to a narrow, slightly cleft apex. Each posterior apophysis fused most of its length, relatively long, slender. Papillae anales a pair of small, rounded, setose lobes; longest setae about  $0.25\times$  length of apophyses; lobes arising from a small, common base with short, sinuate, lateral extensions; length of lobes  $\sim 0.3\times$  width of main base, excluding extensions (Figure 454). Vestibulum elongate, slender. Ductus bursae narrow, gradually enlarging to corpus bursae, with a dense zone of pectinations composed of transverse rows of usually 2–5 spicules extending length of ductus. Elongate, completely membranous, accessory bursa emerging from junction of corpus bursae with anterior end of ductus bursae. Corpus bursae moderately elongate; signum consisting of a faint, irregular, oval band of elongate spiculate, external tubercles with circular bases. Ductus spermathecae elongate, equal in length to entire bursa copulatrix; membranous outer canal enlarged near area of separation from ductus bursae, then slender to vesicle; inner canal sinuate, terminating in 4–5 convolutions; vesicle a relatively large, oval pouch.

**LARVA AND PUPA.** Unknown.

**LECTOTYPE.** (Designated by Davis, 1989) ♂; TRINIDAD: Jun [19]15, A. Busck, slide USNM 21431, Type 13385 (USNM).

**MATERIAL EXAMINED.** TRINIDAD, WEST INDIES: [specific locality unknown]: 1 ♂ (lectotype), Jun [19]15, A. Busck, USNM slide 21431, Type 13385 (USNM); same data as lectotype except: 1 ♂, 1 ♀ (without date) (paralectotypes), A. Busck, F. W. Urich, slide USNM 32494, wing slide USNM 98498 (USNM).

**FLIGHT PERIOD.** June.

**DISTRIBUTION.** (Map 7) Known only from the general type locality, Trinidad.

**DISCUSSION.** No locality has been provided for this species other than Trinidad. The head of the male paralectotype is missing and the left forewing has been placed inside a gelatin capsule beside the specimen. The elongate, tubular accessory pouch (accessory bursa) present in the one female examined of the species is unique

for the genus. The male is distinguished from the closest related species, *P. mignoniae*, by the gnathos possessing a stouter caudal lobe and more reduced, nonexcavated basal fold, and cucullar lobe bearing a short distal process.

### ***Pseudopostega subtila*, new species**

FIGURES 175, 323–325; MAP 7

**ADULT.** Figure 175. Length of forewing 3.8 mm. Small, mostly white moth with white forewings marked by 2 fuscous, subapical costal strigulae, with brownish basal suffusion, a fainter, fuscous, apical strigula, a short, fuscous, tornal strigula, and a small black apical spot. Male genitalia with a broadly triangular gnathos terminating in an elongate, slender, caudal lobe; basal fold narrow, with slightly concave anterior margin (Figures 323, 324). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, paler ventrally, 67-segmented. Maxillary palpus cream. Labial palpus cream, with brownish suffusion dorsally.

**Thorax:** Entirely white. Forewing white, immaculate except for a pair of fuscous to brown subapical costal strigulae, a single, faint, fuscous apical strigula, a single tornal strigula, and a small black, apical spot; strigula 1 extremely short and fuscous at costa, becoming gradually broader, more suffused and golden brown to black apical spot; strigula 2 fading into golden brown suffusion before apical spot; apical strigula faint, curving around and beyond apical spot; tornal strigula fuscous, beginning below apical spot and ending at tornus; terminal cilia mostly white, becoming cream around tornus; venter of forewing light brown except for short, basal white patch. Hindwing and cilia light golden brown dorsally and ventrally. Legs mostly white to cream; foreleg with lateral and dorsal surfaces of femur, most of tibia, and some tarsomeres suffused with pale fuscous; tarsi of mid- and hindlegs without dark suffusion.

**Abdomen:** Brown dorsally and laterally, white ventrally.

**Male Genitalia:** Figures 323–325. Socii a pair of moderately long rounded, setose lobes, widely separated by a distance  $\sim 0.4\times$  length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum moderately broad, with rounded anterior margin. Gnathos broadly triangular, tapering abruptly to form a slender, elongate, slightly recurved dorsally, caudal lobe; apex of lobe subacute; anterior margin of gnathos shallowly concave; basal fold narrow, moderately arched. Valva with an elongate cucullar



lobe  $\sim 0.65\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 55$  blunt spines; distal apex of cucullar lobe slightly extended; pedicel broad,  $\sim 0.13\times$  length of cucullar lobe; length of valva along sacculus  $\sim 0.7\times$  length of genital capsule; saccular lobe stout, moderately long with a highly irregular, rugose apex bearing  $\sim 7\text{--}8$  setae; basal process of valva tapering to acute apex, approximately equaling length of slender costal process. Juxta developed as a slender median rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MINAS GERAIS: Nova Lima, 850 m, 30 Dec 1988, V. O. Becker, slide DRD 4235 (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** December (unique record).

**DISTRIBUTION.** (Map 7) Known only from the type locality in the state of Minas Gerais of southeastern Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *subtilis* (thin, slender, acute) in reference to the elongate, slender, caudal lobe of the male gnathos.

**DISCUSSION.** The male of this species is partially characterized by the long, slender caudal lobe and slender basal fold of the gnathos and elongate cucullar lobes. *Pseudopostega subtila* differs from *P. trinidadensis* by the more slender apical lobe and broader apex of the saccular lobes of the valvae. From *P. acuminata* it differs in possessing much longer cucullar lobes and an evenly rounded anterior margin of the vinculum.

### ***Pseudopostega acuminata*, new species**

FIGURES 176, 326, 327; MAP 7

**ADULT.** Figures 176. Length of forewing 3.1–3.3 mm. Small, mostly white moth with white forewings marked with a moderately large, broadly triangular, fuscous spot near distal third of costa, a pair of slender, fuscous, subapical strigulae, the most apical of which is more faint, a slender, fuscous, tornal strigula, and a small, oblong, dark fuscous apical spot. Male with gnathos broadly triangular, tapering to slender, elongate, strongly reflexed caudal lobe; basal fold narrow, with slightly convex caudal margin (Figures 326, 327). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum golden brown dorsally, paler ventrally,  $\sim 44$ -segmented. Maxillary palpus white. Labial palpus white, with brownish suffusion laterally and dorsally.

**Thorax:** White. Forewing almost entirely white, with a broadly triangular, fuscous spot at distal  $2/5\text{--}1/3$

of costa, a dark fuscous, subapical costal strigula from costal subapex to brownish suffusion immediately basal to oblong, fuscous apical spot; strigula 2 fuscous, short, and poorly preserved in specimens examined but curving across apex of wing around apical spot; tornal strigula fuscous, shortly extended below apical spot; terminal cilia variable, white around apex and tornus, becoming light brown immediately above apical spot and immediately distad to terminal strigula and then brown apically and along dorsal margin; venter of forewing light brown with white patch over base of wing. Hindwing and cilia light brown dorsally and ventrally. Legs mostly cream; foreleg heavily suffused with dark gray dorsally from coxa to end of tarsi; mid- and hindlegs with dorsal base of tarsomeres banded with gray.

**Abdomen:** Grayish brown dorsally, white ventrally.

**Male Genitalia:** Figures 326, 327. Socii a pair of moderately long, rounded, setose lobes, widely separated by a distance  $\sim 0.9\times$  length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum moderately broad, narrowing to a slightly concave to truncate anterior margin. Gnathos broadly triangular, tapering abruptly to form a slender, elongate, strongly curved dorsally, caudal lobe; apex of lobe acute; anterior margin of gnathos shallowly concave, slightly swollen at middle; basal fold narrow, moderately arched (Figure 326). Valva with a relatively short cucullar lobe  $\sim 0.3\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 28\text{--}29$  blunt spines; distal apex of cucullar lobe extended; pedicel moderately broad,  $\sim 0.2\times$  length of cucullar lobe; length of valva along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe moderately stout, elongate, gradually tapering to a narrow, smoothly rounded apex bearing  $\sim 7\text{--}8$  small setae; basal process of valva tapering to acute apex, slightly exceeding length of slender costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ARGENTINA: TUCUMÁN: 11 km S Tacanas, 28 km WSW Trancas, sta. 28, 800 m: 16–17 Dec 1995, Neth. Ent. Exp. N-Arg., slide DRD 4135 (RMNH).

**MATERIAL EXAMINED.** VENEZUELA: MÉRIDA: Mucuy Fish Hatchery, 7 km E Tabay, 6600 ft [ $\sim 2000$  m]: 1 ♂, 10–13 Feb 1978, J. B. Heppner, slide USNM 32968 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in February (Venezuela) and April (Argentina).

**DISTRIBUTION.** (Map 7) Known from only two widely disjunct localities in northern Argentina and northwestern Venezuela.

**ETYMOLOGY.** The species name is derived from the Latin *acuminatus* (pointed, sharpened), in reference to the long, slender, acute caudal lobe of the male gnathos.

**DISCUSSION.** The holotype male of *P. acuminata* from Argentina is characterized by the long, slender, dorsally recurved caudal lobe of the gnathos, broad basal fold with a small median swelling, and broad, slightly concave anterior margin of the vinculum. A single male from Venezuela may represent a disjunct population of this species, but the genitalia differ from the holotype in possessing a slightly more narrow, truncate vinculum and basal fold without a noticeable median enlargement. For these reasons this specimen has not been considered a paratype.

### ***Pseudopostega tanygnatha*, new species**

FIGURES 177, 328, 329; MAP 7

**ADULT.** Figure 177. Length of forewing 2.3 mm. Small, mostly white moth with white forewings marked with 2 brown, subapical costal strigulae and a dark brown apical spot. Male with caudal lobe of gnathos extremely long and slender; basal fold absent (Figure 328). Female unknown.

**Head:** Vestiture white. Scape white; flagellum brown dorsally, paler ventrally, 47-segmented. Palpi white; labial palpus with light brown suffusion laterally.

**Thorax:** White; anterior margin of tegula with faint suffusion of light brown. Forewing almost entirely white, with 2 brown, subapical costal strigulae and a dark brown apical spot; first strigula fading well before apical spot; area immediately basal to dot suffused with pale yellow; apical strigula slightly curved around spot, fading to tornus; terminal cilia mostly white, with brownish suffusion apically beyond strigula 2; venter of forewing light brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces mostly cream with slight suffusion of light brown, paler on tarsomeres; midleg with light brown bands dorsally on tarsomeres 3 and 4; hindlegs missing.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 328, 329. Socii a pair of small, rounded, setose lobes, very widely separated by a distance equal to length of gnathos; caudal rim of uncus undulate, with a median, triangular projection. Vinculum broad; anterior margin subtruncate, slightly concave. Gnathos triangular, with a broad base gradually constricting to form an elongate, slender, caudal lobe; anterior margin

broadly concave, without basal fold (Figure 328). Valva with a moderately large cucullar lobe  $\sim 0.4\times$  length of entire genital capsule, bearing a pectinifer consisting of 18–25 blunt spines; distal apex of cucullar lobe slightly extended, acute; pedicel curved, extremely long and slender, approximately equal to cucullar lobe in length with a width less than  $0.2\times$  length of lobe; valva short, length along sacculus  $\sim 0.75\times$  length of entire genital capsule; saccular lobe strongly tapered, more than  $2/3$  length of pedicel; basal process of valva tapering to a slender base; costal lobe moderately stout, basal apex terminating at same level as basal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, P. N. Guanacaste, 700 m, 19–23 Jun 1993, P. Rios, slide DRD 4213 (INBIO).

**HOST.** Unknown.

**FLIGHT PERIOD.** June (unique record).

**DISTRIBUTION.** (Map 7) Known only from the type locality in northwestern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Greek *tany* (long) and *gnathos* (jaw) in reference to the slender, greatly elongated caudal lobe of the male gnathos.

**DISCUSSION.** The gnathos of *P. tanygnatha* possesses the most slender, elongate caudal lobe of any member in the *triangularis* group. Other diagnostic features of the male include the absence of a basal fold, broadly truncate vinculum, and valva with a reduced cucullar lobe and elongate pedicel.

### **The *saltatrix* group**

The *saltatrix* group includes those species with typically elongate valvae, which either equal or surpass the length of the genital capsule in length. The cucullar lobe is greatly enlarged (usually  $>0.5$  the length of the genital capsule), obovate in form, and is supported by a slender pedicel. The gnathos terminates in a stout to slender caudal lobe and possesses a variably developed basal fold. The juxta is usually absent.

### ***Pseudopostega colognatha*, new species**

FIGURES 178, 330, 331; MAP 9

**ADULT.** Figure 178. Length of forewing 1.8–2.1 mm. Small white moth with forewing pattern similar to that of *P. latifurcata latifurcata*, bearing a large brown to fuscous dorsal spot that extends most of the length of the hind margin and 2 dark brown, subapical costal strigulae.

Male with apex of gnathos strongly recurved, relatively short, appearing blunt (viewed ventrally); basal fold, narrow, strongly arched (Figure 330). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum light brown, ~45–48-segmented. Maxillary palpus cream; labial palpus cream, with suffusion of brown laterally.

**Thorax:** White; anterior margin of tegula fuscous. Forewing white, with large dark brown to fuscous dorsal spot extending ~half the length of wing from near base to distal fourth; a closely parallel pair of dark brown to fuscous, subapical costal stigulae extending across base of terminal cilia from costa to wing apex; strigula 1 terminating at reduced, dark brown to fuscous, apical spot; costal third to one-half of proximal margin of strigula 1 shadowed with dark brown suffusion, which can appear as an additional, although indistinct, strigula; strigula 2 sometimes faint, usually curving around apical spot; terminal cilia cream to light brown; venter of forewing brown with basal portion of discal area white. Hindwing and cilia pale brown with basal suffusion of white both dorsally and ventrally; distal half of wing unusually slender. Legs mostly white to cream; foreleg brown over lateral and dorsal surfaces; midleg and hindleg with light brownish suffusion dorsally, especially over terminal tarsal segments.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 330, 331. Socii a pair of moderately large, rounded, setose lobes, separated by a distance less than half the length of cucullar lobe. Caudal rim of uncus moderately concave. Vinculum broadly V-shaped; anterior margin subacute. Gnathos broad, width approximately equaling distance between lateral margins of socii; caudal third abruptly constricted to form relatively short, stout lobe; apex of lobe dorsally upturned, bluntly rounded; anterior margin of gnathos deeply concave, with narrow, strongly arched, basal fold (Figure 330). Valva with a relatively large, oval cucullar lobe ~0.55× length of genital capsule, bearing a pectinifer consisting of 47–49 blunt spines; pedicel elliptical, very slender, broadest width ~0.1× length of cucullar lobe; valva long, length along sacculus ~0.8× length of genital capsule; saccular lobe short, rounded; basal process of valva elongate, gradually tapering to acute base; costal process of valva very slender and elongate, terminating near anterior margin of vinculum near basal process of valva. Juxta a slender, membranous, median extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: PUERTO RICO: Patillas, 590 m: 1 ♂, Aug 1987, V. O. Becker, slide USNM 32475 (USNM).

**PARATYPES.** PUERTO RICO: Carite, 500 m: 1 ♂, 17 Aug 1987, V. O. Becker (USNM). Cayey, 450 m: 2

♂, 1 UNK, 2 Aug 1987, V. O. Becker, slide USNM 32751 (USNM). Patillas, 590 m: 1 ♂, Aug 1987, V. O. Becker, slide USNM 32750 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** August.

**DISTRIBUTION.** (Map 9) Currently known only from Puerto Rico.

**ETYMOLOGY.** The species name is derived from the Greek *kolos* (shortened, stunted) and *gnathos* (jaw), in reference to the short, blunt apex of the gnathos as viewed ventrally.

**DISCUSSION.** The large dark brown dorsal spot on the forewing of *P. colognatha* is similar to that present in *P. dorsalis dorsalis* and *P. latifurcata latifurcata*, although in *dorsalis* the spot usually extends to the costal margin and the terminal cilia are typically lighter in color in *colognatha*. The gnathos of *colognatha* is characteristic in having the broad base abruptly constricted to form a stout, dorsally recurved caudal lobe. Viewed ventrally the “apex” of the lobe appears truncate. The basal fold is relatively narrow and strongly arched caudally. The valva is very long with proportionately the longest costal process of any species of *Pseudopostega*.

### ***Pseudopostega obtusa*, new species**

FIGURES 179, 332, 333; MAP 9

**ADULT.** Figure 179. Length of forewing 3.4 mm. Small white moth with forewing pattern similar to that of some variations of *P. saltatrix*, bearing a prominent, oblique, brownish fuscous fascia and 3 dark brownish fuscous, subapical costal strigulae. Male with apex of gnathos strongly upturned dorsally, relatively short and blunt; basal fold narrow, sharply triangular in form (Figures 332, 333). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum yellowish brown dorsally, cream ventrally, ~67-segmented. Maxillary palpus cream; labial palpus white, with suffusion of brownish fuscous laterally.

**Thorax:** White; anterior margin of tegula fuscous. Forewing white, with prominent fuscous fascia gradually expanding obliquely across wing from basal ¼ of dorsal margin to basal 2/5 of costa; fascia ~3× as broad on costa as at dorsal margin; 3 brownish to fuscous subapical strigulae present; strigula 1 brown, fading halfway to elongate, black apical spot; strigula 2 dark fuscous, extending to apical spot; strigula 3 dark brown, terminating just before apical spot; 2 fuscous tornal stigulae present extending parallel from or near apical spot to tornus; terminal cilia mostly light brown,

white at tornus, then becoming light brown along dorsal margin; venter of forewing brownish fuscous except for slender streak of cream near base. Hindwing and cilia grayish brown dorsally, dark brown ventrally. Foreleg mostly grayish brown, white ventrally; midleg and hindleg cream with grayish brown banding on terminal tarsal segments.

**Abdomen:** Golden brown dorsally, with grayish suffusion laterally on A2–4; white to cream ventrally.

**Male Genitalia:** Figures 332, 333. Socii a pair of relatively small, rounded, setose lobes, separated by a distance  $\sim 0.45\times$  length of cucullar lobe. Caudal rim of uncus moderately concave. Vinculum broadly rounded. Gnathos broad, abruptly constricted caudally to form moderately short, stout caudal lobe; apex of lobe dorsally upturned, bluntly rounded; anterior margin of gnathos convex, triangular; basal fold narrow, sharply triangular in form, tightly appressed to base of gnathos. Valva with a relatively large

cucullar lobe  $\sim 0.6\times$  length of genital capsule, bearing a pectinifer consisting of 47–49 blunt spines; pedicel slightly curved, elongate, slender, width  $\sim 0.12\times$  length of cucullar lobe; saccular lobe short, triangular; valva short, length along sacculus  $< 0.6\times$  length of genital capsule; basal process of valva stout, gradually tapering to acute base; costal process of valva slender and elongate, terminating short of apex of basal process. Juxta poorly developed, a short, slender, median extension from vinculum.

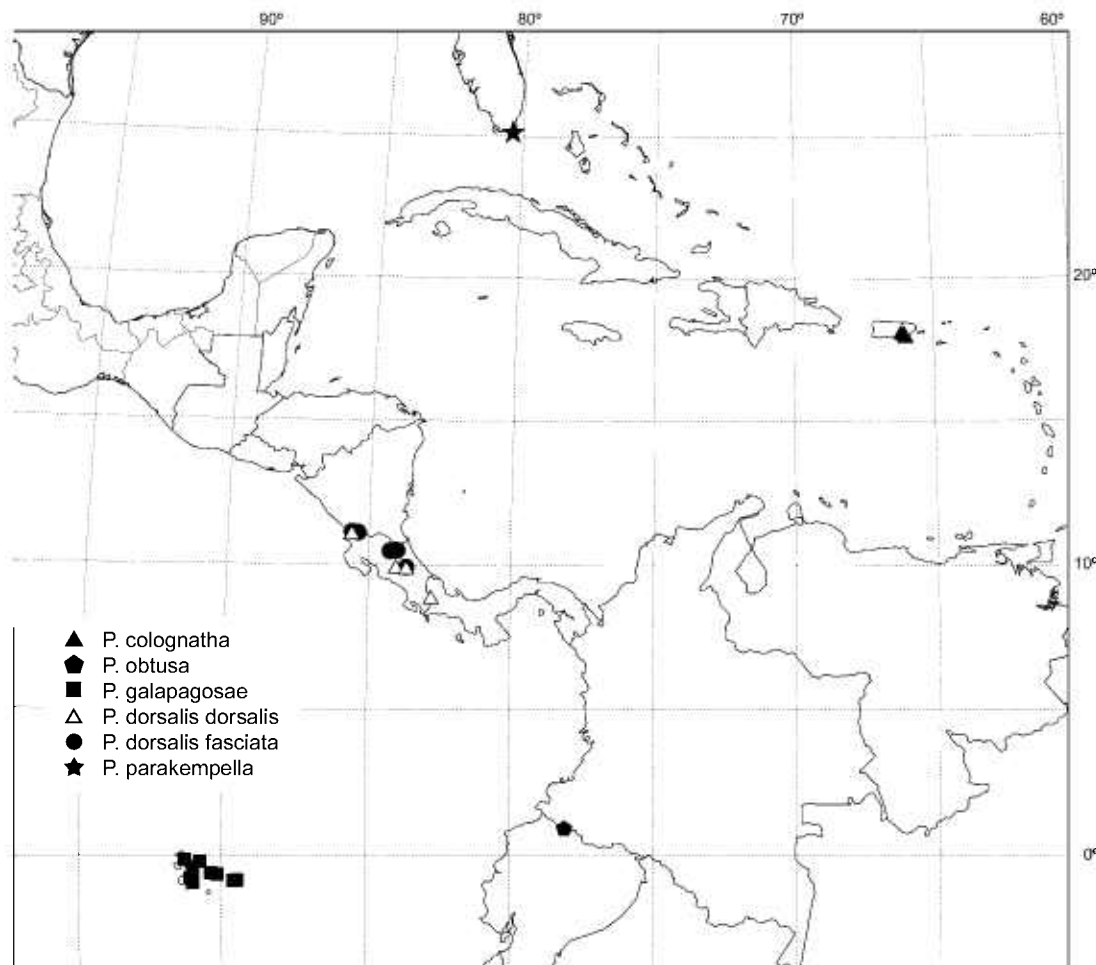
**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: CARCHÍ: Maldonado, 2200 m, 9–11 Jan 1993, V. O. Becker, slide USNM 32895 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** January (unique record).

**DISTRIBUTION.** (Map 9) Known only from the type locality in northern Ecuador.



MAP 9. Distribution of New World *Pseudopostega saltatrix* species group.

**ETYMOLOGY.** The species name is derived from the Latin *obtusus* (blunt, dull), in reference to the short, blunt apex of the male gnathos.

**DISCUSSION.** The male gnathos of this species resembles that of *P. colognatha* in possessing a stout, dorsally recurved caudal lobe that appears blunt in ventral view. The basal fold of *P. obtusa* is more narrow and more triangular than in *colognatha*, with the anterior margin extended as a triangular lobe. The sacculus of *obtusa* is proportionately among the shortest within the *saltatrix* group, whose members typically possess the longest valvae in *Pseudopostega*.

### ***Pseudopostega galapagosae*, new species**

FIGURES 129, 180–182, 334, 335, 455, 456; MAP 9

**ADULT.** Figures 129, 180–182. Length of forewing 2.3–3.4 mm. Small, mostly white moth with white forewings variably marked, usually with a dark brown fascia traversing at or slightly below middle of wing, 3 dark brown, subapical costal strigulae, a short, dark brown terminal strigula, a dark brown to nearly black apical spot, and a short, dark brown tornal strigula extending from apical spot. Male with cucullar and saccular lobes of valvae greatly enlarged; basal fold narrow, usually triangular (Figure 334). Female with papillae anales fused, consisting of a single, short, rounded, setose lobe broader than long (Figures 455, 456).

**Head:** Vestiture white. Scape white with dark brown, anteroventral margin; flagellum light golden brown to dark brown, 46–90-segmented. Maxillary palpus cream to light gray; labial palpus cream with gray to dark brown suffusion dorsally.

**Thorax:** White; anterior margin of tegula dark brown. Forewing mostly white variably marked, usually with a dark brown fascia traversing at or slightly below middle of wing; sometimes with only a portion of fascia preserved usually at costal and/or dorsal margins; fascia either slightly arched toward apex (Figure 181), or sharply angled at middle (Figures 129, 182); costal edge of wing dark brown nearly to fascia; 3 dark brown, subapical costal strigulae present; first strigula broadest, often triangular, sometimes with faint suffusion of light gray to brown scales extending to dark brown tornal spot; strigula 2 a narrow, short band ending at anterior margin of a variably developed yellow spot, but often extending around apex of wing to tornus; strigula 3 usually curving around and beyond dark brown to nearly black apical spot, often interrupted by a small patch of grayish to yellowish brown scales at apex of wing;

a short, dark brown tornal strigula extending through cilia from dark brown apical spot, sometimes along outer border of yellow spot; terminal cilia mostly white between strigulae, grayish to yellowish brown at apex beyond strigula 3, becoming light brown along dorsal margin; venter of forewing light to dark brown except for basal white area. Hindwing and cilia cream to light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces suffused with gray to brown; mid and hind tarsi gray to brown dorsally, usually with pale banding evident, especially on tarsomeres 3 and 4.

**Abdomen:** Cream to brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 334, 335. Socii a pair of relatively short, round, setose lobes, widely separated by a distance  $\sim 0.33\times$  length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum moderately broad, slightly tapering; anterior margin broadly round. Gnathos with a relatively broad base tapering to stout, blunt, dorsally upturned apical lobe with minutely irregular margins; basal fold narrow, usually triangular with caudal apex sometimes slightly attenuate. Valva with cucullar lobe obovate, greatly enlarged  $\sim 0.6\text{--}0.7\times$  length of genital capsule, nearly equal to or exceeding length of saccular lobe of valva, bearing a pectinifer consisting of 58–64 blunt spines; distal apex of cucullar lobe broadly rounded; pedicel obovate, tapering to a variably slender junction with cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; apex of saccular lobe broadly rounded; basal process of valva terminating slightly before basal end of costal lobe. Juxta poorly developed, consisting of a short, slender, median rod from vinculum.

**Female Genitalia:** Figures 455, 456. Abdomen tapering to a slender, slightly cleft apex. Each posterior apophysis fused for most its length, slender, elongate, length  $\sim 4.75\times$  width of papillae anales. Anal papilla a single, short, rounded, setose lobe broader than long; width  $\sim 1.5\times$  length; longest setae  $\sim 0.4\times$  length of apophyses. Vestibulum slender, membranous. Ductus bursae slender, elongate, with a median zone of pectinations consisting of variable rows of 2–5 minute spicules. Corpus bursae elongate, slender, gradually enlarging anteriorly; anterior half of bursa with variable, generally elongate, flattened spicules embedded in wall; anterior third with a faint, U-shaped band of variably angulate, flattened, external tubercles. Ductus spermathecae moderately short, about half as long as bursa copulatrix; membranous outer canal short, slender; inner canal curved to slightly sinuate, terminating in no more than 1–2 convolutions, enlarging to a short, coiled, tubular vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: GALÁPAGOS: Isabela: V. Darwin, 630 m: 16 May 1992, B. Landry, slide DRD 4241 (MHNG).

**PARATYPES.** ECUADOR: GALÁPAGOS: Fernandina: SW side, crater rim, GPS: 1341 m, 00°21.910'S, 91°34.034'W: 1 ♀, 13 Feb 2005, uvl, B. Landry, P. Schmitz (MHNG). Fernandina: SW side, GPS: 815 m, 00°21.270'S, 91°35.341'W, 1 ♂, daytime, 11 Feb 2005, B. Landry, P. Schmitz (MHNG). Fernandina: SW side, GPS: 815 m, 00°21.270'S, 91°35.341'W: 1 ♀, 14 Feb 2005, uvl, B. Landry, P. Schmitz (MHNG). Isabela: NE slope Alcedo, GPS: 292 m, 00°23.829'S, 91°01.957'W: 1 ♂, 1 ♀, 30 Mar 2004, uvl, B. Landry, P. Schmitz (MHNG). Isabela: 1 km W Puerto Villamil: 1 ♀, 3 Mar 1989, B. Landry, (CNC). Isabela: 8.5 km N Pto. Villamil: 3 ♂, 11 Mar 1989, B. Landry, slide USNM 30843 (CNC, USNM). Isabela: 3 km N Sto. Tomas: 1 ♀, 8 Mar 1989, B. Landry (CNC). Isabela: Alcedo, lado NE, 200 m: 1 ♂, 14 Apr 2002, 1 ♂, 18 Apr 2002, B. Landry & L. Roque (MHNG). Isabela: ~15 km N Puerto Villamil: 1 ♀, 25 May 1992, B. Landry (MHNG). Isabela: Puerto Villamil: 2 ♀, 2 Mar 1989, B. Landry (CNC). Isabela: V. Alcedo, Cumbre, 1200 m: 1 ♂, 9 Apr 1999, L. Roque (CDRS). Isabela: V. Darwin, 1000 m: 1 ♂, 18 May 1992, B. Landry (MHNG). Isabela: V. Darwin, 200 m: 1 ♂, 11 Feb 1999, L. Roque (CDRS). Isabela: V. Darwin, 300 m: 4 ♂, 1 ♀, 15 May 1992, B. Landry, slide USNM 32852 (MHNG, USNM). San Cristóbal: 1 km S El Progreso: 1 ♂, 1 ♀, 14 Feb 1989, B. Landry (CNC). San Cristóbal: 4 km SE Pto. Baquarizo: 3 ♀, 12 Feb 1989, 2 ♀, 20 Feb 1989, B. Landry (CNC, USNM). San Cristóbal: 1 ♀, near Loberia, GPS: 14 m, 00°55.149'S, 89°36.897'W: 1 ♀, 16 Mar 2004, uvl, B. Landry, P. Schmitz (MHNG). San Cristóbal: pampa zone: 2 ♀, 18 Feb 1989, B. Landry (CNC, USNM). San Cristóbal: Pto. Baquarizo: 1 ♀, 17 Feb 1989, B. Landry (CNC). San Cristóbal: 2 km W Bella Vista: 1 ♂, 1 ♀, 1 UNK, 27 Feb 1989, B. Landry, slides USNM 32869, DRD 4018 (CNC, USNM). Santa Cruz: 2 females, agriculture zone, near (NNW) Bella Vista, GPS: 223 m, 00°41.297'S, 90°19.670'W: 2 ♀, 7 Apr 2004, uvl, B. Landry (MHNG). Santa Cruz: low agriculture zone, GPS: 00°42.132'S, 90°19.156'W: 1 ♀, 13 Mar 2004, uvl, B. Landry, P. Schmitz (MHNG). Santa Cruz: CDRS, Barranco, 20 m: 2 ♂, 30 Apr 2002, B. Landry (MHNG). Santa Cruz: E.C.C.D: 2 ♀, 7 Mar 1989, 1 ♂, 7 Mar 1992, B. Landry (CNC, MHNG). Santa Cruz: Finca S. Devine: 1 ♀, 17 Mar 1989, B. Landry, slide USNM 32851 (USNM). Santa Cruz: Finca Vilema, 2 km W Bella Vista: 1 ♂, 2 ♀, 1 Apr 1992, B. Landry, slide DRD 4019 (MHNG, USNM). Santa Cruz: Los Gemelos: 1 ♀, 31 Jan 1989, B. Landry,

slide USNM 32850 (USNM). Santa Cruz: transition zone, recently cut road, GPS: 00°42.528'S, 90°18.849'W: 1 ♀, 12 Mar 2004, uvl, B. Landry, P. Schmitz (MHNG). Santiago: 1 ♀, 5 Apr 1992, B. Landry, DNA sample DRD188 (MHNG). Santiago: Aguacate, 520 m: 1 ♂, 1 ♀, 6 Apr 1992, B. Landry (MHNG). Santiago: Bahia Espumilla: 1 ♀, 4 Apr 1992, B. Landry, slide USNM 31796 (MHNG, USNM). Santiago: Central, 700 m: 1 ♂, 9 Apr 1992, B. Landry (MHNG).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from January to May.

**DISTRIBUTION.** (Map 9) This species is probably endemic to the Galápagos Islands where it has been collected on the islands of Fernandina, Isabela, San Cristóbal, Santa Cruz, and Santiago.

**ETYMOLOGY.** The species name is derived from the name of the general type locality, the Galápagos Islands of Ecuador.

**DISCUSSION.** Although the forewing pattern of this species appears variable, relatively similar male genital morphology suggests there to be only one species of *Pseudopostega* present in the Galápagos Islands. It would, of course, be interesting to compare possible genetic differences between the island populations once properly preserved specimens become available for analysis. Hebert's lab was unable to sequence the CO1 gene in the single specimen submitted from Santiago (DRD188). The male valva of *P. galapagosae* is unique in possessing the relatively broadest sacculus of any New World *Pseudopostega*. Some variation was noted in the relative length of the saccular lobe, with that illustrated (Figure 334) representing the shorter length. The pedicel is also slightly variable but is usually strongly constricted at the connection with the relatively greatly enlarged cucullar lobe.

### *Pseudopostega saltatrix* (Walsingham)

FIGURES 183–190, 336, 337, 457–460; MAP 10

*Opostega saltatrix* Walsingham, 1897:140.—Forbes, 1930:149.—Davis, 1984:18.

*Pseudopostega saltatrix* (Walsingham).—Davis, 1989:77.—Puplesis and Diškus, 2003:417.

**ADULT.** Figures 183–190. Length of forewing 2.1–3.1 mm. Small, mostly white moth with white forewings prominently marked by a broad, dark brown to fuscous fascia extending obliquely from basal fourth of hind margin to middle of costa, usually 3 dark brown, subapical costal

strigulae, and 1–2 shorter, brown tornal strigulae below indistinct, dark brown apical spot. Male genitalia with gnathos terminating in a moderately short, slender, strongly recurved caudal lobe; basal fold well developed, triangular (Figures 336, 337). Papillae anales of female largely fused to form an extremely short, tuberculate, slightly bilobed ridge bearing approximately 12 long setae (Figure 458).

*Head:* Vestiture white. Scape white, sometimes bordered ventrally with dark brown; flagellum light golden brown, 53–62-segmented. Maxillary and labial palpi white to cream. Labial palpus suffused with dark brown laterally.

*Thorax:* White; anterior margin of tegula dark grayish brown. Forewing white, occasionally with slight cream to brownish cream suffusion basally, variably marked, usually with a broad, dark brown to fuscous fascia extending obliquely from basal fourth of hind margin to middle of costa, sometimes continuing along costa and parallel basally to first costal strigula to merge with dark brown to fuscous, apical spot; fascia sometimes incomplete with only dorsal half preserved (Figures 184, 185) or absent (as in two males and one female from French Guiana, Figure 183); 3 slender, dark brown, subapical costal strigulae usually present, the first fading into apex of apical spot; strigula 2 continuing through apical spot to tornus; strigula 3 curving around apical spot to tornus; 1–2 slender, dark brown tornal strigulae extending from apical spot to tornus; terminal cilia grayish white to light brown between strigulae; light brown beyond strigulae and even lighter brown to cream from tornus to dorsal margin; venter of forewing medium to dark brown except for short, basal white area. Hindwing and cilia medium to dark brown dorsally and ventrally except for white suffusion ventrally at base. Legs mostly white; foreleg with lateral and dorsal surfaces dark brown; midleg with usually brown banding dorsally on terminal three tarsomeres; hindleg cream with tarsal banding paler, more scattered.

*Abdomen:* Light to medium brown dorsally, white to cream ventrally.

*Male Genitalia:* Figures 336, 337. Socii a pair of relatively long, bluntly rounded to subacute, setose lobes, widely separated by a distance  $\sim 0.25\text{--}0.45\times$  length of cucullar lobe; caudal rim of uncus truncate to slightly concave. Vinculum moderately broad, tapering to rounded anterior margin. Gnathos with a broad, approximately triangular to rectangular base, which constricts abruptly to form a short, dorsally recurved, acute, caudal lobe; anterior margin of gnathos moderately convex medially, with a triangular basal fold extending  $\sim 0.3\text{--}0.5\times$  length of gnathos; free width of fold variable from narrow and barely visible to moderately broad (Figures 336, 337). Valva with a greatly elongate cucullar lobe nearly equaling length of basal portion of

valva and  $\sim 0.65\text{--}0.7\times$  length of genital capsule, and bearing a pectinifer consisting of 41–60 blunt spines; terminal apex of cucullar lobe with a minute tubercular projection; pedicel slender to moderately broad,  $\sim 0.08\text{--}0.12\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.55\text{--}0.8\times$  length of genital capsule; saccular lobe rounded, not produced; basal process of valva relatively stout, subacute, slightly longer than costal process. Juxta greatly reduced to a minute, rod-like projection from vinculum or undeveloped.

*Female Genitalia:* Figures 457–460. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophysis fused for most its length, slender and moderately long. Papillae anales largely fused to form an extremely short, tuberculate, slightly bilobed ridge bearing approximately 12 long setae up to  $0.65\times$  length of apophysis. Vestibulum broad, membranous. Ductus bursae with an elongate, caudal zone of variable pectinations arranged in series of 1–3 spicules and another zone at junction with corpus bursae composed of longer pectinations arranged in transverse rows of usually 7–9 spicules. Corpus bursae long and slender, with a faint, elongate band bearing numerous minute, irregular, external tubercles extending most of length of bursa and partially encircling anterior end (Figures 457, 459). Ductus spermathecae  $\sim 0.5\times$  length of bursa copulatrix; membranous outer canal relatively short and slender,  $\sim 0.3\times$  length of entire duct; inner canal long, slightly sinuous, with about 2–3 terminal convolutions; vesicle a partially coiled, distally inflated tube.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; U.S. VIRGIN ISLANDS: ST. THOMAS, 2 Apr 1894, Hedemann, Walsingham Collection 1910–427, slide BMNH 29637 (BMNH).

**MATERIAL EXAMINED.** BELIZE: San Ignacio: 7 ♂, 2 ♀, 17–18 Apr 1998, R. Puplesis & S. Hill, slide AD 0446 (VPU). CAYO DISTRICT: Chiquibul Forest Reserve, Las Cuevas Research Station: 4 ♂, 1 ♀, 3–16 Apr 1998, R. Puplesis (VPU). COSTA RICA: CARTAGO: R. F. Rio Pacuare, P. N. Barbilla, Estación Barbilla, 500 m: 1 ♂, 3 ♀, Jan 2002, 2 ♂, 4 ♀, Feb 2002, L. Chavarria, slide USNM 33070 (INBIO, USNM). CARTAGO: Parque Nacional Tapanti, 1650 m: 27 Apr 2005, K. Nishida, light sheet, slide USNM 33200 (USNM). Turrialba, 600 m: 1 ♀, Jun 1972, 1 ♂, Jul 1981, 1 ♀, Aug 1972, 1 ♂, Sep 1971, 1 ♂, 20 Nov 1971, 1 ♀, 10 Dec 1971, V. O. Becker, slides DRD 4174, 4285, 4289 (VOB, USNM). GUANACASTE: Estación Cacao, Lado SO Volcán Cacao, P. N. Guanacaste, 1000–1400 m: 1 ♂, 1 ♀, May 1991, 1 ♂, 25 Sep–11 Oct 1990, 1 ♂, 2 ♀, 23 Oct–9 Nov 1990, C. Chaves, slides USNM 32817, 33074 (USNM, INBIO). Estación Pitilla, 9 km S Santa Cecilia, P. N. Guanacaste, 700 m: 1 ♂, Apr 1991,

C. Moraga, slide DRD 4214; 1 ♂, Apr 1995, P. Rios, slide DRD 4322 (INBIO); 2 ♂, 4 ♀, 1 UNK, 19–23 Jun 1993, P. Rios, slide USNM 32256; 1 ♂, 19–23 Jun 1993, P. Rios & C. Moraga (INBIO, USNM). Z. P. Tenorio, Sector Alto Los Masis, 1100 m: 1 ♂, 10–11 Jun 2002, J. Jimenez, slide USNM 33071; 1 ♂, 10–14 Jun 2002, L. Chavarria (INBIO, USNM). Santa Rosa Station, Area de Guanacaste, 300 m: 1 ♂, 1 ♀, 22 Jun 2003, K. Nishida, light sheet, slide USNM 33206 (USNM). HEREDIA: El Ceibo, 10 km SE La Virgen, 450–550 m, 05/L/00/052: 4 ♂, 9 Apr 2003, D. & M. Davis, slide USNM 32004, 1 ♂, Feb 2003, A. Kawahara (USNM, INBIO); 05/L/00/058: 1 ♂, 12 Apr 2003, D. & M. Davis (INBIO); 05/L/00/060: 1 ♀, 13 Apr 2003, D. & M. Davis, (INBIO). Estación Biológica La Selva, 50–150 m, L/00/145: 1 ♂, 14 Feb 1996, INBio-OET, slide DRD 4262 (INBIO); L/00/169: 1 ♂, 28 Feb 1996, INBio-OET, (INBIO); L/00/177: 1 UNK, 6 Mar 1998, INBio-OET (INBIO); L/00/189: 2 ♂, 1 ♀, 19 Mar 1996, INBio-OET, slide USNM 32872 (USNM, INBIO); L/00/193: 4 ♂, 21 Mar 1996, INBio-OET, slide USNM 32874 (INBIO, USNM); L/00/194: 1 ♂, 21 Mar 1996, INBio-OET, slide USNM 32764 (USNM); L/04/093: 1 ♀, 13 Jan 1996, INBio-OET (INBIO); L/04/144: 1 ♂, 1 ♀, 14 Feb 1996, INBio-OET (INBIO, USNM); L/04/164: 1 ♀, 26 Feb 1996, INBio-OET (INBIO); L/05/021: 1 ♂, 20 Mar 1993, INBio-OET (INBIO); L/05/124: 1 ♀, 13 Jan 1996, INBio-OET (INBIO); L/05/183: 2 ♂, 11 Mar 1996, INBio-OET, slide USNM 33029 (INBIO, USNM); L/05/185: 1 ♂, 13 Mar 1996, INBio-OET, slide USNM 32162 (USNM); L/05/190: 2 ♂, 19 Mar 1996, INBio-OET (INBIO, USNM); L/05/195: 1 ♂, 5 ♀, 21 Mar 1996, INBio-OET, slide USNM 32848 (INBIO, USNM); L/05/200: 1 ♀, 27 Mar 1996, INBio-OET, slide USNM 32960 (USNM); L/07/322: 2 ♂, 1 ♀, 25 Feb 1998, INBio-OET (INBIO); L/11/326: 4 ♂, 4 Mar 1998, INBio-OET (INBIO); L/11/338: 1 ♂, 24 Mar 1998, INBio-OET (INBIO); L/12/303: 1 ♀, 28 Jan 1998, INBio-OET (INBIO); L/12/327: 1 ♀, 4 Mar 1998, INBio-OET (INBIO); L/12/339: 1 ♂, 24 Mar 1996, INBio-OET, (USNM); L/15/496: 1 ♀, 27 Oct 1998, INBio-OET (INBIO); L/16/391: 1 ♂, 4 Jun 1998, INBio-OET, (INBIO); L/18/333: 1 ♂, 12 Mar 1998, INBio-OET (INBIO); L0012: 1 ♂, 15 Jan 1993, INBio-OET (INBIO). Finca Murillo, 9 km NE Vara Blanca, 1500 m: 1 ♂, 9 Apr 2005, K. Nishida, 15/L/00/052 trap, slide 4351 (INBIO). LIMON: Cerro Tortuguero, P. N. Tortuguero, 0–100 m: 1 ♂, Apr 2001, J. Solano, slide USNM 32873 (USNM). R. B. Hitoy Cerere, Cerro Bitarkara, Sector El Rancho, 900–1025 m: 2 ♂, 13 Mar 2002, M. Moraga & L. Chavarria (INBIO). R. B. Hitoy Cerere, Sector Calavera Danta, 400–500 m: 1 ♂, 14 Mar 2002, M. Moraga

& L. Chavarria (INBIO). CUBA: Central Baragua: 1 ♂, Mar 1931, 2 ♀, Apr 1931, 2 ♀, May 1931, H. K. Plank, slides USNM 32728, 32763 (USNM). DOMINICA: Macoucheri, 500 ft [152 m]: 1 ♂, 1 UNK, 12 Feb 1965, J. F. G. & T. M. Clarke, slide USNM 32758 (USNM). Rosalie, 500 ft [152 m]: 1 ♂, 15 Jun 1965, D. R. Davis, slide USNM 32484 (USNM). Soufrière, 500 ft [152 m]: 2 ♂, 11 Feb 1965, J. F.G. & T. M. Clarke, slides USNM 32476, 32480 (USNM). ECUADOR: 80 km E Guayaquil, Bucay (= Cumanda), 700 m: 1 ♂, 16–19 Jan 2001, R. Puplesis & S. Hill (VPU). NAPO: SE Tena, Jatun Sacha and Misahualli, 400–500 m: 9 ♂, 26–31 Jan 2000, R. Puplesis & S. Hill, slides AD 0359, 0448, 0449, 0452, 0477 (VPU). FRENCH GUIANA: Montagne de Kaw, Piste de Kaw, km 40, 350 m: 1 ♂, 1 UNK, 1 ♀, 21 Jan 1985, J.-F. Landry, slide USNM 32841 (USNM). JAMAICA: Runaway Bay: 1 ♀, 28 Feb 1905, Walsingham, slide BMNH 29640 (BMNH). NICARAGUA: Esteli: 2 ♂, 4 ♀, 22 Aug 1972, G. F. & S. Hevel, slides USNM 31964, 32830 (USNM). PANAMA: La Chorrera: 4 ♂, 2 ♀, 1 UNK, Apr 1912, A. Busck, slides USNM 31837, 32833, 32871, 32923, 32941 (USNM). PARAGUAY: Itapua, El Tirol: 2 ♂, 22–26 Apr 1986, M. Pogue & A. Solis, slide USNM 32823 (USNM). PUERTO RICO: Centro Vacacional, Monte del Estado, nr. Maricao, 650 m: 1 ♀, 1–9 Mar 1971, C. P. Kimball (USNM). U.S. VIRGIN ISLANDS: St. THOMAS: 1 ♂ (holotype), 2 Apr 1894, Hedemann, Walsingham Collection 1910–427, slide BMNH 29637 (BMNH). Same data except: 1 ♂ (paratype), slide BMNH 29638 (BMNH), 1 ♀ (paratype), 2 Apr 1894, slide 4256 (MGAB). JAMAICA: Runaway Bay: 1 ♀, 28 Feb 1905, Walsingham, slide BMNH 29640 (BMNH).

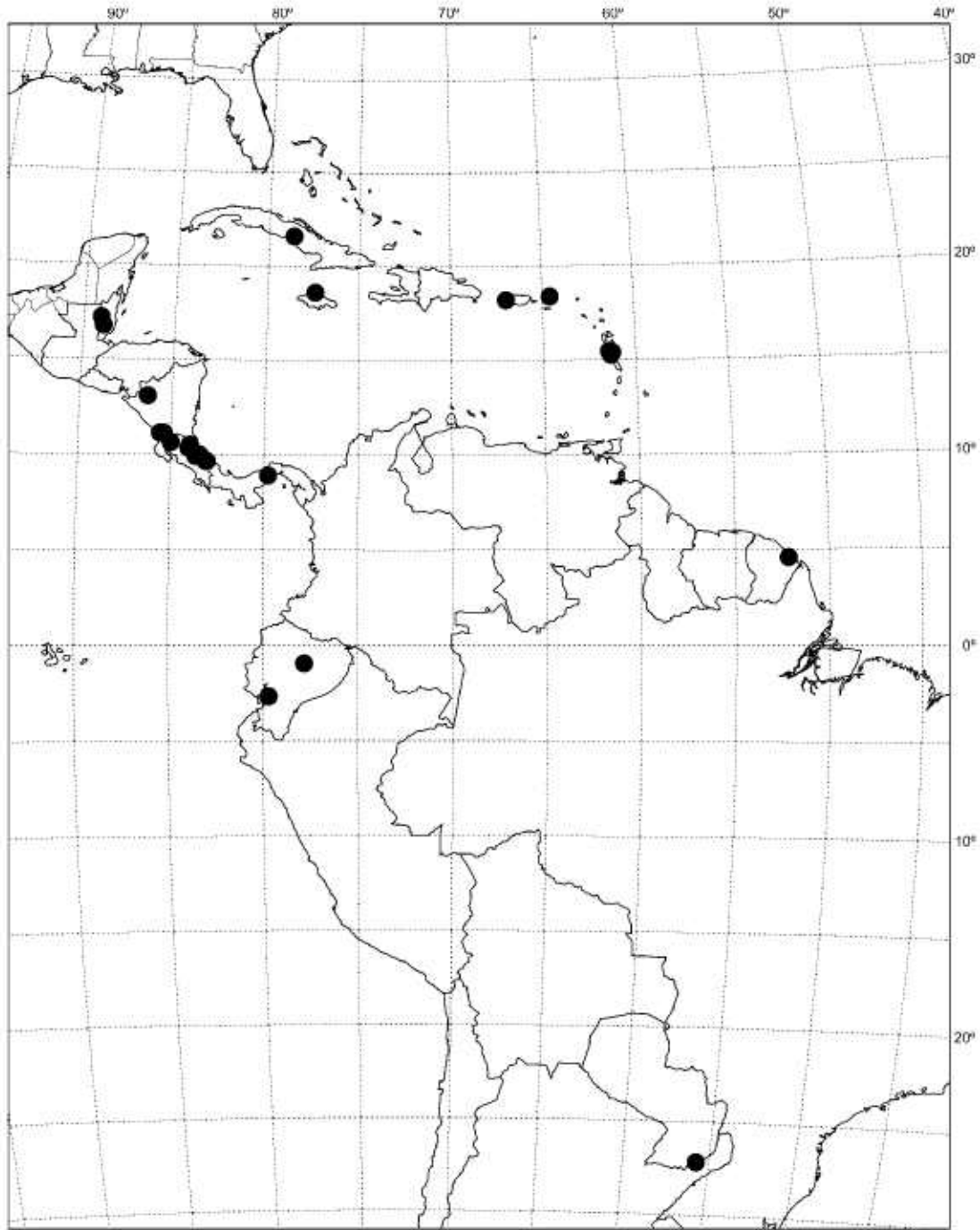
**HOST.** Unknown.

**FLIGHT PERIOD.** In Costa Rica adults have been collected throughout the year. A similar pattern may exist over much of the species' broad range, although collecting records are too incomplete to assess.

**DISTRIBUTION.** (Map 10) Extremely widespread from Cuba to Dominica in the West Indies, south from Belize to Ecuador, French Guiana, and Paraguay.

**DISCUSSION.** Originally described from St. Thomas in the U.S. Virgin Islands, *Pseudopostega saltatrix* is now recognized as the most widely distributed New World opostegid. The wing pattern can be highly variable with a dark brown, oblique fascia fully developed to absent. Examination of the male genitalia is usually necessary to distinguish *saltatrix* from other fasciated *Pseudopostega*, particularly *P. dorsalis fasciata* from Costa Rica. The latter typically possesses a small, elongated, white spot immediately distad to the dark apical spot in the terminal cilia of the forewing that





MAP 10. Distribution of *Pseudopostega saltatrix* (*saltatrix* species group).

is lacking in *saltatrix*. The caudal lobe of the gnathos is much shorter in *saltatrix* than in both subspecies of *dorsalis*.

The female genitalia of *saltatrix* differ from that of *dorsalis* in the smaller lobes of the papillae anales, in less internal spiculation within the corpus bursae, and possibly in

possessing a broader corpus bursae. Significance of the latter requires more examination of females of both species.

The genital morphology of a few West Indian females examined displays various degrees of variation that may represent other species now confused with *saltatrix*. A

female in the BMNH (slide 29640) differs from other *saltatrix* females examined in possessing pectinations within the bursae copulatrix of a different shape and more slender external tubercles (Figure 459). The female paratype of '*saltatrix*' in the collections of MGAB may also represent a different, unknown species as indicated by the more reduced papillae anales (Figure 460).

***Pseudopostega dorsalis dorsalis*, new species**

FIGURES 127, 128, 191, 338, 339, 461–463; MAP 9

**ADULT.** Figures 127, 128, 191. Length of forewing 2.2–3.3 mm. Small, mostly white moth with white forewings marked by a large, dark brown to fuscous dorsal spot extending most of the length of hind margin, a prominent, dark brown to fuscous, a subapical costal strigula extending obliquely along base of cilia, and 1–2 much more slender, dark brown, costal strigulae through terminal cilia; apical spot indistinct. Male gnathos with slender, attenuated caudal lobe; basal fold well developed, triangular (Figures 338, 339). Papillae anales of female bilobed, lobes short and usually truncate (Figure 462).

**Head:** Vestiture white. Scape white; flagellum light to dark brown, ~57–67-segmented. Maxillary palpus cream. Labial palpus white to dull white, dark brown to fuscous dorsally and laterally.

**Thorax:** White; anterior margin of tegula brown. Forewing white, sometimes with suffusion of light golden brown along costal margin, prominently marked by a large, dark brown to fuscous dorsal spot extending most of length of hind margin; a prominent, dark brown to fuscous, subapical costal strigula extending obliquely across base of cilia, broadest on costal margin then broadening again at termination in area of apical spot near tornus; a second, short, slender brown costal strigula located immediately more distad, closely parallel to prominent basal strigula 1 and occasionally confluent with it; a third, equally short, brown, costal strigula located midway across terminal cilia; apical spot indistinct; terminal cilia white to grayish white between strigulae and at tornus, light brown beyond strigulae and along hind margin; an elongate white spot at base of cilia immediately above apical dark streak; venter of forewing medium to dark brown except for short, basal white patch. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with lateral and dorsal surfaces dark brown; midleg with dark brown banding dorsally on terminal 3 tarsomeres; hindleg cream with light grayish brown dorsal spot at apex of tibia and two light grayish brown bands on tarsomeres 2 and 3.

**Abdomen:** Medium to dark brown dorsally, white to cream ventrally with brownish suffusion laterally.

**Male Genitalia:** Figures 338, 339. Socii a pair of relatively long rounded, setose lobes, widely separated by a distance ~0.4× length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broad, tapering to rounded anterior margin. Gnathos with broad base that constricts abruptly to form a slender, elongate, straight, caudal lobe; apex of lobe minutely rounded; anterior margin of gnathos convex; basal fold broadly triangular, laterally narrow (Figure 338). Valva with an elongate cucullar lobe ~0.6× length of genital capsule, bearing a pectinifer consisting of ~42–45 blunt spines; distal apex of cucullar lobe rounded, not extended; pedicel slender, approximately 0.1× length of cucullar lobe; valva elongate, length along sacculus ~0.75× length of genital capsule; sacculus lobe stout, moderately long with a rounded, setose apex; basal process of valva tapering to acute apex, approximately equaling length of costal process. Juxta undeveloped.

**Female Genitalia:** Figures 461–463. Abdomen tapering to a narrowly rounded, minutely cleft apex. Each posterior apophysis divided slightly more than half its length with anterior fused section relatively short. Papillae anales bilobed, consisting of a pair of broad, usually truncate but sometimes minutely cleft, divergent lobes (Figures 462, 463); lobes short, length ~1.1× width, bearing ~8–10 moderately long setae. Vestibulum narrow, membranous. Ductus bursae approximately same diameter to corpus bursae; inner walls densely lined with pectinations consisting of usually 2–5 minute spicules arranged in short, transverse rows; pectinations continuing almost half the length of corpus bursae. Corpus bursae elongate, slender, enlarging slightly anterior to separation of ductus spermathecae; a narrow, elliptical, faint band of external tubercles extending through anterior half of bursa. Ductus spermathecae relatively short, ~0.33× length of bursa copulatrix; membranous outer canal slender, short; inner canal terminating in 3–4 convolutions; vesicle composed of enlarged, partially coiled sac; lagena absent.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: SAN JOSÉ: San Pedro de Montes de Oca, UCR, Reserva Ecológica Leonel Oviedo, 10°26'N, 84°01'W, 1150 m: 5 Jun 2000, K. Nishida, slide USNM 32793 (USNM).

**PARATYPES.** COSTA RICA: CARTAGO: Turrialba, 600 m: 2 ♂, Jul 1981, V. O. Becker, slides DRD 4331, USNM 31803 (USNM, VOB). GUANACASTE: Estación Cacao, lado SO Volcán Cacao, P. N. Guanacaste, 1000–1400 m: 5 ♂, 2 ♀, 23 Oct–9 Nov 1990, C. Chaves, slides DRD 4335, DRD 4336, DRD 4340, DRD 4341,

USNM 32255, USNM 32424 (INBIO, USNM). PUNTARENAS: Finca Cafrosa, Estación Las Mellizas, P.N. Amistad 1300 m: 1 ♀, Mar 1991; 1 ♀, Apr 1991, M. Ramirez, slides DRD 4333, DRD 4334 (INBIO). SAN JOSÉ: San Pedro de Montes de Oca, UCR, Reserva Ecológica Leonel Oviedo, 1150 m: 1 ♀, 5 Jun 2000, K. Nishida, slide USNM 33099 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults probably occur throughout much of the year, with records known for March to April, June to July and October to November.

**DISTRIBUTION.** (Map 9) Currently known from only Costa Rica from elevations of 600 to 1400 m.

**ETYMOLOGY.** The species name is derived from the Latin *dorsualis* (of the back, dorsal) in reference to the large, dark brown to fuscous spot present along the dorsal margin of the forewing.

**DISCUSSION.** This is one of the few Costa Rican *Pseudopostega* species yet to be found at La Selva, although the subspecies *P. dorsalis fasciata*, mentioned below, is known from La Selva. Known records show the species to occur at slightly higher elevations in Costa Rica, which may explain its absence at La Selva. The large forewing dorsal spot present in *P. dorsalis dorsalis* differs from that in *P. colognatha* and *P. latifurcata latifurcata* by extending across the forewing to the costal margin. The male genitalia of all three species differ greatly, as illustrated.

*Pseudopostega dorsalis* is believed to consist of two subspecies possessing identical male genitalia but with distinctly different wing patterns. No intermediate pattern variation is known to exist between the subspecies with a large forewing dorsal spot (Figure 191), herein named *P. dorsalis dorsalis*, and *P. dorsalis fasciata*, which possesses a dark brown fascia extending obliquely across the forewing (Figure 192). Because adults of both subspecies were collected within the same area at Estación Cacao and Turrialba, the status of these proposed taxa is subject to question. Sympatry in this case suggests that either (a) two distinct species possessing identical genital morphology may be involved or (b) these two morphs represent more recently derived subspecies, perhaps as a result of sympatric speciation associated with, for example, a significant shift in host plants (Doebeli and Dieckmann, 2000). Two Costa Rican specimens representing a male *dorsalis dorsalis* from San Jose (D181; 493 base pairs sequenced) and a female *dorsalis fasciata* (D195; 397 base pairs) from La Selva were submitted for DNA analysis of the mitochondrial gene CO1. Although the number of base pairs sequenced was not optimal, greater genetic difference (~3%)

was observed between these samples than resulted in the comparison of the vicariant populations of *P. duplicata*. Because the ~3% difference that resulted is more typical of individuals from different hosts (*P. Hebert*, Biodiversity Institute of Ontario, University of Guelph, Guelph, Ontario, Canada, personal communication) and considerably less than that normally exhibited between morphologically distinct, congeneric species (*Hebert et al.*, 2004), the two superficially distinct forms with identical genitalia have been considered subspecies. *Landry et al.* (1999) also caution that simple percent sequence divergence between closely related sister species of Lepidoptera can be highly variable and may not necessarily be a reliable predictor of whether two unknown populations constitute reproductively isolated species.

A similar example of subspeciation apparently has evolved within another, similarly marked species proposed herein, *P. latifurcata*. However, in this case the two subspecies are allopatric, with the one possessing a large dorsal spot, *P. latifurcata latifurcata*, restricted to the West Indies, and the banded subspecies, *P. latifurcata apoclima*, known only from Costa Rica.

### ***Pseudopostega dorsalis fasciata*, new subspecies**

FIGURE 192; MAP 9

**ADULT.** Figure 192. Length of forewing 2.4–2.9 mm. Small, mostly white moth with white forewings marked by an oblique, dark fuscous fascia extending from basal fourth of dorsal margin to basal 0.4 of costal margin; subapical costal area mostly fuscous with 2–3 indistinct strigulae and a small white apical spot. Male genitalia similar to *P. dorsalis dorsalis*; gnathos with slender, attenuated caudal lobe and broadly triangular basal lobe. Papillae anales of female similar to *P. dorsalis dorsalis*, bilobed, lobes short and usually truncate.

**Head:** Vestiture white. Scape white; flagellum light golden brown, ~66–69-segmented. Maxillary palpus white. Labial palpus white, with brownish suffusion dorsally.

**Thorax:** Entirely white. Forewing white, with an oblique, dark fuscous fascia extending from basal fourth of hind margin to basal 0.4 of costal margin; subapical costal area mostly fuscous with 2–3 indistinct strigulae; strigulae 1 and 2 nearly confluent, with 2 enlarging slightly to form an indistinct black apical spot; a distinct, small white apical spot immediately distad of black spot; terminal cilia mostly light fuscous becoming paler and more grayish brown around tornus and along dorsal margin; venter of forewing

dark brown except for short, basal white patch. Hindwing and cilia grayish brown dorsally and ventrally. Legs mostly white to cream; foreleg with lateral and dorsal surfaces fuscous; midleg dark fuscous dorsally on terminal three tarsomeres; hindleg cream with light grayish suffusion dorsally on tarsomeres 2 and 3.

**Abdomen:** Fuscous dorsally, white to cream ventrally.

**Male Genitalia:** Similar to *P. dorsalis dorsalis*.

**Female Genitalia:** Similar to *P. dorsalis dorsalis*.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: ALAJUELA: Reserva San Ramón, 800 m: 12 Nov 1999, K. Nishida, slide USNM 32791 (USNM).

**PARATYPES.** COSTA RICA: ALAJUELA: Finca San Gabriel, 2 km SW Dos Rios, 600 m: 1 UNK, May 1989, GNP Biodiv. Survey, (USNM). CARTAGO: Turrialba, 600 m: 2 ♂, Jul 1981, V. O. Becker, slides DRD 4243, USNM 31802 (USNM, VOB). HEREDIA: Estación Biológica La Selva, 50–150 m., L/06/091: 1 ♀, 10 Jan 1994, INBio-OET, slide USNM 32818 (USNM); L/04/176: 1 ♀, 6 Mar 1996, INBio-OET, DNA voucher D-195, slide USNM 32163 (USNM). Finca Murillo, 9 km NE Vara Blanca, 1500 m: 1 ♂, 9 Apr 2005, K. Nishida, 15/L/00/052 trap, slide USNM 33209 (USNM). GUANACASTE: Estación Cacao, Lado SO Volcán Cacao, P. N. Guanacaste, 1000–1400 m: 1 UNK, May 1991, C. Chaves (INBio). Estación Pitilla, 9 km S Santa Cecilia, P. N. Guanacaste, 700 m: 1 ♂, 19 Sep–22 Oct 1990, P. Rios & C. Moraga, slide DRD 4265 (INBio).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from May to July and September to November.

**DISTRIBUTION.** (Map 9) Currently known only from Costa Rica from elevations of 50 to 1500 m.

**ETYMOLOGY.** The subspecies name is derived from the Latin *fasciatus* (banded) in reference to the prominent, dark brown band extending obliquely across the forewing.

**DISCUSSION.** As discussed under the preceding nominal subspecies, the species *P. dorsalis* is currently believed to consist of two, partially sympatric subspecies based on their markedly different forewing patterns and identical male genitalia. *Pseudopostega dorsalis fasciata* differs from *P. dorsalis dorsalis* by possessing a dark fuscous fascia extending obliquely across the forewing, thus more resembling the adults of *P. saltatrix* and *P. latifurcata apoclina*. Male genital morphology readily distinguishes all three species. The small, elongate white spot in the cilia at the apex of the forewing of *P. dorsalis fasciata* further

associates this subspecies with the nominal subspecies and helps to distinguish it from the superficially similar, much more widespread *P. saltatrix*.

### ***Pseudopostega parakempella*, new species**

FIGURES 193, 340, 341, 464, 465; MAP 9

*Opostega kempella* Eyer, 1967:39–41. [partim, misidentification].

**ADULT.** Figure 193. Length of forewing 2.1–2.4 mm. Small white moth; forewing white with an elongate, brownish fuscous spot near basal 2/5 of dorsal margin slanted toward apex and separated slightly from margin, and 2 dark brown to fuscous, oblique, subapical, costal strigulae; dark apical spot absent. Male gnathos with dorsal posterior region minutely spined; caudal lobe simple, subacute (Figures 340, 341). Papillae anales of female largely fused to form an extremely short, tuberculate ridge (Figure 465).

**Head:** Vestiture white. Scape white; flagellum cream to dark cream, ~59–60-segmented. Palpi cream; dorsal and lateral surfaces of labial palpus lightly suffused with brown.

**Thorax:** White. Forewing white, with an elongate, brownish fuscous spot near basal 2/5 of dorsal margin slanted toward apex and separated slightly from dorsal margin; 2 dark brown to fuscous, oblique, subapical, costal strigulae present; first strigula fuscous, shadowed internally with dark brown, curving around apex to tornus; strigula 2 dark brown, slightly shorter than 1; dark apical spot absent; terminal cilia mostly cream to light brown, becoming white around tornus, white to light brown along dorsal margin; venter of forewing mostly brown except for white, subhumeral area. Hindwing and cilia whitish to ochreous cream (depending upon angle of view). Legs mostly ochreous cream; forelegs with grayish brown suffusion laterally and dorsally.

**Abdomen:** Yellowish brown dorsally; whitish cream ventrally.

**Male Genitalia:** Figures 340, 341. Socii a pair of relatively small, rounded, setose lobes widely separated by a distance ~0.5× length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad, tapering to rounded anterior margin. Gnathos moderately broad across base; anterior margin subtruncate, slightly sinuate; basal fold narrow, well separated medially from gnathos (as viewed laterally); posterodorsal region of gnathos with numerous, minute spines; gnathos constricted to form short, slightly uncinuate, subacute caudal lobe. Valva with a large cucullar lobe ~0.65× length of genital capsule, bearing a pectinifer

consisting of ~52 blunt spines; distal apex of cucullar lobe evenly rounded; pedicel narrow; minimum width ~0.05× length of cucullar lobe; valva elongate, ~0.8× length of genital capsule along sacculus; saccular lobe tapering to short, rounded, setose apex; basal process of valva elongate, tapering to subacute apex; costal process as long as basal process, slender. Juxta undeveloped.

**Female Genitalia:** Figures 464, 465. Apex of abdomen narrowly truncate, with two poorly defined setose lobes. Each posterior apophysis fused ~0.75× its length, slender and moderately long. Papillae anales largely fused to form an extremely short, tuberculate ridge consisting of ~4–6 tubercles bearing long setae 0.36–0.65× length of apophysis. Vestibulum membranous. Ductus bursae elongate, merging imperceptibly to corpus bursae, with elongate patch of pectinate spicules consisting of transverse rows of ~3–6 spicules. Corpus bursae elongate; walls densely covered with relatively large, elongate, external tubercles arranged in an irregular band; tubercles absent from anterior third. Ductus spermathecae ~0.5× length of bursa copulatrix; membranous outer canal slender, short, ~0.3× length of entire duct; inner canal long, slightly sinuous, with about 3–4 terminal convolutions. Vesicle consisting of a pair of small sacs.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: FLORIDA: Monroe Co.: Key Largo, 31 Jan 1967, S. Kemp, slide USNM 32432 (USNM).

**PARATYPES.** USA: FLORIDA: Monroe Co.: Key Largo: 1 UNK, 2 Nov 1965, 1 UNK, 8 Nov 1964, 1 UNK, 8 Nov 1965, 1 ♂, 19 Nov 1964, 1 ♀, 20 Nov 1964, 1 ♂, 21 Dec 1965, S. Kemp, slides DRD 4260, DRD 4261, USNM 32916 (MCZ, USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from November to January.

**DISTRIBUTION.** (Map 9) Currently known only from the type locality in southern Florida (USA).

**ETYMOLOGY.** The specific name is derived from the Greek *para* (near, beside) prefixed to the name of the species (*kempella*) with which this species has been confused.

**DISCUSSION.** The type series of *Pseudopostega kempella* (Eyer) was found to consist of three species. The male genitalia illustrated in the original description by Eyer (1967: fig. 5) actually represents *P. parakempella* and not *kempella*. The physical condition of the type series of *parakempella* is generally poor. The holotype and two paratypes are relatively well preserved, one paratype is slightly crushed, and the remaining three paratypes are now without abdomens. However, all specimens exhibit the distinctive forewing pattern for the species, particularly the relatively elongate, brownish fuscous dorsal spot.

The male genitalia of *parakempella* show some similarity with *P. saltatrix*, except for the more reduced basal fold of the gnathos, presence of numerous spines over the caudal surface of the gnathos, and absence of a forewing fascia in the former.

### The *longipedicella* group

The two species assigned to this group closely agree in the general morphology of their valvae, which possess a relatively short basal half (~0.5× the length of the genital capsule), an elongate, slender pedicel, and absence of a saccular lobe. The cucullar lobe is proportionately the longest and most slender within the genus, ranging ~0.6–0.7× the length of the genital capsule, with a pectinifer bearing ~60 spines. The gnathos terminates in a stout caudal lobe, with the basal fold present or absent. The juxta is absent.

### *Pseudopostega adusta* (Walsingham)

FIGURES 194, 342, 343; MAP 11

*Opostega adusta* Walsingham, 1897:140.—Forbes, 1930:149.—Davis 1984:18.

*Pseudopostega adusta* (Walsingham).—Davis, 1989:76.—Puplesis and Diškus, 2003:417.

**ADULT.** Figure 194. Length of forewing 2.1–2.8 mm. Small white moth with forewings possessing a distinct, dark brown, dorsal spot near basal one-third, a smaller dark brown costal spot near distal one-third, 3 light to dark brown subapical costal strigulae, 1 brown tornal stigula, and a minute black apical spot. Male gnathos moderately narrow at base, tapering slightly to relatively stout, bluntly rounded caudal apex; basal fold undeveloped (Figure 342). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, ~70-segmented. Palpi pale brownish cream; labial palpus with light brown suffusion dorsally.

**Thorax:** White; tegula with faint suffusion of light brown anteriorly. Forewing white dorsally, with a dark brown spot near basal one-third of dorsal margin and a smaller, more elongate, dark brown costal spot near distal one-third; area midway between latter two spots usually with a light brown, more suffused spot (suggesting a broken, oblique fascia); 3 light to dark brown subapical costal strigulae present near apex; strigula 1 straight, terminating at minute dark brown to black apical spot; strigula 2 curving around apical spot and continuous with tornal strigula; strigula 3 also curving around apical spot and fading near

tornus; terminal cilia white to brownish cream becoming white around tornus and light brown along dorsal margin; venter of forewing light brown except for white subhumeral area. Hindwing and cilia light brown. Legs mostly cream dorsally, white ventrally; foreleg with scattered suffusion of light brown dorsally.

**Abdomen:** Light brown dorsally, white ventrally.

**Male Genitalia:** Figures 342, 343. Socii a pair of short to moderately long, rounded, setose lobes separated by a distance  $\sim 0.3\times$  length of cucullar lobe; caudal margin of uncus slightly concave. Vinculum broad, tapering to a narrow rounded to subtruncate anterior margin. Gnathos relatively narrow at base, with caudal lobe gradually narrowing to stout, broadly rounded and dorsally curved apex; lateral margin of gnathos with paired, triangular, lamellate extensions; anterior margin concave; basal fold undeveloped (Figure 342). Valva with extremely long, slender cucullar lobe, approximately equal in length to remainder of valva and  $0.65\times$  length of genital capsule, bearing very long pectinifer consisting of 55–58 blunt spines; terminal apex of cucullar lobe acute, not produced; pedicel slender, greatly elongated,  $\sim 0.25\times$  length of cucullar lobe; valva relatively short, length along sacculus short,  $\sim 0.55\times$  length of genital capsule; sacculus lobe undeveloped, rounded; basal process of valva slender and acute; costal process of valva moderately stout, elongate, exceeding length of basal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; U.S. VIRGIN ISLANDS: ST. THOMAS [Danish West Indies]: 20 Mar 1894, Hedemann, slide 3323 (MGAB).

**MATERIAL EXAMINED.** BELIZE: CAYO DISTRICT: Chiquibul Forest Reserve, Las Cuevas Research Station: 2 ♂, 3–16 Apr 1998, R. Puplesis, slide AD 0475 (VPU). CUBA: Central Baragua: 1 ♂, Mar 1931, H. K. Plank, slide USNM 32762 (USNM). DOMINICA: Cabrit Swamp: 1 ♂, 15 Jun 1964, O. S. Flint, slide USNM 32759 (USNM). ECUADOR: Napo: SE Coca, nr. Rio Tiputini, Yasuni Research Station, 200 m: 1 ♂, 15–25 Jan 2000, R. Puplesis, slide AD 0474 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in January, March to April, and June.

**DISTRIBUTION.** (Map 11) West Indies, from Cuba east to Dominica, south to Belize and Ecuador.

**DISCUSSION.** The forewing of this species typically possesses both a small dorsal and costal spot, which differs from the solitary dorsal spot present in the closely allied species, *P. longipedicella*. The male genitalia of these two species also differ by the absence of a basal fold and relatively shorter sacculus and pedicel in *P. adusta*.

## *Pseudopostega longipedicella*, new species

FIGURES 195, 344, 345; MAP 11

**ADULT.** Figure 195. Length of forewing 2.3–3.7 mm. Small, mostly white moth with white forewings marked with 2 dark brown, subapical costal strigulae, a relatively indistinct brown apical spot, and a small, elongate, brown dorsal spot along basal  $\frac{1}{4}$  of dorsal margin. Male genitalia with greatly elongated cucullar lobe and pedicel; caudal lobe of gnathos short, bluntly rounded, and slightly recurved; basal lobe sharply triangular (Figures 344, 345). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light brown, 64-segmented. Palpi white; labial palpus with sparse suffusion of light brown dorsally.

**Thorax:** White; anterior margin of tegula with faint suffusion of light brown. Forewing almost entirely white with 2 dark brown, subapical costal strigulae; strigula 1 extending along costal margin as faint brownish suffusion, terminating at relatively indistinct, elongate, brown apical spot; strigula 2 curving around apical spot to tornus; with a small, elongate, brown dorsal spot along basal  $\frac{1}{4}$  of dorsal margin; terminal cilia white between strigulae, brown beyond strigula 2, becoming paler brown along dorsal margin; venter of forewing brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces lightly suffused with brown, paler on tarsomeres; midleg with brown bands dorsally on tarsomeres 3 and 4; faint brownish tarsal banding on hindleg.

**Abdomen:** Brown dorsally, white ventrally.

**Male Genitalia:** Figures 344, 345. Socii a pair of small rounded, setose lobes, widely separated by a distance  $\sim 0.35\times$  length of cucullar lobe; caudal rim of uncus slightly concave. Vinculum broad; anterior margin rounded. Gnathos broad basally, abruptly constricted to form stout caudal lobe with bluntly rounded apex; anterior margin moderately convex; basal fold present, sharply triangular; margin slightly separated from base of gnathos. Cucullar lobe of valva greatly elongated,  $\sim 0.7\times$  length of entire genital capsule, bearing a pectinifer consisting of  $\sim 60$  blunt spines; terminal apex of cucullar lobe not extended; pedicel extremely long and slender, width  $\sim 0.08\times$  length of cucullar lobe; length of pedicel longer than main base of valva and  $\sim 0.6\times$  length of cucullar lobe; valva relatively short, length along sacculus  $\sim 0.5\times$  length of entire genital capsule; sacculus lobe stout short, broadly rounded; basal process of valva tapering to acute apex, approximately equaling length of costal lobe. Juxta undeveloped.

FEMALE, LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; COSTA RICA: PUNTARENAS: Estación Quebrada Bonita, Reserva Biológica Carará, 50 m, Apr 1991, R. Zuniga, slide DRD 4167 (INBIO).

PARATYPES. PANAMA: CANAL ZONE: Paraiso: 1 ♂, slide USNM 32923 (USNM).

HOST. Unknown.

FLIGHT PERIOD. April.

DISTRIBUTION. (Map 11) Known only from Puntarenas, Costa Rica, and the Canal Zone, Panama.

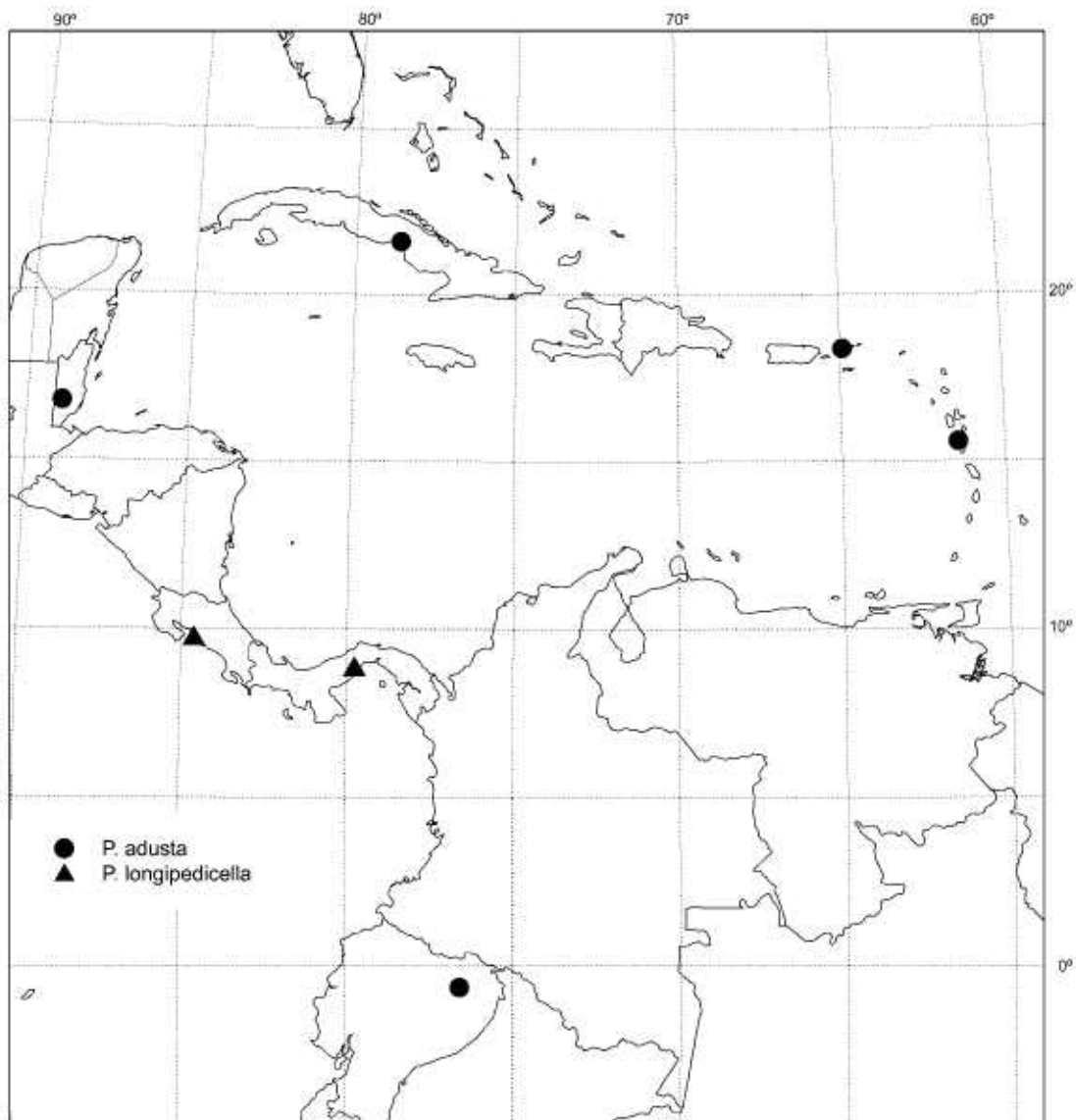
ETYMOLOGY. The species name is derived from the Latin *longus* (long) and *pedicellus* (small, slender stalk) in reference to the extremely long pedicel of the male valva.

der stalk) in reference to the extremely long pedicel of the male valva.

DISCUSSION. The male genitalia of *P. longipedicella* are distinct in possessing the most elongate pedicel and proportionately shortest sacculus of any member of the genus. From its sister species, *P. adusta*, it differs also in the presence of the male basal fold and absence of a dark costal spot on the forewing.

### The lobata group

The males of this group are easily recognized by a prominent synapomorphy: the development of the socii



MAP 11. Distribution of New World *Pseudopostega longipedicella* species group.

into a pair of nearly contiguous, broad, setose lobes. The gnathos is also atypical, with the basal fold produced caudally as a prominent, rounded lobe possessing slender, lateral folds. The valvae are relatively short (length along saccus  $\sim 0.5\times$  the length of genital capsule). The anterior margin of the vinculum is broad and slightly concave. The juxta is usually absent to poorly developed.

### *Pseudopostega lobata*, new species

FIGURES 196, 197, 346, 347, 466, 467; MAP 12

**ADULT.** Figures 196, 197. Length of forewing 2.0–2.4 mm. Small, mostly white moth with white forewings marked with a pair of dark brown, subapical costal strigulae, the basalmost strigula broader and more distinct; apical spot absent. Male genitalia with basal fold of gnathos produced caudally as a prominent, rounded lobe possessing slender, lateral folds (Figures 346, 347). Papillae anales of female basically bilobed but apex subdivided into approximately four minute, secondary lobes (Figure 467).

**Head:** Vestiture white. Scape white; flagellum light golden brown,  $\sim 41$ – $45$ -segmented. Maxillary and labial palpi cream. Labial palpus suffused with brown laterally.

**Thorax:** White; tegula white. Forewing white marked with a pair of long, dark brown subapical, costal strigulae, both extending to tornal area; strigula 1 broader and more distinct; apical spot absent; a small, slightly elongate, brown spot sometimes present near basal third along hind margin; terminal cilia light brown, more white around tornal area; venter of forewing light brown except for white at wing base and along basal half of costa. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with lateral and dorsal surfaces brown; midleg with usually brown banding dorsally on tarsomeres 2–3; hindleg white to cream without tarsal banding.

**Abdomen:** Light to medium brown dorsally, white ventrally.

**Male Genitalia:** Figures 346, 347. Socii expanded to a pair of low, broad, rounded, setose, nearly contiguous lobes; width of each lobe nearly half the length of cucullar lobe; caudal rim of uncus smoothly convex. Vinculum broad, tapering slightly to broad, concave anterior margin. Gnathos with a moderately broad, bulbous base (viewed laterally); anterior margin of gnathos simple, convex; basal fold produced to form a prominent, stout, median lobe terminating caudally in a broad, bluntly rounded knob that slightly surpasses caudal margin of socii; with a pair of caudally divided, slender, lateral folds aligned longitudinally and subparallel along basal half of median lobe (Figures 346, 347). Valva with an elon-

gate cucullar lobe  $\sim 0.3\times$  length of genital capsule, bearing a pectinifer consisting of 31–34 blunt spines; terminal apex of cucullar lobe rounded, only slightly extended; pedicel broad, width  $\sim 0.3\times$  length of cucullar lobe; valva relatively short, length along saccus  $\sim 0.5\times$  length of genital capsule, saccular lobe stout, roughly rounded, tuberculate and setose, extending nearly to apex of cucullar lobe; basal process of valva tapering to an acute apex, approximately equaling length of stout costal process. Juxta undeveloped.

**Female Genitalia:** Figures 466, 467. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophysis fused most its length, relatively stout and short. Papillae anales basically bilobed but apex subdivided into approximately 4 minute, irregular secondary lobes, each bearing 2–4 elongate setae, the longest nearly as long as the posterior apophyses; lobes arising from a small, narrow basal plate; maximum length of lobes  $\sim 0.35\times$  width of basal plate (Figure 467). Vestibulum relatively broad, membranous. Ductus bursae with a dense patch of pectinate spicules arranged usually 3–6 in transverse rows. Corpus bursae relatively short, broad, with a faint, irregular U-shaped band partially encircling most the length of the corpus; band bearing numerous, relatively elongate, acute, external tubercles (Figure 466). Spermathecal duct  $\sim 2/3$  length of bursae copulatrix; membranous outer canal narrow; inner canal long, sinuous, terminating in  $\sim 5$ – $6$  convolutions. Vesicle large, divided into a large tube of  $\sim 3$  coils, and a much smaller, less coiled, lateral lagena.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m, Bosque Primario, L/14/304, 2 Feb 1998, INBio-OET, slide DRD 4263 (INBio).

**PARATYPES.** ARGENTINA: JUJUY: Parque Nacional Calilegua, Mirador, sta.14, 800 m: 1 ♂, 20 Nov 1995, Neth. Ent. Exp. N-Arg., slide DRD 4134 (RMNH). SALTA: 5 km NW Aguas Blancas, Finca Yaculika, 53 km NNW Orán, sta. 16, 500 m: 1 ♂, 24 Nov 1995, Neth. Ent. Exp. N-Arg., slide DRD 4252 (RMNH). BELIZE: CAYO DISTRICT: Chiquibul Forest Reserve, Las Cuevas Research Station: 1 ♂, 3–16 Apr 1998, R. Puplesis, slide AD 0445 (VPU). COSTA RICA: GUANACASTE: Santa Rosa Station, Area de Conservación Guanacaste, 300 m: 1 ♂, 22 Jun 2003, K. Nishida, light sheet, slide USNM 33212 (USNM). HEREDIA: Estación Biológica La Selva, 50–150 m, L/00/180: 1 ♂, 11 Mar 1998, INBio-OET, slide USNM 33034 (USNM); L/00/223: 1 ♂, 22 Apr 1996, INBio-OET, slide DRD 4279 (INBio); L/00/273: 1 ♂, 15 Jan 1998, INBio-OET, slide DRD 4282 (INBio); L/04/162: 1 ♂, 22 Feb 1996, INBio-OET, slide DRD 4274 (INBio); L/04/205: 1 ♂, 8 Apr 1996, INBio-OET, slide DRD



4199 (INBIO); L/04/212: 1 ♂, 15 Apr 1996, INBio-OET, slide DRD 4170 (INBIO); L/07/440: 1 ♀, 11 Aug 1998, INBio-OET (INBIO); L/08/285: 1 ♂, 19 Jan 1998, INBio-OET, slide USNM 33035 (USNM); L/09/442: 1 ♂, 12 Aug 1998, INBio-OET, slide USNM 33036 (USNM); L/09/490: 1 ♀, 20 Oct 1998, INBio-OET (INBIO); L/10/539: 1 ♀, 12 Jan 1998, INBio-OET, slide USNM 32773 (USNM); L/11/350: 1 ♂, 14 Apr 1998, INBio-OET, slide USNM 32164 (USNM); L/12/625: 1 ♀, 22 Apr 1998, INBio-OET (INBIO); L/13/376: 1 ♂, 19 May 1998, INBio-OET, slide DRD 4204 (INBIO); L/15/342: 2 ♂, 31 Mar 1998, INBio-OET, slide USNM DRD 4270, 32808 (INBIO, USNM); L/15/354: 1 ♂, 16 Apr 1998, INBio-OET, slide USNM 32790 (USNM); L/15/424: 1 ♂, 21 Jul 1998, INBio-OET, slide USNM 32171 (USNM); L/15/574: 1 ♀, 18 Feb 1999, INBio-OET, slide DRD 4255 (INBIO); L/17/356: 1 UNK, 21 Apr 1998, INBio-OET (INBIO); L/17/426: 1 ♀, 22 Jul 1998, INBio-OET, slide USNM 32172 (USNM); L/17/664: 1 ♂, 15 Jun 1999, INBio-OET, slide DRD 4284 (INBIO); L/18/547: 1 ♂, 20 Jan 1998, INBio-OET, slide DRD 4011 (INBIO); L0012: 1 ♂, 15 Jan 1993, INBio-OET, slide USNM 32797 (USNM). NICARAGUA: Estelí, 700 m: 1 ♂, 22 Aug 1972, G. F. & S. Hevel, slide USNM 31838 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** In Central America adults have been encountered over much of the year from January to August and October, with only November reported for Argentina.

**DISTRIBUTION.** (Map 12) This is probably a common, widespread neotropical species, now reported in Central America from Belize to Costa Rica, with two records from northern Argentina.

**ETYMOLOGY.** The species name is derived from the Latin *lobus* (a rounded projection or protuberance) in reference to the broadly rounded, median basal lobe of the male gnathos.

**DISCUSSION.** This species appears most allied to the West Indian *P. clavata* on the basis of their very similar male and female genital morphology. The forewings of the two species differ significantly with those of *lobata* being nearly all white except for the subapical strigulae. The forewings of *clavata* are generally darker, with a relatively large costal spot. The sacculus lobe of *lobata* is also more slender and elongate than in *clavata*.

### ***Pseudopostega clavata*, new species**

FIGURES 46, 198, 348, 349, 468, 469; MAP 12

**ADULT.** Figure 198. Length of forewing 2.2–2.6 mm. Small, mostly cream to light golden brown moth

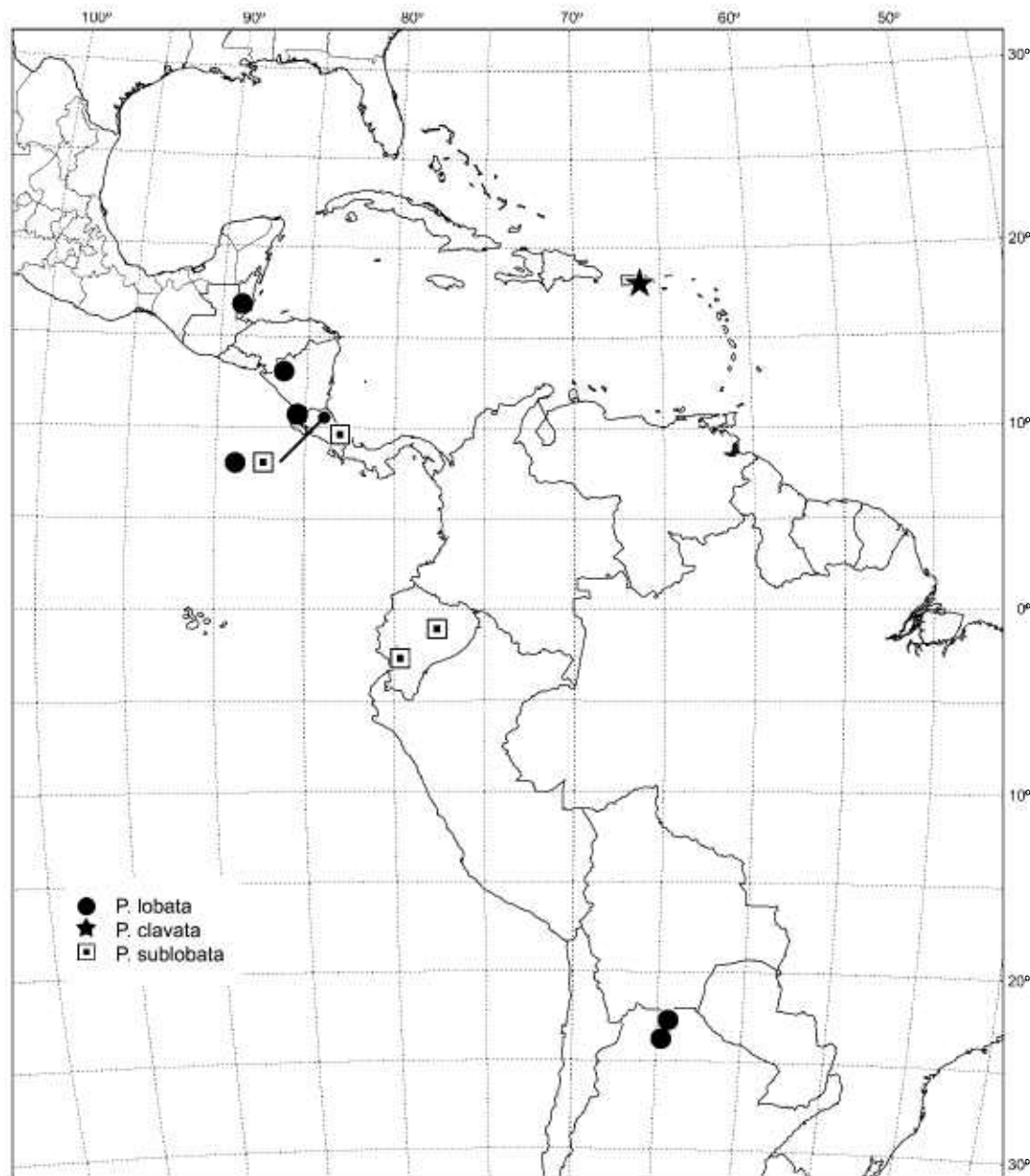
with forewings usually marked by a small, brown dorsal spot near basal third, an elongate, brown spot on distal third of costa, and 2 slender, brown, subapical costal strigulae, with the outer, more faint strigula extending to tornus; apical spot absent. Male with basal fold of gnathos extended caudally to form a prominent median lobe terminating in a clavate, rounded apex (Figure 348). Papillae anales of female bilobed; lobes short, tuberculate, conical (Figure 469).

**Head:** Vertex white, occipital area cream. Scape white; flagellum brown, ~38–39-segmented. Maxillary palpus white to cream. Labial palpus white to cream, suffused with dark brown laterally.

**Thorax:** White ventrally, cream to light golden brown dorsally; anterior margin of tegula white. Forewing mostly cream to light golden brown, becoming paler along base of costal margin and near apex, marked by a small, brown dorsal spot near basal third, an elongate dark brown spot on distal third of costa, 2 slender, brown, subapical costal strigulae, with the outer, more faint strigula extending to tornus; apical spot absent; terminal cilia mostly light brown beyond terminal strigula, becoming white to cream around tornus and along outer dorsal margin; venter of forewing light brown except white over basal discal cell area and terminal cilia. Hindwing and cilia white to cream dorsally and ventrally. Legs mostly cream; foreleg with lateral and dorsal surfaces of coxa, femur and tibia light brown; tarsi partially ringed with dark brown; mid- and hindlegs cream.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 348, 349. Socii a pair of moderately large, basally contiguous, rounded, setose lobes; caudal rim of uncus slightly concave. Vinculum broad; anterior margin concave. Gnathos a broad, oval plate; basal fold extended caudally to form a prominent median lobe and terminating in a clavate, rounded apex that slightly surpasses caudal margins of socii; midlateral margins of lobe with elongate, narrow folds; anterior margin of gnathos poorly defined, slightly convex. Valva with a moderately large cucullar lobe ~0.25× length of genital capsule, bearing a pectinifer consisting of a single row of 39–42 blunt spines; terminal apex of cucullar lobe subacute, not extended; pedicel broad, width ~0.3× length of cucullar lobe; valva relatively short, length along sacculus ~0.5× length of genital capsule; sacculus lobe broad, gradually narrowing to tuberculate, setose apex; basal process of valva short, strongly tapered, acute, slightly shorter than slender, elongate costal lobe. Juxta rudimentary, with only a faint, slender extension from vinculum.



MAP 12. Distribution of New World *Pseudopostega lobata* species group.

*Female Genitalia:* Figures 46, 468, 469. Abdomen tapering to a slender, slightly rounded, cleft apex. Each posterior apophysis fused for most its length, relatively long, slender. Papillae anales a pair of small, short, divergent, tuberculate, conical, setose lobes; longest setae about 2/3 the length of apophyses; lobes arising from a narrow basal plate consisting of fused bases of lobes; maximum length of lobes  $\sim 0.6\times$  width of basal plate (Figure 468). Vestibulum relatively broad, minutely spiculate caudally. Ductus bursae

short, relatively broad, with dense rows of small to large pectinations composed of transverse rows of 2–5 spicules continuing anteriorly into caudal end of corpus bursae. Corpus bursae broadly ovate, with a faint band of numerous, moderately elongate, external tubercles extending over most of length of bursa. Ductus spermathecae elongate, nearly as long as entire bursa copulatrix; membranous outer canal long, slender for entire length; inner canal sinuate, with more than 12 convolutions over most the length of canal; inner

canal expanding and dividing distally to form a tightly coiled vesiculum and a more membranous, elongate utriculus.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; PUERTO RICO: Cayey, 450 m: 2 Aug 1987, V. O. Becker, slide USNM 32898 (USNM).

**PARATYPES.** PUERTO RICO: Cayey, 450 m: 11 ♂, 4 ♀, 2 UNK, 2 Aug 1987, V. O. Becker, slides USNM 31938, 32734, 32735, 32760, 32761 (USNM, VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** August.

**DISTRIBUTION.** (Map 12) Known only from the type locality in southeastern Puerto Rico.

**ETYMOLOGY.** The species name is derived from the Latin *clavatus* (clubbed), in reference to the diagnostic, clavate shape of the apex of the greatly enlarged basal fold of the male gnathos.

**DISCUSSION.** This species is most easily recognized by its suffused brownish forewing color and prominent brown costal spot. It may also be distinguished from its sister species, *P. lobata*, by the broader apex of the male sacculus lobe.

### ***Pseudopostega sublobata*, new species**

FIGURES 199, 350, 351; MAP 12

**ADULT.** Figure 199. Length of forewing 2.1–2.5 mm. Small, mostly white moth with white forewings bearing a pattern similar to that of *P. lobata*, with usually 2 dark brown, subapical costal strigulae; strigula 1 more oblique and beginning more basally on the costa than in *lobata*, and with the dark brown apical spot more distinct. Male genitalia similar to *P. lobata*, but with the gnathal lobe possessing a more slender apex and the caudal margins of the socii more irregular (Figure 350). Female unknown.

**Head:** Vestiture white. Scape white; flagellum brown, ~42–45-segmented. Maxillary and labial palpi white to cream. Labial palpus suffused with light grayish brown laterally.

**Thorax:** White; tegula white. Forewing white marked with usually 2 dark brown, subapical costal strigulae, the basal strigula more oblique and beginning more basally on the costa than in *lobata*, and with the dark brown apical spot more distinct; a small brown dorsal spot often present along basal third of hind margin; cilia white to gray between strigulae, light brown beyond apical strigula and along hind margin, except white around tornus; venter of forewing light brown except for basal white area. Hindwing and cilia light grayish brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with

lateral and dorsal surfaces light grayish brown; midleg with usually brown banding dorsally on tarsomeres 3 and 4; hindleg cream, without tarsal banding.

**Abdomen:** Light to medium brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 350, 351. Socii highly modified, consisting of a pair of low, very irregular, tuberculate ridges, each bearing ~6 elongate setae; caudal margin of uncus a relatively narrow, shallow, median depression at caudal apex. Vinculum broad, tapering very slightly to broad, subtruncate to slightly concave anterior margin. Gnathos relatively narrow at base; basal fold greatly extended caudally to form long, moderately stout, dorsally recurved, median lobe with a slightly expanded apex; a medially divided pair of narrow lateral folds extending longitudinally along median lobe (Figures 350, 351); anterior margin of gnathos concave. Valva with an elongate cucullar lobe ~0.35× length of genital capsule, bearing a pectinifer consisting of 25–27 blunt spines; terminal apex of cucullar lobe slightly extended as a slender, setose lobe; pedicel broad, width ~0.5× length of cucullar lobe; valva elongate, length along sacculus ~0.6× length of genital capsule, sacculus lobe short, stout, tapering to relatively blunt, tuberculate, setose apex; basal process of valva tapering to acute apex, slightly exceeding length of stout costal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva (OET), Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, 50–150 m, 24 Sep 1998, L/17/474, Bosque secundario, DRD slide 4293 (INBIO)

**PARATYPES.** COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, 50–150 m, L/00/187: 1 ♂, 14 Mar 1996, INBio-OET, slide USNM 32796 (USNM); L/00/189: 1 ♂, 19 Mar 1996, INBio-OET, slide USNM 32794 (USNM); L/04/155: 1 ♂, 18 Feb 1996, INBio-OET, slide USNM 32795 (USNM); L/11/444: 1 ♂, 13 Aug 1998, INBio-OET, slide DRD 4175 (INBIO); L/11/492: 1 ♂, 21 Oct 1998, INBio-OET, slide DRD 4165 (INBIO); L/11/624: 1 ♂, 22 Apr 1999, INBio-OET, slide DRD 4273 (INBIO); L/13/470: 1 ♂, 22 Sep 1998, INBio-OET, slide DRD 4168 (INBIO); L/14/389: 1 ♂, 3 Jun 1998, INBio-OET, slide USNM 32787 (USNM); L/15/448: 1 ♂, 19 Aug 1998, INBio-OET, slide DRD 4189 (INBIO); L/15/460: 1 ♂, 2 Sep 1998, INBio-OET, slide USNM 32809 (USNM); L/17/426: 1 ♂, 22 Jul 1998, INBio-OET, USNM 32795 (USNM); L/17/450: 1 ♂, 20 Aug 1998, INBio-OET, slide DRD 4311 (INBIO); L/17/474: 1 ♂, 24 Sep 1998, INBio-OET, slide DRD 4173 (INBIO); L/17/618: 1 ♂, 14 Apr 1999, INBio-OET, slide DRD 4275 (INBIO); L/18/487: 1 ♂, 14 Oct 1998, INBio-OET, slide USNM 32801 (USNM).

LIMÓN: R. B. Hitoy Cerere, Sector Calavera Danta, 400–500 m: 2 ♂, 14 Mar 2002, M. Moraga & L. Chavarria, slide DRD 4321 (INBIO, USNM). ECUADOR: 80 km E Guayaquil, Bucay (=Cumanda), 700 m: 2 ♂, 16–19 Jan 2001, R. Puplesis & S. Hill, slide AD 0468 (VPU). Napo: SE Tena, nr. Rio Napo, Jatun Sacha, and Misahualli, 400–500 m: 3 ♂, 26–31 Jan 2000, R. Puplesis & S. Hill, slides AD 0469, 0470, 0472 (VPU).

HOST. Unknown.

FLIGHT PERIOD. Adults have been collected over much of the year, from February to October in Costa Rica and during January in Ecuador.

DISTRIBUTION. (Map 12) Currently known only from Costa Rica and Ecuador.

ETYMOLOGY. The species name is derived from the Latin *sub* (under) and *lobus* (a rounded projection or protuberance) in reference to the more slender gnathal lobe of the male, the distinguishing feature separating this species and *P. lobata*.

DISCUSSION. The male of *P. sublobata* is characterized by the reduced caudal lobe, the greatly lengthened basal fold of the gnathos, and by the highly modified socii. The caudal margins of the socii are diagnostic in being much more irregular than those of the other two members of this group, *P. lobata* and *P. clavata*.

### The *duplicata* group

The members of this group share a striking synapomorphy in the development of the basal fold of the male gnathos, which forms a prominent median lobe that surpasses the caudal apex of the gnathos in length. The latter terminates in either one or two caudal processes. Members of the *duplicata* group differ from the *lobata* group, which also have developed a prominent elongation of the basal fold, in the presence of tuberculate socii typical for the genus. The anterior margin of the vinculum is extended well beyond the bases of the valvae and tends to be relatively broad to moderately concave. A juxta is absent.

### *Pseudopostega duplicata*, new species

FIGURES 200, 201, 352–354, 470, 471; MAP 13

ADULT. Figures 200, 201. Length of forewing 2.0–2.8 mm. Small white moth with almost immaculate forewings except for black apical spot, 3 light to dark brown, subapical costal strigulae and 1 dark brown tornal strigula. Male with base of gnathos broad, gradually tapering to moderately elongate, slender, attenuate, caudal lobe; basal fold greatly developed to form a relatively

large, elongate-conical lobe exceeding the more dorsal, caudal lobe in length and width (Figures 352–353). Papillae anales of female consisting of a pair of elongate, slender, widely divergent, setose lobes (Figure 471).

Head: Vestiture white. Scape white. Flagellum light golden brown, ~38–49-segmented. Palpi white to cream. Labial palpus with suffusion of brown laterally and dorsally.

Thorax: White; anterior margin of tegula suffused with brown. Forewing almost entirely white except for black apical spot, 3 light to dark brown, subapical, costal strigulae and 1 dark brown tornal strigula; costal strigulae 1 and 2 short to moderately long, slanted obliquely toward but often fading well short of small black apical spot; strigula 1 usually lighter brown, relatively broad at costa and tapering posteriorly; strigula 3 long, sinuate, slanted obliquely toward apical spot, then curving around spot to tornus; tornal strigula dark brown, extending from apical spot straight to tornus, sometimes absent; terminal cilia variable, white to light brown between stigulae 2 and 3, light brown around apex, then becoming white around tornus and dorsal margin; venter of forewing brown except for basal patch of white around subhumeral area and along costa. Hindwing and cilia light brown, whitish at base both dorsally and ventrally. Legs white to cream; foreleg with lateral and dorsal margins of coxa, femur and tibia partially suffused with brown; midleg sometimes with apices of tarsal segments brown.

Abdomen: Light to medium brown dorsally, cream to white ventrally.

Male Genitalia: Figures 352–354. Socii a pair of moderately small to large, rounded, setose lobes, widely separated by a distance ~0.65–0.8× length of cucullar lobe; caudal margin of uncus concave. Vinculum broad, tapering slightly to moderately broad, truncate to slightly concave anterior margin. Gnathos broad basally, tapering to slender, moderately long, acuminate apex; anterior margin slightly convex to subtruncate; basal fold greatly developed to form a relatively large, elongate-conical lobe exceeding dorsal, caudal lobe in length and width; apex of basal fold bluntly rounded. Valva with a moderately reduced cucullar lobe ~0.25–3× length of genital capsule, bearing a pectinifer consisting of 24–27 blunt spines; distal apex of cucullar lobe slightly extended, irregular; pedicel moderately broad, width nearly 0.2× length of cucullar lobe; valva short, length along sacculus ~0.55–0.7× length of genital capsule; sacculus lobe reduced, slender, with irregular, setose apex; basal process of valva relatively short, attenuate, costal process slender, elongate, terminating near apex of basal process. Juxta undeveloped.

Female Genitalia: Figures 470, 471. Abdomen tapering to relatively broad, bilobed, setose apex. Each pos-

terior apophysis fused ~2/3 its length, long, slender, length ~2.3× width of papillae anales. Papillae anales consisting of a pair of elongate, slender, widely divergent, setose lobes; setae moderately short, up to 1.6× length of papillar lobe; lobes arising from inconspicuous, mostly membranous base (Figure 471). Vestibulum moderately broad, largely free of spicules. Ductus bursae with dense, short transverse rows of pectinations consisting usually of 2–3 spicules; rows becoming gradually longer with 4–6 spicules to caudal end of corpus bursae. Corpus bursae moderately inflated, without spicules or external tubercles. Ductus spermathecae elongate, nearly as long as bursa copulatrix; membranous outer canal inflated near junction with ductus bursae, then slender to anterior apex; inner canal sinuate, terminating in 4–6 convolutions, enlarging to form small saccate vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, 50–150 m, L/17/522: 26 Nov 1998, INBio-OET, slide DRD 4201 (INBIO).

**PARATYPES.** BRITISH VIRGIN ISLANDS: Tortola Island: Mt. Sage National Park, 460 m: 1 ♀, 7–8 Jul 1985, S. Miller et al. (USNM); 5 ♂, 2 ♀, 1 UNK, 13–15 Jul 1987, V. O. Becker & S. Miller, slides USNM 32755, 32757, 32921 (USNM); 2 ♂, 5 ♂, 5 Apr 1958, J. F. G. Clarke, slide USNM 33682 (USNM). COSTA RICA: [CARTAGO]: Turrialba, 600 m: 1 ♂, 1 ♂, Jun 1972, 1 ♂, Jul 1971, 1 ♀, Sep 1971, 1 ♂, 1 UNK, Oct 1971, V. O. Becker, slides DRD 4286, 4290, 4291, USNM 32422 (USNM, VOB). GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, 700 m: 1 ♂, Nov 1990, C. Moraga & P. Rios, slide USNM 32804 (USNM). Estación Santa Rosa, P. N. Guanacaste, 300 m: 2 ♀, Jul 1990, I Curso MicroLepidopterologia, slide DRD 4169 (INBIO); 2 ♂, 22 Jun 2003, K. Nishida, light sheet, slides USNM 33210, 33211 (USNM). HEREDIA: Estación Biológica La Selva, 50–150 m, L/00/280: 1 ♂, 17 Jan 1998, INBio-OET, slide USNM 32800 (USNM); L/08/477: 1 ♂, 29 Sep 1998, INBio-OET, slide USNM 33025 (USNM); L/09/442: 1 ♂, 12 Aug 1998, INBio-OET, slide USNM 32783 (USNM); L/09/478: 1 ♂, 30 Sep 1998, INBio-OET, slide DRD 4203 (INBIO); L/11/350: 1 ♀, 14 Apr 1998, INBio-OET (INBIO); L/11/492: 2 ♂, 21 Oct 1998, INBio-OET, slides DRD 4200, USNM 32434 (USNM, INBIO); L/13/662: 1 ♂, 1 Jun 1999, INBio-OET, slide DRD 4188 (INBIO); L/15/484: 1 ♂, 8 Oct 1998, INBio-OET, slide DRD 4186 (INBIO); L/15/520: 1 ♀, 25 Nov 1998, INBio-OET, slide DRD 4202 (INBIO); L/15/544: 1 ♀, 19 Jan 1999, INBio-OET, slide USNM 32169 (USNM); L/15/564: 1 ♀, 4 Feb 1999, INBio-OET (INBIO); L/17/368: 1 ♂, 1 ♀, 6 May 1998, INBio-OET, slide USNM 32170 (INBIO, USNM);

L/17/474: 1 ♂, 24 Sep 1998, INBio-OET, slide DRD 4312 (INBIO); L/17/534: 3 ♀, 15 Dec 1998, INBio-OET, slides USNM 33026, 33027, DRD 4177 (INBIO, USNM). LIMÓN: P. N. Cahuita, Sector Puerto Vargas, 600 m. E La Casetilla, 10 m: 1 ♂, May 2002, L. Chavarria, slide USNM 31801 (USNM); Sector Playa Blanca, 800 m E La Casetilla, 3 m: 1 ♂, Jun 2002, L. Chavarria (INBIO).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected almost throughout the year in Costa Rica and in April and July in the British Virgin Islands.

**DISTRIBUTION.** (Map 13) Currently known only from Costa Rica and Tortola Island in the British Virgin Islands.

**ETYMOLOGY.** The species name is derived from the Latin *duplicatus* (repeat, double), in reference to the characteristic dual lobes of the male gnathos.

**DISCUSSION.** The apparent disjunct distribution of *P. duplicata* probably indicates an even broader distribution, perhaps more similar to that of the widespread *P. saltatrix* or *venticola*. The wing patterns and both male and female genital morphology closely agree between the Costa Rican and West Indian populations of *P. duplicata*, thereby suggesting a single species. The anterior margin of the vinculum varies from being moderately narrow and truncate to broader and concave (Figures 352, 354). Both extremes are evident within Costa Rican males. Differences determined in the CO1 sequences between these vicariant populations were between 1% and <2%, which usually indicates some biological significance because this is above the average 0.25% divergence observed among conspecific individuals but well below the 6.5% typically observed for morphologically distinct, congeneric moth species (Hebert et al., 2004). However, percentage sequence divergence between closely related sister species of Lepidoptera sometimes have been found to be highly variable (Landry et al., 1999).

Similar variation of the vinculum is also evident within the small series of males of *P. didyma* from Ecuador. The two species differ in the smaller valvae, relatively less massive gnathos, and less recurved gnathal lobes of *P. duplicata*. The papillae anales of female *duplicata* are remarkable in being among the longest, most slender and divergent of any *Pseudopostega*.

### *Pseudopostega didyma*, new species

FIGURES 202, 355–357; MAP 13

**ADULT.** Figure 202. Length of forewing 2.5–2.7 mm. Small white moth with almost immaculate forewings

except for black apical spot, 3 fuscous, subapical, costal strigulae and 1 fuscous ternal strigula. Male gnathos similar to that of *P. duplicata*, broad, with caudal half abruptly tapered to a strongly curved, spiniform, apical lobe; basal fold, with triangular anterior margin, tapered to form a stout, greatly elongated, apically rounded, median lobe greatly surpassing caudal lobe in size (Figures 355, 356). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum yellowish brown to grayish brown, ~42–44-segmented. Palpi white. Labial palpus with suffusion of gray to fuscous laterally and dorsally.

**Thorax:** White; anterior margin of tegula slightly suffused with gray. Forewing almost entirely white except for black apical spot, 3 brownish to fuscous, subapical, costal strigulae and 1 fuscous ternal strigula; costal strigula 1 usually lighter brown, short, relatively broad at costa and tapering distally; strigula 2 extending immediately basal to apical spot; strigula 3 long, sinuate, slanted obliquely toward apical spot, then curving around spot to tornus; ternal strigula brownish black, extending from strigula 2 a short distance to tornus; terminal cilia white; venter of forewing yellowish brown except for basal patch of cream around subhumeral area and along costa. Hindwing and cilia light brown, cream at base both dorsally and ventrally. Legs white; foreleg with lateral and dorsal margins of coxa, femur and tibia partially suffused with dark gray; midleg with apices of tarsal segments black.

**Abdomen:** Color not examined.

**Male Genitalia:** Figures 355–357. Socii a pair of moderately large, rounded, setose lobes, widely separated by a distance ~0.8× length of cucullar lobe. Vinculum broad, tapering slightly to moderately broad, truncate to slightly concave anterior margin. Gnathos broad, irregularly thickened laterally, with caudal half abruptly tapered to a dorsally curved, slender, spiniform, subacute to acute, caudal lobe; anterior margin of gnathos faint, membranous, smoothly convex; basal fold with thickened, triangular, anterior margin, produced caudally to form a stout, greatly elongated, apically rounded, dorsally curved lobe greatly surpassing caudal lobe in size (Figures 355, 356). Valva with a moderately large cucullar lobe ~0.3× length of genital capsule, bearing a pectinifer consisting of about 33 blunt spines; distal apex of cucullar lobe slightly extended, irregular; pedicel well sclerotized, spiniform; valva moderately long, length along sacculus ~0.6× length of genital capsule; sacculus broadening in the middle but narrowing to long and slender setose apex; basal process of valva long and slender; costal process slender and very long, terminating near apex of basal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: GUAYAS: 80 km E Guayaquil, Bucay (=Cumanda), western foothills of Andes, premontane tropical forest and orchards, 700 m: 16–19 Jan 2001, R. Puplesis & S. Hill, slide AD 0478 (VPU).

**PARATYPES.** ECUADOR: Same data as holotype: 2 ♂, slides: AD 0441, 0442 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January.

**DISTRIBUTION.** (Map 13) Known only from the type locality, a moist tropical site located on the western slopes of the Andes of Ecuador.

**ETYMOLOGY.** The species name is derived from the Greek *didymos* (double), in reference to the characteristic double lobes of the male gnathos.

**DISCUSSION.** *Pseudopostega didyma* is closely related to *P. duplicata* but differs in the more complex gnathos, which (in contrast to *duplicata*) possesses well-thickened, irregular, lateral lobes. Both lobes of the gnathos are curved ventrally in *didyma*, compared to straight in *duplicata*. Also the valva of *didyma* differs in possessing a broader sacculus lobe, more narrow pedicel, and larger cucullar lobe.

### *Pseudopostega acidata* (Meyrick)

FIGURES 203, 204, 358, 359; MAP 13

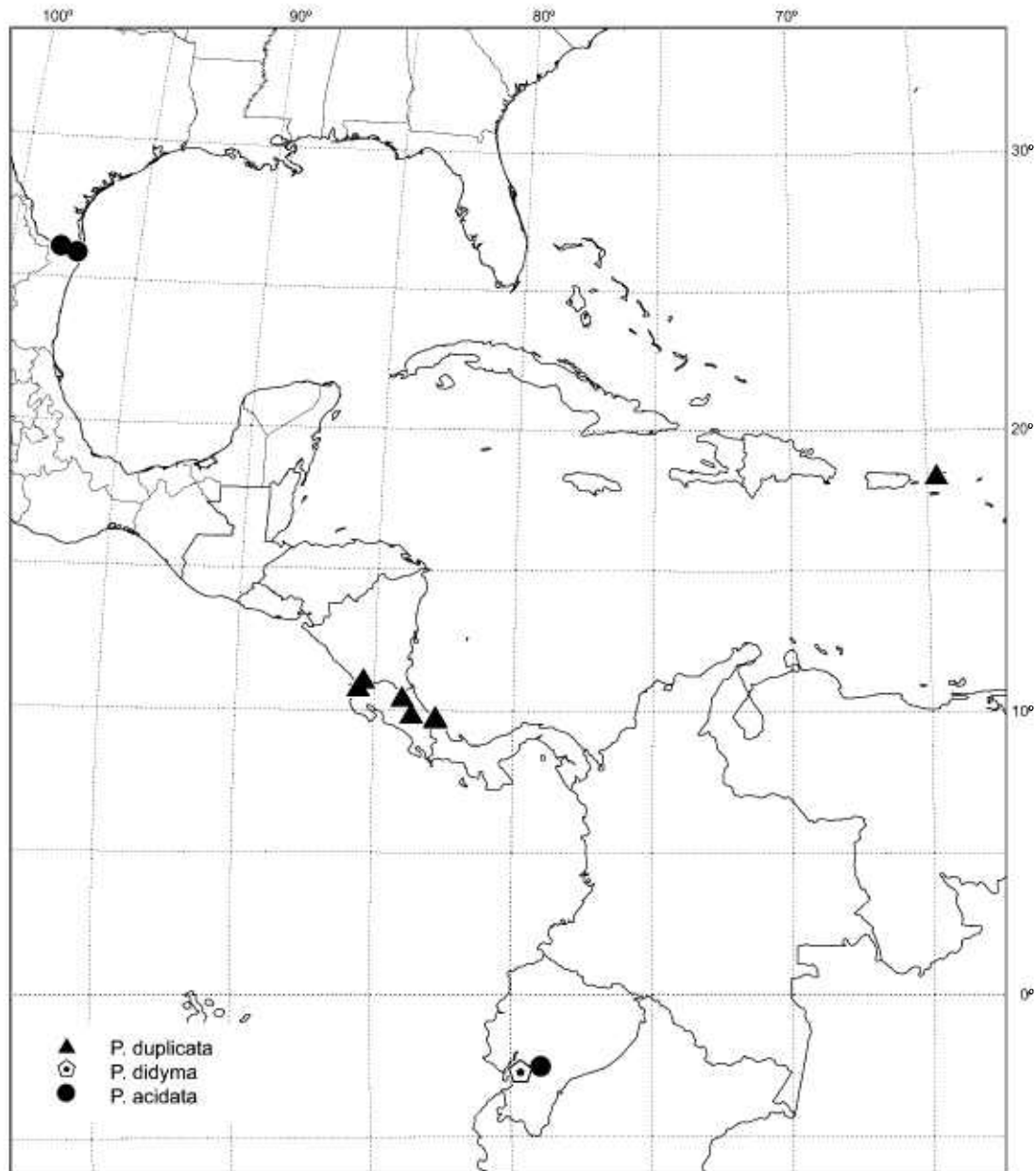
*Opostega acidata* Meyrick, 1915:240.—Clarke, 1955:34.—Davis, 1984:18.

*Pseudopostega acidata* (Meyrick).—Davis, 1989:75.—Puplesis and Diškus, 2003:418.

**ADULT.** Figures 203, 204. Length of forewing 2.7–4.1 mm. Small, mostly white moth with almost immaculate forewings except for 3 dark brown, subapical costal and 3 ternal strigulae, and a dark brown to black apical spot. Male gnathos appearing trilobed, with caudal lobe deeply furcate and basal fold produced as an elongate, median ventral lobe (Figure 358). Female unknown.

**Head:** Vestiture white. Scape white, with dark brown suffusion along anterior edge. Flagellum pale ochreous to brown, ~48–63-segmented. Maxillary and labial palpi cream, with slight suffusion of pale brown laterally.

**Thorax:** White; anterior margin of tegula brown. Forewing almost entirely white, without a costal spot but with a faint brown dorsal spot at basal two-fifths usually evident; dark brown to black apical spot present; 3 pale to dark brown subapical strigulae usually present, consisting of 3 costal and 3 ternal strigulae; basal most costal/ternal



MAP 13. Distribution of New World *Pseudopostega duplicata* species group.

strigulae relatively faint, mostly pale brown and nearly continuous; outer most tornal strigula extending around terminal margin to slightly anterior of apical spot; terminal cilia mostly white, becoming cream to pale brown along dorsal margin; venter of forewing light brown to gray. Hindwing and cilia cream to light brown both dorsally and ventrally. Legs mostly cream; foreleg with lateral margins of tibia and tarsus grayish brown; midleg with apices of tarsal segments grayish brown.

**Abdomen:** Light yellowish brown to gray dorsally, gradually fading to cream to white laterally and ventrally.

**Male Genitalia:** Figures 358, 359. Socii a pair of slender and setose lobes widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal rim of uncus concave, well sclerotized. Vinculum broad, tapering to a narrowly rounded to subtruncate anterior margin. Gnathos complex, broad at base, tapering to a relatively broad, broadly furcate caudal lobe; anterior margin of gnathos

slightly concave; basal fold produced medially into an elongate lobe approximately equaling the length of the arms of the furcate caudal lobe. Valva with large cucullar lobe  $\sim 0.4\times$  length of genital capsule and bearing a long pectinifer consisting of  $\sim 38\text{--}42$  blunt spines; distal apex of cucullar lobe variably produced into a short, rounded, setose lobe; pedicel moderately broad, width  $\sim 0.2\times$  length of cucullar lobe; valva elongate, length along saccus  $\sim 0.65\times$  length of genital capsule; saccular lobe with an elongate, slender to moderately broadly rounded setose apex; basal process of valva short, subacute; costal process of valva well sclerotized, short, and approximately same length as basal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**LECTOTYPE.** (Designated by Davis, 1989) ♂; ECUADOR: CHIMBORAZO: Huigra, 4500 ft [ $\sim 1372$  m]: Jun [19]14, Parish, slide BMNH 29632 (BMNH).

**MATERIAL EXAMINED.** ECUADOR: CHIMBORAZO: Huigra, 4500 ft [ $\sim 1372$  m]: 1 ♂ (lectotype), 1 ♂ (paralectotype), Jun [19]14, Parish, slides BMNH 28711, 29632 (BMNH). USA: TEXAS: Hidalgo Co.: Santa Ana Refuge: 1 ♂, 2 Nov 1985, E. Knudson (TLS). Cameron Co.: Southmost: 1 ♂, 27 Sep 1988, E. Knudson, slide USNM 32491 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in June (Ecuador) and September to November (southern Texas, USA)

**DISTRIBUTION.** (Map 13) Known from two disjunct regions: the Rio Grand Valley of southern Texas and southern Ecuador.

**DISCUSSION.** The unusually disjunct distribution between the northern and southern populations of this species immediately questions whether they are conspecific. The nearly identical morphology of their male genitalia, in particular the synapomorphic, trifid gnathos, indicate they are. The absence of collecting records between the southern USA and Ecuador may simply reflect the relative difficulty and infrequency in sampling members of this family. The basal fold of the gnathos in this species attains a development nearly comparable to that present in *Pseudopostega duplicata*, another disjunctly distributed species, and *P. didyma*, also from Ecuador. Minor variations observed in the genitalia were found to occur within the small series (two males from each area) of each population. The males from Ecuador are somewhat larger in size (forewings 3.9–4.1 mm in length) than those from Texas, USA (2.7–2.8 mm). Until more information about their biology and degree of genetic similarity becomes available, it seems prudent to recognize a single species.

Because of the poor, partially denuded condition of both syntypes (Figure 203), the external description of this species was derived largely from the two males from Texas. The forewings of both syntypes are lacking much of their terminal cilia and, consequently, exhibit no strigulae.

### The *tenuifurcata* group

This group consists of two species possessing the shortest valvae proportional to the length of the genital capsule ( $\sim 0.4\times$  the total length of the capsule as measured along the length of the sacculus) within *Pseudopostega*. The gnathos possesses a well-developed basal fold and terminates in a moderately slender caudal lobe with a minutely furcate to sinuate apex. The anterior margin of the vinculum is broadly truncate to deeply concave and extends nearly half the length of the genital capsule beyond the bases of the valvae. The juxta is relatively well developed as an elongate, slender, median rod. Sequence data from Hebert's CO1 analysis closely associated both members of this group within the same clade.

### *Pseudopostega tenuifurcata*, new species

FIGURES 205, 360, 361; MAP 14

**ADULT.** Figure 205. Length of forewing 2.3–2.5 mm. Small, mostly white moth with white forewings marked with 2 dark brown, subapical costal strigulae and a short, dark brown terminal, costal strigula; dark brown apical spot sometimes indistinct, usually confluent with outer costal strigula. Male with caudal lobe of gnathos attenuate and minutely furcate; basal fold broadly triangular (Figure 360). Female unknown.

**Head:** Vestiture white. Scape white; flagellum pale brown,  $\sim 47\text{--}52$ -segmented. Maxillary palpus cream. Labial palpus white to cream, suffused with grayish brown laterally.

**Thorax:** White; anterior margin of tegula grayish brown. Forewing almost entirely white with 2 dark brown, subapical costal, strigulae and a short, dark brown terminal, costal strigula; dark brown apical spot sometimes indistinct, usually confluent with outer costal strigula; strigula 1 broadest along costa, strongly oblique; strigula 3 extending distad to apical spot; strigula 2 usually confluent with darker apical spot, occasionally bypassing spot and confluent with strigula 3; an elongate, dark brown dorsal spot sometimes present along basal third of hind margin; terminal cilia mostly white between strigulae, around tornus, and along hind margin; brown beyond distal costal and terminal strigula; venter of forewing light to medium brown except for basal white area.



Hindwing and cilia brown dorsally and ventrally except for white suffusion at base; apical cilia occasionally white. Legs mostly white; foreleg with dorsal surfaces suffused with brown; brown scaling more diffused on tarsomeres; midleg with usually brown bands dorsally on tarsomeres 3 and 4; tarsal banding paler to absent on hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally, occasionally with brownish suffusion anteriorly.

**Male Genitalia:** Figures 360, 361. Socii a pair of relatively long rounded, setose lobes, widely separated by a distance  $\sim 0.75\times$  length of cucullar lobe; caudal rim of uncus smoothly concave. Vinculum broad, tapering slightly to truncate anterior margin. Gnathos with a broad, triangular base tapering to form a slender, elongate, caudal lobe with a minutely furcate apex; anterior margin of gnathos subtruncate, slightly sinuate; basal fold present, moderately broad medially and narrowing laterally (Figure 360). Valva relatively short, length along sacculus  $\sim 0.55\times$  length of entire genital capsule, with a moderately elongate cucullar lobe  $\sim 0.35\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 28\text{--}30$  blunt spines; distal apex of cucullar lobe slightly extended as an irregular, tuberculate, setose lobe; pedicel broad, approximately  $0.23\times$  length of cucullar lobe; saccular lobe moderately long, stout, tapering, bluntly rounded; basal process of valva relatively stout, short, slightly exceeding length of costal process. Juxta consisting of a slender, elongate, sclerotized, median rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m, Bosque secundario, L/18/547, 20 Jan 1999, INBio-OET, slide DRD 4191 (INBIO).

**PARATYPES.** COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , 50–150 m, L/00/156: 1 ♂, 19 Feb 1996, INBio-OET, slide DRD 4183 (INBIO); L/08/359: 1 ♂, 22 Apr 1998, INBio-OET, slide USNM 32813 (USNM); L/10/325: 1 ♂, 3 Mar 1998, INBio-OET, slide DRD 4162, (INBIO); L/13/650: 1 ♂, 27 May 1999, INBio-OET, slide DRD 4205 (INBIO).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from January to May.

**DISTRIBUTION.** (Map 14) Known only from the type locality, a lowland rainforest area in northeastern Costa Rica.

**ETYMOLOGY.** The species name is derived from the Latin *tenuis* (thin, slender) and *furcatus* (forked) in reference to the diagnostic attenuated, furcate structure of the caudal lobe of the male gnathos.

**DISCUSSION.** The nearly immaculate forewing of this species differs from the forewing of its proposed sister species, *P. sectila*, in lacking a subapical costal spot. The male genitalia of *P. tenuifurcata* differs markedly from *P. sectila* in possessing a basally broader gnathos, more slender (viewed laterally) caudal lobe, and more developed basal fold. The vinculum in *tenuifurcata* is more slender, with a truncate anterior margin, instead of deeply concave as in *sectila*.

### ***Pseudopostega sectila*, new species**

FIGURES 206, 362, 363, 472, 473; MAP 14

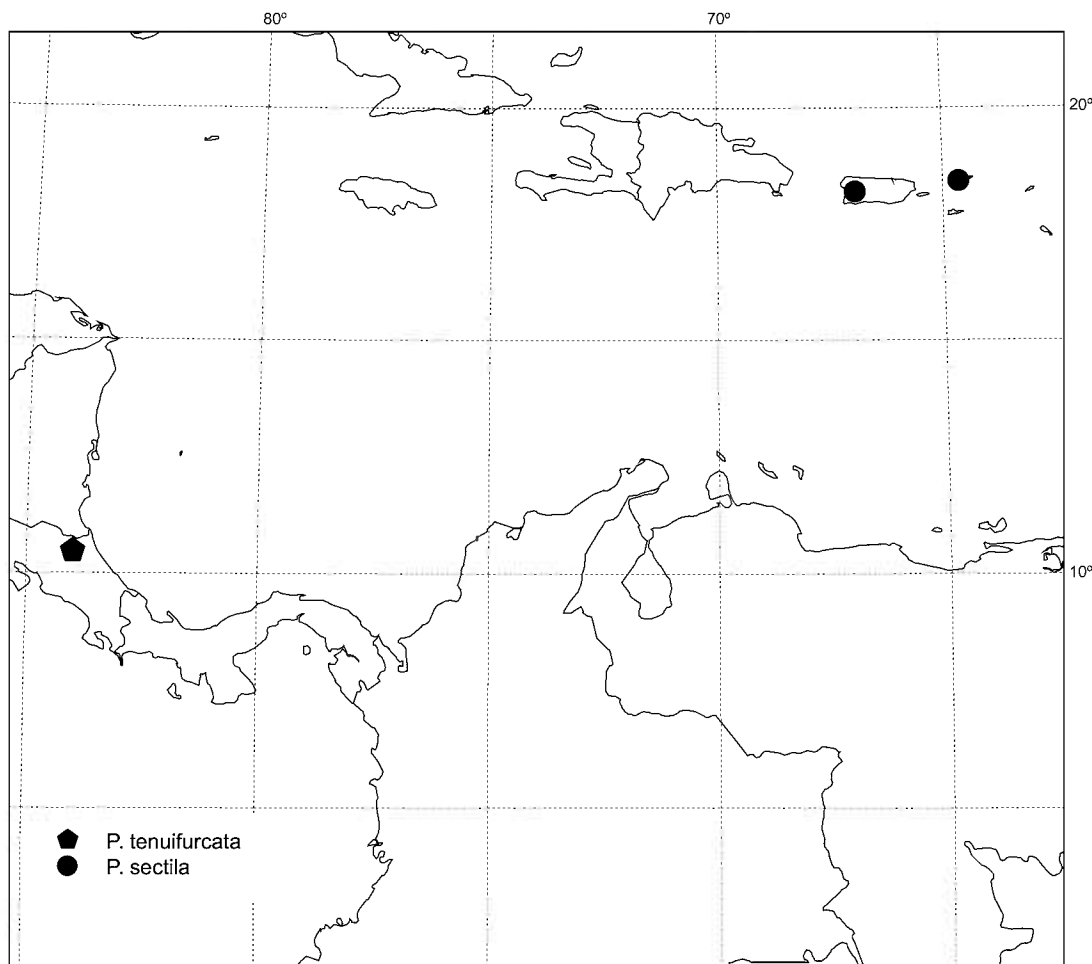
**ADULT.** Figure 206. Length of forewing 3.0–3.7 mm. Small, mostly white moth with white forewings usually marked by a small, gray dorsal spot near basal third, a small, triangular, fuscous spot on distal third of costa, a fuscous apical spot, and a single, brown to fuscous, terminal costal strigulae. Male with anterior margin of vinculum deeply concave, broadly V-shaped; gnathos tapering to moderately slender, truncate caudal lobe; basal fold mostly transverse, narrow (Figure 362). Female with papillae anales consisting of a pair of extremely divergent, slender lobes (Figure 473).

**Head:** Vestiture white. Scape white; flagellum pale brown,  $\sim 65\text{--}70$ -segmented. Maxillary palpus cream. Labial palpus white to cream, suffused with dark brown laterally.

**Thorax:** White; anterior margin of tegula faintly tinged with gray. Forewing almost entirely white, usually marked by a small, gray dorsal spot near basal third, a triangular, obliquely outward slanted, dark fuscous spot on distal third of costa, a small fuscous subapical spot, and a single, prominent brown to fuscous strigula extending across terminal cilia from costa to wing apex beyond subapical spot; terminal cilia mostly white, pale brown beyond terminal strigula and along outer dorsal margin; venter of forewing fuscous except white at base and terminal cilia. Hindwing and cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly cream; foreleg with lateral and dorsal surfaces gray to fuscous; mid- and hindlegs light brown dorsally with lateral (shorter) tibial spines and terminal tarsal segments pale to dark gray; inner hindtibial spur unusually long.

**Abdomen:** Light brown dorsally, cream ventrally.

**Male Genitalia:** Figures 362, 363. Socii a pair of moderately large rounded, setose lobes, widely separated by a distance  $\sim 0.5\times$  length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad; anterior margin deeply concave, broadly V-shaped. Gnathos complex, with



MAP 14. Distribution of New World *Pseudopostega tenuifurcata* species group.

a broad base that constricts to form a moderately broad plate which constricts again to a moderately slender, blunt apical lobe; dorsal margin of lobe with a spinose median ridge (Figure 363); anterior margin slightly sinuate; basal fold relatively narrow but prominent, well separated from base of gnathos. Valva with an elongate cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer consisting of 39–42 blunt spines; terminal apex of cucullar lobe extended as a setose, rounded lobe; pedicel broad, width  $\sim 0.5\times$  length of cucullar lobe; valva short, length along sacculus  $\sim 0.45\times$  length of genital capsule; sacculus lobe stout, tapering, extending almost to base of pedicel; basal process of valva relatively stout, approximately equaling length of slender costal process. Juxta consisting of a slender, elongate, sclerotized, median rod from vinculum.

*Female Genitalia:* Figures 472, 473. Abdomen tapering to a narrowly rounded, minutely cleft apex. Each

posterior apophysis elongate, fused for most of its length. Papillae anales consisting of a pair of moderately elongate, extremely divergent lobes bearing 5–6 long, apical setae; length of lobe  $\sim 2.5\times$  width (Figure 473). Vestibulum moderately narrow, membranous. Ductus bursae elongate, approximately same diameter as corpus bursae; a small, dense concentration of minute, solitary spicules along inner wall anterior to juncture with ductus spermathecae. Corpus bursae moderately short, oval; a narrow, elliptical, faint band of minute, external tubercles extending most the length of bursa. Ductus spermathecae greatly elongate,  $\sim 1.7\times$  length of bursa copulatrix; membranous outer canal short, saccate, arising immediately caudad of anterior enlargement of corpus bursae; inner canal mostly straight to curved, without terminal convolutions; vesicle divided into a small irregular sac and a short, stout, lateral lagena.

LARVA AND PUPA. Unknown.

**HOLOTYPE.** ♂; BRITISH VIRGIN ISLANDS: Tortola Island, Mt. Sage National Park, 480 m, 22–24 Jul 1986, S. E. Miller & M. G. Pogue, black light trap in “aridulate” rainforest, slide: USNM 31844 (USNM).

**PARATYPES.** BRITISH VIRGIN ISLANDS: Tortola Island, Mt. Sage National Park, 460 m: 1 ♂, 7–8 Jul 1985, S. E. Miller et al. (USNM); 2 ♂, 13–15 Jul 1987, V. O. Becker & S. E. Miller, slides USNM 31846, 32756 (USNM); 1 ♂, 1 ♀, 22–24 Jul 1986, S. E. Miller & M. Pogue, slide USNM 32474 (USNM). PUERTO RICO: Maricao Lt.: 1 ♂, Jul 1960, J. Maldonado, slide USNM 32743 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** July.

**DISTRIBUTION.** (Map 14) West Indies: known only from Puerto Rico and Tortola Island in the British Virgin Islands.

**ETYMOLOGY.** The species name is derived from the Latin *sectilis* (cleft, cut, divided) in reference to the diagnostic, deeply divided, or cleft condition of the male vinculum.

**DISCUSSION.** The forewing of this species has the subapical costal spot lacking in its sister species, *P. tenuifurcata*. The inner hindtibial spur is also unusually long. The male genitalia of *P. sectila* is among the most highly modified and distinct within *Pseudopostega*. Of particular significance are the relatively robust, complex form of the caudal lobe of the gnathos (viewed laterally) and deeply concave anterior margin of the vinculum. The papillae anales are similar to those in female *P. duplicata* in being slender and widely divergent, but with stouter bases. The inner canal of the ductus spermathecae of *P. sectila* is the longest of any member of *Pseudopostega* (~1.7× length of bursa copulatrix) and lacks the terminal convolutions typically present within the genus.

### The *divaricata* group

The principal characteristic defining this group is the variable development of a furcate apex on the caudal lobe of the gnathos. Only one Old World species, *Pseudopostega epactaea* from southeast Asia, exhibits this characteristic, but only in a very reduced state. The caudal lobe within the members of the *divaricata* group varies from minutely furcate to prominently divided. The base of the gnathos is typically broadly triangular, with moderate to no development of a basal fold. The length of the sacculus ranges from 0.5 to 0.75× the length of the genital capsule. The vinculum is usually broadly U- to V-shaped, with usually some vestige of a rod-like juxta present. The females of six species in this group have been associated with their corresponding males. All possessed shortly divided to

bilobed papillae anales except for the completely fused, simple lobe in *P. acrodicra*. A faint, irregular U-shaped to elliptical band of numerous, blunt, external tubercles partially encircled most the length of the corpus bursae in all six species.

Sequence data for CO1 has been amplified by Paul Hebert’s lab for four members of the *divaricata* group. *Pseudopostega brevifurcata* (438 bp) and *brevivalva* (518 bp) were closely associated in the same clade but were not associated with *P. divaricata* (261 bp). Amplification of CO1 for the latter is currently too poor to assess its relationships with much confidence. The CO1 data for *P. quadristrigella* (513 bp) indicated a closer relationship with *albogaleriella*, recognized herein as a member of the *spatulata* species group, than with any of the other three species of the *divaricata* group for which sequence data were available.

### *Pseudopostega texana*, new species

FIGURES 207, 364, 365, 474, 475; MAP 15

**ADULT.** Figure 207. Length of forewing 2.5–3.0 mm. Small, mostly white moth with a small, broadly triangular, dark brown costal spot at distal three-fifths of forewing and as many as 3 dark brown, subapical costal and 1 ternal strigulae. Male genitalia with minutely furcate gnathos (Figure 364). Papillae anales of female consisting of a pair of small, short lobes divided to base (Figure 475).

**Head:** Vestiture white. Scape white, sometimes with dark brown suffusion along anterior edge. Flagellum golden cream, ~63–67-segmented. Maxillary palpus white. Labial palpus white with brown suffusion laterally.

**Thorax:** White; anterior margin of tegula dark brown. Forewing mostly white with a small, slender, dark brown costal spot at distal three-fifths; a few light brown scales sometimes evident at basal one-third of dorsal margin; a small, black apical spot present; area immediately basal to spot often slightly suffused with pale brown; a maximum of 3 dark brown, subapical costal strigulae consisting of a short, often absent, basal, costal strigula (1) beyond costal spot; a prominent, terminal strigula (3) extending from costa and curving slightly around apical spot to termen; a less distinct subterminal, costal strigula (2) terminating near apical spot, and a similar ternal strigula extending from apical spot to tornus; terminal cilia brown along terminal strigula, then becoming white around tornus; venter of forewing light brown to gray. Hindwing and cilia light brown both dorsally and ventrally. Legs mostly white, with lateral surfaces of fore- and midlegs dark brown and lighter brown on hindlegs.

**Abdomen:** Brown dorsally; white to cream ventrally and laterally.

**Male Genitalia:** Figures 364, 365. Socii a pair of small rounded, setose lobes, widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal rim of uncus deeply concave, broadly V-shaped. Vinculum broad; anterior margin narrowly rounded to slightly concave. Gnathos triangular, broad at base, tapering to short, slender, minutely furcate, caudal apex; anterior margin slightly convex; basal fold produced and deepest at midventer, becoming extremely narrow laterally (Figure 364). Valva with elongate cucullar lobe  $\sim 0.6\times$  length of genital capsule, bearing pectinifer consisting of  $\sim 26\text{--}33$  blunt spines; distal apex of cucullar lobe undeveloped, rounded; pedicel moderately stout, width  $\sim 0.18\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.85\times$  length of genital capsule; saccular lobe moderately broad, tapering to setose, rounded apex; basal process of valva short, acuminate; costal process of valva relatively long and slender, exceeding length of basal process by  $\sim 0.35\times$  length. Juxta not developed.

**Female Genitalia:** Figure 474, 475. Abdomen tapering to a moderately broad, subacute, slightly cleft apex. Each posterior apophysis fused most its length, slender, elongate. Papillae anales consisting of a pair of small, short lobes divided to base and bearing numerous, moderately long setae, the longest  $\sim 0.33$  as long as posterior apophyses; length of each lobe  $\sim 1.2\times$  width (Figure 475). Vestibulum broad, membranous without spicules; ductus bursae moderately broad, with elongate zone of relatively indistinct spicules, a few of which are arranged in short rows of 2–3 spicules. Corpus bursae broadly oval, with a faint, irregular U-shaped band of numerous, relatively elongate, blunt, external tubercles partially encircling most the length of bursa (Figure 474). Spermathecal duct  $\sim 0.8\text{--}0.9\times$  length of bursa copulatrix; membranous outer canal narrow; inner canal long, sinuous, terminating in  $\sim 1\text{--}2$  convolutions; vesicle a relatively large, bilobed tube.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; USA: TEXAS: San Patricio Co.: R[ob] and B[essie] Welder Refuge, 14–15 Jul 1985, J. E. Gillaspay, slide USNM 32471 (USNM).

**PARATYPES.** USA: TEXAS: Cameron Co.: Sabal Palm Sanctuary: 1 ♀, 19–20 Apr 1998, E. C. Knudson (USNM). Hidalgo Co.: Santa Ana Nat. Wildlife Refuge: 6 ♂, 3 ♀, 6 Sep 1992, 1 ♂, 8 Oct 1991, E. C. Knudson, slides USNM 32492, 32493, 32844, 32847 (TLS, USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in April and July to early October.

**DISTRIBUTION.** (Map 15) Rio Grande Valley of southern Texas and probably south into Mexico.

**ETYMOLOGY.** The species name is derived from the general type locality, Texas.

**DISCUSSION.** The broad, triangular base of the male gnathos of *P. texana* is similar to that more characteristic of the *triangularis* group, but on the basis of a bifurcate, although much reduced, caudal lobe, this species has been included in the *divaricata* group. This species also differs from other members of the group by the presence of a moderately well developed basal fold on the gnathos. The papillae anales of the female consists of a pair of short, rounded lobes minutely separated at their bases.

### *Pseudopostega curtarama*, new species

FIGURES 208, 366, 367, 476, 477; MAP 15

**ADULT.** Figure 208. Length of forewing 3.4–5.0 mm. Small, mostly white moth with white forewings suffused with scattered light brown scales, and marked with a relatively large, rhomboidal, dark brown spot near basal one-third of dorsal margin, 3 variable, brown to dark brown, subapical costal strigulae, a small, dark brown to nearly black apical spot, and a short, dark brown tornal strigula. Male gnathos with apex of caudal lobe bilobed; furcations short, stocky; basal fold absent (Figure 367). Papillae anales of female bilobed; lobes very short, round (Figure 477).

**Head:** Vestiture white. Scape white; flagellum light brown dorsally, cream ventrally, 57-segmented. Palpi cream; labial palpus dark brown laterally.

**Thorax:** White; tegula with brownish suffusion on anterior margin. Forewing mostly white, suffused with scattered light brown scales in the holotype, with suffusion becoming more concentrated near apical strigulae; marked with a relatively large, rhomboidal, dark brown spot near basal one-third of dorsal margin, 3 variable, brown to dark brown, subapical costal strigulae; strigula 1 brown heavily shadowed basally with light brown around apex of wing and along base of terminal cilia; strigula 2 darker brown, becoming lighter and more faint toward termination near fuscous apical spot; strigula 3 faint, partially interrupted near apex and continuing around apical spot to tornus; a short, dark brown tornal strigula separated from apical spot by a small patch of white scales; terminal cilia mostly light brown, with whitish suffusion near tornus; dorsal cilia light brown; venter of forewing brown except for basal, subhumeral white area. Hindwing and cilia brown dorsally and ventrally. Legs mostly cream; foreleg with dorsal surfaces

heavily suffused with grayish brown; midleg with light scattering of brown scales laterally over tibia; basal tarsomeres ringed with brown, becoming completely brown dorsally over apical half of tarsus; tarsomeres of hindleg more lightly ringed with brown dorsally, mostly cream ventrally.

**Abdomen:** Brown dorsally with grayish suffusion laterally, cream ventrally.

**Male Genitalia:** Figures 366, 367. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim 0.55\times$  length of cucullar lobe; caudal rim of uncus relatively deeply concave. Vinculum broad; anterior margin rounded. Base of gnathos broad, gnathos abruptly narrowing posteriorly to moderately short, caudal lobe with relatively short, broad, bilobed apex; anterior margin of gnathos slightly concave; basal fold absent (Figure 366). Valva with an elongate cucullar lobe  $\sim 0.55\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 47\text{--}49$  blunt spines; distal apex of cucullar lobe extended slightly as a rough, narrowly rounded lobe; pedicel slender,  $\sim 0.08\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.65\times$  length of genital capsule; sacculus lobe short, broad, abruptly tapering to subacute apex; basal process of valva moderately long, tapering to acute apex; costal process slightly shorter than basal process, with blunt apex. Juxta developed as a very slender filamentous appendage from vinculum.

**Female Genitalia:** Figures 476, 477. Abdomen tapering to a narrowly rounded, minutely cleft apex. Posterior apophyses elongate, fused for most of their length. Papillae anales bilobed, consisting of a pair of very short, broadly rounded lobes (Figure 477); length of lobe  $\sim 0.4\times$  width, bearing  $\sim 12\text{--}14$  moderately long setae. Vestibulum moderately narrow, membranous. Ductus bursae approximately same diameter to corpus bursae; inner walls densely lined with pectinations consisting of  $\sim 4\text{--}8$  minute spicules arranged in short, transverse rows; pectinations terminating well posterior of separation of ductus spermathecae. Corpus bursae elliptical, enlarging well anterior to separation of ductus spermathecae; a narrow, elliptical, faint band of external tubercles extending about half the length of bursa. Ductus spermathecae elongate,  $\sim 0.5\times$  length of bursa copulatrix; membranous outer canal short, broad; inner canal slender, terminating in 3–4 convolutions; vesicle composed of a moderately enlarged, coiled tube that gradually decreases in size anteriorly.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MINAS GERAIS: Nova Lima, 850 m: 30 Dec 1988, V. O. Becker, slide DRD 4217 (VOB).

**MATERIAL EXAMINED.** BRAZIL: GOIAS: Alto Paraiso, 1400 m: 1 ♀, 1–6 Nov 1996, V. O. Becker (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from November to December.

**DISTRIBUTION.** (Map 15) Known only from the provinces of Goias and Minas Gerais in southern Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *curtus* (short) and *ramus* (branch), in reference to the short, forked branches of the caudal lobe of the male gnathos.

**DISCUSSION.** The moderately stout, shortly divided caudal lobe of the gnathos is diagnostic for the male of this species. The female papillae anales are short and superficially bilobed as in *P. bidorsalis*, but are more broadly rounded. Because the single female examined was not collected at the same locality as the holotype and differs slightly morphologically, it may not be conspecific and has not been considered a paratype. The female is larger (forewing = 5.0 mm) than the male and possesses whiter forewings with the dorsal spot positioned more medially along the dorsal margin; in other regards, the general wing pattern resembles that of the male holotype.

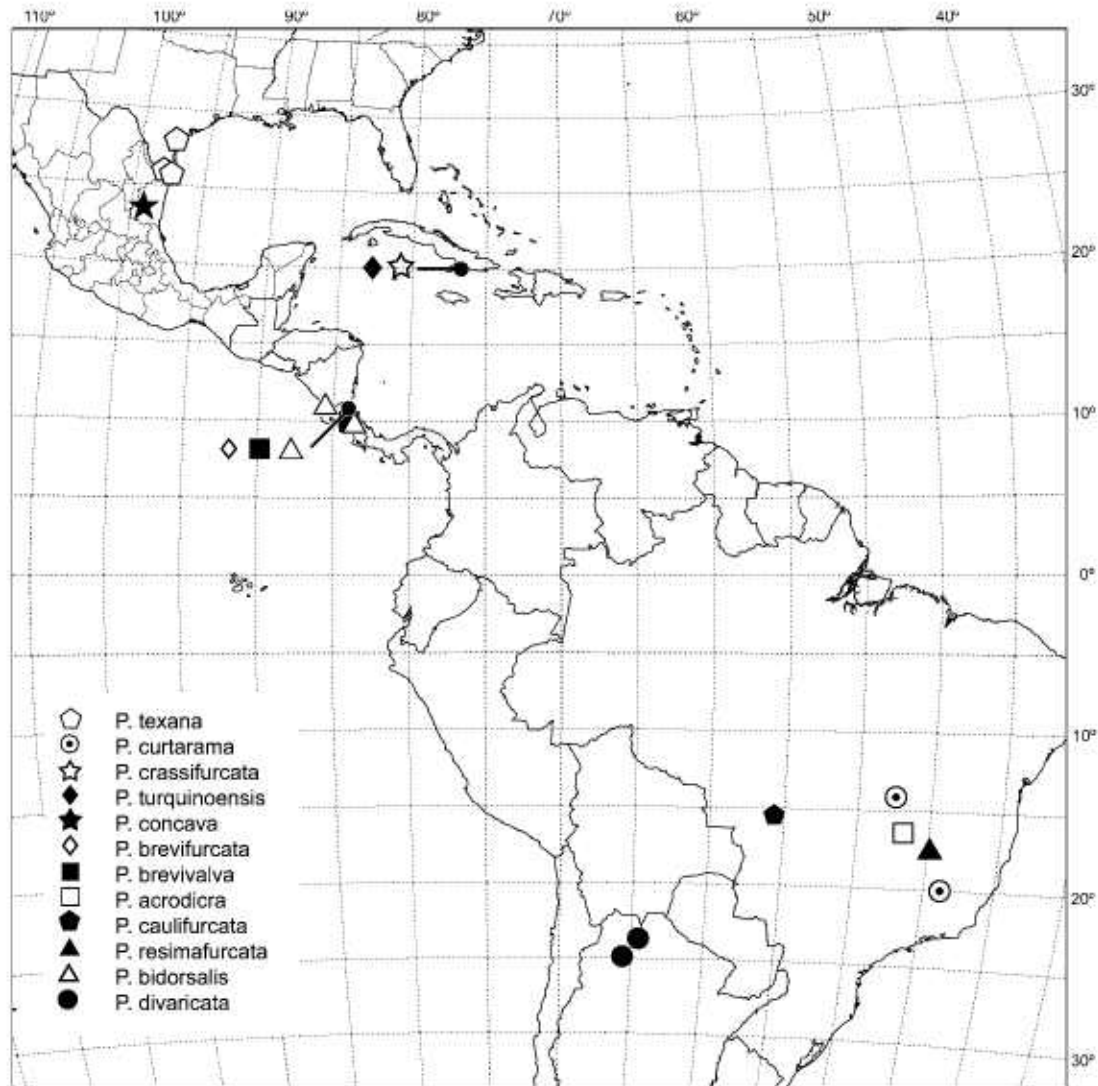
### ***Pseudopostega crassifurcata*, new species**

FIGURES 209, 368, 369; MAP 15

**ADULT.** Figure 209. Length of forewing 2.5 mm. Small, mostly white moth with white forewings usually marked by a faint, light brown dorsal spot midway along hind margin, 2 brownish subapical costal strigulae, a short, brown terminal strigula, a short, brown tornal strigula, and a black apical spot. Male with furcate caudal lobe of gnathos relatively stout and socii enlarged (Figure 368). Female unknown.

**Head:** Vestiture white. Scape white; flagellum pale brown,  $\sim 52\text{--}57$ -segmented. Maxillary palpus cream. Labial palpus white to cream, suffused with grayish brown laterally.

**Thorax:** White; anterior margin of tegula grayish brown. Forewing almost entirely white with basal third of costal edge fuscous, usually marked by a faint, light brown dorsal spot midway along dorsal margin, 2 brownish subapical costal strigulae, a short, brown terminal strigula, a short, brown tornal strigula, and a black apical spot; most basal of costal strigulae light brown, all other strigulae darker brown; area between distal end of basal strigula and apical black spot suffused with pale yellowish brown; terminal cilia mostly white, pale brown beyond terminal strigula and along outer dorsal margin; venter of forewing brown except for short, basal white streak. Hindwing and



MAP 15. Distribution of New World *Pseudopostega divaricata* species group.

cilia brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with lateral and dorsal surfaces grayish brown; midleg with usually three light grayish brown bands dorsally on tarsus; tarsal banding paler to absent on hindleg.

**Abdomen:** Light grayish brown dorsally, white ventrally.

**Male Genitalia:** Figures 368, 369. Socii a pair of long rounded, setose lobes, widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad, tapering slightly to truncate anterior margin. Gnathos with a broad base that constricts slightly beyond its middle, then expanding slightly to form a broad, furcate caudal lobe; arms of

lobe short and stout; anterior margin subtruncate with a minute, triangular, median projection; basal fold not present (Figure 368). Valva with an elongate cucullar lobe  $\sim 0.55\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 44$  blunt spines; distal apex of cucullar lobe slightly extended as a setose, rounded lobe; pedicel moderately slender, width  $\sim 0.12\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.6\times$  length of genital capsule; sacculus lobe stout, moderately short, slightly tapering to obliquely truncate apex; basal process of valva stout, tapering sharply to acuta apex, approximately equaling length of costal process. Juxta undeveloped.

FEMALE, LARVA AND PUPA. Unknown.

**HOLOTYPE.** ♂; CUBA: Santiago, Sierra Maestra, Pico Cuba, 1500 m: 31 Jul 1990, V. O. Becker, slide USNM 32727 (USNM).

**PARATYPE.** CUBA: Santiago, Sierra Maestra, Pico Cuba, 1500 m: 1 UNK, 31 Jul 1990, V. O. Becker (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** July.

**DISTRIBUTION.** (Map 15) Known only from the type locality in the Sierra Maestra of southeastern Cuba.

**ETYMOLOGY.** The species name is derived from the Latin *crassus* (thick, fat, stout) and *furcatus* (forked) in reference to the unusually stout form of the furcate apex of the male gnathos.

**DISCUSSION.** The male gnathos is characteristic for this species in lacking a basal fold and in being relatively broad throughout its length, with little lateral constriction before the stout, divided caudal lobe. The socii are proportionately the most elongate of any *Pseudopostega*.

### ***Pseudopostega turquinoensis*, new species**

FIGURES 210, 370; MAP 15

**ADULT.** Figure 210. Length of forewing 2.8–3.3 mm. Small, mostly white moth with almost immaculate forewings except for 3 dark brown, subapical costal and 2 tornal strigulae. Male with apex of gnathos bifid; basal fold relatively narrow, transverse (Figure 370). Female unknown.

**Head:** Vestiture white. Scape white, without brownish suffusion along anterior edge. Flagellum pale brown, ~50–55-segmented. Maxillary palpus white to cream. Labial palpus white, with suffusion of brown laterally.

**Thorax:** Entirely white. Forewing almost entirely white, without costal and dorsal spots; dark brown to black apical spot present; 3 pale brown, subapical costal strigulae usually present; 2 most basal strigulae obliquely slanted outward toward black apical spot; strigula 3 slanted slightly inward toward spot; outermost tornal strigula slightly sinuate, extending around terminal margin to slightly anterior of apical spot; basal tornal strigula usually faint, slanted obliquely outward toward apical spot; terminal cilia mostly white, lightly tinged with cream around apex; venter of forewing light brown to gray except for basal white patch around humeral area. Hindwing and cilia pale brown to gray both dorsally and ventrally, with basal whitish suffusion ventrally. Legs mostly cream, with grayish brown suffusion laterally and dorsally on foreleg.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figure 370. Socii a pair of relatively small, rounded, setose lobes, separated by a distance about 0.3× basal width of gnathos. Caudal rim of uncus smoothly concave. Vinculum narrowing slightly to truncate anterior margin. Gnathos broad basally, abruptly constricted to moderately stout, shortly bifurcate caudal apex; anterior margin sinuate, moderately concave medially; basal fold relatively narrow, extending transversely across width of gnathos. Valva with a relatively large cucullar lobe ~0.4× length of genital capsule, bearing a pectinifer consisting of 36–40 blunt spines; pedicel broad, width ~0.28× width of cucullar lobe; valva short, length along sacculus ~0.6× length of genital capsule; saccular lobe relatively stout, rounded, bearing 6 large apical spines; basal process of valva relatively short, approximately equal to length of costal process. Basal junction of juxta usually preserved.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; CUBA: SANTIAGO: Turquino, 470 m, 27–29 Jul 1990, V. O. Becker, (USNM).

**PARATYPES.** CUBA: Same data as holotype: 3 ♂, slides USNM 31940, 31963 (USNM, VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** July.

**DISTRIBUTION.** (Map 15) Known only from the type locality in southeastern Cuba.

**ETYMOLOGY.** The species name is in reference to the type locality, Turquino.

**DISCUSSION.** This species is similar to *P. concava* from Mexico in wing pattern and in the morphology of the gnathos. The male genitalia of *turquinoensis* differs from the latter in possessing a more narrowly truncate vinculum, more reduced socii, and more slender saccular lobe.

### ***Pseudopostega concava*, new species**

FIGURES 211, 371, 478, 479; MAP 15

**ADULT.** Figure 211. Length of forewing 2.8–3.7 mm. Small, mostly white moth with white forewings marked with 3 brown, subapical costal strigulae, a small, dark brown apical spot, and a faint vestige of a light brown tornal strigula. Male with caudal lobe of gnathos furcate, with short, stout arms; basal fold very slender, slightly arched (Figure 371). Papillae anales of female a pair of small, moderately elongate, rounded to conical, setose lobes (Figure 479).

**Head:** Vestiture white. Scape white; flagellum light golden brown dorsally, cream ventrally, 58–60-segmented.

Palpi white; labial palpus with sparse suffusion of light brown dorsally.

**Thorax:** White; tegula all white. Forewing almost entirely white with 3 brown, subapical costal strigulae; first strigula fading to a pale yellowish brown suffusion midway to small, dark brown apical spot; strigula 2 fading before spot; strigula 3 sinuate, curving around apical spot to tornus; a faint, brown tornal stigma extending down from apical spot; terminal cilia mostly white, with brownish tipped scales beyond strigula 3, becoming mostly cream to light brown along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces lightly suffused with brown, paler on tarsomeres; midleg with light brown suffusion dorsally on tarsomeres 3 and 4; very faint brownish tarsal suffusion on tarsomeres 3 and 4 of hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figure 371. Socii a pair of relatively large, rounded, setose, lobes, variable in width and length, and widely separated by a distance  $\sim 0.65\times$  length of cucullar lobe; caudal rim of uncus smoothly concave. Vinculum broad; anterior margin slightly concave. Base of gnathos broad, abruptly narrowing posteriorly to short, stout, furcate apex, which may be curved dorsally in some specimens; terminal furcations variable in degree of divergence; anterior margin of gnathos slightly concave to cleft, with very slender, slightly arched basal fold (Figure 371). Valva with an elongate cucullar lobe  $\sim 0.45\times$  length of entire genital capsule, bearing a pectinifer consisting of a single row of 42–44 blunt spines; distal apex of cucullar lobe extended as a rough, setose, rounded lobe; pedicel broad, width  $\sim 0.5\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.8\times$  length of entire genital capsule, saccular lobe moderately slender, tapering, extending to apex of pedicel; basal process of valva slender, attenuated, exceeding length of costal lobe. Juxta consisting of a relatively short, slender, sclerotized, median rod from vinculum.

**Female Genitalia:** Figures 478, 479. Apex of abdomen subacute, with moderately long setae. Posterior apophyses fused  $\sim 0.33\times$  their length, moderately long and slender. Papillae anales a pair of small, moderately elongate, rounded to conical, setose lobes; length of lobes  $\sim 1.44\times$  width. Vestibulum moderately broad, membranous. Ductus bursae very elongate, moderately slender, gradually enlarging anteriorly to corpus bursae; a dense concentration of mostly transverse pectinations at caudal end of ductus consisting of rows of  $\sim 4$ – $6$  minute spicules; anterior region of ductus with smaller, more scattered rows of 2–3 spicules continuing into indefi-

nite caudal region of corpus bursae. Corpus bursae relatively slender, elongate, with a faint, U-shaped band of numerous, external, irregularly shaped tubercles extending most the length of corpus. Ductus spermathecae nearly as long as bursa copulatrix; membranous outer canal moderately slender, particularly at junction with ductus bursae; inner canal long, sinuous for  $\sim$  half its length, terminating in  $\sim 16$ – $19$  small convolutions; vesicle an elongate, slender, sinuate tube partially enclosed by relatively large, membranous utriculus.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; MEXICO: TAMAULIPAS: 6 mi [9.7 km] S Ciudad Victoria, 1050 ft [320 m]: 6 Aug 1963, Duckworth & Davis, slide USNM 32827 (USNM).

**PARATYPES.** MEXICO: TAMAULIPAS: 4 mi [6.4 km] SW Ciudad Victoria, 1200 ft [366 m]: 1 ♂, 1 ♀, 5 Aug 1963, Duckworth & Davis, slide USNM 32828 (USNM). 6 mi [9.7 km] S Ciudad Victoria, 1050 ft [320 m]: 27 ♂, 5 ♀, 3 UNK, 6 Aug 1963, Duckworth & Davis, slides: USNM 28654, 31839, 32799, 32829 (UNAM, USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** August.

**DISTRIBUTION.** (Map 15) Known only from the type locality, a seasonally dry forest area in northeastern Mexico.

**ETYMOLOGY.** The species name is derived from the Latin *concauus* (arched inward, concave) in reference to the broadly concave anterior margin of the male vinculum.

**DISCUSSION.** The adults of *P. concava* and *turquinoensis* are essentially inseparable in wing pattern. The male genitalia of *concaua* are distinct in possessing stouter socii, a broadly concave vinculum, and a much stouter saccular lobe of the valva. The female genitalia are characterized by the relatively long, slender bursa copulatrix and very convoluted inner canal of the ductus spermathecae.

### *Pseudopostega brevifurcata*, new species

FIGURES 212, 372, 373; MAP 15

**ADULT.** Figure 212. Length of forewing 2.7 mm; female unknown. Small, mostly white moth with white forewings marked with 3 dark brown, subapical costal strigulae and a dark brown apical spot. Male with caudal lobe of gnathos terminating in a pair of short, stout, divergent lobes; basal fold faint, poorly developed (Figure 372). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 55-segmented. Palpi white; labial palpus with brown suffusion laterally.



**Thorax:** White; anterior margin of tegula with faint suffusion of brown. Forewing almost entirely white with 3 dark brown, subapical costal strigulae and an elongate, dark brown apical spot; first strigula very short, mostly confined to costal margin; strigula 2 extending halfway to apical spot; strigula 3 curving slightly around apical spot and fading; no tornal strigula evident; dorsal spot very faint, a few light brown scales present at basal third of dorsal margin; terminal cilia mostly white around apex and tornus, with suffusion of cream between strigulae and light brown along dorsal margin; venter of forewing light brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with brownish suffusion over lateral and dorsal surfaces, tibia mostly cream; mid- and hindlegs cream with brown bands dorsally on tarsomeres 2–4.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 372, 373. Socii a pair of relatively small rounded, setose lobes, widely separated by a distance  $\sim 1.1\times$  length of cucullar lobe; caudal rim of uncus sinuate, nearly truncate. Vinculum broad, gradually tapering to a narrowly rounded, subacute anterior apex. Gnathos with a moderately broad, oval base that constricts to form a broad caudal lobe; apex of lobe with short, broad, acute furcations; anterior margin of gnathos slightly concave; basal fold faint, poorly developed, closely appressed to base of gnathos. Valva with a moderately long cucullar lobe  $\sim 0.35\times$  length of entire genital capsule, bearing a pectinifer consisting of  $\sim 30$  blunt spines; distal apex of cucullar lobe slightly extended as a setose, rounded lobe; pedicel moderately broad, width  $\sim 0.15\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.6\times$  length of entire genital capsule; sacculus stout, tapering slightly to broadly rounded apex; basal process of valva moderately long, tapering to subacute apex; costal lobe reduced, slender and short,  $\sim$  half the length of basal process. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biología La Selva (OET), 50–150 m,  $10^{\circ}26'N$ ,  $84^{\circ}01'W$ , Puerto Viejo de Sarapiquí, bosque secundario, L/15/402, 18 Jun 1998, slide DRD 4211 (INBIO).

**PARATYPE.** COSTA RICA: GUANACASTE: Est. Pitilla, 700 m, 9 km S Sta. Cecilla: 1 ♂, Oct 1990, P. Rios & C. Moraga, slide 4179 (INBIO).

**HOST.** Unknown.

**FLIGHT PERIOD.** June and October.

**DISTRIBUTION.** (Map 15) Known from the provinces of Heredia and Guanacaste in northern Costa Rica at elevations from 50 to 700 m.

**ETYMOLOGY.** The species name is derived from the Latin *brevis* (short) and *furcatus* (forked) in reference to the shortened, furcate caudal apex of the male gnathos.

**DISCUSSION.** The caudal lobe of the male gnathos of this species is similar to that of *P. brevivalva* in possessing a shortly divided, broadly divergent apex, but differs in having a relatively shorter gnathal base and a more transverse, less developed basal fold. The sacculus of the valva is also proportionately longer in *P. brevifurcata* than in *brevivalva*. The wing patterns of the two species are similar in being relatively sparingly marked and in possessing a small dorsal spot, which appears faint in the two specimens available of *brevifurcata*.

### ***Pseudopostega brevivalva*, new species**

FIGURES 213, 374–376; MAP 15

**ADULT.** Figure 213. Length of forewing 2.0–2.8 mm. Small, mostly white moth with white forewings marked with 3 brown, subapical costal strigulae, a very short, faint brown tornal strigula, and a dark brown to fuscous apical spot. Male with shortened valva, length  $\sim 0.6\times$  that of genital capsule; caudal lobe of gnathos triangular with short, acute, divergent lobes; basal fold well developed, triangular (Figure 374). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light brown,  $\sim 43$ – $45$ -segmented. Palpi cream; labial palpus with light brown suffusion laterally.

**Thorax:** White; anterior margin of tegula light brown. Forewing almost entirely white with 3 brown, subapical costal strigulae, a very short, faint brown tornal strigula, and a dark brown to fuscous apical spot; first costal strigula at base of cilia; strigulae 2 and 3 progressively further distad across cilia with third greatest in length and curving around apical spot to terminate near tornal area; costal strigulae 1 and 2 converging at apical spot; a small, faint brown dorsal spot at basal third of dorsal margin; terminal cilia mostly white, with brownish suffusion apically and along dorsal margin; venter of forewing light brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces suffused with light brown, paler on tarsomeres; midleg with light brown bands dorsally on tarsomeres 3 and 4; tarsal banding absent on hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 374–376. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim$  equal to length of cucullar lobe; caudal rim of tegumen

smoothly, shallowly concave. Vinculum V-shaped; anterior margin subacute, narrowly rounded. Gnathos complex, with a broad base that constricts to form an elongate, stout caudal lobe; apex of lobe short, furcate with acute apices; anterior margin of gnathos strongly convex, with prominent, triangular, basal fold (Figure 374). Valva relatively short, length along sacculus  $\sim 0.55\times$  length of genital capsule, with an elongate cucullar lobe  $\sim 0.3\times$  length of entire genital capsule, bearing a pectinifer consisting of 30–32 blunt spines; terminal apex of cucullar lobe slightly produced, acute; pedicel broad, width  $\sim 0.5$  length of cucullar lobe; saccular lobe extended as a moderately broad (at base), tapering, triangular, apically setose lobe, extending almost to apex of cucullar lobe; basal process of valva relatively stout, tapering to acute base, approximately equaling length of slender costal lobe. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva (OET), 50–150 m, 10°26'N, 84°01'W, Puerto Viejo de Sarapiquí, 29 Apr 1996, Biblioteca, L/04/228, slide DRD 4209 (INBio).

**PARATYPES.** COSTA RICA: HEREDIA: Estación Biológica La Selva, 50–150 m, Puerto Viejo de Sarapiquí, L/08/323: 1 ♂, 25 Feb 1998, INBio-OEL, slide USNM 32781 (USNM). SAN JOSÉ: San Pedro de Montes de Oca, UCR [University of Costa Rica], Reserva Ecológica Leonel Oviedo, 1150 m: 1 ♂, 9 Jul 1999, K. Nishida, slide USNM 32792 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in February, April, and July.

**DISTRIBUTION.** (Map 15) Known only from Costa Rica at elevations from 50 to 1150 m.

**ETYMOLOGY.** The species name is derived from the Latin *brevis* (short) and *valva* (leaf of a folding door), in reference to the unusually short length of the male valvae.

**DISCUSSION.** *Pseudopostega brevivalva* is similar to *P. brevifurcata* in general forewing pattern and in the form of the caudal lobe of the male gnathos, but differs in several other features of the male genitalia. The gnathos is more elongate, the basal fold more developed and triangular in form, and the sacculus relatively shorter in *brevivalva*. The reduced sacculus of this species resembles that of members in the *tenuifurcata* group, but the apical lobe of the gnathos is much more stoutly furcate than in the latter group.

### ***Pseudopostega acrodicra*, new species**

FIGURES 214, 377, 480, 481; MAP 15

**ADULT.** Figure 214. Length of forewing 5.0–5.6 mm. Small, mostly white moth with white forewings

marked with a relatively large, often triangular, dark brown to fuscous spot at distal one-fourth of costa, 2 faint, light brown, subapical costal strigulae, and a small, dark brown to nearly black apical spot. Male gnathos with apex of caudal lobe minutely forked; basal fold slender, slightly arched (Figure 377). Papillae anales of female fused into a single, stout, moderately long setose lobe (Figure 481).

**Head:** Vestiture white. Scape white; flagellum light brown, 74–76-segmented. Palpi cream, lightly irrorated dorsally with brown scales on maxillary palpus, more heavily irrorated dorsally and laterally with brown on labial palpus.

**Thorax:** White; tegula with dark brown spot on anterior margin. Forewing white with a relatively large, often triangular, dark brown to fuscous spot at distal one-fourth of costa and 2 faint, light brown, subapical costal strigulae traversing apical cilia; first strigula crossing near base of cilia, often with faint suffusion of grayish brown from inner margin over apical area of wing; strigula 2 across middle of cilia, terminating just before small, brown to nearly black apical spot; terminal cilia mostly white, with faint brownish suffusion along dorsal margin; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces heavily suffused with dark brown; tarsomeres mostly brown ventrally; midleg with tarsomeres ringed with brown; tarsomeres of hindleg more lightly ringed with brown dorsally, mostly cream ventrally.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 377. Socii a pair of relatively small, rounded, setose lobes widely separated by a distance  $\sim 0.7\times$  length of cucullar lobe; caudal rim of tegumen concave, broadly V-shaped. Vinculum broad; anterior margin subtruncate to slightly concave. Base of gnathos broad, abruptly narrowing posteriorly to a moderately long, slender, caudal process with a slightly broader, short, furcate apex; anterior margin slightly concave, with a slender, slightly arched, basal fold. Valva with an elongate cucullar lobe  $\sim 0.6\times$  length of genital capsule; bearing a pectinifer consisting of a single row of  $\sim 46$ – $48$  blunt spines; terminal apex of cucullar lobe extended slightly as a roughly tuberculate, narrowly rounded lobe; base of pedicel broad, approximately one-third length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe moderately slender, tapering to subtruncate, setose apex; basal process of valva tapering to acute apex, exceeding length of costal lobe. Juxta undeveloped.

**Female Genitalia:** Figures 480, 481. Apex of abdomen subacute, with two large, closely aligned setose lobes.

Each posterior apophysis fused most its length, slender and moderately long, length  $\sim 5.5\times$  length of papillae anales. Papillae anales fused into a single, moderately long, stout, setose lobe; setae  $\sim 0.32\times$  length of apophysis. Vestibulum relatively narrow, membranous. Ductus bursae with a small concentration of pectinations aligned in transverse rows of usually 3–7 minute spicules; a similar, longer zone of pectinate spicules located more anteriorly at junction of corpus bursae. Corpus bursae slightly enlarged anteriorly, with a dense, U-shaped band of relatively large, external tubercles. Ductus spermathecae  $\sim 0.5\times$  length of bursa copulatrix; membranous outer canal broadly inflated,  $\sim 0.85\times$  length of entire duct; inner canal long, slightly sinuous, with about 3–4 small, terminal convolutions abruptly enlarging to form a bilobed, tubular vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MINAS GERAIS: Unaí, 700 m: 1 ♂, 3 Nov 1983, V. O. Becker (VOB).

**PARATYPES.** BRAZIL: MINAS GERAIS: Unaí, 700 m: 3 ♂, 27 Sep 1983, 1 ♂, 16 Oct 1988, 7 ♂, 1 ♀, 1 UNK, 7 Nov 1982, V. O. Becker, slides USNM 28653, 31961, 32870, (USNM, VOB). MATO GROSSO: Unai, 700 m, 9 Nov 1983, V. O. Becker (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from September to November.

**DISTRIBUTION.** (Map 15) Known only from the type locality in south-central Brazil.

**ETYMOLOGY.** The species name is derived from the Greek *akron* (tip, end) and *dikros* (forked, cloven) in reference to the small, apical furcation of the caudal lobe of the male gnathos.

**DISCUSSION.** This species is closely allied to another Brazilian species, *P. caulifurcata*, as evidenced by their similar wing pattern and male genital morphology. The male of *P. acrodicra* differs from the latter in possessing a gnathos with a broader base and relatively shorter caudal lobe. The most significant distinction between the males of these two species is the longer sacculus of *acrodicra* (nearly  $0.7\times$  length of genital capsule), and in particular the longer, more robust saccular lobe. The papillae anales of female *acrodicra* are unusual in consisting of a single, fused lobe, similar to that occurring in *P. elachista* and most *P. venticola*. The female of *caulifurcata* is unknown.

### ***Pseudopostega caulifurcata*, new species**

FIGURES 215, 378, 379; MAP 15

**ADULT.** Figure 215. Length of forewing 4.6 mm. Small, mostly white moth with white forewings suf-

fused with cream and marked with a dark brown costal spot at distal 2/3, a faint brown, subapical costal strigulae, a similar, smaller terminal strigula, and dark brown to fuscous apical spot. Male gnathos abruptly constricted to form an elongate, slender, caudal lobe with a short, furcate apex; basal fold slender, slightly arched (Figure 378). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown dorsally, cream ventrally, 68-segmented. Palpi cream; labial palpus with dorsolateral margins brown.

**Thorax:** White; tegula with brown suffusion on anterior margin. Forewing white suffused with cream and marked with a dark brown costal spot at distal 2/3 and a faint brown, subapical costal strigulae, a similar, smaller terminal strigula; strigula 1 extending midway through terminal cilia to and slightly around small, dark brown to fuscous apical spot; strigula 2 poorly preserved, extending a short distance around apical margin of cilia; terminal and dorsal cilia white; venter of forewing brown except for basal, subhumeral white to cream area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white to cream; foreleg with dorsal surfaces suffused with dark brown; midleg with brownish suffusion dorsally over tarsomeres 3–5; banding paler on tarsomeres of hindleg.

**Abdomen:** Dark brown dorsally and laterally, cream ventrally.

**Male Genitalia:** Figures 378, 379. Socii a pair of moderately large, rounded, setose lobes widely separated by a distance  $\sim 0.6\times$  length of cucullar lobe; caudal margin of uncus smoothly concave. Vinculum broad, tapering to narrow, subtruncate, anterior margin. Base of gnathos broadly cupuliform, abruptly narrowing posteriorly to slender, elongate, caudal lobe; apex of lobe shortly furcate, with arms acute and widely divergent; anterior margin of gnathos shallowly concave medially; basal fold extremely narrow, slightly arched at midventer with free margin. Valva with an elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule; bearing a pectinifer consisting of  $\sim 55$ – $57$  blunt spines; terminal apex of cucullar lobe extended slightly as a tuberculate, setose rounded lobe; pedicel moderately broad,  $\sim 0.2\times$  length of cucullar lobe; valva short, length along sacculus  $\sim 0.6\times$  length of genital capsule; saccular lobe moderately broad, tapering slightly to tuberculate, rounded apex bearing long setae; a relatively prominent setose, subapical tubercle present along costal margin; basal process of valva tapering to broadly acute apex, equaling length of costal process. Juxta developed as a moderately short, median rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MATO GROSSO: Chapada dos Guimarães, 800 m: 1 ♂, 26 Oct 1993, V. O. Becker, slide DRD 4230 (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** October (unique record).

**DISTRIBUTION.** (Map 15) Known only from the type locality in southwestern Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *caulis* (stalk, stem) and *furcatus* (forked) in reference to the stalked, furcate caudal lobe of the male gnathos.

**DISCUSSION.** On the basis of their similar forewing pattern and male genital morphology, this species appears most closely related to *P. acrodicra*. Male *P. caulifurcata* differ in possessing a more slender gnathos and relatively longer caudal lobe, shorter valvae (length of sacculus ~0.5× length of genital capsule), and shorter saccular lobe.

### ***Pseudopostega resimafurcata*, new species**

FIGURES 216, 380, 381; MAP 15

**ADULT.** Figure 216. Length of forewing 4.1 mm. Small, mostly white moth with white forewings marked with a small, dark brown spot midway along dorsal margin, 3 faint brown, subapical costal strigulae, and a very small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to a strongly recurved, furcate caudal lobe; basal fold broad, extremely slender, strongly arched at middle (Figures 380, 381). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 68-segmented. Palpi white; labial palpus with sparse suffusion of light brown dorsally on basal two segments, apical segment entirely white.

**Thorax:** White; tegula white. Forewing white marked with a small, dark brown spot midway along dorsal margin and 3 faint brown, subapical costal strigulae; strigulae 1 and 2 short, terminating before a small, moderately elongate dark brown spot located immediately basal to small, dark fuscous, apical spot; strigula 3 curving anterior to apical spot toward a very short, faint, terminal strigula; terminal and dorsal cilia white; venter of forewing light brown irrorated with white and with basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white; foreleg with dorsal surfaces sparsely suffused with light brown; tarsi faintly banded dorsally with cream to light brown; tarsi of mid- and hindlegs cream dorsally.

**Abdomen:** Light golden brown dorsally, light grayish brown laterally, with a narrow cream stripe ventrally.

**Male Genitalia:** Figures 380, 381. Socii a pair of relatively small, rounded, setose, lobes widely separated by

a distance ~0.5× length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broadly V-shaped; anterior margin narrowly rounded. Base of gnathos broad, radially narrowing posteriorly to an elongate, slender, strongly recurved, caudal lobe apically divided about half its length; furcations acute, slightly divergent; anterior margin sharply concave as an inverted V-shaped incision; basal fold broad, extending across gnathos, extremely slender, strongly arched at middle, with caudal margin slightly separated from base (Figure 380). Valva with a very long cucullar lobe ~0.5× length of genital capsule, bearing a pectinifer consisting of ~47 blunt spines; terminal apex of cucullar lobe extended as a densely tuberculate, narrowly rounded lobe; pedicel broad, approximately one-third length of cucullar lobe; valva moderately long, length along sacculus ~0.65× length of genital capsule; saccular lobe extremely long, moderately slender, with a roughly rounded, setose apex; basal process of valva tapering to acute apex, exceeding length of relatively short, slender, costal lobe. Juxta slightly developed as short slender rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; BRAZIL: MINAS GERAIS: Pirapora, 500 m, 29 Oct 1988, V. O. Becker, 60069, slide DRD 4221 (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** October (unique record).

**DISTRIBUTION.** (Map 15) Known only from the type locality in southeastern Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *resimus* (turned up, bent back) and *furcatus* (forked) in reference to the dorsally curved, furcate apex of the male gnathos.

**DISCUSSION.** The male genital morphology of this species is not likely to be confused with any other species. The dorsal curvature of the caudal lobe of the gnathos is similar to that of *P. caulifurcata*, but more pronounced. The relative separation and subsequent length of the saccular lobe in *resimafurcata* are greater than that present in any other member of the genus. The North American *P. quadristrigella* superficially resembles *resimafurcata* in forewing pattern and in also possessing an elongate saccular lobe but differs in the general structure of the gnathos (e.g., convex anterior margin compared to concave in *resimafurcata*) and longer costal process of the valva.

### ***Pseudopostega quadristrigella* (Chambers)**

FIGURES 217, 218, 382–384, 482, 483; MAP 16

*Opostega quadristrigella* Chambers, 1875:106.—Dyar, 1903:547, no. 6231.—McDunnough, 1939:100, no. 9404.—Eyer, 1963:239; 1966:234.—Davis, 1983:3, no. 122.—Brower, 1984:47.

*Opostega albogalleriella* [sic] var. *quadristrigella* Chambers.—Forbes, 1923:161.

*Pseudopostega quadristrigella* (Chambers).—Davis, 1989:77.—Poole, 1996:797.—Knudson and Bordelon, 1999:1.—Heppner, 2003:232.—Puplesis and Diškus, 2003:417.

*Opostega accessoriella* Frey and Boll, 1876:216.—Dyar, 1903:547, no. 6227.—McDunnough, 1939:100, no. 9404 (synonym of *Opostega quadristrigella*).—Davis, 1984:18.—Poole, 1996:797.—Puplesis and Diškus, 2003:417.

*Pseudopostega accessoriella* (Frey and Boll).—Davis, 1989:77.—Heppner, 2003:232.

**ADULT.** Figures 217, 218. Length of forewing: 4.4–5.2 mm. Small, mostly white moth with usually white forewings variably marked with 0–1 brown spot midway along dorsal margin, 1–3 brown, subapical costal strigulae, 0–1 tornal strigula, and an apical black spot. Male gnathos terminating in variably furcate apical lobe; basal fold extremely narrow, slightly arched at middle (Figures 382, 383). Papillae anales of female bilobed, consisting of a pair of small, rounded, setose lobes on a narrow, elliptical base (Figure 483).

**Head:** Vestiture white. Scape white; flagellum pale yellowish brown to ochreous gray, about 58–64-segmented. Palpi white to cream; labial palpus sometimes with brownish suffusion dorsally and laterally.

**Thorax:** Typically white, more brownish in some melanic specimens. Forewing with variable pattern, usually white, but sometimes with suffusion of scattered brownish scales over distal half; median dorsal spot usually present, yellowish to dark brown, irregularly shaped, usually depressed along dorsal margin, seldom slightly extended toward costa and distally oblique; subapical strigulae variable from yellowish to fuscous brown, and from usually 2–3 costal and 0–2 tornal strigulae; occasionally only a single costal strigula might be visible (in combination with white forewing lacking a dorsal spot and distal suffusion of scattered brownish scales); occasionally first costal strigula shadowed proximally with yellowish brown scales; terminal cilia white, becoming cream sometimes along dorsal margin; venter of forewing yellowish brown to brown, except for subhumeral white area. Hindwing usually yellowish brown to cream dorsally and ventrally; cilia from cream to pale yellowish brown, occasionally white. Legs white to cream; foreleg light brown to gray laterally and dorsally; midleg with tarsomeres 2–4 occasionally banded with gray dorsally.

**Abdomen:** Yellowish brown to cream dorsally; cream ventrally.

**Male Genitalia:** Figures 382–384. Socii a pair of short, setose lobes widely separated by a distance  $\sim 0.75\times$  length of cucullar lobe; excavation between socii shallow to deep, varying from triangular to more or less trapezoidal. Tegumen a narrow, dorsal band. Vinculum broad, narrowing to variable, slightly truncate, rounded, or sometimes subacute anterior margin. Gnathos broad at base, constricted near middle to form elongate, variably furcate, caudal lobe; length of division varies from near middle of lobe to almost to base and nearly forming two completely separate lobes; furcations also varying in degree of divergence and in angle of dorsal curvature; anterior margin of gnathos usually sinuate, with small to moderately deep median excavation and with narrow, slightly arched, basal fold well separated from base. Valva with relatively large cucullar lobe,  $\sim 0.45\times$  length of genital capsule, bearing elongate pectinifer, consisting of about 46–48 blunt spines; pedicel relatively broad,  $\sim 0.3\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.8\times$  length of genital capsule; sacculus lobe gradually tapering to slender, narrowly rounded, setose apex; basal process of valva short, relatively stout, tapering to acute apex; costal process of valva elongate, slightly exceeding length of basal process, straight, well sclerotized, and gradually narrowing to acute apex. Juxta often reduced to a small caudally directed projection from inner margin of vinculum.

**Female Genitalia:** Figures 482, 483. Apex of abdomen setose, appearing acute but minutely clefted. Each posterior apophysis fused  $\sim 3/4$  its length, slender, elongate, with acute apex. Papillae anales bilobed, consisting of a pair of small, rounded, setose lobes on a narrow, elliptical base; length of lobes  $\sim$  equal to width. Vestibulum moderately broad, membranous. Ductus bursae gradually enlarging to corpus bursae; inner walls densely covered with pectinations consisting of usually 5–10 minute spicules arranged in transverse rows; pectinations continuing into caudal 1/5 of corpus bursae at separation of ductus spermathecae. Corpus bursae relatively large, elliptical; transverse rows of minute spicules gradually changing to shorter rows of longer spicules and finally to even longer, solitary spines over much of corpus bursae; spines then becoming more sparse and reduced at extreme anterior end; a faint, U-shaped band of minute, external tubercles extending over anterior half of corpus bursae. Ductus spermathecae  $\sim 0.8\times$  length of bursa copulatrix; proximal half of membranous outer canal broad, saccate; distal half of outer canal slender and indistinct; inner canal slightly sinuous, with  $\sim 3\text{--}4$  moderately large, distal convolutions; vesicle consisting of 2, elongate, tubular lobes with larger lobe  $\sim 2\text{--}3\times$  length of shorter lobe.

LARVA AND PUPA. Unknown.

TYPES. Holotype [lost], *P. quadristrigella* (Chambers).—sex ?; KENTUCKY: Edmonson (not Edmondson [sic]) Co.: Camp Bee Spring, early July. Neotype, *P. quadristrigella* (Chambers).—♂; (present designation): NORTH CAROLINA: Jackson Co.: Balsam: 19 Jul 1911, Annette F. Braun, slide USNM 33134 (USNM). Syntypes [lost], *P. accessoriella* (Frey and Boll).—sex ?; TEXAS: Dallas, Boll.

MATERIAL EXAMINED. USA: ARKANSAS: Washington Co.: Devil's Den State Park: 1 ♂, 11 Apr 1966, 1 ♂, 16 Apr 1966, 1 ♂, 23 Apr 1966, 1 ♀, 25 Apr 1966, 1 ♀, 30 May 1966, 1 ♂, 19 Jun 1966, 1 ♂, 3 Jul 1966, R. W. Hodges, slides USNM 17176, 17190, 17191, 17208 (USNM). DISTRICT OF COLUMBIA: Washington: 1 ♀, May 1902, 1 ♂, Jun, 1 ♂, Jun 1902, 1 ♂, 10 Jun 1905, 1 ♂, 11 Jun 1905, 1 ♂, Aug 1900, A. Busck, C. R. Ely, slides DRD 4346, USNM 33117, 33119, 33120 (LACM, USNM). MAINE: Aroostook Co.: Ashland: 1 ♂, 29 Jul (USNM). Somerset Co.: Dennistown: 2 ♂, 25 Jul, 3 ♂, 1 ♀, 1 UNK, 6 Aug, 4 ♂, 1 ♀, 8 Aug (USNM). NORTH CAROLINA: Jackson Co.: Balsam: 11 ♂, 4 ♀, 4 UNK, [no date], slides USNM 33113, 33114; 1 ♂ (neotype), 19 Jul 1911, Annette F. Braun, slide USNM 33134 (USNM), 6 ♀, 1 UNK, 19 Jul 1911, A. F. Braun, slides USNM 32498, 33135, 33136, 33137, 33138 (USNM). Macon Co.: Highlands: 1 ♂, 19 Jul 1973, R. W. Hodges, slide USNM 33139 (USNM). OKLAHOMA: Murray Co.: 1 km W Turner Falls, Arbuckle Mts.: 1 ♂, 28 Jun–2 Jul 1984, D. & M. Davis (USNM). Sequoyah Co.: 2 mi [3.2 km] NW Blackgum, Lake Tenkiller: 1 ♂, 2 ♀, 11–14 Jun 1981, D. & M. Davis, slides USNM 32495, 32496 (USNM). PENNSYLVANIA: Allegheny Co.: Oak Station: 1 ♂, 21 Jun 1911, 1 ♂, 1 UNK, 5 Jul 1911, 8 ♂, 2 ♀, 4 UNK, 8 Jul 1911, F. Marloff, slides USNM 17171, 17189, 33065, 33067, 33069 (LACM, USNM). Pittsburgh: 1 ♂, 12 Jun 1906, 1 ♂, 1 ♀, 17 Jun 1906, 1 ♂, 23 Jul 1906, 1 ♂, 26 Jun 1906, H. Eigel (USNM). SOUTH DAKOTA: Lawrence Co.: Hardy Work Camp, T3N, R1E, S30: 1 ♂, 21 Jul 1965, R. W. Hodges, slide USNM 32497 (USNM). TENNESSEE: Blount Co.: Cades Cove, Abrams Creek Bridge, west side of road: 1 ♂, 21 Jul 2004, J. Rota, slide USNM 33109 (USNM). TEXAS: Fort Bend Co.: Brazos Bend State Park: 1 ♂, 3 Aug 1985, E. C. Knudson, slide DRD 4149 (TLS). Hardin Co.: Big Thicket Nature Preserve, Headquarters, Turkey Creek Unit: 1 ♂, 15–16 Apr 1994, E. C. Knudson, slide DRD 4309 (TLS). Harris Co.: Spring Valley: 1 ♂, 16 Apr 1995, E. C. Knudson, slide USNM 33293, DNA DRD# 202 (USNM). Tyler Co.: Big Thicket Nature Preserve, Turkey Creek: 1 ♂, 22–23 Oct 1993, E. C. Knudson (TLS). VIR-

GINIA: Alexandria Co.: Holmes Run, Falls Church: 1 ♂, 18 Jun 1961, W. W. Wirth, slide USNM 17185 (USNM).

HOST. Unknown.

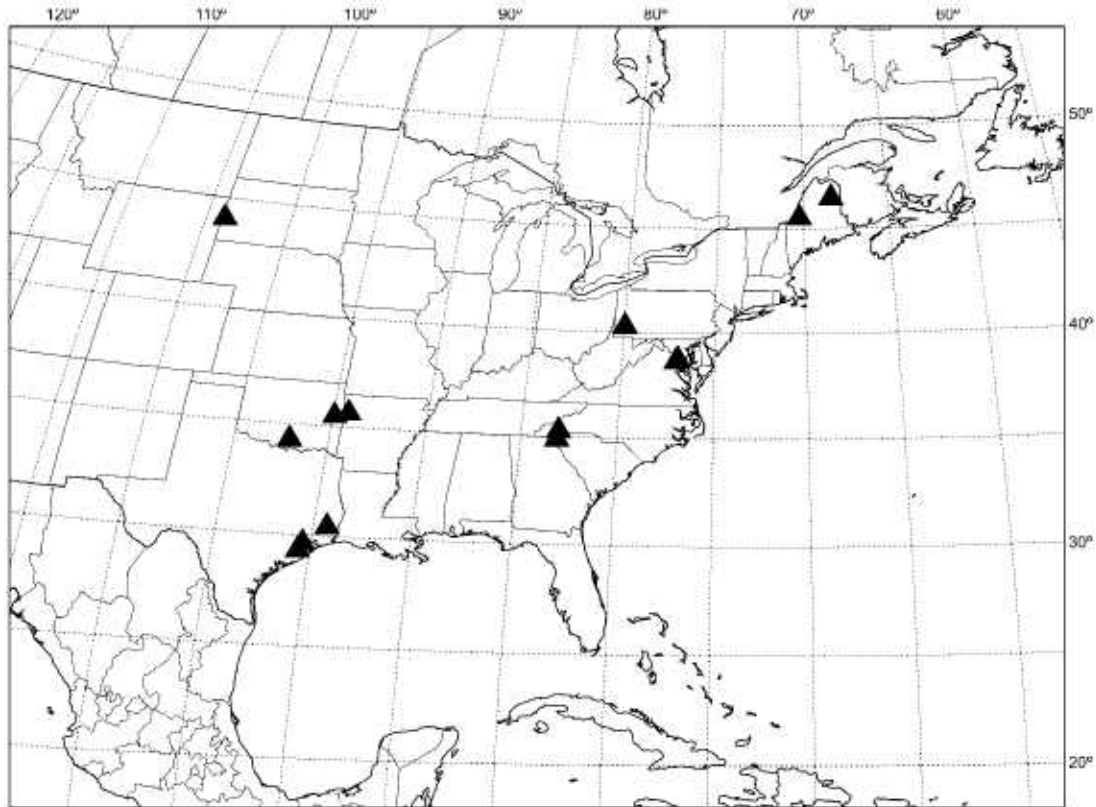
FLIGHT PERIOD. May to August, with adults tending to fly earlier along the southern USA and later in the north.

DISTRIBUTION. (Map 16) Widespread within the USA from Maine west to South Dakota and south to Texas.

DISCUSSION. The wing pattern of *P. quadristrigella* appears as variable as any species examined within this genus. A melanic form has also been documented by Eyer (1966). No correlation between pattern variation and geographic distribution has been observed. Furthermore, within-population variation sometimes encompasses most of the pattern variation observed over the species' entire range. Superficially *quadristrigella* may be easily confused with *P. albogaleriella*, and the female genitalia are also somewhat similar in possessing a dense scattering of minute spines over much of the internal surface of the corpus bursae. Males of the two species are distinguished by the variably furcate caudal lobe of the gnathos in *quadristrigella*, compared to the spatulate form typical of *albogaleriella*. Females of *quadristrigella* differ slightly from *albogaleriella* in possessing an even more extensive distribution of minute spines internally within the bursa. As discussed under *P. albogaleriella*, preliminary CO1 comparisons indicate these two species to be more closely related than considered in this report.

Chambers originally described *Opostega quadristrigella* from a single specimen collected at light at Camp Bee Spring, Edmonson County, Kentucky. A thorough search of the collections at the Museum of Comparative Zoology, Harvard University, where Chambers' collection now resides, failed to reveal any specimen associated with this name. Because of the morphological variability of this species as well as the absence of a type specimen upon which to base comparisons, we have encountered and corrected frequent misidentifications of *P. quadristrigella* in the material examined. To stabilize the application of this troublesome name, we have designated a neotype from Balsam, North Carolina, a locality approximately 260 air miles [~420 km] southeast of Chambers' original site. Balsam is surrounded predominantly by broadleaf Appalachian oak forest, whereas the Kentucky type locality lies in a more mixed, grassland/eastern deciduous forest habitat. The neotype was selected from a large series of this species, which Annette Braun had collected in July 1911.

*Pseudopostega accessoriella* was described from an unspecified number "einigen wenigen Stücken" of specimens



MAP 16. Distribution of *Pseudopostega quadristrigella* (*divaricata* species group).

collected by Jacob Boll in Dallas, Texas. The present deposition of this material is unknown and presumed lost.

### ***Pseudopostega bidorsalis*, new species**

FIGURES 219, 385, 386, 484–486; MAP 15

**ADULT.** Figure 219. Length of forewing 2.5–3.0 mm. Small, mostly white moth with white forewings marked by a large, dark brown dorsal spot extending most of the length of hind margin, a pair of brown, subapical costal strigulae, a pair of faint, short, brown, tornal strigula, and a small, elongate, dark brown apical spot. Male gnathos with broad, short, slightly arched basal fold and deeply divided caudal lobe (Figure 385). Papillae anales of female minutely bilobed, with nearly sessile to moderately stalked base; lobes short (Figures 485, 486).

**Head:** Vestiture white. Scape white; flagellum light golden brown, 53–56-segmented. Palpi white; labial palpus with suffusion of brown dorsally.

**Thorax:** White; tegula with light brown suffusion on anterior margin. Forewing white marked by a large,

dark brown dorsal spot extending most the length of hind margin, 2–3 dark brown, subapical costal strigulae, a pair of faint, short, dark brown, tornal strigulae, and a small, elongate, dark brown apical spot; strigula 1 faint, short, absent in most specimens examined; strigula 2 merging apically with elongate dark brown apical spot and then continuing a short distance caudally as a tornal strigula; strigula 3 curving distad around apical spot; terminal and dorsal cilia white to brown; venter of forewing light brown, with basal, subhumeral white area. Hindwing and cilia brown dorsally and ventrally. Legs mostly white; foreleg with dorsal surfaces partially suffused with light brown; tarsomeres of all legs partially suffused with light brown dorsally.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 385, 386. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim 0.5\times$  length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broadly rounded; anterior margin slightly truncate. Base of gnathos broadly triangular; basal fold narrow, anterior margin slightly concave; gnathos abruptly narrows caudally to a deeply furcate caudal lobe;

lobe divided nearly to base. Valva with an elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 37$  blunt spines; distal apex of cucullar lobe slightly extended as a short, setose lobe; pedicel moderately broad,  $\sim 0.13\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe elongate, tapering to narrow, rounded, setose apex; basal process of valva tapering to acute apex, approximately equal to length of costal lobe. Juxta a slender, elongate, median rod.

**Female Genitalia:** Figures 484–486. Abdomen tapering to slender, cleft apex. Each posterior apophysis divided nearly half its length before fusion; fused portion relatively short. Papillae anales minutely bilobed, with nearly sessile to moderately stalked base; lobes short, bearing  $\sim 6$ – $7$  elongate setae. Vestibulum moderately narrow, membranous. Ductus bursae gradually enlarging anteriorly, densely lined with pectinations comprised usually of 2–4 spicules arranged in short, transverse rows; pectinations gradually terminating along one side of caudal end of corpus bursae. Corpus bursae elongate, elliptical, gradually narrowing to ductus; a narrow, faint, elliptical band of tubercular outgrowths extending most the length of corpus. Ductus spermathecae elongate,  $\sim 0.6\times$  length of bursa copulatrix; membranous outer canal short, slender; inner canal sinuate, terminating in 4–5 convolutions; vesicle composed of an abruptly enlarged, tightly coiled lobe.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, L/17/474, 50–150 m: 24 Sep 1998, INBio-OET, slide DRD 4337 (INBIO).

**PARATYPES.** COSTA RICA: CARTAGO: Turrialba, 600 m: 1 ♀, Jun 1972, V. O. Becker, 36930 (VOB). HEREDIA: Estación Biológica La Selva, 50–150 m, L/17/474: 1 ♀, 24 Sep 1998, INBio-OET, slide USNM 33098 (USNM); L/12/481: 1 ♀, 6 Oct 1998, INBio-OET, slide: DRD 4332 (INBIO); Lab area, L006: 1 ♀, 10–17 Jan 1993, INBio-OET, slide DRD 4338 (INBIO). GUANACASTE: Estación Cacao, Lado SO Volcán Cacao, P. N. Guanacaste, 1000–1400 m: 1 ♀, Aug 1990; 1 ♂, 1 ♀, 23 Oct–9 Nov 1990, C. Chaves, slides DRD 4339, USNM 32447, 33096, (INBIO, USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from August to October and January.

**DISTRIBUTION.** (Map 15) Known only from northern Costa Rica.

**ETYMOLOGY.** The species name refers to two major morphological characters of this moth, which are derived from the Latin *bi* (two, double) in reference to the

bifurcate apex of the male gnathos, and *dorsualis* (*dorsalis*) (of the back) in reference to the prominent forewing dorsal spot.

**DISCUSSION.** The forewing pattern of *P. bidorsalis* superficially resembles that of *P. colognatha* and *latifurcata latifurcata* from the West Indies and the Costa Rican *P. dorsalis dorsalis*. All species are easily distinguished on the basis of male genital characters, with the gnathi of *colognatha* and *dorsalis* possessing a simple, acute caudal lobe and that of *latifurcata* being more narrow with a dorsally reflexed caudal lobe. The deeply furcate male gnathos of *bidorsalis* most resembles that of a few other members of the *divaricata* group, particularly *P. quadristrigella* from North America, but the forewings of the latter lack the enlarged dorsal spot of *bidorsalis*. The female papillae anales within *bidorsalis* vary noticeably in width but are consistently minutely bilobed.

### ***Pseudopostega divaricata*, new species**

FIGURES 220, 387, 388, 487, 488; MAP 15

**ADULT.** Figure 220. Length of forewing 3.5–4.8 mm. Small, mostly white moth with white forewings variably marked with a usually large, relatively suffused, faint to light brown spot sometimes obliquely oriented across middle of wing, 2 light to dark brown, subapical costal strigulae, a similarly suffused, light brown area basal to first strigula, and a small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to a strongly divergent, furcate, caudal lobe (Figure 387). Papillae anales of female bilobed; lobes short, broadly round, densely setose (Figure 488).

**Head:** Vestiture white. Scape white; flagellum light golden brown, 62–70-segmented. Palpi cream; labial palpus with suffusion of dark brown dorsally.

**Thorax:** White; tegula with suffusion of dark brown on anterior margin. Forewing white, variably marked with a usually large, relatively suffused, faint to light brown spot, typically obliquely oriented across middle of wing, occasionally absent; 2 light to dark brown, subapical costal strigulae present; strigula 1 brown, fading caudally into large, suffused, light brown spot near middle of wing apex before dark brown to fuscous apical spot, sometimes continuing caudally as a short, faint, brown, tornal strigula; strigula 2 usually curving around apical spot to tornus; terminal and dorsal cilia mostly white, sometimes with brownish suffusion along basal and apical margins of strigula 2; cilia along basal half of dorsal margin brown; venter of forewing brown with basal, subhumeral white area. Hindwing and



cilia brown dorsally and ventrally. Legs mostly cream; foreleg with dorsal surfaces heavily suffused with dark brown; tarsi of mid- and hindlegs often banded with brown dorsally, especially on terminal segments.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 387, 388. Socii a pair of relatively long, rounded to subacute, setose lobes widely separated by a distance  $\sim 0.66\times$  length of cucullar lobe; caudal rim of uncus shallowly to moderately deeply concave. Vinculum broad, tapering to narrowly truncate to slightly concave anterior margin. Base of gnathos broad, abruptly narrowing posteriorly to moderately stout, caudal lobe with widely divergent, moderately recurved, furcate arms; anterior margin of gnathos slightly concave, with broad, short, slightly arched basal fold (Figure 387). Valva with an elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 41\text{--}48$  relatively elongate, slender, blunt spines; terminal apex of cucullar lobe extended slightly as a narrowly rounded, setose lobe; pedicel moderately elongate, stout, approximately  $0.25\text{--}0.3\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe moderately slender, tapering to rounded apex; basal process of valva tapering to acute apex that extends to inner anterior margin of vinculum, exceeding length of costal lobe. Juxta a slender projection from vinculum.

**Female Genitalia:** Figures 487, 488. Apex of abdomen densely setose, appearing rounded but minutely cleft. Each posterior apophysis fused most its length, short, relatively stout, length  $\sim 1.5\times$  maximum width of papillae anales, slender. Papillae anales bilobed; lobes short, length  $\sim$  equal to width, broadly rounded, densely setose, arising from narrow, triangular base. Vestibulum broad, membranous. Ductus bursae with pectinations consisting of transverse rows of usually 2–6 blunt, minute spicules; pectinations continue as dense field well into ductus bursae. Corpus bursae moderately large, elongate, length  $\sim$  equal to length of ductus spermathecae; a faint, oval band of relatively large, irregularly shaped, external tubercles extending most the length of bursa. Ductus spermathecae nearly as long as corpus bursae, emerging from ductus spermathecae via an enlarged, membranous, saccular outer canal; elongate inner canal terminating in approximately 4 small convolutions; vesicle a relatively complex, divided tube, with longer branch tightly coiled.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ARGENTINA: JUJUY: 3 km NE Caimancito, 23 km ENE Calilegua, sta. 18, 500 m: 26 Nov 1995, Neth. Ent. Exp. N.Arg., slides DRD 4136 (RMNH).

**PARATYPES.** ARGENTINA: JUJUY: 3 km NE Caimancito, 23 km ENE Calilegua, sta. 18, 500 m: 4 ♂, 1 ♀, 26 Nov 1995, Neth. Ent. Exp. N. Arg., slides DRD 4137, USNM 32457, 32458 (RMNH USNM). SALTA: 2 km NW Campo Quijano, 31 km WSW Salta, sta. 58, 1600 m: 1 ♀, 30 Jan 1996, Neth. Ent. Exp. N. Arg., slide DRD 4153 (RMNH).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in January and November.

**DISTRIBUTION.** (Map 15) Known only from northern Argentina.

**ETYMOLOGY.** The species name is derived from the Latin *divaricatus* (spread apart) in reference to the greatly divergent, furcate apex of the male gnathos.

**DISCUSSION.** The male of *P. divaricata* is distinguished from all other *Pseudopostega* by the widely divergent, moderately recurved, caudal lobes and broad, smoothly triangular base of the gnathos.

### The *latifurcata* group

The male gnathos within the members of the *latifurcata* group is morphologically similar in being relatively narrow with a bifurcate caudal lobe, without a basal fold, and with a pair of slender, lateral folds. The valva possesses a prominent saccular lobe, and the length of the entire sacculus ranges from approximately  $0.5\times$  to nearly  $0.8\times$  the length of the genital capsule. The vinculum is broad, with a subtruncate to slightly sinuate anterior margin. Usually some vestige of a rod-like juxta is evident.

### *Pseudopostega contigua*, new species

FIGURES 221, 389, 390; MAP 17

**ADULT.** Figure 221. Length of forewing 2.0 mm. Small, mostly white moth with white forewings marked with a small, dark brown spot at basal third of dorsal margin, 3–4 dark brown, subapical costal strigulae, a dark brown tornal strigula, and a small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to a short, furcate apex, the branches of which lie closely parallel; basal fold divided into a lateral pair of narrow, longitudinal, parallel folds (Figures 389, 390). Female unknown.

**Head:** Vestiture white. Scape white; flagellum cream to light golden brown dorsally, cream to white ventrally, 51-segmented. Palpi white to cream; labial palpus with light brown suffusion over dorsolateral margins; apical segment mostly cream.

**Thorax:** White; tegula with brown suffusion on anterior margin. Forewing white with a small, dark brown spot at basal third of dorsal margin and 3–4 dark brown, subapical costal strigulae; strigulae 1 and 2 closely parallel, terminating near pale yellowish suffusion immediately basal to dark brown to fuscous apical spot; strigula 3 either continuous and curving around apical spot to tornus, or broken to form a short strigula terminating above apical spot and a fourth strigula extending around apical spot to tornus; tornal strigula brown, extending obliquely caudad from apical spot; terminal cilia mostly white between strigulae and along dorsal margin, lightly suffused with pale brown beyond strigula 3–4; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white; foreleg with dorsal surfaces suffused with light brown; tarsomeres mostly white, with slight dorsal brown banding; midleg white with tarsomeres 3–5 brown dorsally; banding paler, more reduced on tarsomeres 2–5 of hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 389, 390. Socii a pair of relatively small, rounded, setose, lobes widely separated by a distance  $\sim 0.7\times$  length of cucullar lobe; caudal rim of uncus smoothly concave. Vinculum broad, tapering to relatively narrow, slightly concave anterior margin. Base of gnathos narrow, moderately swollen laterally, gradually tapering to slender dorsally recurved caudal lobe; apical third of lobe furcate, with short, closely aligned arms (Figure 389); anterior margin of gnathos with moderately deep, inverted V-shaped, median indentation; basal fold separated medially into a pair of very narrow, longitudinally aligned, lateral folds. Valva with elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 28$  blunt spines; terminal apex of cucullar lobe extended slightly as short, rounded, setose lobe; pedicel relatively slender,  $\sim 0.13\times$  length of cucullar lobe; valva short, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe moderately elongate, tapering to narrowly rounded, setose apex; basal process of valva tapering to acute apex, exceeding length of slender costal lobe by nearly half its length. Juxta vestigial as a slender, median rod-like extension from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; VENEZUELA: TERRITORIO FEDERAL DE AMAZONAS: San Carlos de Río Negro,  $1^{\circ}56'N$ ,  $67^{\circ}03'W$ : 13–17 Dec 1984, R. L. Brown, slide USNM 32426 (USNM).

**PARATYPE.** VENEZUELA: TERRITORIO FEDERAL DE AMAZONAS: San Carlos de Río Negro: 1 ♂, 6–12 Dec 1984, R. L. Brown, slide USNM 32822 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** December.

**DISTRIBUTION.** (Map 17) Known only from the type locality from riparian forest along the Rio Negro of southern Venezuela.

**ETYMOLOGY.** The species name is derived from the Latin *contiguus* (near, adjacent) in reference to the paired, contiguous, apical lobes of the male gnathos.

**DISCUSSION.** Although differing significantly from *P. latifurcata* in the form of the caudal lobes of the male gnathos, other similarities within the male genitalia suggest a close relationship between *P. contigua* and *latifurcata*. In particular are the relative narrow base of the gnathos, similar development of the lateral fold, and absence of a basal fold. The forewing pattern of *contigua* differs markedly from both subspecies of *latifurcata* in being mostly white except for the subapical strigulae and minute dorsal spot.

***Pseudopostega latifurcata latifurcata*,  
new species**

FIGURES 222, 223, 391–393, 489, 490; MAP 17

**ADULT.** Figures 222, 223. Length of forewing 2.6–3.0 mm. Small white moth with forewings bearing a large, dark fuscous, dorsal spot that extends over most of wing, a strongly oblique subapical costal spot, and 2 slender, subapical costal strigulae. Gnathos of male genitalia broadly furcate; basal fold narrow, directed caudally and widely separated midventrally, resembling a pair of thickened, lateral rods (Figures 391–393). Papillae anales of female fused to form a single, minute, tuberculate, setose lobe (Figure 490).

**Head:** Vestiture white except for narrow band of pale brown to light fuscous at caudal margin of occiput. Scape white, with fuscous suffusion along anterior edge. Flagellum pale golden brown,  $\sim 62$ – $66$ -segmented. Maxillary palpus white to cream; labial palpus white, with fuscous suffusion laterally.

**Thorax:** White; anterior margin of tegula fuscous. Forewing white, with a large dark fuscous dorsal spot that extends most the length of dorsal margin and nearly across wing to costa; a moderately large, elongate, subapical costal spot, broadest at costa, then narrowing as it extends obliquely to strigulate apical spot; 2 slender, subapical costal strigulae, separated by bands of pale grayish scales, converging from costa to apical spot; area immediately basal to terminal strigula suffused with pale brown; a short, fuscous tornal strigula usually evident below apical strigula;

terminal cilia mostly fuscous beyond strigula 2, becoming abruptly white beyond first strigula, then continuing as pale golden brown to dorsal margin; venter of forewing grayish brown, except for large patch of white over basal half of discal cell. Hindwing and cilia pale brown to gray both dorsally and ventrally. Legs mostly cream; foreleg with lateral margins of tibia and tarsus grayish brown; midleg with apices of tarsal segments grayish brown.

**Abdomen:** Gray dorsally, gradually fading to white laterally and ventrally.

**Male Genitalia:** Figures 391–393. Socii reduced to short, round, setose lobes relatively narrowly separated by a distance approximately equal to basal width of gnathos. Caudal rim of uncus smoothly concave. Vinculum broad; anterior margin subtruncate. Gnathos moderately narrow at base, tapering slightly to broad, deeply furcate, caudal lobe; anterior margin of gnathos weakly defined, concave; basal fold narrow, directed caudally and widely separated mid-ventrally, resembling a pair of thickened, lateral rods. Valva with relatively large cucullar lobe  $\sim 0.55\times$  length of genital capsule, bearing a pectinifer consisting of a single, caudal row of 34–38 blunt spines; distal apex of lobe smoothly round; pedicel slender, width  $\sim 0.14\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.95\times$  length of genital capsule; sacculus lobe moderately stout, subacute, extending to pedicel; basal process of valva elongate, acuminate, exceeding length of costal process. Juxta undeveloped.

**Female Genitalia:** Figures 489, 490. Abdomen tapering to slender, subacute, setose apex. Each posterior apophysis fused most its length, slender, elongate. Papillae anales fused to form a single, minute, short, tuberculate lobe (Figure 490) bearing  $\sim 10$  elongate setae, the longest seta  $\sim 0.3\text{--}0.4\times$  length of posterior apophyses. Vestibulum relatively broad, membranous, without spicules. Ductus bursae long and slender, with a moderately dense zone of transverse rows of 1–4 minute, blunt spicules largely concentrated along one side the entire length of ductus. Corpus bursae moderately expanded, broadly oval, with an indistinct, irregular U-shaped band bearing numerous, relatively stout, external tubercles partially encircling most the length of bursae (Figure 489). Spermathecal duct  $\sim 0.66\times$  length of bursae copulatrix; membranous outer canal narrow, short, largely fused to bursae; inner canal long, sinuous, terminating in  $\sim 1\text{--}2$  convolutions and irregularly curved, tubular vesicle.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; PUERTO RICO: Cayey, 450 m, 2 Aug 1987, V. O. Becker, slide USNM 32752 (USNM).

**PARATYPES.** BRITISH VIRGIN ISLANDS: Tortola Island, Mt. Sage National Park, 480 m: 1 ♀, 7–8 Jul 1985, S. Miller et al. (USNM); 11 ♂, 9 ♀, 13–15 Jul 1987,

V. O. Becker & S. Miller, slides USNM 31843, 32753 (USNM, VOB); 1 ♀, 22–24 Jul 1986, S. Miller & M. Pogue (USNM). DOMINICA: Cabrit Swamp: 1 UNK, 18 Jun 1964, O. S. Flint (USNM). Springfield Estate: 1 ♂, 20–26 Jul 1963, O. S. Flint, slide USNM 32473 (USNM). PUERTO RICO: Carite, 500 m: 1 ♂, 17 Aug 1987, V. O. Becker (USNM). Cayey, 450 m: 3 ♂, 1 ♀, 2 Aug 1987, V. O. Becker (USNM). Patillas, 590 m: 2 ♂, 7 ♀, Aug 1987, V. O. Becker, slides USNM 31937, 32472 (USNM). U.S. VIRGIN ISLANDS: ST. THOMAS, 300 m: 2 ♂, 1 ♀, 25–30 Jul 1987, V. O. Becker, slide USNM 31936 (USNM, VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from June to August.

**DISTRIBUTION.** (Map 17) WEST INDIES: Puerto Rico, Virgin Islands, Dominica.

**ETYMOLOGY.** The specific name is derived from the Latin *latus* (broad) and *furcatus* (forked), as suggested by the broadly furcate gnathos diagnostic for this species.

**DISCUSSION.** An interesting parallel has evolved between this species and *P. dorsalis*. Both species possess a nominate form that is characterized by forewings consistently marked by a large dorsal spot, and a subspecies possessing identical male genitalia but with a distinct fasciate wing pattern. The distinction is clearer in *P. latifurcata* in that the two subspecies are allopatric, with *latifurcata latifurcata* occurring in the West Indies and *latifurcata apoclina* known only from Costa Rica. Other than similar forewing patterns, the two species complexes are not closely related, based on strikingly dissimilar male genital morphology.

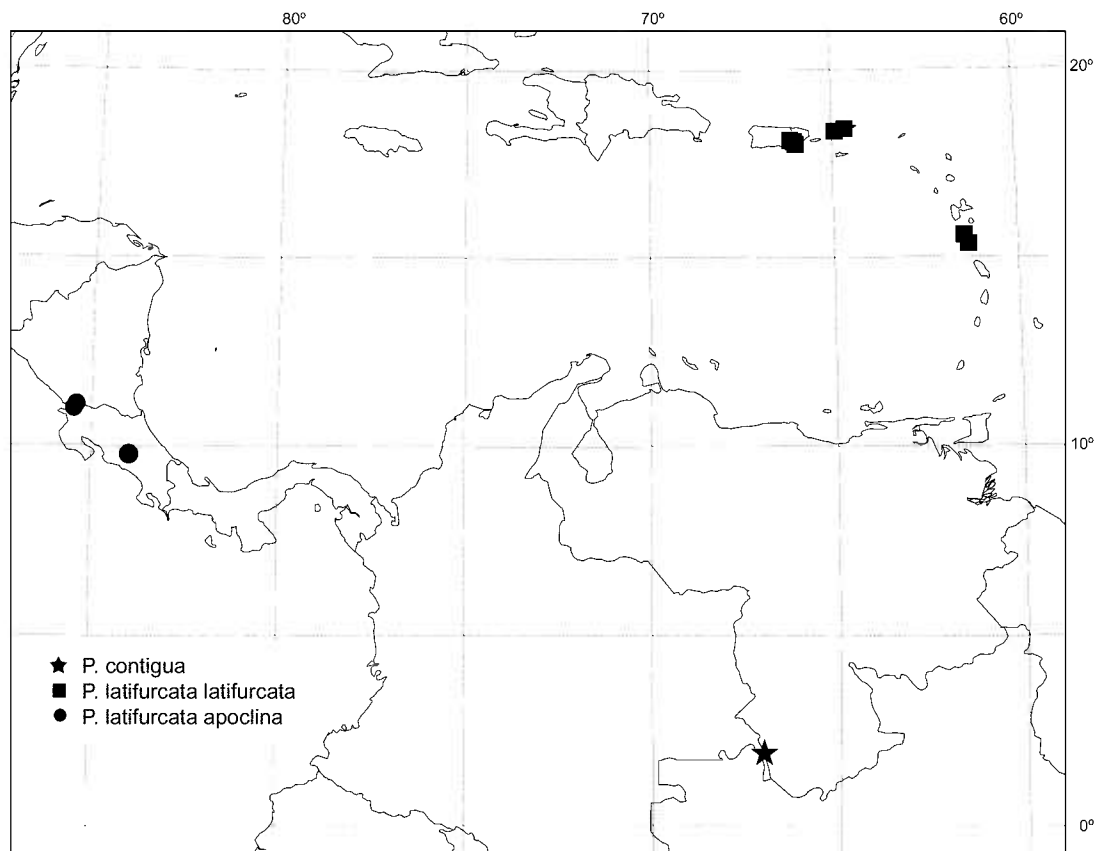
### ***Pseudopostega latifurcata apoclina*, new subspecies**

FIGURE 224; MAP 17

**ADULT.** Figure 224. Length of forewing 2.5–2.8 mm. Small white moth with forewings marked by a dark fuscous, oblique fascia from basal fourth of dorsal margin to middle of costa, and 3, fuscous, subapical costal strigulae. Gnathos of male genitalia broadly furcate as in *P. latifurcata latifurcata*. Female similar to *P. latifurcata latifurcata*.

**Head:** Vestiture white. Scape white; flagellum pale golden brown,  $\sim 58\text{--}61$ -segmented. Maxillary palpus white; labial palpus white, with fuscous suffusion laterally.

**Thorax:** White; anterior margin of tegula with brownish suffusion. Forewing white, with a dark fuscous, oblique fascia from basal fourth of dorsal margin to middle



MAP 17. Distribution of New World *Pseudopostega latifurcata* species group.

of costa; fascia broadest along dorsal margin, sometimes not reaching costa; 3 subapical, fuscous costal strigulae present; strigula 1 short, nearly parallel to costa; second strigula reaching minute black apical spot and continuing past spot as a short tornal strigula; strigula 3 extending distally around apical spot; terminal cilia mostly dull white, with small streak of white scales distad to apical spot; dorsal fringe brown; venter of forewing brown, except for large patch of white over basal half of discal cell. Hindwing and cilia pale brown to gray both dorsally and ventrally. Legs mostly white to cream; foreleg with lateral margins of tibia and tarsus suffused with dark brown; midleg with apices of tarsomeres 1–3 fuscous.

**Abdomen:** Light golden brown dorsally, white to cream laterally and ventrally.

**Male Genitalia:** Similar to *P. latifurcata latifurcata*.

**Female Genitalia:** Believed similar to *P. latifurcata latifurcata* (identity of female examined uncertain).

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, 700 m: Aug 1992, P. Rios, slide DRD 4245 (INBIO).

**PARATYPES.** COSTA RICA: CARTAGO: Parque Nacional Tapanti, 1650 m: 1 ♂, 27 Apr 2005, K. Nishida, light sheet, slide USNM 33213 (USNM). GUANACASTE: Estación Pitilla, 9 km S Santa Cecilia, 700 m: 1 ♂, 31 Mar–15 Apr 1992, P. Rios, slide USNM 33023 (USNM).

**MATERIAL EXAMINED.** COSTA RICA: Estación Maritza, Lado O Volcán Orosí, 600 m: 1 ♀, Jul 1990, I curso Microlepidopterologia, slide DRD 4329 (INBIO).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected in January, March, April, July, and August.

**DISTRIBUTION.** (Map 17) Known only from Costa Rica at elevations from 50 to 1650 m.

**ETYMOLOGY.** The subspecific name is derived from the Greek *apoklines* (leaning, sloping) in reference to the dark brown fascia extending obliquely across the forewing.

**DISCUSSION.** As discussed under the nominate subspecies, *P. latifurcata apoclina* is morphologically identical to *latifurcata latifurcata* except in forewing pattern.

The nominate subspecies possesses a large dorsal spot over much of the forewing and is restricted to the West Indies, in contrast to the obliquely fasciate pattern in the Costa Rican *latifurcata apoclina*. This subspecies is represented by only three male specimens and one female, which has not been included within the type series because its identity remains somewhat questionable.

Because of low sequence recovery of the CO1 gene, resolution of the genetic relationship of *P. latifurcata apoclina* (only 397 bp sequenced) and *latifurcata latifurcata* (504 bp) was inconclusive.

### The *brachybasis* group

This group is similar to the *divaricata* group in the variable development of a bifurcate apex of the gnathos. The base of the gnathos within the *brachybasis* group, however, is broader and more quadrate in outline with usually lobiform lateral expansions. In some species (e.g., *P. protomochla*), the lateral lobe is clearly separated from the gnathos, but morphologically may be derived from that tergite. A basal fold may be either absent or poorly to moderately developed. The length of the sacculus ranges from 0.45× to nearly 0.7× the length of the genital capsule. The vinculum varies from V- to broadly U-shaped and usually extends far forward of the base of the valvae. The juxta is either present or absent. Although sequence data (>500 base pairs for CO1) was obtained for only three members of this group (*P. beckeri*, *protomochla*, and *venticola*), these data grouped the three species together as a well-defined clade, with *beckeri* and *protomochla* more closely allied to each other than to *venticola*.

### *Pseudopostega latiapicula*, new species

FIGURES 225, 394, 395; MAP 18

**ADULT.** Figure 225. Length of forewing 2.4 mm. Small, mostly white moth with white forewings marked with 3 dark brown, subapical costal strigulae, and a dark brown to fuscous apical spot. Male with caudal lobe of gnathos broadly expanded, subtruncate; basal fold well developed, broadly arched (Figure 394). Female unknown.

**Head:** Vestiture white. Scape white; flagellum golden brown dorsally, cream ventrally, 45-segmented. Palpi white to cream; labial palpus with dark brown suffusion laterally and dorsally.

**Thorax:** White; anterior margin of tegula light brown. Forewing almost entirely white with 3 dark brown, costal strigulae and a dark brown apical spot; strigulae 1 and 2 narrowly separated, slightly convergent; 2 fading just

before apical spot; 3 curving slightly around apical spot then fading at tornus; ternal strigula not evident; a very faint, light brown dorsal spot at basal third of dorsal margin; terminal cilia mostly light brown, white between strigulae; venter of forewing brown except for basal white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white; foreleg with dorsal surfaces suffused with light brown, paler on tarsomeres; midleg with dark brown bands dorsally on tarsomeres 3 and 4; tarsal banding paler, more diffuse on hindleg.

**Abdomen:** Light golden brown dorsally, white ventrally.

**Male Genitalia:** Figures 394, 395. Socii a pair of moderately small, rounded, setose lobes, widely separated by a distance ~0.5× length of cucullar lobe; caudal rim of uncus shallowly concave. Vinculum broad; anterior margin ~ rounded to subtruncate. Gnathos broad across base, with laterally expanded lobes, then abruptly constricted to form slender caudal lobe that terminates in a broad, slightly lobed apex; anterior margin truncate, with basal fold well developed, broadly arched, ~0.3× length of entire gnathos, and slightly separated from main body of gnathos (Figure 394). Valva with elongate cucullar lobe ~0.5× length of entire genital capsule, bearing a pectinifer consisting of single row of 35–37 blunt spines; distal apex of cucullar lobe not extended, rounded; pedicel slender at base, flaring to join cucullar lobe where it is nearly 0.3× length of lobe; valva elongate, length along sacculus ~0.7× length of entire genital capsule, saccular lobe tapering to slender, rounded apex, extending beyond apex of pedicel; basal process of valva tapering to acute base, approximately equaling length of slender costal lobe. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, 50–150 m, Bosque secundario, L/18/321, 24 Feb 1998, INBio-OET, slide DRD 4212 (INBio).

**PARATYPES.** BRAZIL: PARANÁ: Capitaio Poco: 2 ♂, 25–31 Jan 1984, V. O. Becker, slide DRD 4226 (VOB). COSTA RICA: HEREDIA: Estación Biológica La Selva, Puerto Viejo de Sarapiquí, 50–150 m, L/07/322: 1 ♂, 25 Feb 1998, INBio-OET, slide USNM 31798 (USNM); L/11/444: 1 ♂, 13 Aug 1998, INBio-OET, slide DRD 4292 (INBio); L/14/296: 1 ♂, 22 Jan 1998, INBio-OET, slide DRD 4271 (INBio); L/15/306: 1 ♂, 3 Feb 1998, INBio-OET, slide DRD 4276 (INBio).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in January, February, and August.

**DISTRIBUTION.** (Map 18) Known from two disjunct localities, the La Selva Biological Station of north-eastern Costa Rica and the state of Paraná in northeastern Brazil.

**ETYMOLOGY.** The species name is derived from the Latin *latus* (broad, wide) and *apiculus* (little top, apex), in reference to the broad apex of the caudal lobe of the male gnathos.

**DISCUSSION.** The male gnathos of this species resembles that of *P. ecuadoriana* in possessing a laterally expanded base and an elongate caudal lobe terminating in a broadly expanded apex. The gnathos of *latiopicula* differs in the larger basal fold, truncate anterior margin, and in having larger, more lobiform lateral expansions. The sacculus of *latiopicula* is also relatively longer (length  $\sim 0.65\times$  length of the genital capsule) than in *ecuadoriana*. The hindwing of *latiopicula* differs from *ecuadoriana* in being slightly darker and more brown. The gnathos of *latiopicula* is also similar in form to that of *P. spatulata* and *albogaleriella*, but differs in possessing a broader base with laterally expanded lobes and a more well developed basal fold.

### ***Pseudopostega ecuadoriana*, new species**

FIGURES 226, 396, 397; MAP 18

**ADULT.** Figure 226. Length of forewing 3.3 mm. Small white moth with an almost immaculate forewing pattern, marked only by 2 faint brown, subapical costal strigulae and a very small, black, apical spot. Male with apex of gnathos shortly bifid, and with narrow truncate vinculum, and short valvae; basal fold short, strongly arched at middle (Figure 396). Female unknown.

**Head:** Vestiture white. Scape white; flagellum cream,  $\sim 52$ -segmented. Maxillary and labial palpi white.

**Thorax:** Entirely white. Forewing white, almost immaculate except for 2 light brown, subapical costal strigulae and a very small, black, apical spot; both strigulae terminating near apical spot; terminal cilia cream to very light brown; venter of forewing pale ochre brown except for basal, discal cream area. Hindwing and cilia pale ochreous brown. Legs mostly cream; foreleg fuscous over lateral and dorsal surfaces.

**Abdomen:** Pale brown dorsally, cream ventrally.

**Male Genitalia:** Figures 396, 397. Socii a pair of moderately small, rounded, setose lobes, separated by a distance  $\sim$  equal to length of cucullar lobe. Caudal rim of uncus nearly truncate. Vinculum gradually narrowing to truncate anterior margin. Gnathos broad, width approximately equaling distance between lateral margins of socii, abruptly

constricting to moderately stout, elongate, caudal lobe; apex of lobe broadly expanded and slightly bifid; anterior margin of gnathos smoothly concave, with small, arched, basal fold (Figure 396). Valva with relatively small cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer of about 38 short, blunt spines; distal apex of cucullar lobe with minute projection; pedicel elliptical, moderately slender, width  $\sim 0.15\times$  length of cucullar lobe; valva short, length along sacculus  $\sim 0.5\times$  length of genital capsule; saccular lobe short and triangular; basal process of valva short, gradually tapering to narrowly triangular base; costal process of valva slender and elongate, terminating near anterior margin of vinculum near basal process of valva. Juxta absent.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; ECUADOR: NAPO: SE Tena, nr. Rio Napo, Jatun Sacha, and Misahualli,  $77^{\circ}36'W$ ,  $01^{\circ}04'S$ , 400–500 m: 26–31 Jan 2000, Amazon premon-tane tropical forest, R. Puplesis & S. Hill, slide AD 0438 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** January (unique record).

**DISTRIBUTION.** (Map 18) Known only from the type locality, an Amazonian premontane rainforest in east-central Ecuador.

**ETYMOLOGY.** The species name is derived from the country of origin, Ecuador.

**DISCUSSION.** The male gnathos of this species closely resembles that of *P. latiopicula* in the structure of the caudal lobe but differs in possessing less lobiform, basal, lateral expansions and a less developed basal fold that is strongly concave. The sacculus of *ecuadoriana* is relatively shorter ( $\sim 0.45\times$  the length of the genital capsule) than that of *latiopicula* and possesses a much larger saccular lobe. The wings of *ecuadoriana* are generally lighter in color and with less pattern than observed in *latiopicula*. Because of the lack of specimens, however, the extent of color variation in these species is unknown.

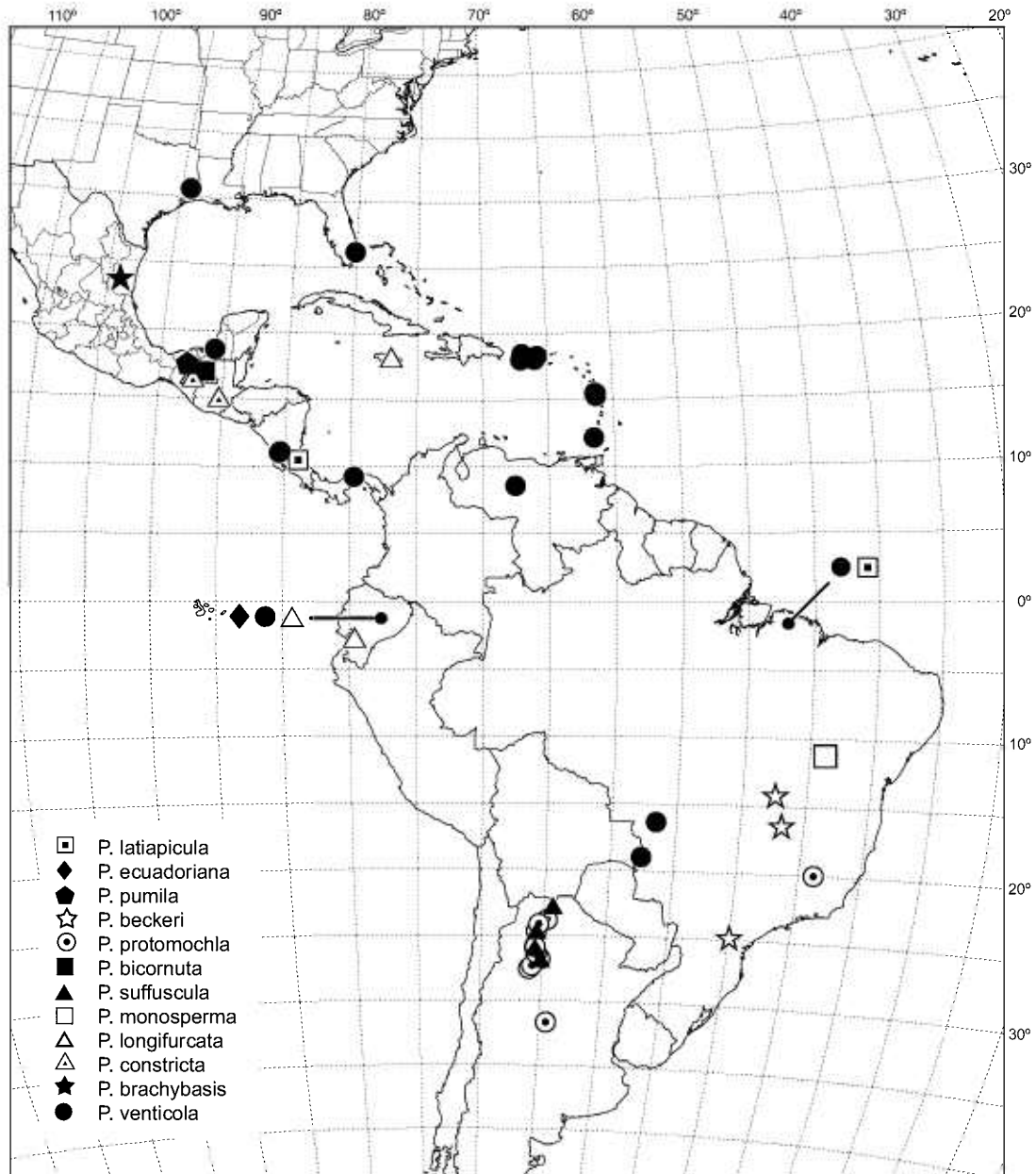
### ***Pseudopostega pumila* (Walsingham)**

FIGURES 227, 398, 399; MAP 18

*Opostega pumila* Walsingham, 1914:350.—Davis, 1984:18.

*Pseudopostega pumila* (Walsingham).—Davis, 1989:77.—Puplesis and Diškus, 2003:418.

**ADULT.** Figure 227. Length of forewing  $\sim 3.2$  mm. Small white moth with 3 golden brown, subapical costal strigulae and a fuscous apical spot near apex of forewing.



MAP 18. Distribution of New World *Pseudopostega brachybasis* species group.

Male gnathos with stout caudal lobe terminating in a broadly bilobed apex; basal fold absent (Figure 398). Female unknown.

**Head:** Vestiture white. Scape white; flagellum ochreous cream dorsally, whitish cream ventrally, ~56-segmented. Palpi whitish cream.

**Thorax:** White. Forewing white, with very light brownish scales suffused over wing and visible from a certain viewing angle; subapical region of forewing marked with 3 golden brown, subapical costal strigulae; first strigula

extending obliquely across wing well before small, fuscous, apical spot; strigula 2 parallel to 1 but shorter and fading to yellowish area before apical spot; strigula 3 short, fading above apical spot, then interrupted above spot before continuing around spot to tornus; terminal cilia cream, otherwise white; venter of forewing yellowish brown. Hindwing whitish cream dorsally and yellowish brown ventrally, except for cream white area at basal 1/6; cilia cream to ochreous cream. Legs ochreous cream with brownish suffusion on tarsi of mid- and hindlegs.

**Abdomen:** Ochreous cream dorsally, lustrous cream ventrally.

**Male Genitalia:** Figures 398, 399. Socii a pair of slender, setose lobes moderately widely separated by a distance  $\sim 0.35\times$  length of cucullar lobe; caudal margin of uncus rather deeply concave. Tegumen narrow. Vinculum broad, with anterior margin rounded. Gnathos broad at base, consisting of a broad, oval plate that constricts abruptly to form a moderately stout, elongate, caudal lobe terminating in a broadly bilobed apex which curves slightly dorsally; basal fold absent. Valva with elongate cucullar lobe  $\sim 0.45\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 38\text{--}40$  blunt spines; outer apex of cucullar lobe slightly extended, rounded, and setose; Valva moderately long,  $\sim 0.65\times$  length of genital capsule; saccular lobe broad, irregularly rounded; basal process of valva relatively short, acute; costal process of valva well sclerotized and equal in length to basal process. Juxta undeveloped.

FEMALE, LARVA AND PUPA. Unknown.

**HOLOTYPE.** ♂; MEXICO: TABASCO: Teapa, Mar 1918, H. H. Smith, Gdm. Slv. 66772, BMNH slide 29631 (BMNH).

**MATERIAL EXAMINED.** Holotype ♂.

**HOST.** Unknown.

**FLIGHT PERIOD.** March (unique record).

**DISTRIBUTION.** (Map 18) Known only from the type locality in southern Mexico.

**DISCUSSION.** This species is represented only by the male holotype, which is in good condition. The caudal lobe of the male gnathos in *P. pumila* superficially resembles that of some species of the *divaricata* species group (e.g., *P. concava*, also from Mexico). The gnathi in the latter group, however, do not possess the lateral, lobate expansion present in *pumila* and in other members of the *brachybasis* group. The gnathos of *pumila* differs from that of *latiapicula* and *ecuadoriana* in having the apical lobe more divided and in lacking a basal fold.

### ***Pseudopostega beckeri*, new species**

FIGURES 228, 400, 401; MAP 18

**ADULT.** Figure 228. Length of forewing 3.7–4.4 mm. Small, mostly white moth with white forewings marked with a diffuse, dark brown, oblique fascia traversing approximate middle of wing, 2 brown, subapical costal strigulae, a short, brown ternal strigula, and a small, dark brown to nearly black apical spot. Male gnathos with apex of caudal lobe deeply forked almost to base of lobe; basal fold absent (Figure 400). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 74-segmented. Palpi cream; labial palpus with dark brown suffusion laterally.

**Thorax:** White; tegula with dark brown spot on anterior margin. Forewing white with a diffuse dark brown, oblique fascia traversing approximate middle of wing; fascia variable, constricted to incomplete in middle; 2 brown, subapical costal strigulae present; basal strigula converging toward a small, dark brown to nearly black apical spot; area immediately basal to apical spot suffused with light golden brown scales; strigula 2 curving distally around apical spot, partially interrupted near spot; a faint, brown ternal strigula extending a short distance down from apical spot; terminal and dorsal cilia mostly white to cream; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally except for white suffusion at base. Legs mostly white to cream; foreleg with dorsal surfaces suffused with dark brown; mid- and hindlegs with tarsomeres irrorated and ringed with dark brown.

**Abdomen:** Basal 1/4 light golden brown, distal 3/4 dark brown dorsally and ventrally except for midventral cream streak and cream over last 2 sternites.

**Male Genitalia:** Figures 400, 401. Socii a pair of relatively small, rounded, setose, lobes widely separated by a distance  $\sim 0.5\times$  length of cucullar lobe; caudal rim of uncus deeply concave; concavity V-shaped. Vinculum broad, tapering to V-shaped, subacute anterior margin. Base of gnathos broad, with lateral, lobate expansions, narrowing slightly to form broad, deeply furcate caudal lobe; arms of lobe straight, directed slightly dorsad; anterior margin of gnathos slightly sinuate, without basal fold. Valva with elongate cucullar lobe  $\sim 0.4\times$  length of genital capsule; bearing a pectinifer consisting of  $\sim 43\text{--}44$  blunt spines; distal apex of cucullar lobe rounded, not extended; pedicel broad, width  $\sim 0.3\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.55\times$  length of genital capsule; saccular lobe moderately broad, tapering slightly to rounded, setose apex; basal process of valva relatively short, tapering to acute apex, approximately equal to costal process in length. Juxta undeveloped.

FEMALE, LARVA AND PUPA. Unknown.

**HOLOTYPE.** ♂; BRAZIL: GOIAS: Alto Paraiso, 1400 m: 1–6 Nov 1996, V. O. Becker, slide DRD 4218 (VOB).

**PARATYPE.** BRAZIL: MINAS GERAIS: Unaí, 700 m: 1 ♂, 7 Nov 1982, V. O. Becker (USNM). PARANÁ: Castro, S. Brazil: 1 ♂, 1896, Jones (67712), slide BMNH 29648 (BMNH).

**HOST.** Unknown.



**FLIGHT PERIOD.** November.

**DISTRIBUTION.** (Map 18) Known from the states of Goiás, Minas Gerais, and Parana in south-central Brazil.

**ETYMOLOGY.** We are pleased to name this species in honor of Dr. Vitor O. Becker, who collected a major portion of the new material upon which this revision is based.

**DISCUSSION.** The forewing pattern of this species is similar to that of *P. protomochla* in possessing a variable, partially broken, distally curved, brownish fascia across the middle of the wing. The fascia is more well preserved in *beckeri*, and may be nearly absent in some specimens of *protomochla*. The male gnathos of *beckeri* differs in possessing lobiform expansions laterally and stouter, less divergent caudal furcations.

### ***Pseudopostega protomochla* (Meyrick)**

FIGURES 229, 402–404, 491, 492; MAP 18

*Opostega protomochla* Meyrick, 1935:567.—Clarke, 1955:261.—Davis, 1984:18.

*Pseudopostega protomochla* (Meyrick).—Davis, 1989:77.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 229. Length of forewing 3.5–5.0 mm. Small white moth with variably preserved, light to dark brown costal, discal, and dorsal spots, 3 brown, subapical costal strigulae, 1 brown tornal strigula, and a small, fuscous apical spot present. Male gnathos broad with deeply furcate caudal lobe; basal fold absent (Figure 404). Female with a single, fused anal papilla (Figure 492).

**Head:** Vestiture white. Scape white; flagellum light golden brown dorsally, cream ventrally, 59–66-segmented. Palpi mostly white to whitish cream; labial palpus often with light brown suffusion dorsally.

**Thorax:** White. Forewing white, occasionally with suffusion of pale cream white, with a variably preserved, never completely developed, >-shaped, light to dark brown fascia across distal two-thirds of wing; usually only oblique costal and dorsal spots present, less frequently a variably diffused discal spot present; sometimes forewing immaculate except for 3 brown, subapical costal strigulae and 1 brown, tornal strigula, and a small, dark brown to fuscous apical spot; a faint, suffused brown to yellowish area sometimes present before apical spot; strigulae 1 and 2 fading before apical spot; strigula 3 usually faint, fading above spot, sometimes complete and curving sharply distally around

spot; cilia mostly white, light brown beyond strigula 3; venter of forewing whitish cream. Hindwing white; cilia whitish cream. Legs mostly white to whitish cream; foreleg with light brown suffusion dorsally.

**Abdomen:** Usually light golden brown dorsally, sometimes darker brown; cream white ventrally.

**Male Genitalia:** Figures 402–404. Socii a pair of moderately long, setose lobes, widely separated by a distance 1.2× length of cucullar lobe; caudal rim of uncus deeply excavate, V-shaped, well sclerotized, with a pair of broad, nearly contiguous lobes arising from caudal margin. Tegumen moderately broad to middorsal junction. Vinculum broad, gradually tapering to narrowly rounded, anterior margin. Gnathos with central portion broadly rounded ventrally and moderately expanded laterally; a small, oval sclerite present immediately lateral to base; anterior margin convex, without basal fold; gnathos abruptly constricted to form deeply furcate, caudal lobe; lobe divided nearly to base, slightly curved dorsally (Figures 403, 404). Valva with large cucullar lobe ~0.35× length of genital capsule, bearing elongate pectinifer consisting of ~56 blunt spines; distal apex rounded, not extended; pedicel tapering to relatively narrow junction with cucullar lobe; valva elongate, ~0.65× length of genital capsule; saccular lobe relatively broad, elongate, with broadly rounded, setose apex; basal process relatively short, tapering to acute apex; costal process of valva well sclerotized, elongate, exceeding length of basal lobe. Juxta undeveloped.

**Female Genitalia:** Figure 491, 492. Apex of abdomen minutely bilobed, bearing long setae. Scale follicles of sternum 8 relatively broad, caudally furcate (Figure 491). Each posterior apophysis fused most its length, slender, elongate, ~3.6× length of anal papilla. Papillae anales fused into a single, relatively prominent lobe bearing ~10–12 setae 1–3× as long as papilla; base of lobe supported by slender, sinuate bar connecting caudal apices of apophyses. Vestibulum with small oval concentration of minute spicules located at junction with ductus bursae; spicules arranged in short, transverse rows of ~2–5 spines each. Ductus bursae slender, largely membranous except for spicules at junction with vestibulum. Corpus bursae large, elongate, without spicules, but with irregular, indistinct band bearing numerous, minute, external tubercles encircling much of the length of the bursa. Ductus spermathecae half as long as bursa copulatrix; membranous outer canal moderately slender, arising from junction of ductus bursae with corpus bursae; inner canal long, with about 4–5 tightly spiraled convolutions terminating in a very slender, elongate, straight, tubular lagena and membranous utriculus.

**LARVA AND PUPA.** Unknown.

**LECTOTYPE.** (Designated by Davis, 1989) ♂; ARGENTINA: CÓRDOBA: Alta Gracia, Feb [19]34, C. Bruch, slide BMNH 23665 (BMNH).

**MATERIAL EXAMINED.** ARGENTINA: CATAMARCA: 5 km N Aconquija, 18 km ENE Andalgal, sta. 21, 1000 m: 1 ♂, 4 Dec 1995, Neth. Ent. Exp. N-Arg. (RMNH). JUJUY: Parque Nacional Calilegua, Mirador, sta. 14, 800 m: 1 ♂, 20 Nov 1995, Neth. Ent. Exp. N-Arg. (RMNH). Yala, 15 km NW San Salvador de Jujuy, sta. 11, 1500 m: 1 UNK, 13 Nov 1995, Neth. Ent. Exp. N-Arg. (RMNH). CÓRDOBA: Alta Gracia: 1 ♂ (lectotype), Feb [19]34, slide 23665; 5 ♂ (paralectotypes), 1 ♀ (identity questionable), Feb [19]34, slide 28722 (BMNH). SALTA: Parque Nacional El Rey, 100 km NE Metán, sta. 19, 890 m: 1 ♂, 27–28 Nov 1995, Neth. Ent. Exp. N-Arg. (RMNH). Quebrada del Toro, 3 km N Puente del Toro, 33 km W Salta, sta. 40, 1700 m: 5 ♀, 10 Jan 1996, Neth. Ent. Exp. N-Arg. (RMNH). Quebrada del Toro, 6 km NW Campo Quijano, 30 km W Salta, sta. 41, 1650 m: 3 ♀, 11 Jan 1996, Neth. Ent. Exp. N-Arg. (USNM). TUCUMÁN: 11 km S Tacanas, 28 km WSW Trancas, sta. 13, 800 m: 3 ♀, 15 Nov 1995, Neth. Ent. Exp. N-Arg. (RMNH); sta. 28, 800 m: 14 ♂, 17 ♀, 16–17 Dec 1995, Neth. Ent. Exp. N-Arg., slides DRD 4138, USNM 32455, 32456, 32470 (RMNH, USNM). Cochuna, 34 km WNW Aguilares, sta. 20, 1000 m: 1 ♀, 2 Dec 1995, Neth. Ent. Exp. N-Arg. (RMNH). San Javier, 16 km WNW Tucumán, sta. 29, 1010 m: 1 ♀, 18 Dec 1995, Neth. Ent. Exp. N-Arg. (RMNH). Siambón: 1 ♂, R. Schreiter (USNM). Tucumán: 1 ♂, R. Schreiter (USNM). BRAZIL: MINAS GERAIS: Nova Lima, 850 m: 1 ♂, 8 Oct 1985, V. O. Becker, slide USNM 31800 (VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults have been collected from November to February in Argentina and in October in Brazil.

**DISTRIBUTION.** (Map 18) Most records of this relatively common species are from north-central Argentina, with a specimen known from the state of Minas Gerais in southern Brazil.

**DISCUSSION.** The forewing pattern of this species is highly variable, with some specimens similar to *P. beckeri* in possessing at least some indication of a brownish, median fascia across the wing. The base of the male gnathos is moderately expanded laterally, with a bilateral pair of small, oval sclerites immediately lateral to base of gnathos.

The original type series of *P. protomochla* comprised 9 specimens (Meyrick, 1935) of which only 6 males and 1 female remain at the BMNH. The present location of the missing specimens is unknown. Recent collecting now

suggests that the single female ‘paralectotype’ of *protomochla* examined from Alta Gracia is not conspecific with the lectotype. Examination of the large series of male and female *protomochla* in the RMNH from Argentina clearly show a female (Figure 491, 492) that is morphologically distinct from Meyrick’s ‘paralectotype.’ In particular, the female ‘paralectotype’ (Figures 493, 494) differs in possessing a trilobed (with a reduced median papilla) anal papilla (a single enlarged papilla in *protomochla*), and a short, curved vesicle near the termination of the ductus spermathecae (vesicle ~5× longer than the former and mostly straight in *protomochla*). Even the scale follicles of the eighth sternum appear distinct, with those of female *protomochla* being broader and caudally furcate, compared to slender and caudally truncate in the female from Alta Gracia. Although the female genitalia of both species have been illustrated, the foregoing description refers only to what is believed to represent the female of *protomochla* as typified by the females in the RMNH.

### ***Pseudopostega bicornuta*, new species**

FIGURES 230, 405, 406; MAP 18

**ADULT.** Figure 230. Length of forewing 4.6 mm. Small, mostly white moth with white forewings marked with a pair of brown, subapical costal strigulae, a very faint brown, tornal strigula, and a small, dark brown to fuscous apical spot. Male gnathos triangular, gradually tapering to a deeply divided, caudal lobe; basal fold narrow, sharply arched (Figure 405). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 72-segmented. Palpi white; labial palpus with suffusion of brown dorsally and laterally.

**Thorax:** White; tegula with light brown suffusion on anterior margin. Forewing white, marked with a pair of brown, subapical costal strigulae and a very faint brown, tornal strigula; strigula 1 with faint suffusion of very pale, yellowish brown along inner margin, fading just before dark brown to fuscous apical spot, strigula 2 curving around apical spot and terminating near tornus; tornal strigula extending from apical spot to tornus; terminal and dorsal cilia white; venter of forewing light brown, with basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally. Legs mostly white to cream; foreleg with dorsal surfaces partially suffused with light brown; basal, dorsal half of tibia light brown, apical half entirely cream; tarsomeres 1–2 light brown dorsally; remainder of tarsi cream; mid- and hindlegs white to cream.

**Abdomen:** Light golden brown dorsally, cream ventrally.

**Male Genitalia:** Figures 405, 406. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim 0.5\times$  length of cucullar lobe; caudal rim of uncus deeply concave, U-shaped. Vinculum broadly V-shaped; anterior margin slightly concave. Base of gnathos broadly triangular; anterior margin slightly concave; basal fold narrow, sharply arched, with a prominent, acute, median lobe projecting caudad, well separated from base; gnathos gradually narrowing caudally to a pair of slender, acute, caudal lobes directed slightly dorsad. Valva with elongate cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer consisting of 40–41 blunt spines; distal apex of cucullar lobe extended as a rough, narrowly rounded, setose lobe; pedicel broad,  $\sim 0.4\text{--}0.5\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.65\times$  length of genital capsule; sacculus lobe rough, tapering to narrow, setose apex; basal process of valva tapering to acute apex, exceeding length of costal lobe. Juxta undeveloped.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; MEXICO: CHIAPAS: Villa Las Rosas, 1300 m: 27 Jun 1981, V. O. Becker, slide USNM 32258 (USNM).

**HOST.** Unknown.

**FLIGHT PERIOD.** June (unique record).

**DISTRIBUTION.** (Map 18) Known only from the type locality in southern Mexico.

**ETYMOLOGY.** The species name is derived from the Latin *bi* (two) and *cornutus* (horn) in reference to the dorsally curved, furcate apex of the male gnathos.

**DISCUSSION.** The male gnathos of this species resembles that of *P. suffuscula* in the development of a relatively slender, deeply bifurcate caudal lobe. Their genitalia differ in several characters, particularly by the more lobiform, lateral expansion at the base of the gnathos and deeply excavate caudal margin of the uncus in *bicornuta*. The forewing of *bicornuta* differs from that of *suffuscula* in being basically white and not suffused with grayish brown as in the latter.

### ***Pseudopostega suffuscula*, new species**

FIGURES 231, 232, 407, 408; MAP 18

**ADULT.** Figures 231, 232. Length of forewing 2.4–3.0 mm. Small, mostly cream to light brownish moth with cream forewings variably suffused with light grayish brown, marked with 3 dark brown, subapical costal strigulae, 1–2 light to dark brown tornal strigulae, and a small,

dark brown to fuscous apical spot. Male gnathos tapering to a furcate caudal lobe with slender, closely subparallel arms; basal fold extremely slender, arched at middle (Figure 407). Female unknown.

**Head:** Vestiture cream, variably suffused with light brown. Scape white to cream, often suffused with light brown around outer margin; flagellum light golden to dark brown, 40–56-segmented. Palpi white to cream; labial palpus with suffusion of brown dorsally.

**Thorax:** Cream suffused with light brown; tegula cream with brownish suffusion along anterior margin. Forewing cream variably suffused with light grayish brown, with basal third of costal margin edged with brown; 3 brown to dark brown, subapical costal strigulae present; basal strigula strongly oblique, joining a moderately large, suffusion of brown before dark brown to fuscous apical spot; strigula 2 dark brown, less oblique, fading into brown subapical area; strigula 3 usually faint, short, directed caudally to apical spot; first tornal strigula very faint, light brown; tornal strigula 2 dark brown; terminal cilia white to cream becoming light brown at apex around dark apical spot, except for a few white scales immediately surrounding spot; tornal and dorsal cilia light brown; venter of forewing brown with basal, subhumeral white area. Hindwing and cilia brown dorsally and ventrally. Legs mostly cream; foreleg with dorsal surfaces suffused with brown; tibiae and tarsi of mid- and hindlegs mostly cream, variably banded with light to medium brown dorsally.

**Abdomen:** Light golden to dark brown dorsally, light grayish brown suffusion laterally, cream ventrally.

**Male Genitalia:** Figures 407, 408. Socii a pair of moderately large, triangular, setose lobes widely separated by a distance more than  $0.75\times$  length of cucullar lobe; caudal rim of uncus truncate. Vinculum broad; tapering to relatively narrow, slightly concave to subtruncate anterior margin. Base of gnathos broad, abruptly narrowing posteriorly to moderately long, furcate, caudal process consisting of a pair of slender, closely subparallel arms; anterior margin of gnathos concave; basal fold greatly reduced, slender, arched, with margin slightly separated from base (Figures 407, 408). Valva with an elongate cucullar lobe  $\sim 0.4\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 38\text{--}40$  blunt spines; terminal apex of cucullar lobe extended slightly as a tuberculate, rounded lobe; pedicel moderately narrow, width  $\sim 0.15\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.7\times$  length of genital capsule; sacculus lobe moderately long, broad at base, which extends partially behind cucullar lobe, tapering to moderately slender, rounded apex; basal process of valva tapering to acute apex, approximately equal in length to stouter costal lobe. Juxta undeveloped.

FEMALE, LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; ARGENTINA: SALTA: Quebrada del Toro, 6 km NW Campo Quijano, 30 km W Salta, sta. 56, 1650 m, 28 Jan 1996, Neth. Ent. Exp. N-Arg., slide DRD 4139 (RMNH).

PARATYPES. ARGENTINA: SALTA: 5 km NW Aguas Blancas, Finca Yaculika, 53 km NNW Orán, sta. 16, 500 m: 1 ♂, 24 Nov 1995, Neth. Ent. Exp. N-Arg., slide USNM 31800 (USNM). Parque Nacional El Rey, campsite center of park, 100 km NNE Metán, sta. 48, 850 m: 1 ♂, 22–23 Jan 1996, Neth. Ent. Exp. N-Arg. (RMNH). TUCUMÁN: San Javier, 16 km WNW Tucumán, sta. 29, 1010 m: 1 UNK, 18 Dec 1995, Neth. Ent. Exp. N-Arg. (RMNH).

HOST. Unknown.

FLIGHT PERIOD. Adults have been collected from November to January.

DISTRIBUTION. (Map 18) Known only from the provinces of Salta and Tucumán in northern Argentina.

ETYMOLOGY. The species name is derived from the Latin *suffuscus* (brownish) in reference to the characteristic cream to light brownish color of the forewings of this species.

DISCUSSION. The forewing color of this species is somewhat diagnostic in being lightly suffused with cream to light brown. The male gnathos of *suffuscula* is broadly expanded laterally but lacks the lobiform specializations typical of the *brachybasis* species group. For this reason its position within the group, as well as that of *ecuadoriana*, are somewhat questionable. The bifurcate anal lobe of the gnathos in *suffuscula* resembles that of *bicornuta*, which possesses well-developed gnathos lobes.

### ***Pseudopostega monosperma* (Meyrick)**

FIGURES 233, 409; MAP 18

*Opostega monosperma* Meyrick, 1931:162.—Clarke, 1955:210.—Davis, 1984:18.

*Pseudopostega monosperma* (Meyrick).—Davis, 1989:76.—Puplesis and Diškus, 2003:419.

ADULT. Figure 233. Length of forewing 3.6 mm. Small white moth with small, faint light brown spot midway along dorsal margin; black apical spot present; subapical strigulae not evident (partially denuded). Male gnathos with deeply divided, furcate caudal lobe; basal fold undeveloped (Figure 409). Female unknown.

Head: Vestiture white. Scape white; flagellum cream, number of segments unknown (broken). Palpi unknown, probably whitish or cream.

Thorax: White. Forewing white with small, faint, light brown spot midway along dorsal margin; black apical spot present; subapical strigulae not evident; cilia white (partially denuded); venter of forewing not examined. Hindwing and cilia white dorsally and ventrally. Legs generally cream, with light golden suffusion dorsally on femur of foreleg.

Abdomen: White dorsally and ventrally.

Male Genitalia: Figure 409. Socii a pair of narrowly rounded, setose, triangular lobes widely separated by a distance  $\sim 0.8\times$  length of cucullar lobe. Caudal rim of uncus slightly concave, with small median cleft. Tegumen mostly broad dorsally except at middorsal constriction. Vinculum broadly rounded anteriorly. Gnathos of unusual form, relatively narrow basally with median lateral margins expanded to form broad lobes; basal fold undeveloped; gnathos abruptly constricted posteriorly to form a completely divided (bifurcate) caudal lobe; arms of lobe long, slender, straight. Valva with large cucullar lobe  $\sim 0.35\times$  length of genital capsule, bearing elongate pectinifer consisting of a single row of  $\sim 36$  blunt spines; terminal apex of cucullar lobe nearly flush, except for rather prominent tubercle; pedicel relatively slender, width  $\sim 0.1\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.75\times$  length of genital capsule; saccular lobe elongate, extending beyond distal end of cucullar lobe, slightly tapered, broadly rounded; basal process of valva tapering to slender, acuminate apex; costal process of valva well sclerotized, approximately equaling length of basal process. Juxta absent.

FEMALE, LARVA AND PUPA. Unknown.

HOLOTYPE. ♂; BRAZIL: BAHIA: Rio Preto, Baquero: 1 ♂, 1903, Bras. Exped. Penther, slide 4032 (NHMV).

MATERIAL EXAMINED. Holotype ♂.

HOST. Unknown.

FLIGHT PERIOD. Unknown.

DISTRIBUTION. (Map 18) Known only from the type locality in eastern Brazil.

DISCUSSION. This species is represented only by the male holotype, which lacks much of the terminal forewing cilia. The male gnathos is diagnostic in possessing a deeply divided caudal lobe consisting of long, slender, straight furcations, a broad, laterally expanded base, and no basal fold. The valvae are similar to those of *P. beckeri* in being relatively long (length of sacculus  $>0.7\times$  length of genital capsule) with a very stout, elongate saccular lobe.

***Pseudopostega longifurcata*, new species**

FIGURES 234, 235; 410–412; MAP 18

**ADULT.** Figures 234, 235. Length of forewing 2.5–4.0 mm. Small, mostly white moth, typically with almost immaculate forewings, variably marked with a broadly triangular, dark fuscous costal spot at distal third, with or without a highly variable, brownish dorsal spot, a fuscous to black apical spot, and 1–2 brownish, subapical costal strigulae. Male with apex of gnathos deeply furcate; basal fold mostly transverse, narrow (Figure 410). Female unknown.

**Head:** Vestiture white. Scape white. Flagellum light golden brown, 68-segmented. Maxillary palpus cream. Labial palpus white to cream, with brownish suffusion laterally and dorsally.

**Thorax:** White; anterior margin of tegula faintly suffused with brown. Forewing usually predominantly white, variably marked with a broadly triangular, dark fuscous costal spot at distal third, a highly variable, brownish dorsal spot either present (Ecuadorian specimens) or absent (in holotype), a fuscous to black apical spot, and a brown, subapical costal strigula from costal apex to near apical spot; a second brownish subapical strigula (present in Ecuadorian specimens) extending through cilia around apical spot and continuing to tornus; terminal cilia variable, white immediately distad to terminal strigula and then brown apically, white at apex of forewing to tornus, then becoming light brown along dorsal margin; venter of forewing light brown with white patch over base of wing. Hindwing and cilia pale brown both dorsally and ventrally. Legs mostly cream; foreleg missing, but probably with lateral/dorsal suffusion of brown; mid- and hindleg with faint grayish brown bands over tarsomeres.

**Abdomen:** Brown dorsally, white to cream ventrally.

**Male Genitalia:** Figures 410–412. Socii a pair of relatively small, rounded, setose lobes, widely separated by a distance  $\sim 0.7\times$  length of cucullar lobe; caudal margin of uncus deeply concave; a dense concentration of minute spines near middle of tegumen, with largest spines along caudal margin (Figure 412). Vinculum broad, consisting of a narrow ventral ring; anterior margin slightly truncate. Gnathos broadly conical with broad posteriodorsal margin; apex gradually constricted to form deeply furcate caudal lobe; lobes slender, widely divergent, approximately  $0.37\times$  length of entire gnathos; anterior margin slightly concave; basal fold mostly transverse, narrow, approximately  $0.15\times$

length of entire gnathos and slightly separated from larger posterior section. Valva with an elongate cucullar lobe  $\sim 0.5\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 24$  blunt spines; pedicel broad, width nearly  $0.4\times$  length of cucullar lobe; length of valva along sacculus  $\sim 0.85\times$  length of genital capsule; saccular lobe slender, elongate, tapering to elongate, narrow apex bearing 3–4 moderately long setae; basal process of valva attenuate, greatly exceeding length of costal process. Juxta slightly developed.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; JAMAICA: ST. CATHARINE PARISH: Hollymount, Mt. Diablo, 2754 ft [ $\sim 840$  m], 21–24 Apr 1973, UV light trap, D & M. Davis, slide USNM 31842 (USNM).

**PARATYPES.** ECUADOR: GUAYAS: 80 km E Guayaquil, Bucay (=Cumanda), 700 m: 5 ♂, 16–19 Jan 2001, R. Puplesis & S. Hill, slides AD 0460, 0461, 0462 (VPU). Napo: SE of Tena, near Rio Napo, Jatun Sacha, and Misahualli, 400–500 m: 2 ♂, 26–31 Jan 2000, R. Puplesis & S. Hill, slides AD 0458, 0459 (VPU).

**HOST.** Unknown.

**FLIGHT PERIOD.** Adults collected in January (Ecuador) and April (Jamaica).

**DISTRIBUTION.** (Map 18) Known from two widely disjunct regions in the West Indies (Jamaica) and Ecuador.

**ETYMOLOGY.** The species name is derived from the Latin *longus* (long) and *furcatus* (forked), in reference to the deeply furcate apex of the male gnathos.

**DISCUSSION.** Although currently known from only two widely disjunct areas in Jamaica and Ecuador, this species probably occurs over much of the northern Neotropical region. The wing pattern is highly variable between both the Jamaican and Ecuadorian specimens and within the Ecuadorian sample. The Ecuadorian specimens lack the costal spot present in the Jamaican specimen, but possess a dorsal spot that varies from being just visible to extending nearly half the length of the dorsal margin. Males from all populations agree in genital morphology, particularly in the structure of the gnathos and the presence of a dense concentration of minute spines medially on the tegumen (Figure 412).

***Pseudopostega constricta*, new species**

FIGURES 236, 413, 414; MAP 18

**ADULT.** Figure 236. Length of forewing 3.7–5.0 mm. Small, mostly cream white moth with cream white

forewings marked with 3 light to dark brown, subapical costal strigulae, and a very small, dark brown to fuscous apical spot. Male gnathos broad at base, then abruptly constricted to form slender, deeply furcate caudal lobe; basal fold narrow, strongly arched at middle (Figure 413). Female unknown.

**Head:** Vestiture white. Scape white; flagellum light golden brown, 53–79-segmented. Palpi mostly cream; labial palpus with slight dorsal suffusion of light brown at base of each segment.

**Thorax:** Cream white; tegula with dark brown patch on anterior margin. Forewing cream white with basal third of costal margin dark brown; a small, faint brown spot sometimes present at basal third of dorsal margin; 3 light to dark brown, subapical costal strigulae typically present; strigula 1 very faint, light yellowish brown fading well before dark brown to fuscous apical spot; strigula 2 darker, terminating near apical end of 1; strigula 3 sometimes not well preserved, often interrupted, curving around apical spot to tornus; a pale to dark brown tornal strigula extending caudally from apical spot; terminal cilia partially white, often pale yellow between strigulae 1 and 2, light brown anterior to apical spot; dorsal cilia white to light brown; venter of forewing light brown except for basal, subhumeral white area. Hindwing and cilia light brown dorsally and ventrally to almost white ventrally. Legs mostly cream; foreleg with dorsal surfaces suffused with brown; tarsi of mid- and hindlegs usually with light brown banding dorsally.

**Abdomen:** Dark brown dorsally, grayish brown laterally, with moderately narrow cream streak ventrally.

**Male Genitalia:** Figures 413, 414. Socii a pair of small, slender, rounded, setose, lobes widely separated by a distance  $\sim 0.45\times$  length of cucullar lobe; caudal rim of uncus smoothly concave, broadly V-shaped. Vinculum broad, tapering to moderately broad, slightly concave, anterior margin. Base of gnathos broad, with ovoid lateral lobes, abruptly constricted to broadly furcate, dorsally recurved caudal lobe; lobe divided for almost entire length; anterior margin of gnathos with slight median indentation; basal fold narrow, strongly arched at middle (Figure 413). Valva with elongate cucullar lobe  $\sim 0.35\times$  length of genital capsule, bearing a pectinifer consisting of  $\sim 42$  blunt spines; terminal apex of cucullar lobe extended  $\sim 0.2\times$  length of lobe, terminating in a slender, tuberculate, setose lobe; pedicel moderately slender, minimum width  $\sim 0.15\times$  length of cucullar lobe; valva moderately long, length along sacculus  $\sim 0.6\times$  length of genital capsule; saccular lobe moderately stout, elongate, tapering slightly to rounded, setose apex; basal process of valva tapering to acute apex, approximately

equal in length to elongate, slender costal process. Juxta weakly developed as short, slender rod from vinculum.

**FEMALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; MEXICO: CHIAPAS: San Cristobal de las Casas, 2300 m: 23–27 Jun 1981, V. O. Becker, USNM 32802 (USNM).

**PARATYPE.** MEXICO: CHIAPAS: Teopisca, 1900 m: 2 ♂, 23–26 Jun 1981, V. O. Becker, slides USNM 32805, 32826 (USNM, VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** June.

**DISTRIBUTION.** (Map 18) Known only from the state of Chiapas in southern Mexico at elevations from 1900 to 2300 m.

**ETYMOLOGY.** The species name is derived from the Latin *constrictus* (drawn together, contracted) in reference to the strongly constricted male gnathos.

**DISCUSSION.** The male gnathos of this species closely resembles that of another Mexican species, *P. brachybasis*, particularly in the development of a strongly bifurcate, slender, caudal lobe. However, the length of the base of the gnathos is longer and more oval in *constricta*, and the saccular lobe is relatively longer. The wings of these two species differ, with the color of *constricta* being generally paler and more white.

### ***Pseudopostega brachybasis*, new species**

FIGURES 237, 415, 416, 495, 496; MAP 18

**ADULT.** Figure 237. Length of forewing 2.3–2.6 mm. Small, mostly white to pale cream moth with cream white forewings marked with 3 dark to light brown, subapical costal strigulae, 2 light to dark brown tornal strigulae, and a small, dark brown to fuscous apical spot. Base of male gnathos broad, extremely short, abruptly constricted to a deeply furcate, caudal lobe; basal fold transverse, broadly triangular, short (Figure 415). Papillae anales of female minutely bilobed; lobes short and round; corpus bursae covered internally with numerous minute spines (Figures 495, 496).

**Head:** Vestiture white. Scape white; flagellum brown dorsally, cream ventrally, 46–47-segmented. Palpi white; labial palpus with suffusion of dark brown dorsally.

**Thorax:** White; tegula with dark brown suffusion on anterior margin. Forewing white with basal costal margin dark brown; 3 light to dark brown, subapical costal strigulae; strigula 1 moderately broad, light brown, continuing straight and obliquely to join a similar, basal tornal strigula before dark brown to fuscous apical spot;

area between basal strigulae and apical spot suffused with light brown; strigula 2 dark brown, curving slightly down to junction of basal strigulae; strigula 3 usually faint, short, usually fading before apical spot and well separated from short brown, terminal strigula beyond apical spot; terminal cilia mostly cream to light brown, becoming sometimes white around tornus and light brown along dorsal margin; venter of forewing brown with basal, subhumeral white area. Hindwing and cilia brown dorsally and ventrally. Legs mostly cream; foreleg with dorsal surfaces suffused with brown, lighter on tarsus; tarsi of mid- and hindlegs faintly banded dorsally with light brown.

**Abdomen:** Dark brown dorsally, grayish brown laterally, with narrow cream stripe ventrally.

**Male Genitalia:** Figures 415, 416. Socii a pair of small, rounded, setose lobes, widely separated by a distance  $\sim 0.7\times$  length of cucullar lobe; caudal rim of uncus deeply concave. Vinculum broadly rounded. Gnathos broad, extremely short, with well-developed lateral lobes, abruptly constricted to a deeply furcate, caudal lobe; lobe divided to base; anterior margin of gnathos mostly truncate with a shallow median cleft; basal fold mostly transverse, short, broadly triangular (Figure 415). Valva with moderately large cucullar lobe  $\sim 0.3\times$  length of genital capsule, bearing a pectinifer consisting of a single to partially double row of 24–28 blunt spines; distal apex of cucullar lobe moderately extended, slender; pedicel broad,  $\sim 36\times$  length of cucullar lobe; valva elongate, length along sacculus  $\sim 0.65\times$  length of genital capsule; saccular lobe short, tapering to slender, setose apex; basal process of valva tapering to acute base, slightly longer than slender, acute costal lobe. Juxta slightly developed.

**Female Genitalia:** Figures 495, 496. Abdomen tapering to a narrowly rounded, minutely cleft apex. Each posterior apophysis elongate, fused for most of its length. Papillae anales consisting of a pair of minute, broadly rounded lobes (Figure 496); lobes short, length  $\sim 0.7\times$  width, bearing  $\sim 10$ – $12$  moderately long setae. Vestibulum moderately narrow, membranous, with dense concentration of pectinations similar to and continuous with those within caudal end of ductus bursae. Ductus bursae slender, of uniform diameter to corpus bursae; inner walls densely lined with pectinations consisting of  $\sim 3$ – $7$  minute spicules arranged in short, transverse rows; pectinations becoming more sparse anteriorly and terminating caudad of separation of ductus spermathecae. Corpus bursae moderately short, elliptical, enlarging abruptly from ductus bursae; a dense scattering of slender, elongate spines arising from most of inner wall; a faint band of minute, tuberculate outgrowths extending most of length of bursa. Ductus spermathecae elongate,

approximately equaling length of bursa copulatrix; membranous outer canal short, moderately broad near corpus bursae; inner canal terminating in 4–5 convolutions; vesicle composed of a slightly enlarged, moderately elongate, single coiled tube.

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♂; MEXICO: TAMAULIPAS: El Ensino, 250 m: 4–13 Aug 1988, V. O. Becker, slide USNM 32824 (USNM).

**PARATYPES.** MEXICO: TAMAULIPAS: El Ensino, 250 m: 1 ♂, 1 ♀, 4–13 Aug 1988, V. O. Becker, slides USNM 32835, DRD 4223 (USNM, VOB).

**HOST.** Unknown.

**FLIGHT PERIOD.** August.

**DISTRIBUTION.** (Map 18) Known only from the state of Tamaulipas in northeastern Mexico.

**ETYMOLOGY.** The species name is derived from the Greek *brachys* (short) and *basis* (foundation, pedestal), in reference to the extremely short base of the male gnathos.

**DISCUSSION.** This species closely resembles *P. constricta* in genital morphology but may be superficially distinguished by its more cream forewing color and darker strigulae and hindwings. The male of *brachybasis* differs from *constricta* in having a shorter, more compact gnathos base and distinctly shorter saccular lobes on the valvae.

### ***Pseudopostega venticola* (Walsingham)**

FIGURES 238, 239, 417, 418, 497–499; MAP 18

*Opostega venticola* Walsingham, 1897:140.

*Pseudopostega venticola* (Walsingham).—Davis, 1989:77.—Puplesis and Diškus, 2003:417.

**ADULT.** Figures 238, 239. Length of forewing 2.5–3.3 mm. Small white moth; forewings with or without light brown spot approximately midway along dorsal margin; 2 or usually 3 subapical, light brown costal strigulae, a light brown tornal strigula, and a small, dark brown to fuscous apical spot also present. Male genitalia with a pair of semicircular lobes along caudal margin of uncus; gnathos broad with deeply furcate caudal lobe; basal fold undeveloped (Figure 417). Papillae anales of female fused to form a single, rounded to minutely cleft lobe bearing numerous, short to elongate setae (Figures 498, 499).

**Head:** Vestiture white. Scape white; flagellum light golden brown dorsally, cream ventrally, 48–58-segmented.

Palpi white to cream; labial palpus with brown suffusion dorsally.

**Thorax:** White. Forewing white, with or without elongate, light brown spot approximately midway along dorsal margin, occasionally with corresponding spot opposite on costal margin; 2 or usually 3 light to dark brown, subapical costal strigulae present; strigulae 1 and 2 fading into suffused ochreous area immediately basal to small fuscous apical spot; ochreous suffusion occasionally extending between strigulae 1 and 2 almost to costa; strigula 3 also directed toward ochreous area, but curving sharply around apical spot toward tornus; 1–2 light to dark brown tornal strigulae extending from or near apical spot to tornus; cilia mostly white except with light brown suffusion at apex beyond strigula 3; venter of forewing uniformly whitish cream. Hindwing white or grayish white dorsally and ventrally; cilia cream to white. Legs mostly white to cream, with light grayish brown suffusion dorsally on foreleg.

**Abdomen:** Golden brown to cream dorsally, white to cream ventrally.

**Male Genitalia:** Figures 417, 418. Socii a pair of small, rounded, setose lobes widely separated by a distance  $\sim 0.9\times$  length of cucullar lobe; Caudal rim of uncus shallowly to moderately deeply concaved, with a pair of moderately large, triangular to semicircular lobes arising from caudal margin immediately mesad of socii; width of lobes  $\sim 1.5\times$  that of socii. Tegumen moderately broad, constricted middorsally. Vinculum broad, tapering to narrowly rounded anterior margin. Base of gnathos broad, expanded laterally as rounded lobes, with slightly concave anterior margin lacking a basal fold; gnathos abruptly constricted near middle to form a divergent pair of long, slender to moderately stout, caudal lobes; length of lobes  $\sim$  equal to base. Valva with large cucullar lobe bearing elongate pectinifer  $\sim 0.4\times$  length of genital capsule, consisting of 27–40 blunt spines; terminal apex of cucullar lobe slightly extended in a cluster of 4–5 small, tuberculate, setose lobes; pedicel moderately broad; width  $\sim 0.2\text{--}0.35\times$  length of cucullar lobe; valva elongate,  $\sim 0.7\text{--}7.5\times$  length of genital capsule; saccular lobe moderately short to elongate, tapering to narrowly rounded, setose apex; basal process of valva moderately long, tapering to acuminate apex; costal process of valva well sclerotized, slightly shorter than basal process, with bluntly rounded apex. Juxta variable, a short to long, slender, rod-like extension from vinculum.

**Female Genitalia:** Figures 497–499. Abdomen tapering to moderately broad, subacute apex. Each posterior apophysis fused for most its length, slender, elongate. Papillae anales fused to form a single, rounded to minutely cleft lobe bearing numerous, short to elongate setae, the

longest  $1.5\text{--}2.0\times$  width of papilla and  $\sim 0.15\text{--}0.25\times$  length of posterior apophyses; maximum length of anal papilla  $\sim 0.65\text{--}0.75\times$  width (Figures 498, 499). Vestibulum relatively broad, membranous. Ductus bursae similar in width, with two elongate, closely adjacent patches of pectinations containing usually 3–8 spicules per transverse row. Corpus bursae relatively broad, with faint, irregular U-shaped band of numerous, minute, variably shaped, usually broad external tubercles partially encircling most the length of the bursa (Figure 497). Ductus spermathecae  $\sim 0.5\text{--}0.55\times$  length of bursa copulatrix; membranous outer canal short, broad; inner canal long, sinuous, terminating in  $\sim 3\text{--}4$  convolutions; vesicle with sharply curved base and elongate, tubular, terminal lobe.

**LARVA AND PUPA.** Unknown.

**LECTOTYPE.** (Designated by Davis, 1989) ♂; GRENADA: Balthazar (Windward side), 250–300 ft [ $\sim 76\text{--}91$  m], 8 May, H. H. Smith, slide BMNH 29635, Walsingham Collection 65263 (BMNH).

**MATERIAL EXAMINED.** BRAZIL: MATO GROSSO: 60 km S Poconé, Pantanal, 100 m: 1 ♂, 20 Oct 1998, 1 ♂, 1–7 Dec 1997, V. O. Becker, slides DRD 4228, USNM 33127 (USNM, VOB). MATO GROSSO DO SUL: Corumbá, 180 m: 1 ♂, 23–25 Apr 1984, V. O. Becker, slide USNM 31797 (USNM). PARÁ: Capitaço Poco: 1 ♂, 19–22 Nov 1984, V. O. Becker, slide DRD 4236 (VOB). COSTA RICA: GUANACASTE: Estación Maritza, Lado Oeste Volcan Orosí, 600 m: 1 ♂, Jul 1990, I curso Microlep., slide USNM 32768 (USNM). Estación Pitilla, 9 km S Santa Cecilia, 700 m: 1 ♂, Oct 1990, P. Rios & C. Moraga, slide: DRD 4208 (INBIO). DOMINICA: 1 mi [0.63 km] E. Clarke Hall: 5 ♂, 1 ♀, 4 Apr 1965, D. R. Davis (USNM), 2 mi [3.2 km] NW Pont Cassé: 1 ♂, 16 Apr 1965, 1 ♂, 20 Apr 1965, D. R. Davis, slide USNM 32482 (USNM). Clarke Hall: 1 ♂, 10 Mar 1965, 1 ♂, 11 Jan 1965, 6 ♂, 1 ♀, 14 Jan 1965, 1 ♂, 16 Feb 1965, 1 ♂, 18 Feb 1965, 1 ♀, 20 Jan 1965, 2 ♂, 26 Jan 1965, J. F. G. & T. M. Clarke; 2 ♂, 11–20 Jan 1965, 1 ♂, 21–31 Jan 1965, 2 ♂, 8–10 Jan 1965, W. W. Wirth, slides USNM 32729, 32876, 32919 (USNM). Macoucheri: 1 ♂, 12 Feb 1965, J. F. G. & T. M. Clarke (USNM). Soufrière, 500 ft [ $\sim 152$  m]: 1 ♂, 11 Feb 1965, J. F. G. & T. M. Clarke (USNM). South Chiltern: 1 ♂, 25–27 May 1965, D. R. Davis (USNM). Springfield: 1 ♂, 1 Jun 1965, D. R. Davis, slide USNM 32481 (USNM). ECUADOR: NAPO: SE of Tena, near Rio Napo, Jatun Sacha, and Misahualli, 400–500 m: 1 ♂, 26–31 Jan 2001, R. Puplesis & S. Hill, slide AD 0358 (VPU). GRENADA: Balthazar, 250–300 ft [ $\sim 76\text{--}91$  m], windward side: 1 ♂ (lectotype), 8 May, slide BMNH 29635, 1 ♂ (paralectotype), 5–10 May, slide



BMNH 29634, H. H. Smith, Walsingham Collection 65263 (BMNH). MEXICO: CAMPECHE: Escárcega: 1 ♂, slide DRD 4222 (USNM). PANAMA: Cabima: 6 ♂, 4 ♀, May 1911, A. Busck, slides USNM 31841, 31965, 32832 (USNM). PUERTO RICO: El Verde Field Station, Luquillo Exp. Forest, 435 m: 3 ♂, 1 ♀, 1–21 Jan 1971, C. P. Kimball, slide USNM 32741 (USNM). Isla Magueyes, off Parguera, 15 m: 1 ♀, 1–4 Feb 1971, C. P. Kimball (USNM). Maricao Lt.: 4 ♂, Jul 1971, J. Maldonado, slides USNM 32736, 32737, (USNM). Patillas, 590 m: 5 ♂, 2 ♀, Aug 1987, V. O. Becker, slide USNM 31966 (USNM, VOB). Reserva Forestal Guajataca, 360 m: 5 ♂, 1 UNK, 18–28 Mar 1971, 1 ♂, 1 ♀, 1–13 Apr 1971, 2 ♂, 1 UNK, 14–20 Apr 1971, C. P. Kimball, slide USNM 32742 (USNM). USA: FLORIDA: Broward Co.: Royal Palm State Park: 1 ♂, Jan 1930, F. M. Jones, slide USNM 32438 (USNM). TEXAS: Tyler Co.: Big Thicket National Park, Ranch Hs, Turkey Creek, Unit 3: 1 ♂, 4 Jun 1994, E. Knudson, slide USNM 32843 (USNM). VENEZUELA: GUARICO: Hato Masaguaral, 45 km S. Calabozo, 75 m: 1 ♂, 1 UNK, 28–29 Jun 1989, M. Epstein & M. Deza, slide USNM 32967 (USNM).

HOST. Unknown.

FLIGHT PERIOD. Adults have been collected in nearly every month over this species' broad range. No sustained sampling has been conducted in any particular region to assess its relative seasonality.

DISTRIBUTION. (Map 18) This species ranges widely over much of the Neotropical Region from southern Florida and Texas (USA), through much of the West Indies and Central America to southern Brazil.

DISCUSSION. *Pseudopostega venticola* was described from four specimens collected in Grenada and Haiti. Three of the four specimens have been examined during this study, including the male lectotype and paralectotype from Balthazar, Grenada, and one female "paratype" from Port-au-Prince, Haiti. Because the female originates from a different locality and possesses a distinctly different wing pattern (forewing with only a single strigula and no dorsal spot), it was not possible to verify its identity. Consequently, the specimen was excluded from this study. Although the lectotype is without a head, it is otherwise in good condition with the forewing pattern well preserved.

Together with *P. saltatrix*, this species is one of the most widely distributed members within the family. *Pseudopostega venticola* has been found to occur around the Caribbean region from the southern USA to as far south as Brazil. Only minor variation of the male genital morphology was observed, and this mostly involved slight differences in the sacculus lobe of the valva, which may range

from moderately stout to slender. The slender, deeply divided, divergent, caudal lobes and lobiform, lateral expansion of the gnathos, together with the relatively large rounded lobes from the caudal rim of the uncus are diagnostic for the species. Some variation in the form of the papillae anales was observed within females collected at the same locality (Clarke Hall) on the West Indian Island of Dominica (Figures 498, 499).

### Species unplaced to group

Five previously described species cannot be assigned to any of the proposed species groups (based on male genital characters) because they are represented only by female specimens or are missing abdomens (for *P. pontifex*). It is hoped that future collecting will result in discovering males that can be associated with these names.

### *Pseudopostega congruens* (Walsingham)

FIGURES 240, 500; MAP 19

*Opostega congruens* Walsingham, 1914:350.—Davis, 1984:18.

*Pseudopostega congruens* (Walsingham).—Davis, 1989:76.—Puplesis and Diškus, 2003:418.

ADULT. Figure 240. Length of forewing ~4.4 mm. Moderately small brownish moth; forewings with 3 brown to fuscous, subapical costal strigulae, 2 tornal strigulae, and a minute black apical spot. Female with bilobed papillae anales (Figure 500). Male unknown.

Head: Vestiture white with brownish suffusion. Scape white with brownish suffusion; flagellum dark brown, 58-segmented. Palpi yellowish brown with scattered whitish scales.

Thorax: Light grayish brown; tegula darker proximally. Forewing light grayish brown with golden and green iridescence at basal one-third, gradually becoming brown to dark brown with golden and purple iridescence over distal third; 3 fuscous, subapical costal strigulae present; strigulae 1 and 2 converging near black apical spot; strigula 3 interrupted slightly near apical spot; 2 fuscous tornal strigulae present; first tornal strigula fading with first costal strigula before apical spot; second tornal strigula extending from apical spot parallel to first; cilia brown; venter of forewing brown, except for small, elongate dark cream, subhumeral area. Hindwing dark brown dorsally and ventrally; cilia grayish brown. Legs ochreous cream with brown suffusion laterally and dorsally on tarsi and partially on tibiae.

**Abdomen:** Dark brown dorsally, lustrous brownish cream ventrally.

**Female Genitalia:** Figure 500. Apex of abdomen with paired, short, rounded lobes bearing numerous, moderately long setae. Each posterior apophysis fused for most its length, subacute, very slender and long, length  $\sim 3.8\times$  maximum width of papillae anales. Papillae anales bilobed; lobes small, elongate, nearly contiguous, strongly sclerotized and papillose, arising from a common anterior plate. Vestibulum narrow, membranous. Ductus bursae with a dense patch of minute spicules. Corpus bursae large and bulbous; the main body entirely densely covered with pectinate spicules and with faint band of minute, capitate tubercles extending externally most the length of bursa (Figure 500). Ductus spermathecae  $\sim$  equal to bursa copulatrix in length; proximal half of membranous outer canal very broad, bulbous; distal half relatively slender; inner canal slightly sinuous, with  $\sim 2\text{--}3$  relatively large convolutions terminating in an elongate, tubular vesicle.

**MALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♀; MEXICO: GUERRERO: Amula, 6000 ft [ $\sim 1830$  m]: Aug, H. H. Smith, slide BMNH 29641, (BMNH).

**MATERIAL EXAMINED.** Holotype ♀.

**HOST.** Unknown.

**FLIGHT PERIOD.** August (unique record).

**DISTRIBUTION.** (Map 19) Currently known only from the type locality in southwestern Mexico.

**DISCUSSION.** The brownish forewings of this species distinguish it from nearly all other *Pseudopostega*. Because the species is represented only by the holotype, nothing is known regarding possible color variation. The bilobed papillae anales of the female superficially resembles those of *P. albogaleriella*, *P. perdigna*, and *P. texana*, but the presence of a dense concentration of pectinate spicules lining the internal walls of the corpus bursae of *P. congruens* readily distinguishes it from all other species.

### ***Pseudopostega elachista* (Walsingham)**

FIGURES 241, 501; MAP 19

*Opostega elachista* Walsingham, 1914:350.—Davis, 1984:18.

*Pseudopostega elachista* (Walsingham).—Davis, 1989:76.—Puplesis and Diškus, 2003:418.

**ADULT.** Figure 241. Length of forewing 4.4 mm. Moderately small whitish moth; forewings with two brown spots, one located along distal third of costal

margin, the other midway along dorsal margin; also present are 2 brown, subapical costal strigulae, 1 brown tornal strigula, and a small, fuscous, apical spot. Female with a single, fused anal papilla (Figure 501). Male unknown.

**Head:** Vestiture white. Scape white; flagellum yellowish brown, 58-segmented. Maxillary palpus cream with grayish brown suffusion laterally and dorsally; labial palpus grayish cream.

**Thorax:** Cream; tegula white. Forewing white, with two dark spots: a dark brown, triangular costal spot on distal third of costa, and a brownish, irregularly shaped, medial, dorsal spot; 2 brown, subapical costal strigulae with yellowish suffusion along inner margins present; first strigula fading before small, fuscous apical spot; second strigula curving to apical spot, then, with slight interruption, continuing around spot to outer edge of cilia; a single, slender, brown strigula curving around tornus; terminal cilia light brown, becoming ochreous cream on tornus, otherwise whitish cream; venter of forewing light yellowish brown. Hindwing ochreous cream dorsally and ventrally; cilia mostly ochreous, more white distally. Foreleg grayish cream, grayish brown to fuscous on tibia and tarsi; mid- and hindlegs mostly ochreous cream, grayish brown to cream on tarsi.

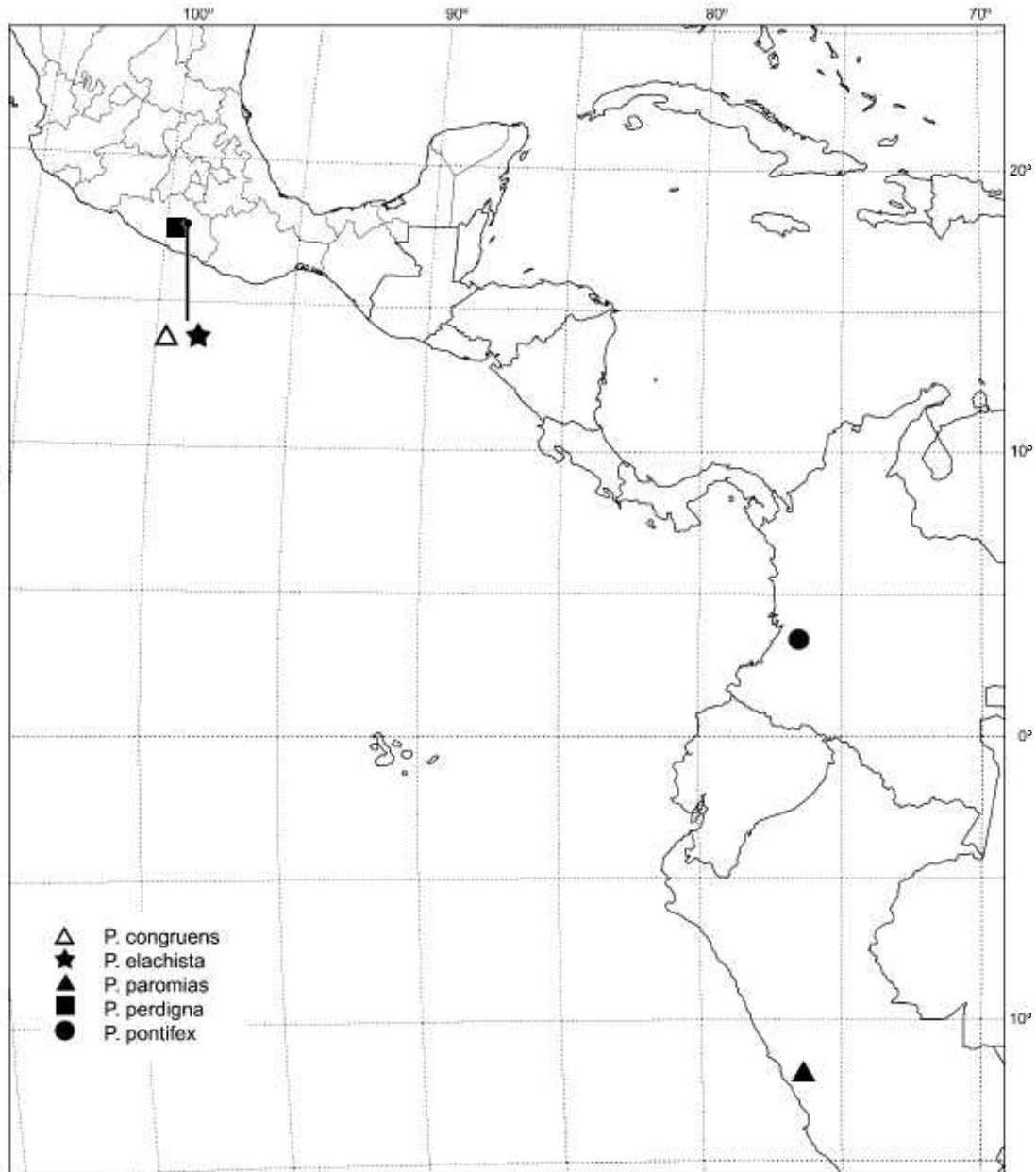
**Abdomen:** Yellowish brown dorsally, lustrous cream ventrally.

**Female Genitalia:** Figure 501. Apex of abdomen gradually narrowing, with shallow cleft, and strongly papillose laterally. Each posterior apophysis fused most of its length, very slender, acute, elongate, length  $\sim 3.5\times$  maximum width of anal papilla. Papillae anales fused into single, trapezoidal, setose lobe with minutely concave apical margin. Vestibulum very narrow, membranous. Ductus bursae with a moderately dense patch of minute, solitary spicules. Corpus bursae large, ovoid, densely covered with minute, pectinate spinules and with faint band of irregularly shaped, external tubercles partially encircling bursa; form of tubercles varying from short and rounded to capitate or bifurcate. Ductus spermathecae equal to bursa copulatrix in length or longer; proximal part of membranous outer canal distinctly rounded; distal  $2/3$  relatively slender; inner canal slightly sinuous, gradually widening distally, with  $\sim 5\text{--}6$  large, heavily sclerotized, compact convolutions and curved, tubular vesicle, terminating in a moderately large, membranous utriculus.

**MALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♀; MEXICO: GUERRERO: Amula, 6000 ft [ $\sim 1830$  m]: Sep 1918, H. H. Smith, Gdm. Slvn 66790, Walsingham Collection, slide BMNH 29642, (BMNH).

**MATERIAL EXAMINED.** Holotype ♀.



MAP 19. Distribution of New World *Pseudopostega* (species group undetermined).

HOST. Unknown.

FLIGHT PERIOD. September (unique record).

DISTRIBUTION. (Map 19) Known only from the type locality in southwestern Mexico.

DISCUSSION. The undivided anal papilla on the female ovipositor of *P. elachista* is similar to that present in the Brazilian *P. acrodicra* and the more widespread *P. venticola*. The corpus bursae of these two species, however, lacks the dense concentration of minute, solitary

spicules that largely cover the internal walls of the corpus bursae of *elachista*.

### ***Pseudopostega paromias* (Meyrick)**

FIGURES 242, 502; MAP 19

*Opostega paromias* Meyrick, 1915:240.—Clarke, 1955:236.—Davis, 1984:18.

*Pseudopostega paromias* (Meyrick).—Davis, 1989:77.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 242. Length of forewing 4.0 mm. Moderately small white moth; forewings marked by large dark brown spot midway along costa, 2 dark brown subapical costal strigulae, 1 brown tornal strigula, and a fuscous apical spot. Papillae anales of female consisting of a slender transverse papillose, setose plate without conspicuous lobes (Figure 502). Male unknown.

**Head:** Vestiture white. Scape white; flagellum grayish to dark brown (depending upon viewing angle), with purplish to yellowish green iridescence, ~48-segmented. Palpi light ochreous to ochreous cream.

**Thorax:** White. Forewing white, with large, semi-elliptical, dark brown spot midway along costal margin; a slight brownish suffusion present near base of costal margin and a larger, somewhat scattered, brownish suffusion in subapical region of forewing before relatively broad, fuscous apical spot; 2 dark brown, relatively short, subapical costal strigulae present; first strigula terminating before apical spot near subapical brownish area; strigula 2 terminating above apical spot; a short, brown tornal strigula slightly distad and below apical spot; cilia from whitish to yellowish brown; venter of forewing yellowish brown, except for small, elongated, subhumeral cream area. Hindwing and cilia light grayish ochreous dorsally and ventrally. Legs ochreous cream with dark gray lateral and dorsal suffusion.

**Abdomen:** Ochreous cream dorsally, cream ventrally.

**Female Genitalia:** Figure 502. Apex of abdomen strongly tapered, with two weakly developed lateral lobes bearing numerous moderately long setae. Each posterior apophysis fused for most its length, long and slender, subacute; length nearly 6× maximum width of papillae anales. Papillae anales without prominent lobes, instead consisting of a slender, transverse, papillose, setose plate. Vestibulum narrow, membranous. Ductus bursae with a dense zone of pectinations, consisting of ~2–4 minute spicules in transverse rows, extending entire length of ductus. Corpus bursae large, ovoid; walls without pectinate spicules, but with faint, U-shaped band of slightly elongate, external tubercles of variable form. Ductus spermathecae unusually short, about half the length of bursa copulatrix; proximal half of membranous outer canal broad and bulbous; much reduced distal half nearly invisible; inner canal slightly sinuous, becoming gradually broader distally, with ~4.0–4.5 relatively small, compact convolutions; vesicle reduced, tubular.

**MALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♀; PERU: LIMA: Matucana, 7780 ft [~2370 m], Jul 1914, Parish, slide BMNH 29644 (BMNH).

**MATERIAL EXAMINED.** Holotype ♀.

**HOST.** Unknown.

**FLIGHT PERIOD.** July (unique record).

**DISTRIBUTION.** (Map 19) Known only from the type locality in western Peru.

**DISCUSSION.** Although it is impossible to assess wing pattern variation in this species at present, the relatively large forewing costal spot may be somewhat diagnostic. The short, fused papillae anales of *P. paromias* most closely resemble those of *P. parakempella* from the Florida Keys, USA. The corpus bursae of *parakempella*, however, is more slender than in *paromias*, with the minute, external tubercles concentrated more along the caudal two-thirds of the bursa.

### ***Pseudopostega perdigna* (Walsingham)**

FIGURES 243, 503; MAP 19

*Opostega perdigna* Walsingham, 1914:349.—Davis, 1984:18.

*Pseudopostega perdigna* (Walsingham).—Davis, 1989:77.—Puplesis and Diškus, 2003:418.

**ADULT.** Figure 243. Length of forewing ~6.0 mm. Moderately small white moth; forewings with two brown spots, one located along distal third of costal margin, the other midway along dorsal margin; also present are 3 brown, subapical costal strigulae, 1 brown tornal strigula, and a small, fuscous, apical spot. Female with prominently bilobed papillae anales (Figure 503). Male unknown.

**Head:** Vestiture white. Scape white; flagellum ochreous, ~68–70-segmented. Maxillary palpus cream with grayish brown suffusion laterally and dorsally; labial palpus cream to grayish cream.

**Thorax:** White. Forewing white, with two brown spots: an elongate, slender, dark brown spot extending along distal third of costa and a brown, approximately triangular, spot midway along dorsal margin; also present are 3 brown, subapical costal strigulae; strigula 1 very faint in holotype) with yellowish suffusion along their inner margins; second strigula terminating in yellowish suffusion before small, fuscous apical spot; third strigula extending to apical spot, then interrupted before continuing around spot toward tornus; tornal strigula a faint, brown streak; terminal cilia light brown, otherwise whitish cream; venter of forewing brown or yellowish brown, except for elongated, subhumeral cream area. Hindwing ochreous cream

to yellowish brown (depending on viewing angle) dorsally and ventrally; cilia ochreous. Foreleg mostly grayish cream, with grayish brown to fuscous suffusion dorsally on tibia and tarsus; mid- and hindlegs mostly ochreous cream, grayish brownish to grayish cream on tarsi.

**Abdomen:** Ochreous cream to brown dorsally (depending on viewing angle), cream ventrally.

**Female Genitalia:** Figure 503. Apex of abdomen bilobed, rounded, with numerous long and moderately long setae. Each posterior apophysis fused most of its length, elongate, slender, with blunt apices. Papillae anales bilobed, consisting of two, small, moderately elongate, sclerotized, setose lobes; length of lobes ~1.5× width. Vestibulum narrow, thickened, with numerous folds. Ductus bursae elongate, moderately slender, with a dense zone of pectinations consisting of short transverse rows of 1–4 minute spicules. Corpus bursae large, with triangular caudal lobe; walls densely covered with both pectinate and elongate, spinose spicules; a faint band bearing weakly sclerotized, external tubercles of variable form (from distally rounded to capitate or bifid) encircling anterior half of bursa. Ductus spermathecae equal to bursa copulatrix in length; proximal 3/4 of membranous outer canal a broad tube, distal 1/4 much constricted; inner canal slightly sinuous, with ~4 small, tightly coiled convolutions terminating in elongate, strongly curved, tubular vesicle and small membranous utriculus.

**MALE, LARVA AND PUPA.** Unknown.

**HOLOTYPE.** ♀; MEXICO: GUERRERO: Omiltemi, 8000 ft [~2440 m], Jul 1918, H. H. Smith, Gdm. Slvn 66818, Walsingham Collection, slide BMNH 29643 (BMNH).

**MATERIAL EXAMINED.** Holotype ♀.

**HOST.** Unknown.

**FLIGHT PERIOD.** July (unique record).

**DISTRIBUTION.** (Map 19) Known only from the type locality in western Mexico.

**DISCUSSION.** The forewing pattern of this species is somewhat similar to that of another species known only from a unique female collected in the Mexican state of Guerrero, *P. elachista*. In *perdigna* the dorsal spot is less developed and more slender than in *elachista*, although with only the holotypes available for study, the amount of pattern variation is unknown. The papillae anales differ considerably between these two females, with that of *elachista* being fused into a single lobe. The papillae anales of *perdigna* most resemble the prominently bilobed condition occurring in the North American *P. albogaleriella*, *quadristrigella*, and *texana*. The minute, solitary spicules that largely cover the internal walls of the corpus bursae

in *perdigna* are lacking in *texana*. The female genitalia of *quadristrigella* appears to resemble that of *perdigna* the most, but differ in possessing relatively shorter posterior apophyses, longer solitary spicules along the anterior half of the corpus bursae, and possibly shorter length of the spermathecal vesicle. Whenever a male of *perdigna* is available for study, the relationship of these two species should be reexamined.

### ***Pseudopostega pontifex* (Meyrick)**

FIGURE 244; MAP 19

*Opostega pontifex* Meyrick, 1915:240.—Clarke, 1955:255.—Davis, 1984:18.

*Pseudopostega pontifex* (Meyrick).—Davis, 1989:77.—Puplesis and Diškus, 2003:419.

**ADULT.** Figure 244. Length of forewing 2.7 mm. Small whitish moth; forewings with brown fascia partially traversing wing near middle, 2 dark brown, subapical stigmulae and a short, faint, terminal strigula. Sex of holotype unknown [abdomen missing].

**Head:** Vestiture white, with slight suffusion of brownish cream. Scape white with similar suffusion as head; flagellum yellowish brown, ~66-segmented. Maxillary palpus ochreous cream with brownish suffusion laterally on distal segments; labial palpus ochreous cream.

**Thorax:** Similar to head in color; tegula white, but with brownish suffusion along anterior margin. Forewing white to off white, with a prominent, brown, oblique, median fascia extending from costa but diffusing midway to dorsal margin into large brownish suffusion extending along dorsum nearly to tornus; 2 dissimilar, subapical costal strigulae present: strigula 1 a heavy, dark brown, strongly oblique band bordering distal edge of wing around base of cilia and obliterating apical spot; strigula 2 short, dark brown, slender, and well separated from a short, faint, brown terminal strigula; cilia light brown to brown; venter of forewing dark yellowish brown, except for small, elongate, subhumeral cream area. Hindwing including cilia gray (see Discussion). Legs ochreous cream, except forelegs with lateral dorsal suffusion of grayish brown.

**Abdomen:** Not examined [missing].

**LARVA AND PUPA.** Unknown.

**HOLOTYPE.** Sex unknown [abdomen missing]; COLOMBIA: Cali, 500 ft [~153 m], May 1914, Parish (BMNH).

**MATERIAL EXAMINED.** Holotype.

HOST. Unknown.

FLIGHT PERIOD. May (unique record).

DISTRIBUTION. (Map 19) Known only from the type locality in western Colombia.

DISCUSSION. This species is represented only by the holotype, which is missing the hindwings and ab-

domen. Consequently, its sex cannot be determined. The drawing and color description of the hindwing were reconstructed according to Meyrick's (1915) original description. The remainder of the holotype is well preserved and may provide sufficient information for eventually recognizing the species.

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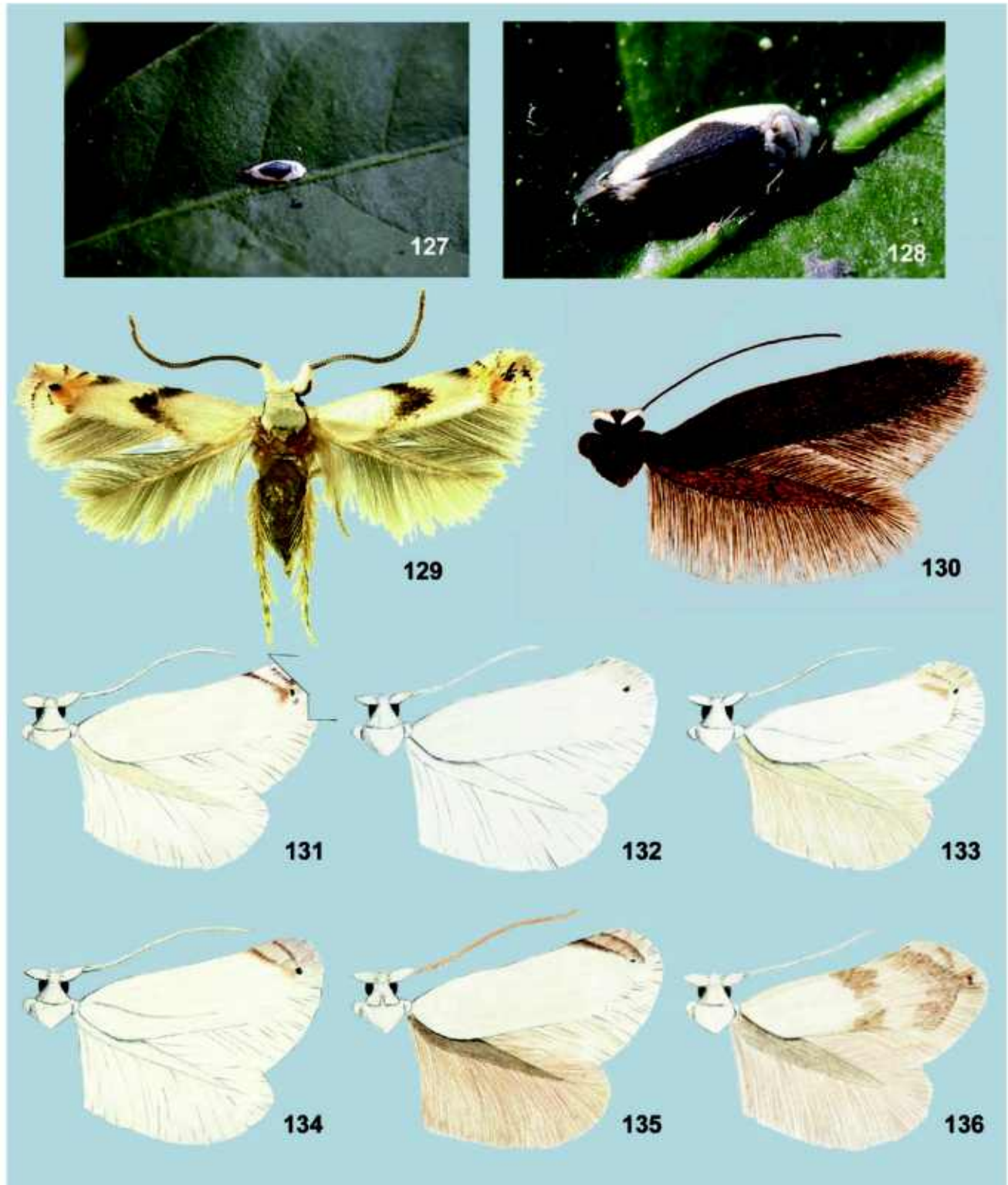
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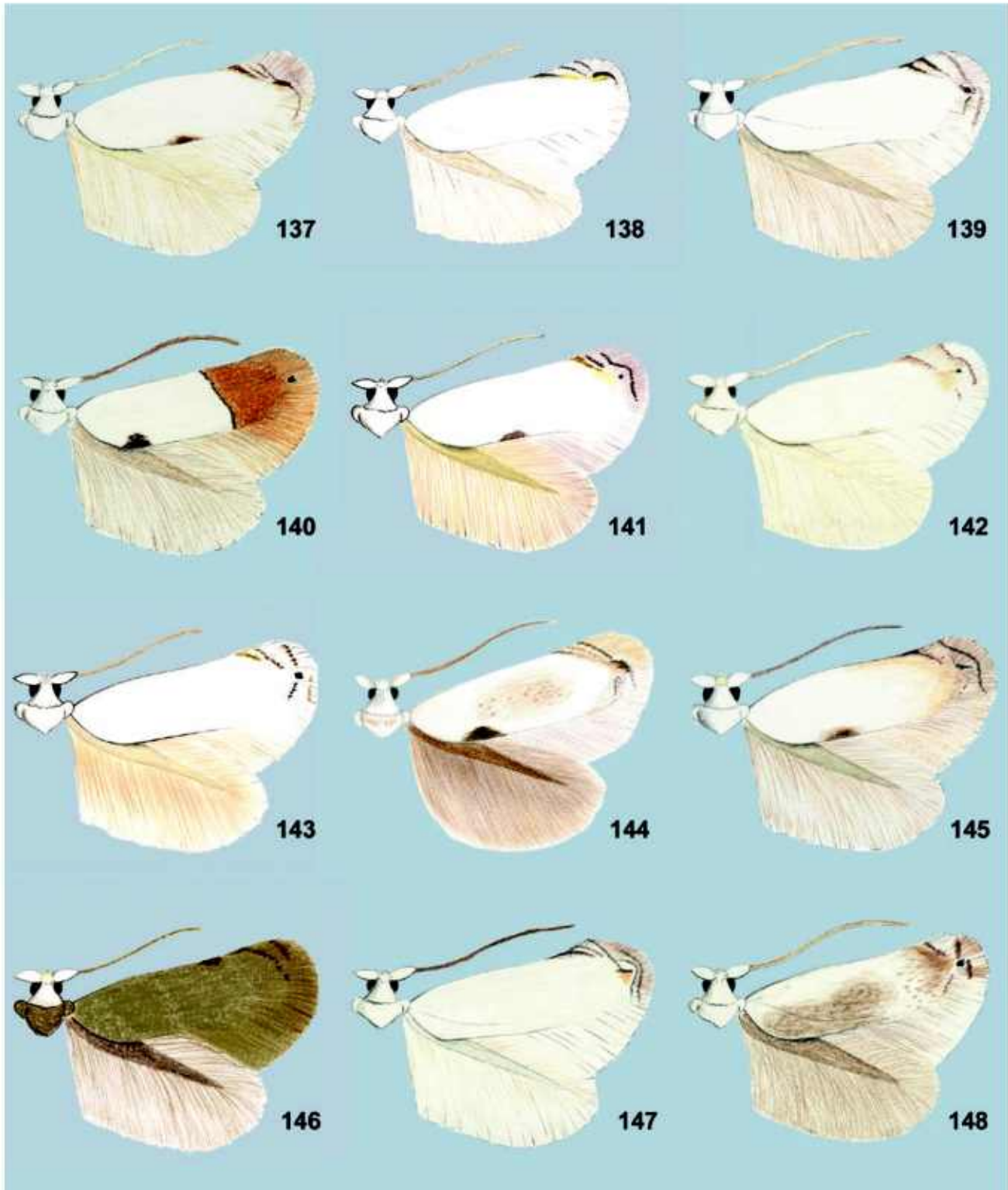
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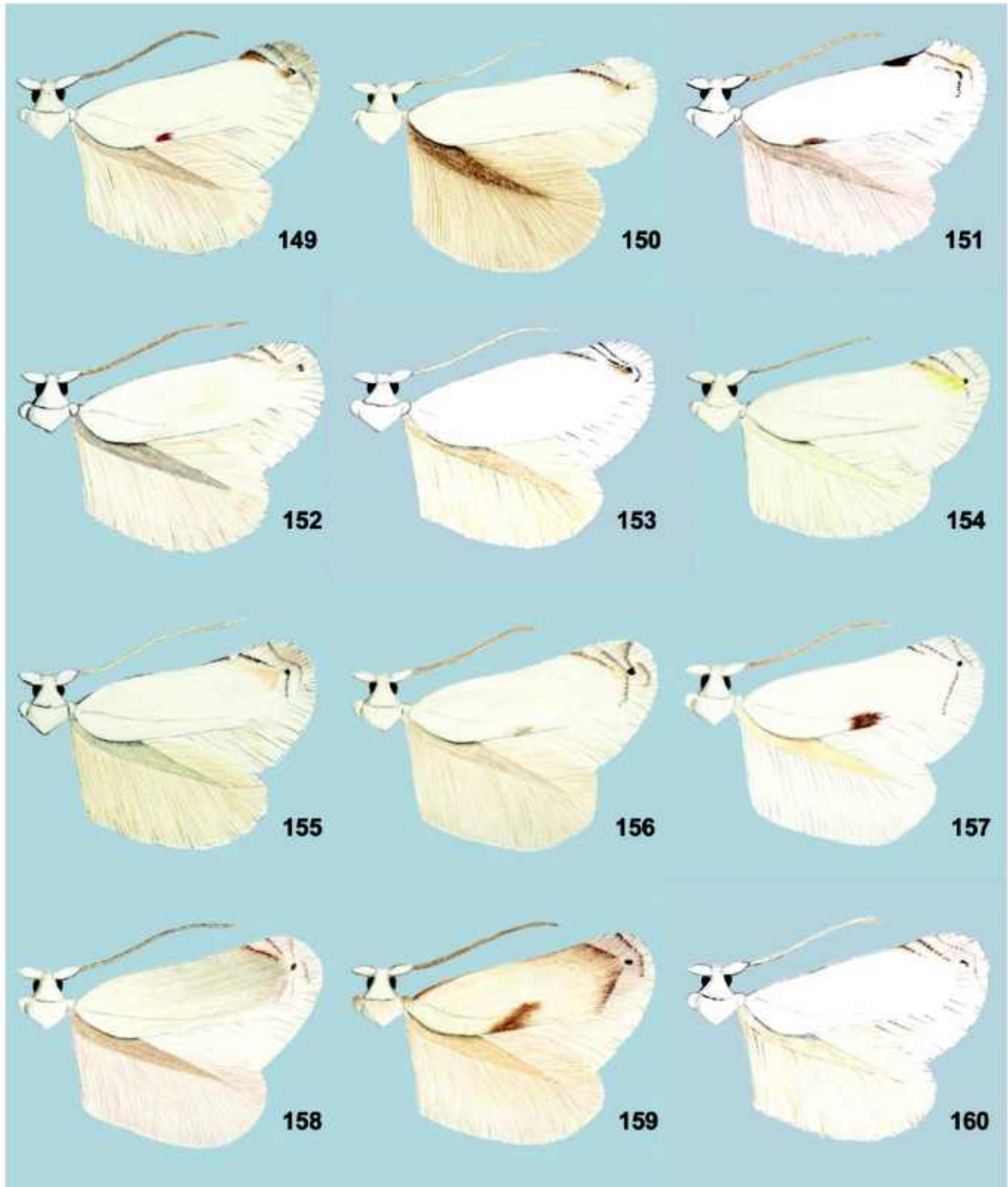
**FIGURES 127–503**



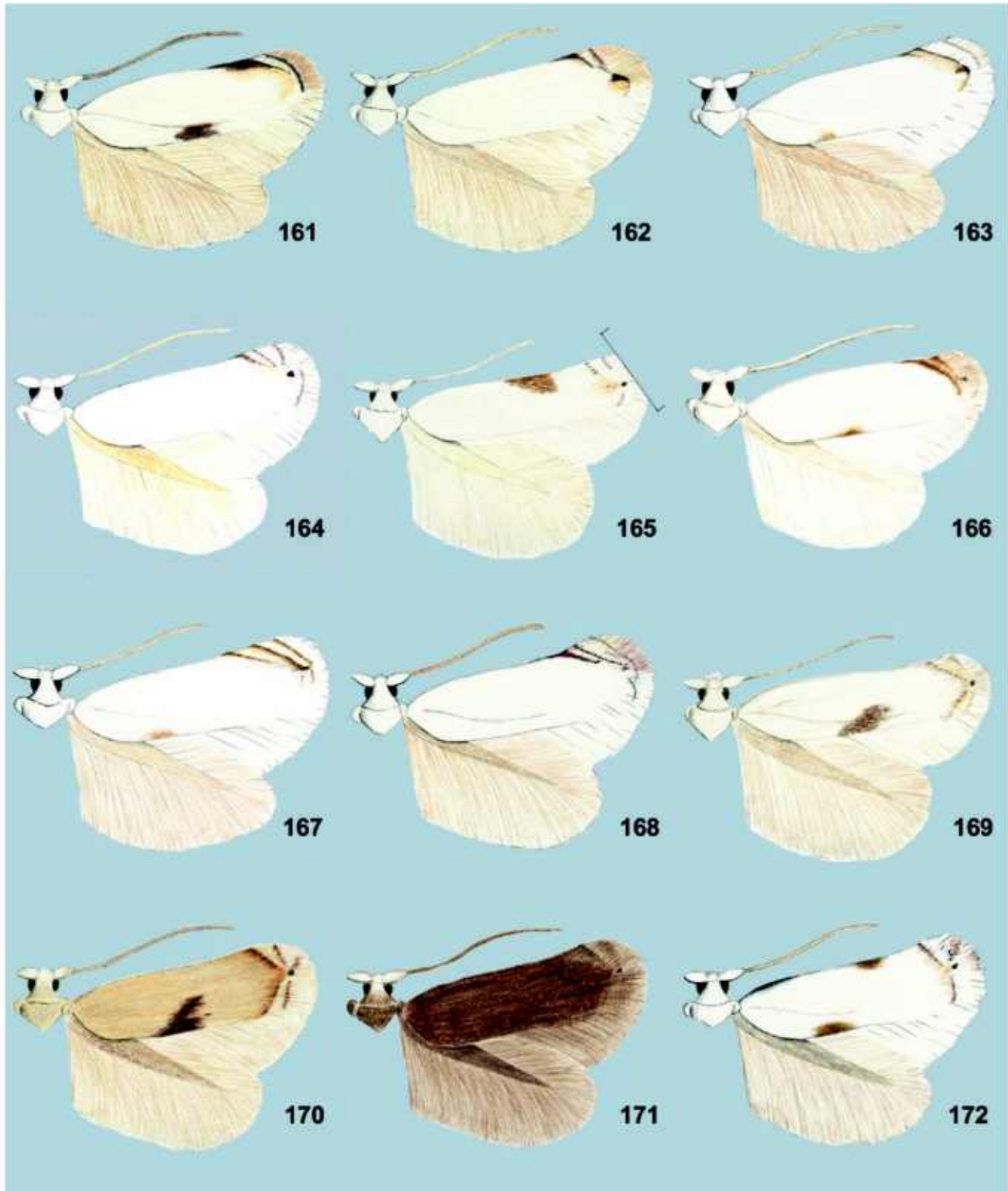
**FIGURES 127–136.** Adults. 127, 128, *Pseudopostega dorsalis dorsalis*, resting on leaf of *Trichilia havaensis*, photographed by K. Nishida, 5 Jun 2000, 3:20 PM (holotype ♂, 3.3 mm, Costa Rica). 129, *P. galapagosae*, photographed by B. Landry (paratype ♀, 2.5 mm, Ecuador: Galápagos Islands). 130, *Notiopostega atrata* (holotype ♀, 8.0 mm, Chile). 131, *Neopostega longispina* (holotype ♂, 2.8 mm, Venezuela). 132, *Neopostega falcata* (holotype ♂, 2.1 mm, Costa Rica). 133, *Neopostega asymmetra* (holotype ♂, 3.0 mm, Brazil). 134, *Neopostega petila* (holotype ♂, 2.6 mm, Costa Rica). 135, *Neopostega distola* (holotype ♂, 3.1 mm, Brazil). 136, *Opostegoides scioterma* (holotype ♀, 3.8 mm, Canada: Ont.). (Forewing lengths in parentheses.)



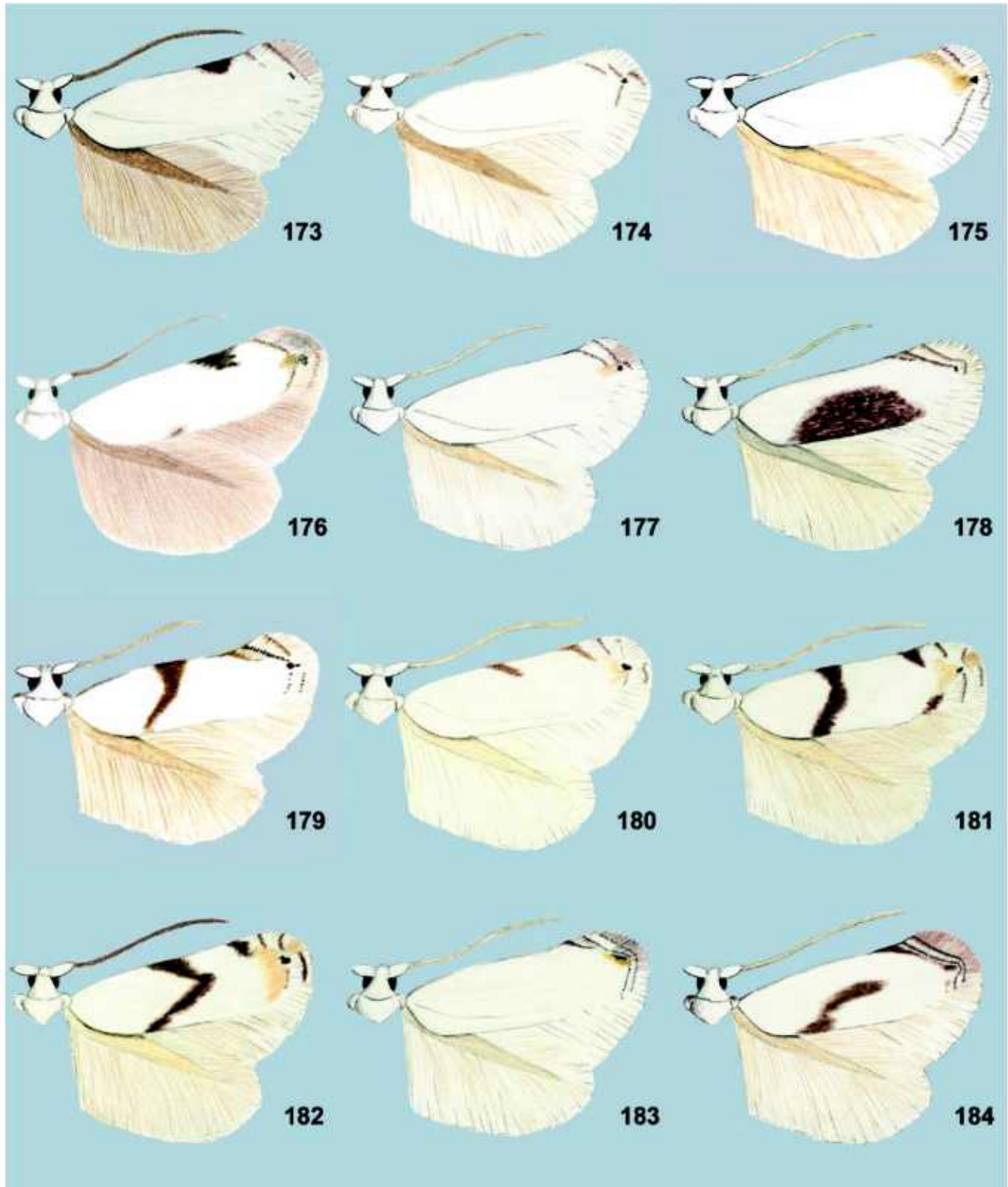
FIGURES 137–148. Adults of *Pseudopostega*. 137, *P. rotunda* (holotype ♂, 1.9 mm, Costa Rica). 138, *P. ovatula* (holotype ♂, 2.1 mm, Ecuador). 139, *P. serrata* (holotype ♂, 2.7 mm, Costa Rica). 140, *P. ferruginea* (holotype ♂, 2.4 mm, U.S. Virgin Islands: St. Thomas). 141, *P. abrupta* (♀, 2.8 mm, British Virgin Islands: Guana Is.). 142, *P. floridensis* (holotype ♂, 2.4 mm, USA: Florida). 143, *P. lateriplicata* (holotype ♂, 1.9 mm, Costa Rica). 144, *P. uncinata* (paratype ♀, 3.0 mm, Venezuela). 145, *P. microacris* (holotype ♂, 2.4 mm, Costa Rica). 146, *P. fumida* (holotype ♂, 2.1 mm, Belize). 147, *P. gracilis* (holotype ♂, 2.5 mm, French Guiana). 148, *P. tucumanae* (holotype ♂, 4.0 mm, Argentina). (Forewing lengths in parentheses.)



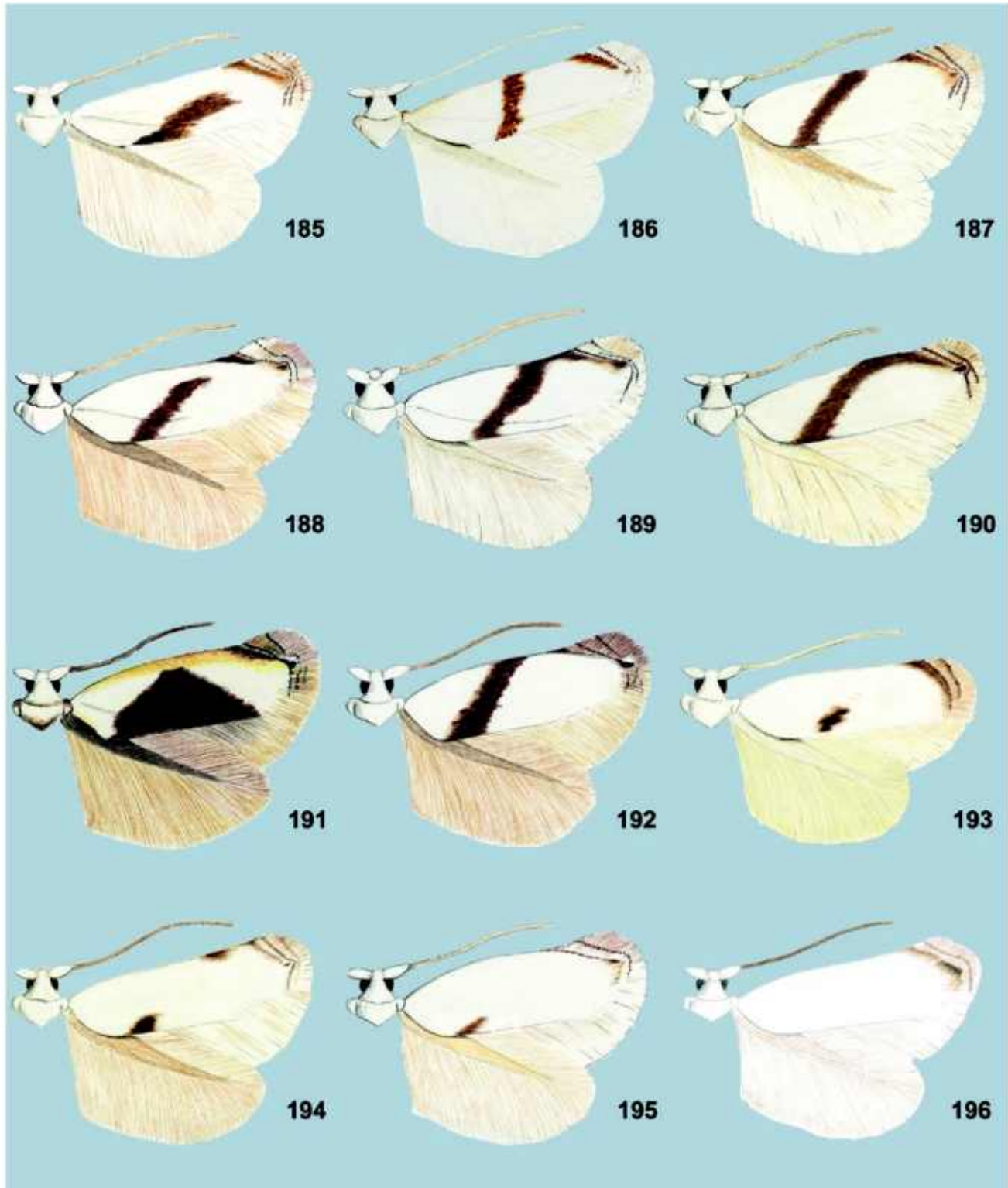
FIGURES 149–160. Adults of *Pseudopostega*. 149, *P. apotoma* (holotype ♂, 3.4 mm, Brazil). 150, *P. pexa* (holotype ♂, 3.2 mm, Brazil). 151, *P. diskusi* (holotype ♂, 3.1 mm, Belize). 152, *P. truncata* (holotype ♂, 2.4 mm, Costa Rica). 153, *P. monstruosa* (holotype ♂, 3.0 mm, Ecuador). 154, *P. microlepta* (holotype ♂, 2.2 mm, Guyana). 155, *P. spatulata* (holotype ♂, 2.4 mm, Costa Rica). 156–159, *P. albogaleriella*: 156, ♂ (4.4 mm, USA: Missouri); 157, ♂ (4.0 mm, USA: Florida); 158, ♀ (4.4 mm, USA: New York); 159, ♂ (4.8 mm, USA: California). 160, *P. denticulata* (holotype ♂, 2.3 mm, Ecuador). (Forewing lengths in parentheses.)



FIGURES 161–172. Adults of *Pseudopostega*. 161, *P. latisaccula* (holotype ♂, 2.1 mm, Dominica). 162, *P. attenuata* (paratype ♀, 2.2 mm, Costa Rica). 163, *P. conicula* (holotype ♂, 2.6 mm, Costa Rica). 164, *P. triangularis* (holotype ♂, 2.6 mm, Argentina). 165, *P. sacculata* (holotype ♂, 2.6 mm, Ecuador). 166, *P. kempella* (holotype ♂, 2.2 mm, USA: Florida). 167, *P. paraplicatella* (holotype ♂, 3.0 mm, Ecuador). 168, *P. plicatella* (holotype ♂, 2.6 mm, Brazil). 169–171, *P. cretea*: 169, lectotype ♂ (4.3 mm, Canada: Ontario); 170, ♂ (4.1 mm, USA: New York); 171, ♂ (3.5 mm, USA: Michigan). 172, *P. brevipicula*, (holotype ♂, 2.9 mm, Brazil). (Forewing lengths in parentheses.)

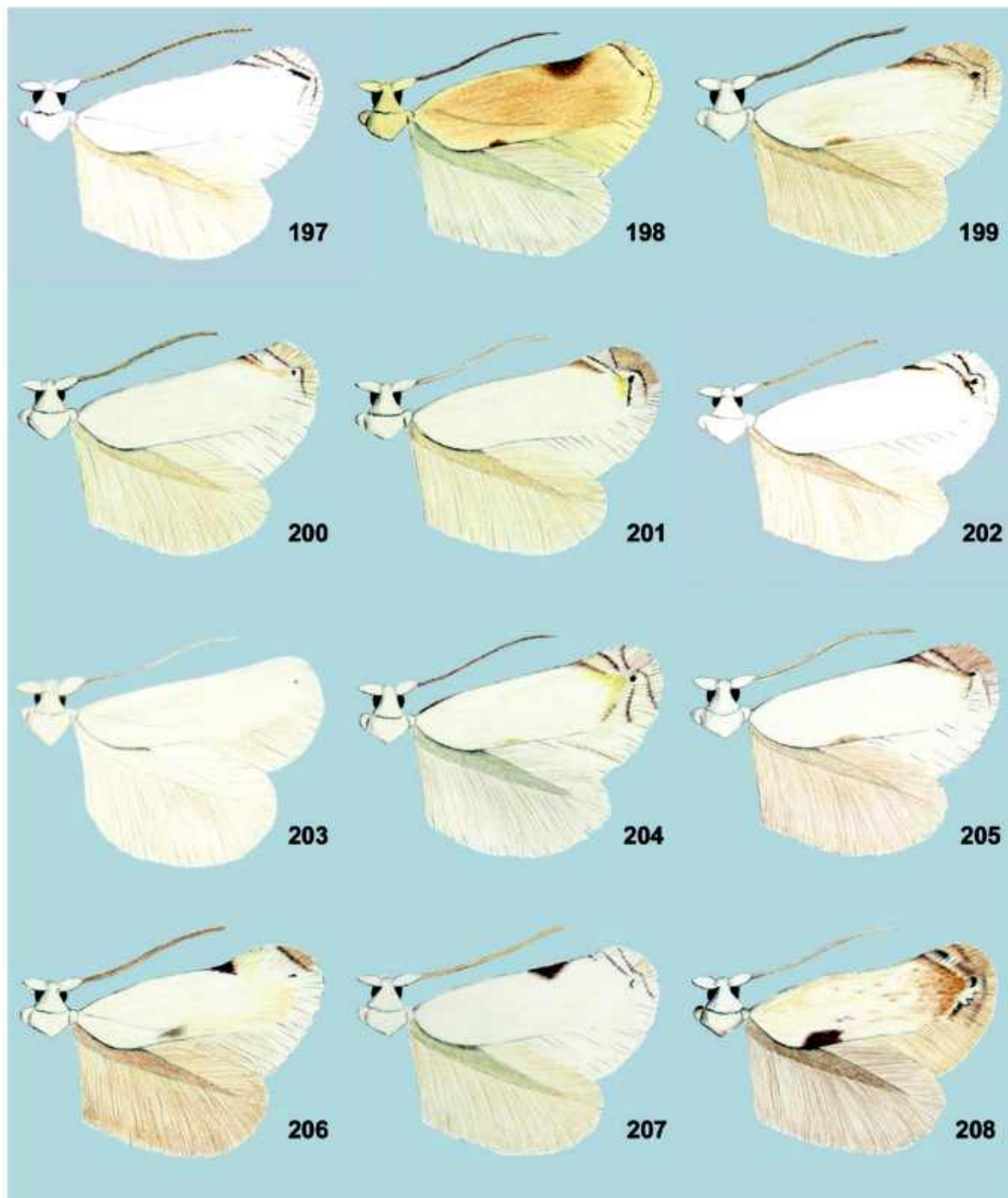


FIGURES 173–184. Adults of *Pseudopostega*. 173, *P. mignonae* (holotype ♂, 4.3 mm, Jamaica). 174, *P. trinidadensis* (holotype ♂, 3.7 mm, Trinidad). 175, *P. subtila* (holotype ♂, 3.8 mm, Brazil). 176, *P. acuminata* (holotype ♂, 3.1 mm, Argentina). 177, *P. tanygnatha* (holotype ♂, 2.3 mm, Costa Rica). 178, *P. colognatha* (holotype ♂, 2.1 mm, Puerto Rico). 179, *P. obtusa* (holotype ♂, 3.4 mm, Ecuador). 180–182, *P. galapagosae*: 180, paratype ♂ (2.4 mm, Ecuador: Galápagos Islands); 181, holotype ♂ (2.6 mm, Ecuador: Galápagos Islands); 182, paratype ♀ (2.2 mm, Ecuador: Galápagos Islands). 183+184, *P. saltatrix*: 183, ♂ (2.4 mm, French Guiana); 184, ♂ (2.6 mm, Costa Rica). (Forewing lengths in parentheses.)

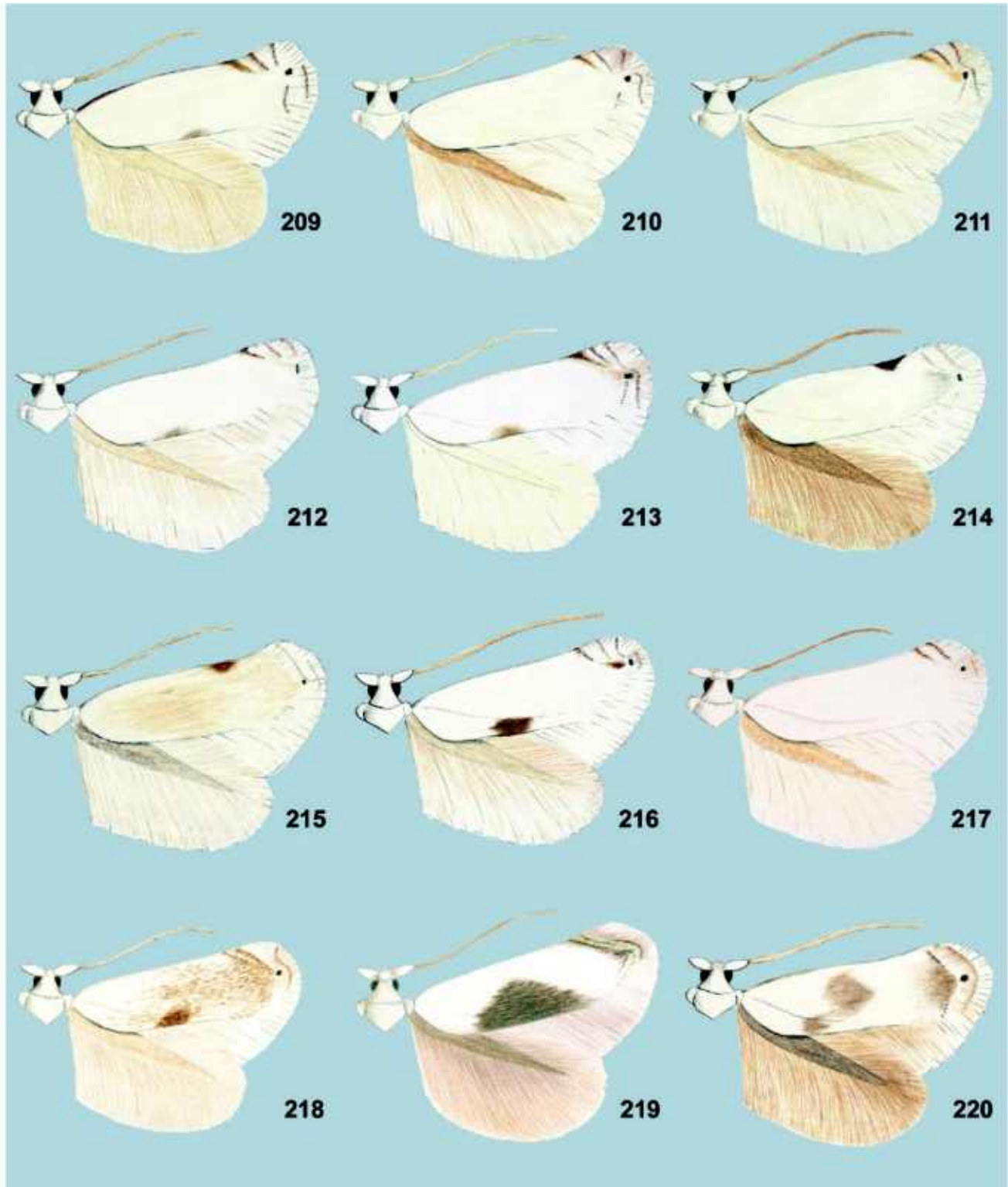


FIGURES 185–196. Adults of *Pseudopostega*. 185–190, *P. saltatrix*: 185, ♂ (2.3 mm, Jamaica); 186, holotype ♂ (2.3 mm, U.S. Virgin Islands: St. Thomas); 187, ♂ (2.2 mm, Nicaragua); 188, ♂ (2.4 mm, Paraguay); 189, ♂ (2.7 mm, Costa Rica); 190, ♂ (2.2 mm, Dominica). 191, *P. dorsalis dorsalis* (holotype ♂, 3.3 mm, Costa Rica). 192, *P. dorsalis fasciata* (holotype ♂, 2.8 mm, Costa Rica). 193, *P. parakempella* (holotype ♂, 2.1 mm, USA: Florida). 194, *P. adusta* (holotype ♂, 2.8 mm, U.S. Virgin Islands: St. Thomas). 195, *P. longipedicella* (holotype ♂, 2.3 mm, Costa Rica). 196, *P. lobata* (holotype ♂, 2.4 mm, Costa Rica). (Forewing lengths in parentheses.)

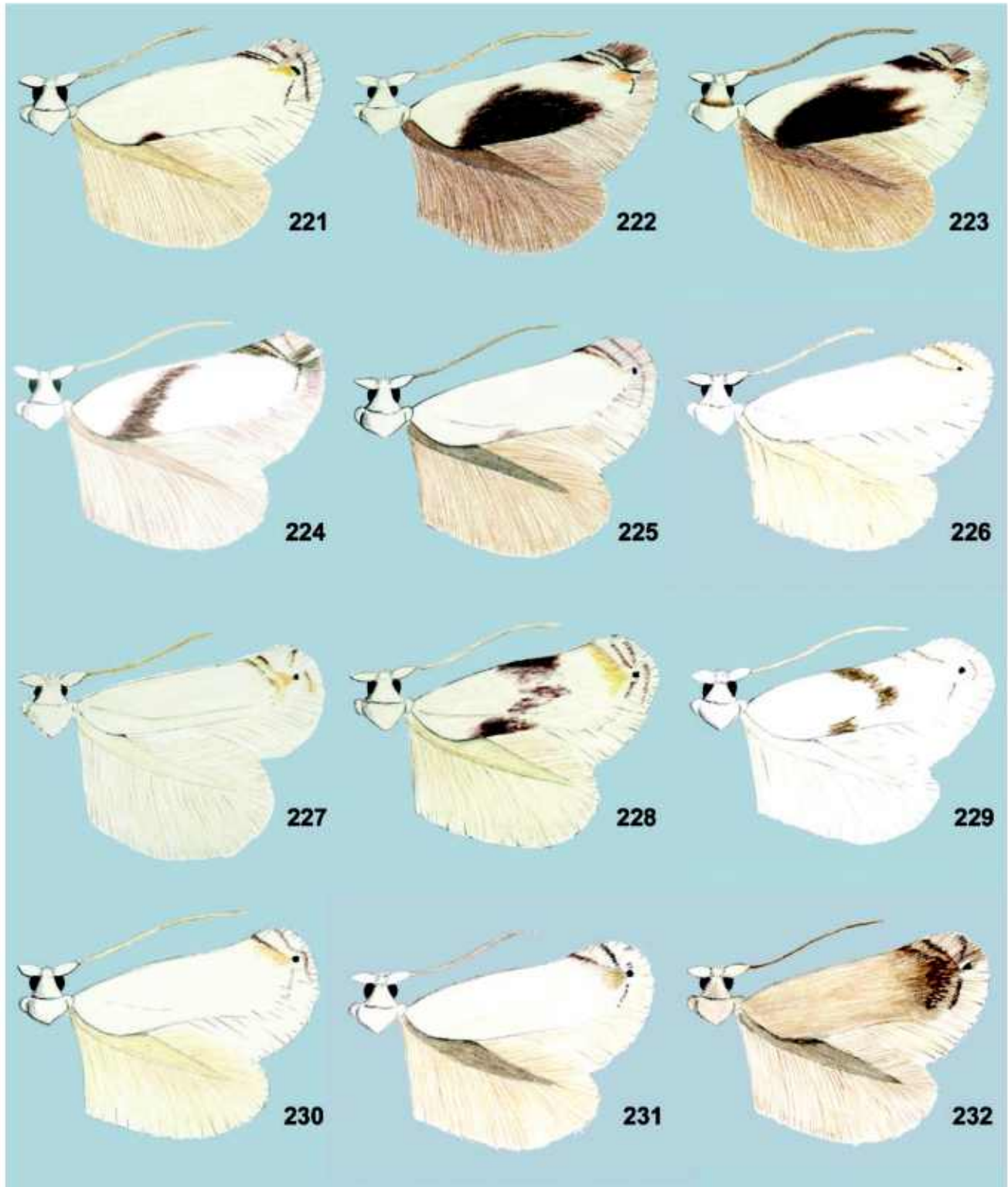




FIGURES 197–208. Adults of *Pseudopostega*. 197, *P. lobata* (paratype ♂, 2.4 mm, Argentina). 198, *P. clavata* (holotype ♂, 2.6 mm, Puerto Rico). 199, *P. sublobata* (holotype ♂, 2.3 mm, Costa Rica). 200–201, *P. duplicata*: 200, paratype ♂ (2.5 mm, British Virgin Islands: Tortola); 201, paratype ♀ (2.5 mm, Costa Rica). 202, *P. didyma* (holotype ♂, 2.6 mm, Ecuador). 203–204, *P. acidata*: 203, holotype ♂ (4.1 mm, Ecuador); 204, ♂ (2.8 mm, USA: Texas). 205, *P. tenuifurcata* (holotype ♂, 2.5 mm, Costa Rica). 206, *P. sectila* (holotype ♂, 3.7 mm, British Virgin Islands: Tortola). 207, *P. texana* (holotype ♂, 2.73 mm, USA: Texas). 208, *P. curtarama* (holotype ♂, 3.4 mm, Brazil). (Forewing lengths in parentheses.)



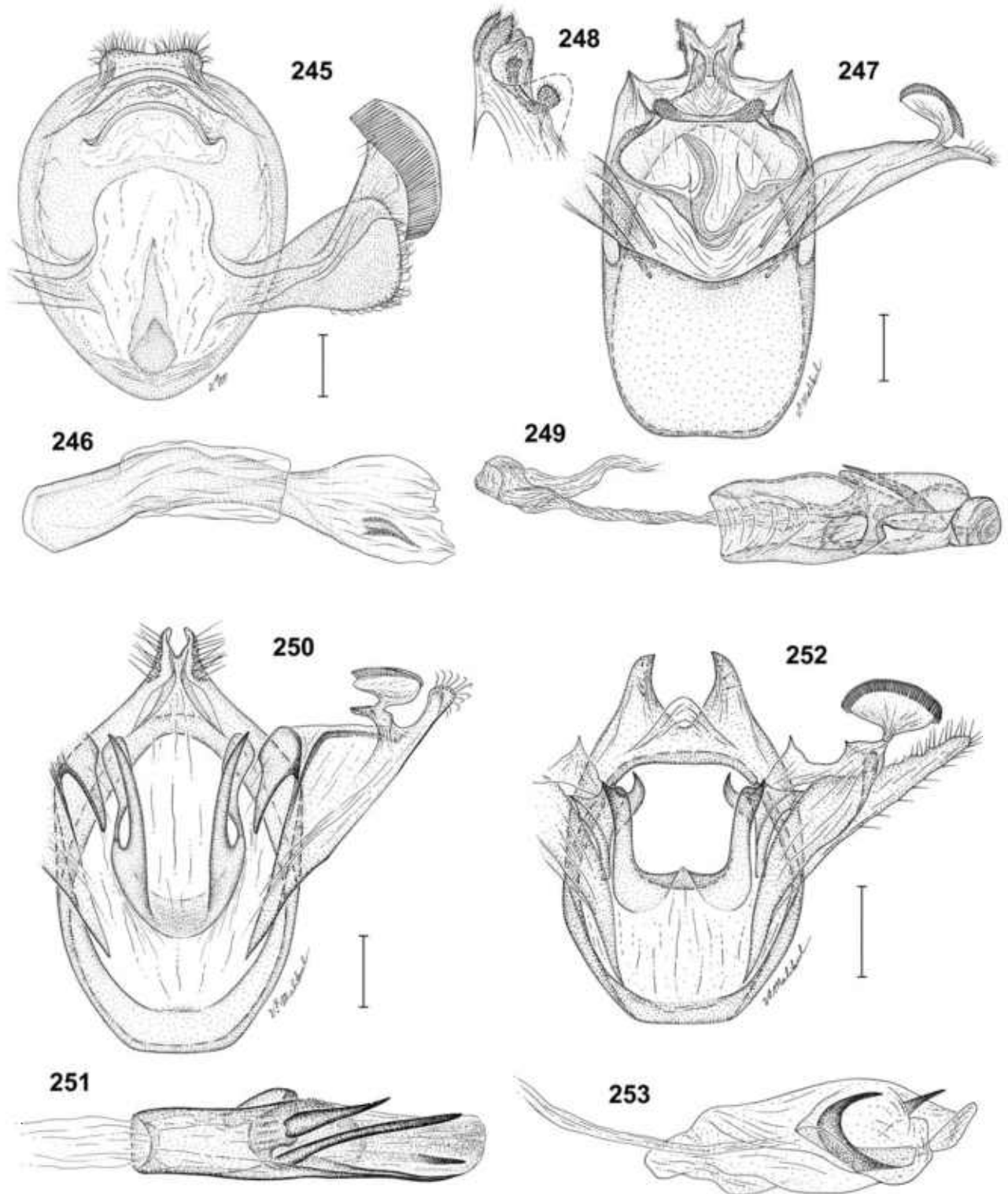
FIGURES 209–220. Adults of *Pseudopostega*. 209, *P. crassifurcata* (holotype ♂, 2.5 mm, Cuba). 210, *P. turquinoensis* (holotype ♂, 3.3 mm, Cuba). 211, *P. concava* (holotype ♂, 3.3 mm, Mexico). 212, *P. brevifurcata* (holotype ♂, 2.7 mm, Costa Rica). 213, *P. brevisalva* (holotype ♂, 2.8 mm, Costa Rica). 214, *P. acrodicra* (holotype ♂, 5.7 mm, Brazil). 215, *P. caulifurcata* (holotype ♂, 4.8 mm, Brazil). 216, *P. resimafurcata* (holotype ♂, 4.1 mm, Brazil). 217–218, *P. quadristrigella*: 217, ♂ (4.1 mm, USA: South Dakota); 218, neotype ♂ (4.8 mm, USA: North Carolina). 219, *P. bidorsalis* (paratype ♀, 2.5 mm, Costa Rica). 220, *P. divaricata* (holotype ♂, 4.4 mm, Argentina). (Forewing lengths in parentheses.)



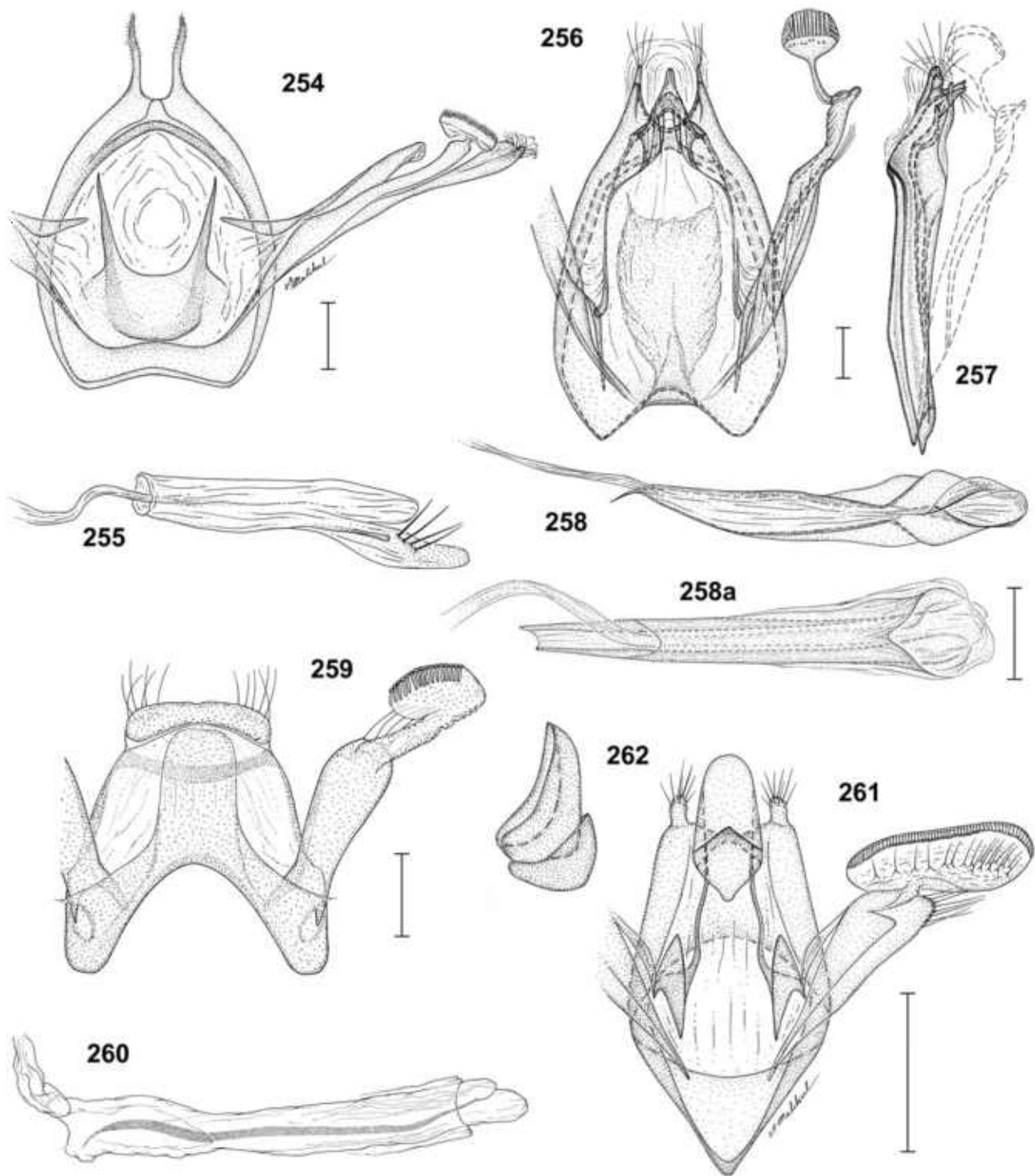
FIGURES 221–232. Adults of *Pseudopostega*. 221, *P. contigua*, (holotype ♂, 2.0 mm, Venezuela). 222–223, *P. latifurcata latifurcata*: 222, holotype ♂ (2.8 mm, Puerto Rico); 223, paratype ♂ (2.9 mm, British Virgin Islands: Tortola). 224, *P. latifurcata apoclina* (holotype ♂, 2.5 mm, Costa Rica). 225, *P. latiapicula* (holotype ♂, 2.4 mm, Costa Rica). 226, *P. ecuadoriana* (holotype ♂, 3.3 mm, Ecuador). 227, *P. pumila* (holotype ♂, 3.2 mm, Mexico). 228, *P. beckeri* (holotype ♂, 4.4 mm, Brazil). 229, *P. protomochla* (♂, 4.3 mm, Argentina). 230, *P. bicornuta* (holotype ♂, 4.6 mm, Mexico). 231–232, *P. suffuscula*: 231, holotype ♂ (2.7 mm, Argentina); 232, paratype, sex ? (abdomen missing, 3.0 mm, Argentina). (Forewing lengths in parentheses.)



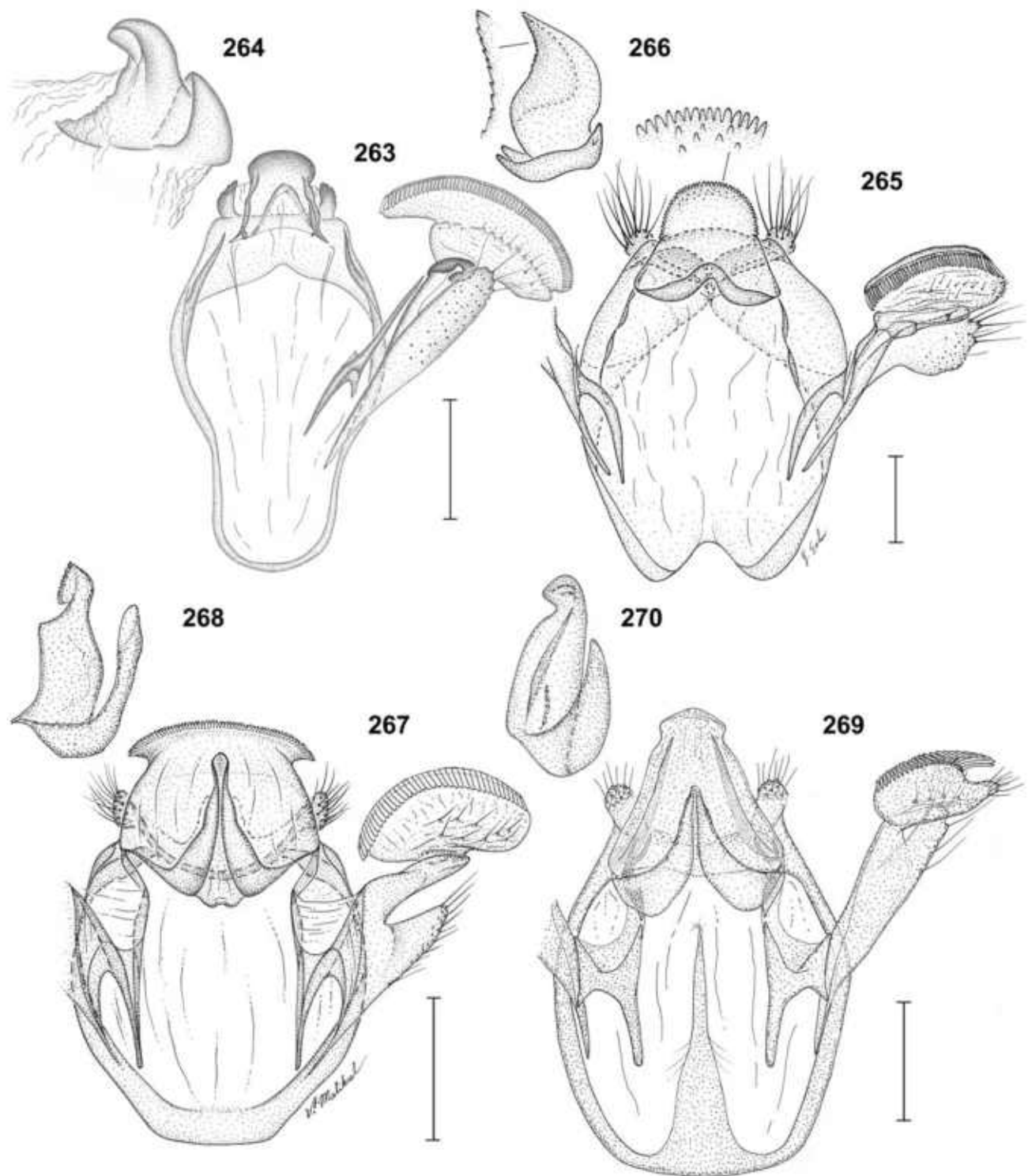
FIGURES 233–244. Adults of *Pseudopostega*. 233, *P. monosperma* (holotype ♂, 3.6 mm, Brazil). 234–235, *P. longifurcata*: 234, holotype ♂ (4.0 mm, Jamaica); 235, paratype ♂ (2.7 mm, Ecuador). 236, *P. constricta* (holotype ♂, 5.0 mm, Mexico). 237, *P. brachybasis* (holotype ♂, 2.6 mm, Mexico). 238–239, *P. venticola*: 238, holotype ♂ (2.9 mm, Grenada); 239, ♂ (3.0 mm, Brazil). 240, *P. congruens* (holotype ♀, 4.4 mm, Mexico). 241, *P. elachista* (holotype ♀, 4.4 mm, Mexico). 242, *P. paromias* (holotype ♀, 4.0 mm, Peru). 243, *P. perdigna* (holotype ♀, 6.0 mm, Mexico). 244, *P. pontifex* (holotype, sex ? [abdomen missing], 2.7 mm, Colombia). (Forewing lengths in parentheses.)



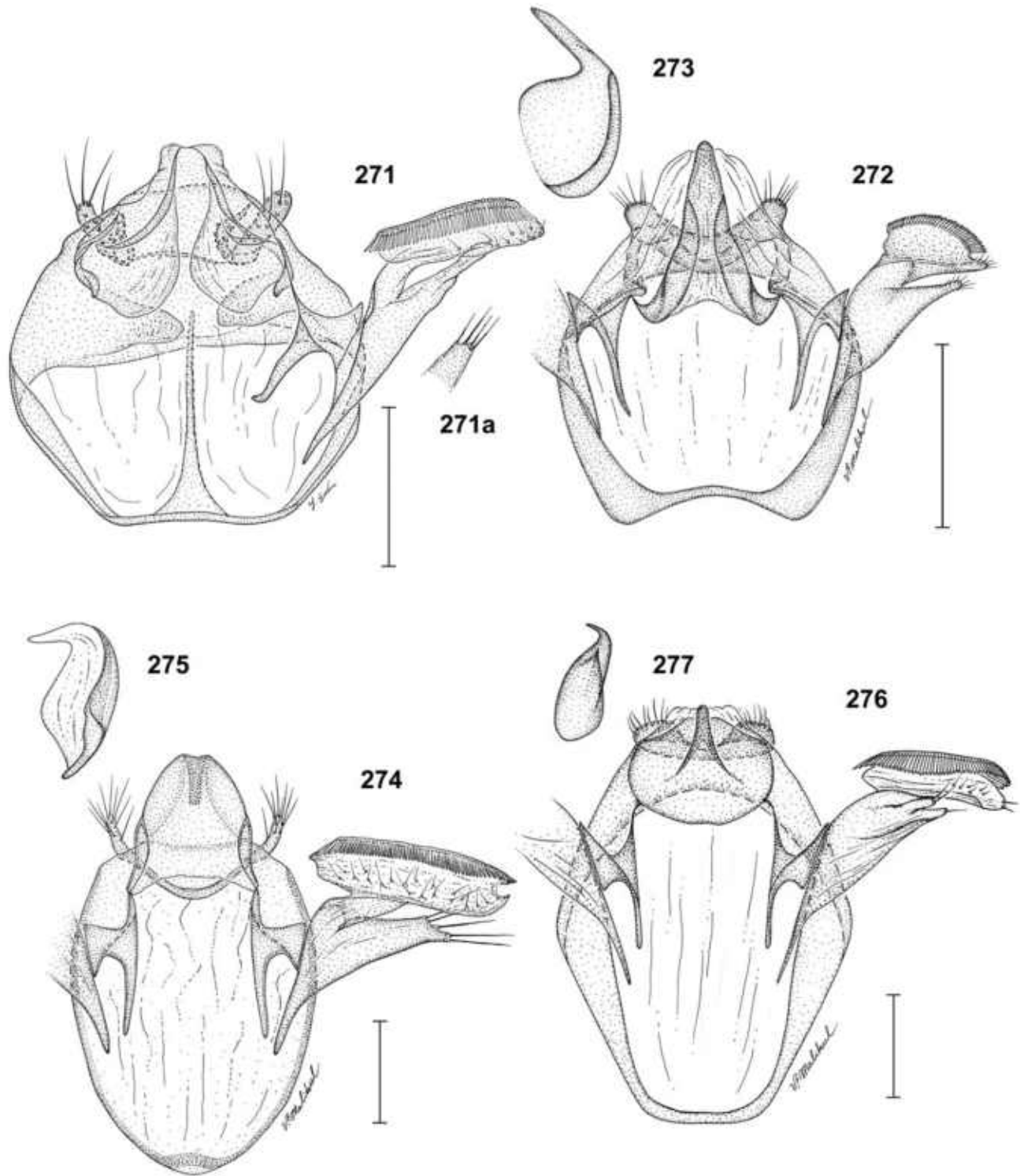
FIGURES 245–253. Male genitalia. *Neopostega atrata*: 245, ventral view; 246, aedeagus. *Neopostega asymmetra*: 247, ventral view; 248, lateral view of socii and gnathos; 249, aedeagus. *Neopostega longispina*: 250, ventral view; 251, aedeagus. *Neopostega falcata*: 252, ventral view; 253, aedeagus. (All scales = 0.1 mm.)



FIGURES 254–262. Male genitalia. *Neopostega petila*: 254, ventral view; 255, aedeagus. *N. distola*: 256, ventral view; 257, lateral view; 258, aedeagus (Brazil); 258a, aedeagus (Costa Rica). *Opostegoides scioterma*: 259, ventral view; 260, aedeagus. *Pseudopostega rotunda*: 261, ventral view; 262, gnathos, lateral view. (All scales = 0.1 mm.)

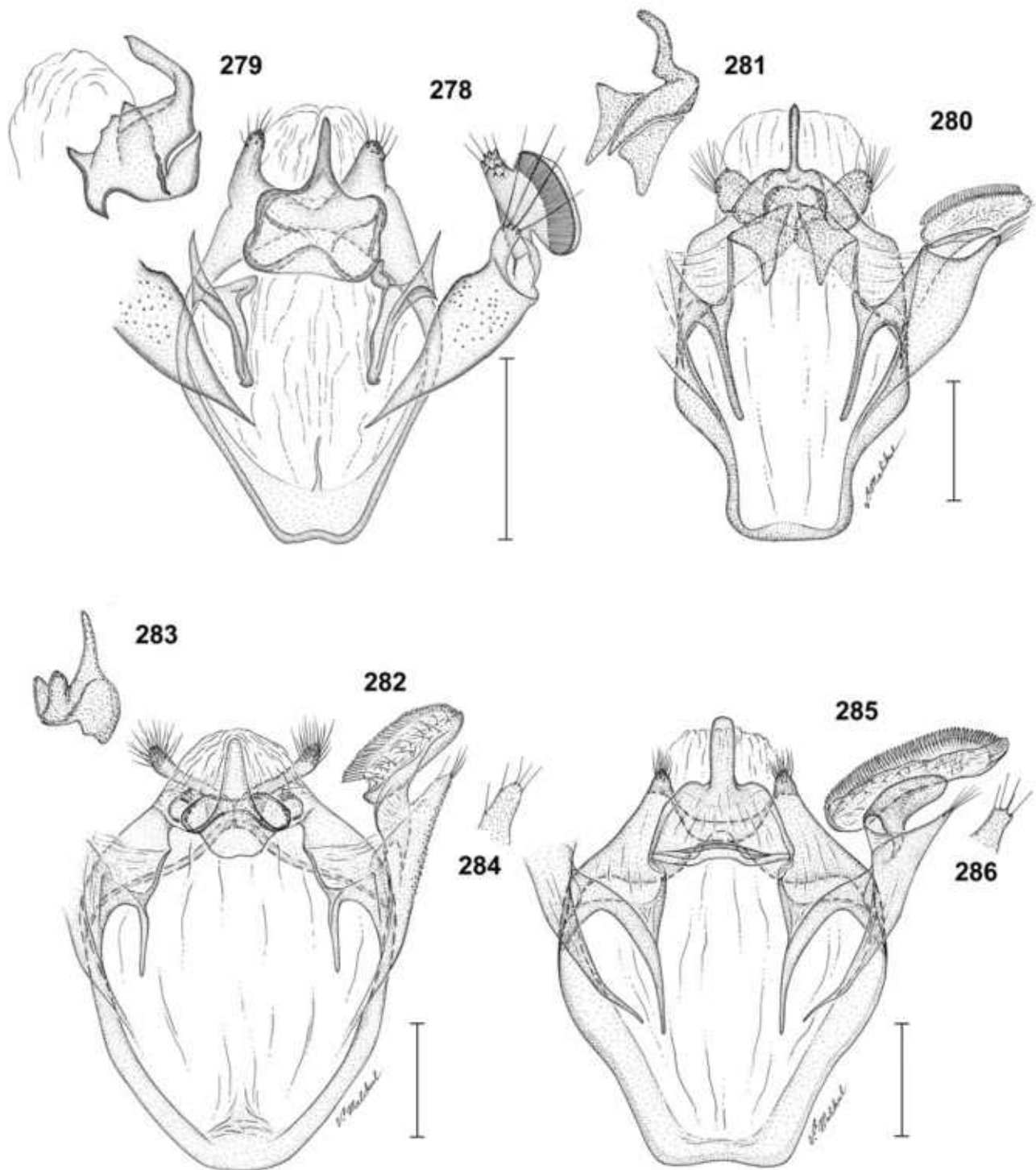


FIGURES 263–270. Male genitalia. *Pseudopostega ovatula*: 263, ventral view; 264, gnathos, lateral view. *P. serrata*: 265, ventral view; 266, gnathos, lateral view. *P. ferruginea*: 267, ventral view; 268, gnathos, lateral view. *P. abrupta*: 269, ventral view; 270, gnathos, lateral view. (All scales = 0.1 mm.)

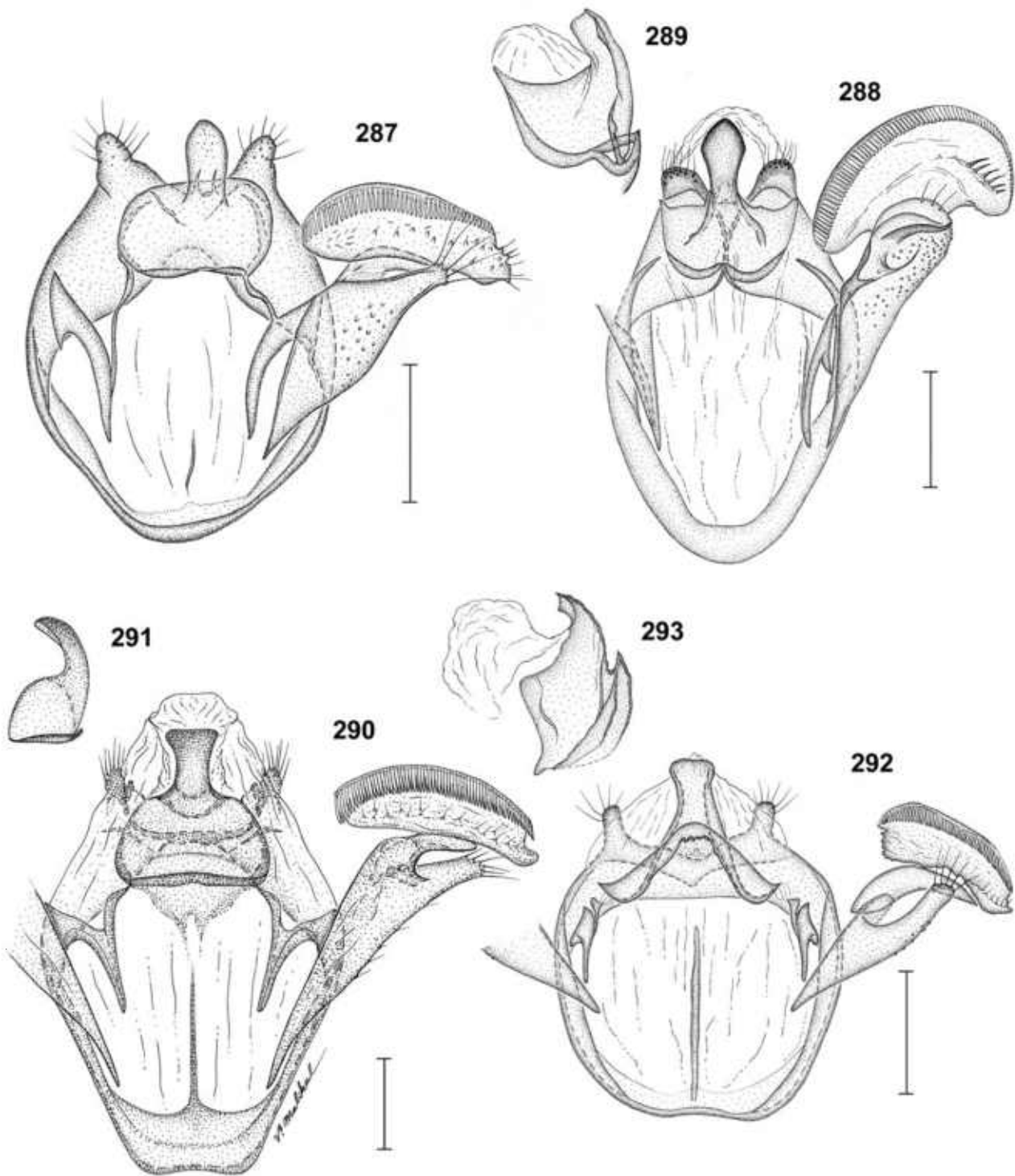


FIGURES 271–277. Male genitalia. *Pseudopostega floridensis*: 271, ventral view; 271a, apical detail of saccular lobe of valva. *P. lateriplicata*: 272, ventral view; 273, gnathos, lateral view. *P. uncinata*: 274, ventral view; 275, gnathos, lateral view. *P. microacris*: 276, ventral view; 277, gnathos, lateral view. (All scales = 0.1 mm.)

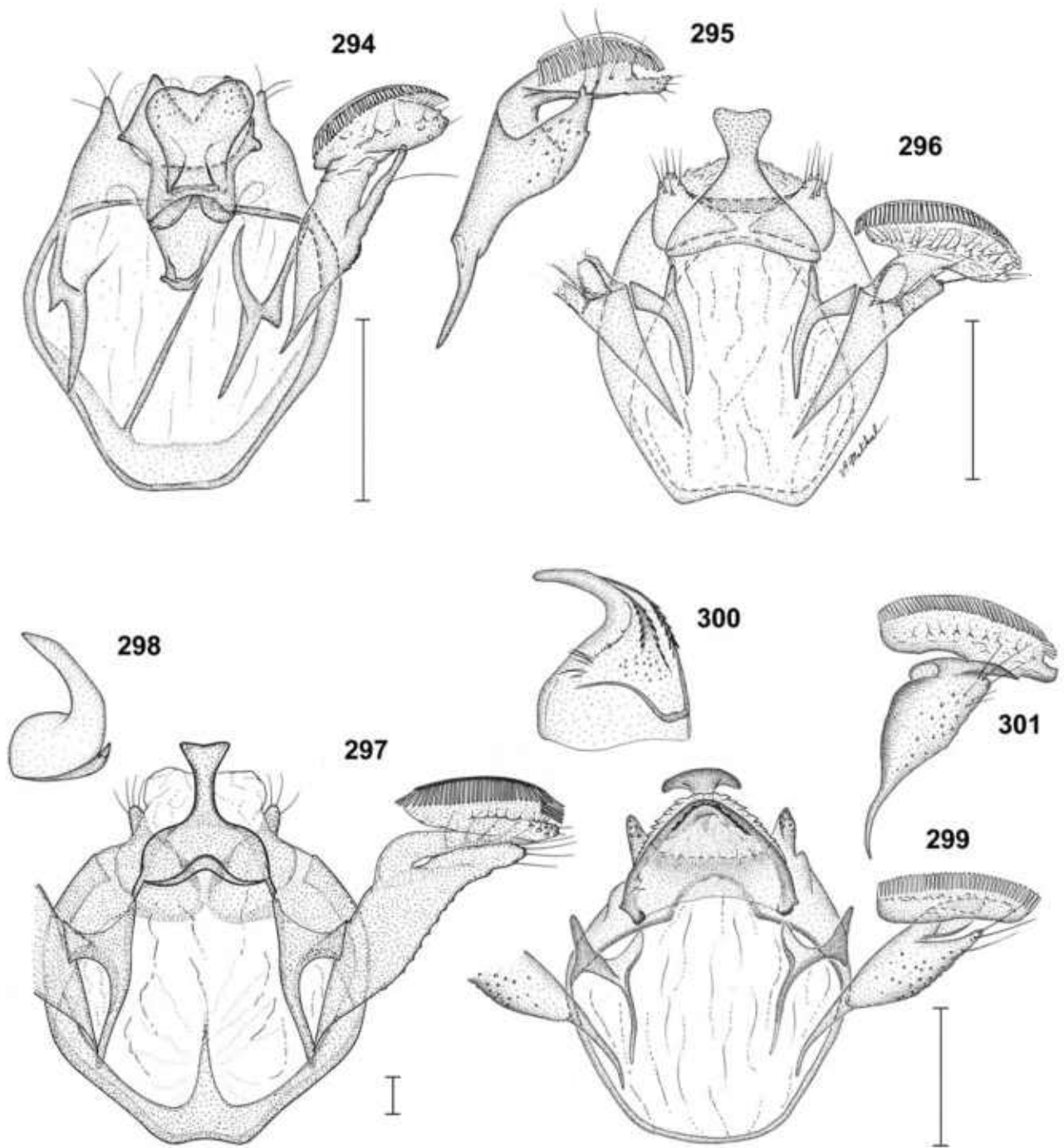




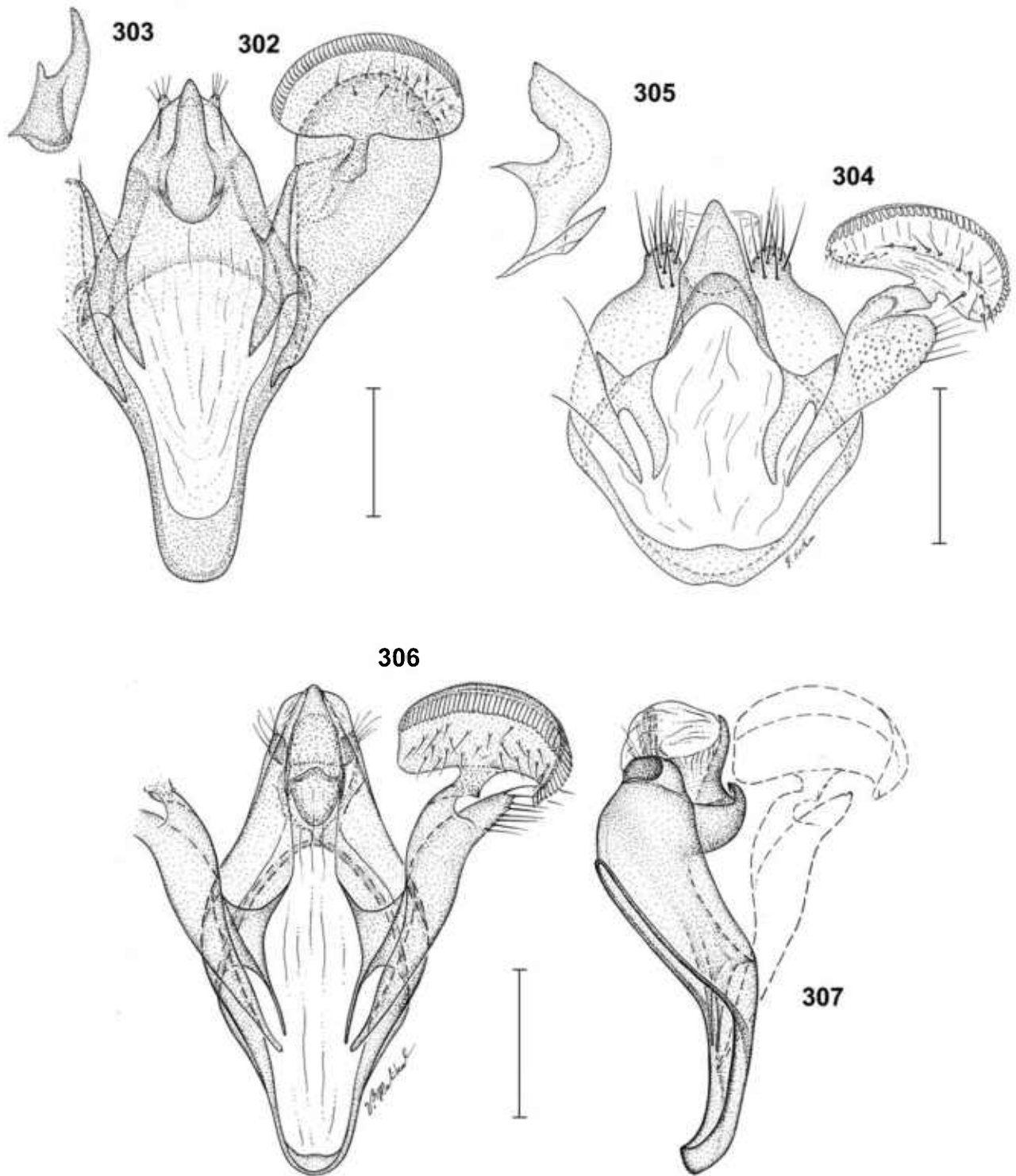
FIGURES 278–286. Male genitalia. *Pseudopostega fumida*: 278, ventral view; 279, gnathos, lateral view. *P. gracilis*: 280, ventral view; 281, gnathos, lateral view. *P. tucumanae*: 282, ventral view; 283, gnathos, lateral view; 284, apical detail of saccular lobe of valva. *P. apotoma*: 285, ventral view; 286, apical detail of saccular lobe of valva. (All scales = 0.1 mm.)



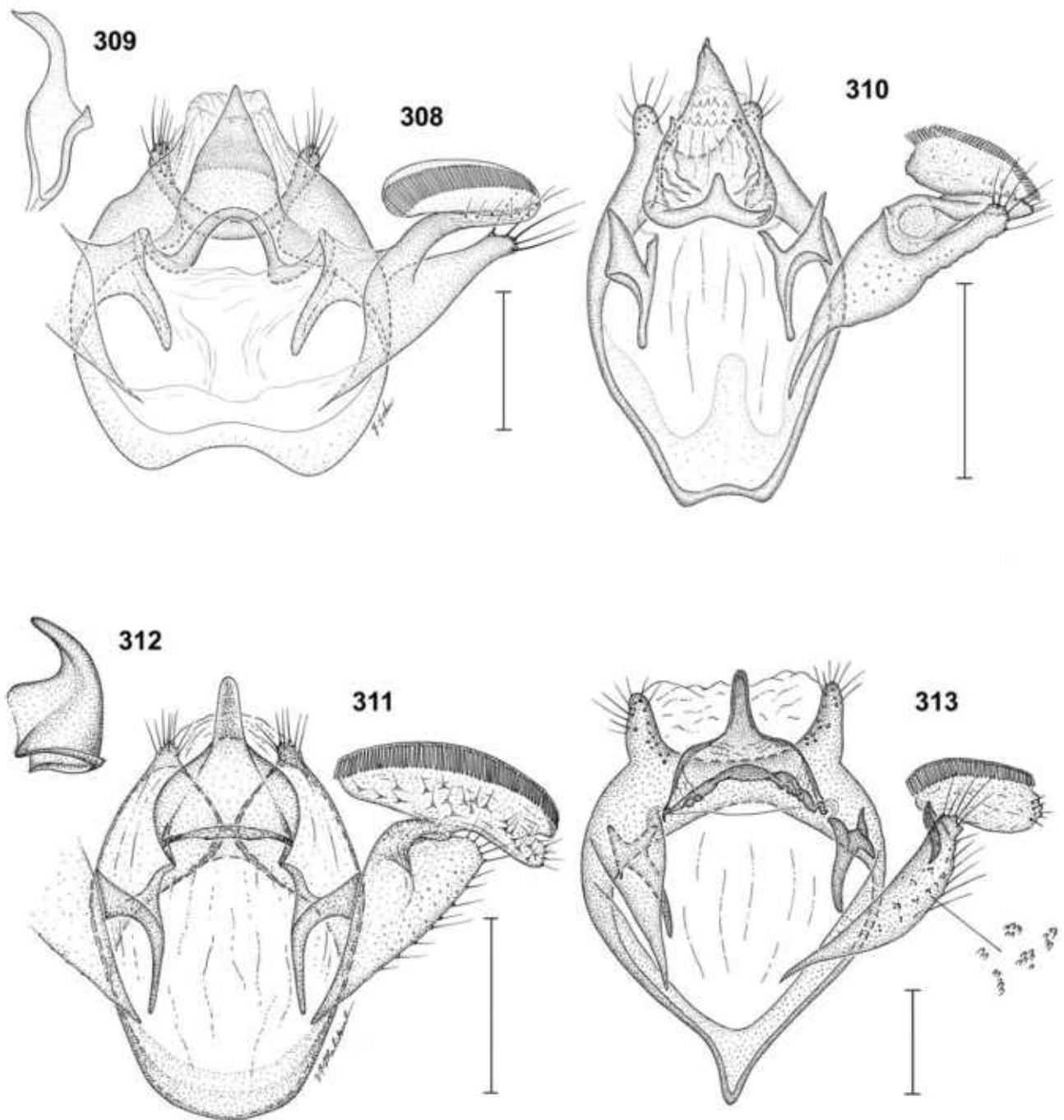
FIGURES 287–293. Male genitalia. *Pseudopostega pexa*: 287, ventral view. *P. diskusi*: 288, ventral view; 289, gnathos, lateral view. *P. truncata*: 290, ventral view; 291, gnathos, lateral view. *P. monstruosa*: 292, ventral view; 293, gnathos, lateral view. (All scales = 0.1 mm.)



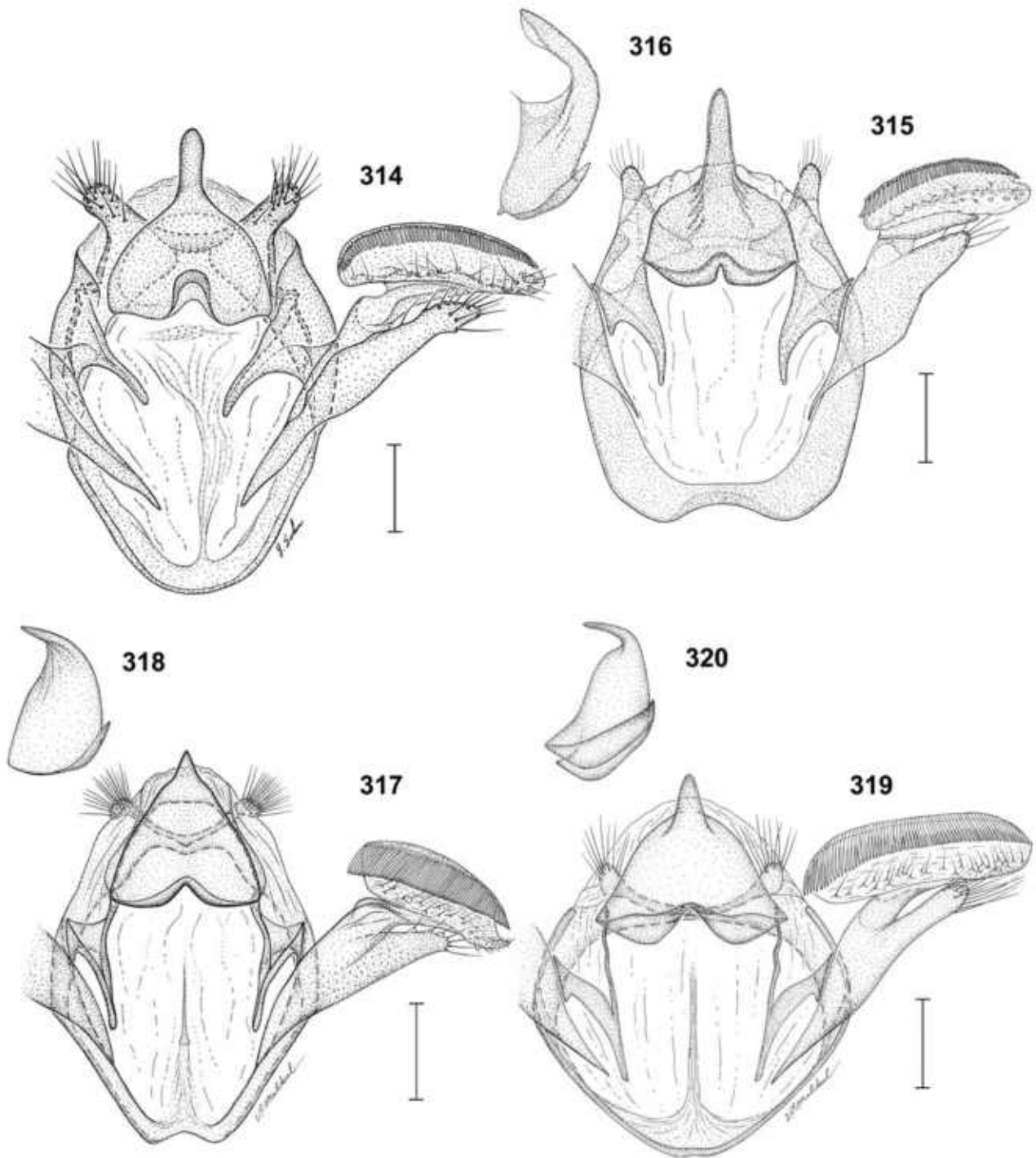
FIGURES 294–301. Male genitalia. *Pseudopostega microlepta*: 294, ventral view; 295, valva, dorsal view. *P. spatulata*, 296, ventral view. *P. albogaleriella*: 297, ventral view; 298, gnathos, lateral view. *P. denticulata*: 299, ventral view; 300, gnathos, lateral view; 301, valva. (All scales = 0.1 mm.)



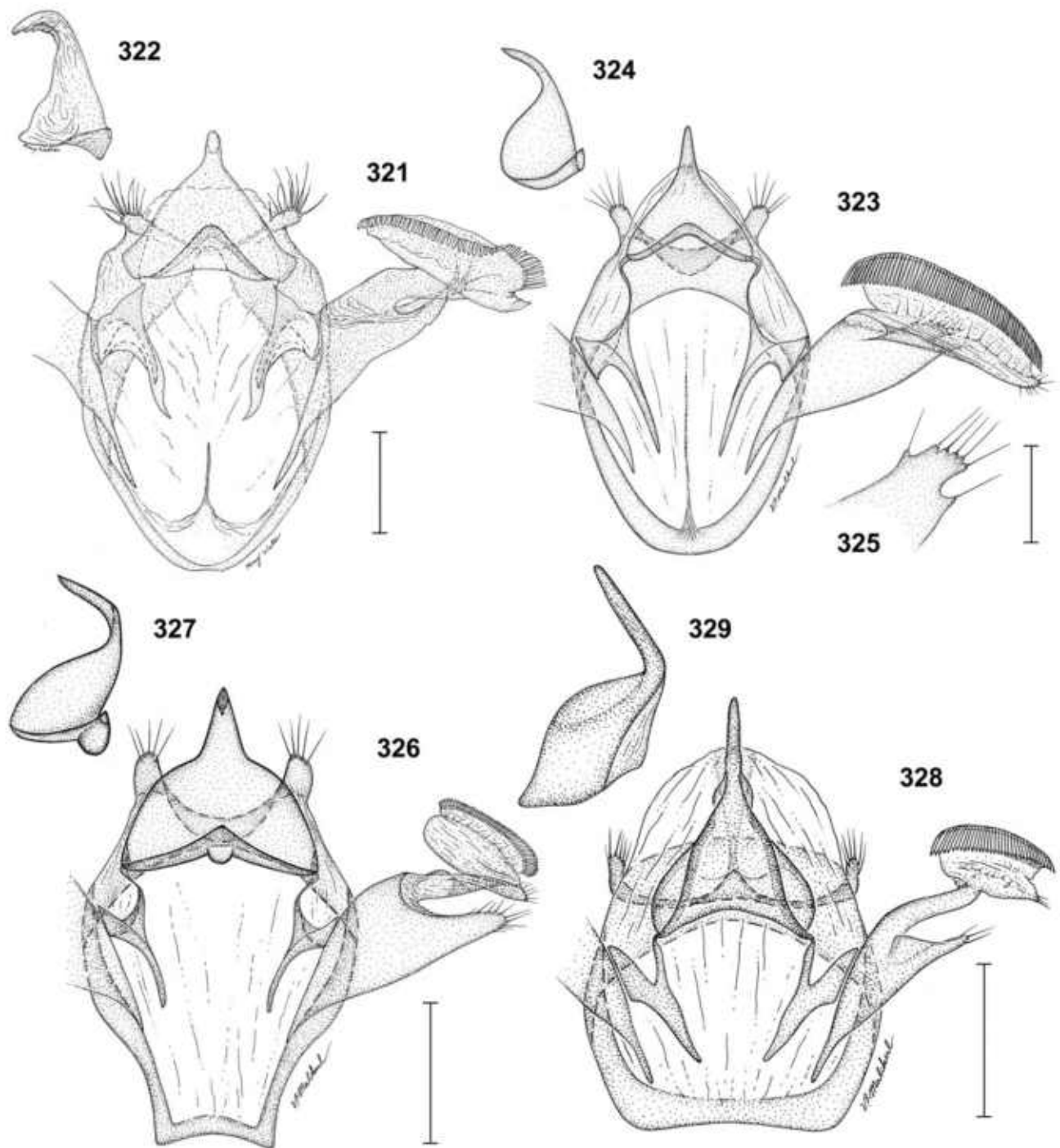
FIGURES 302–307. Male genitalia. *Pseudopostega latisaccula*: 302, ventral view; 303, gnathos, lateral view. *P. conicula*: 304, ventral view; 305, gnathos, lateral view. *P. attenuata*: 306, ventral view; 307, lateral view. (All scales = 0.1 mm.)



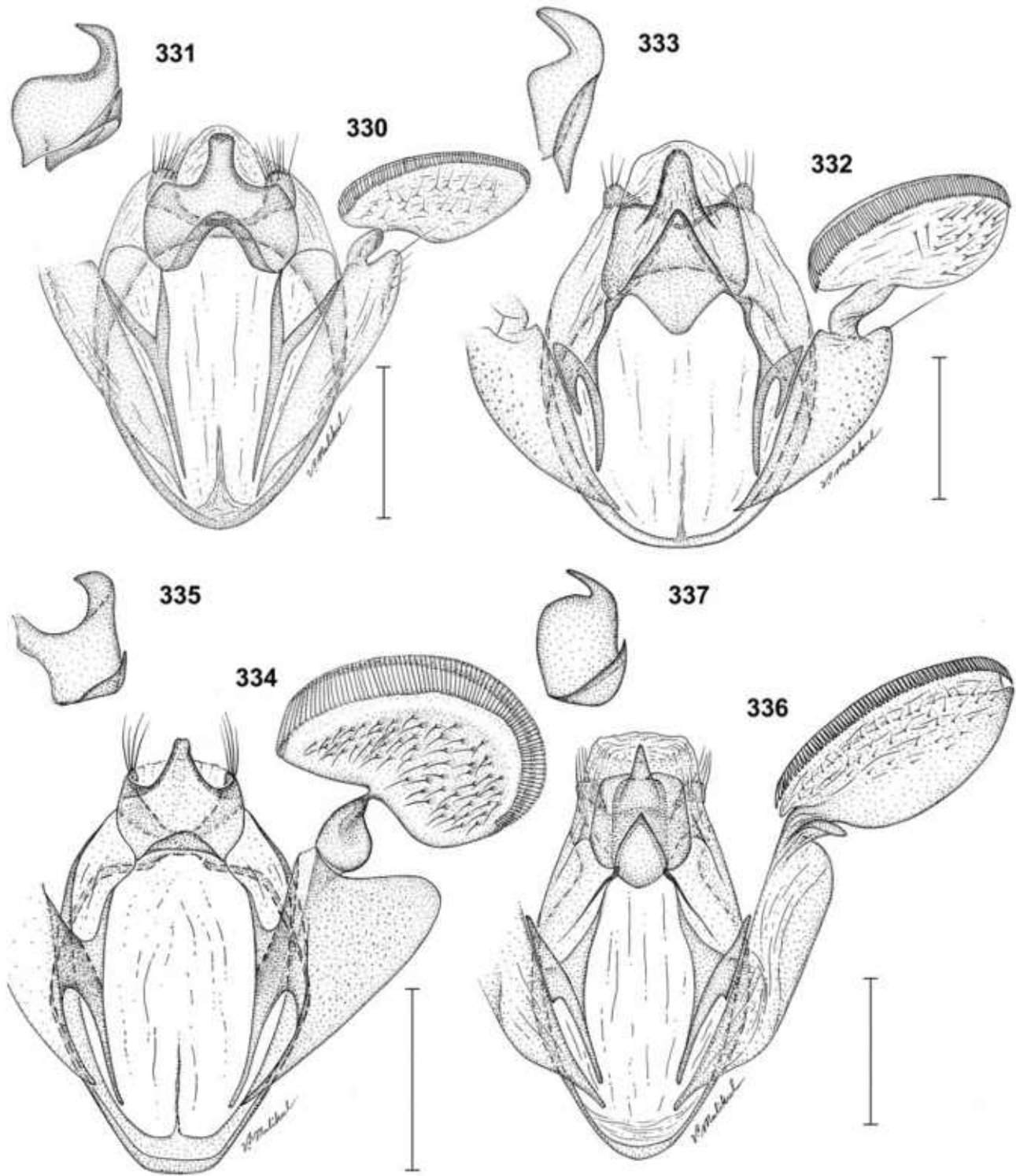
FIGURES 308–313. Male genitalia. *Pseudopostega triangularis*: 308, ventral view; 309, gnathos, lateral view. *P. sacculata*, 310, ventral view. *P. kempella*: 311, ventral view; 312, gnathos, lateral view. *P. paraplicatella*, 313, ventral view. (All scales = 0.1 mm.)



FIGURES 314–320. Male genitalia. *Pseudopostega plicatella*, 314, ventral view. *P. cretea*: 315, ventral view; 316, gnathos, lateral view. *P. brevipicula*: 317, ventral view; 318, gnathos, lateral view. *P. mignoniae*: 319, ventral view; 320, gnathos, lateral view. (All scales = 0.1 mm.)

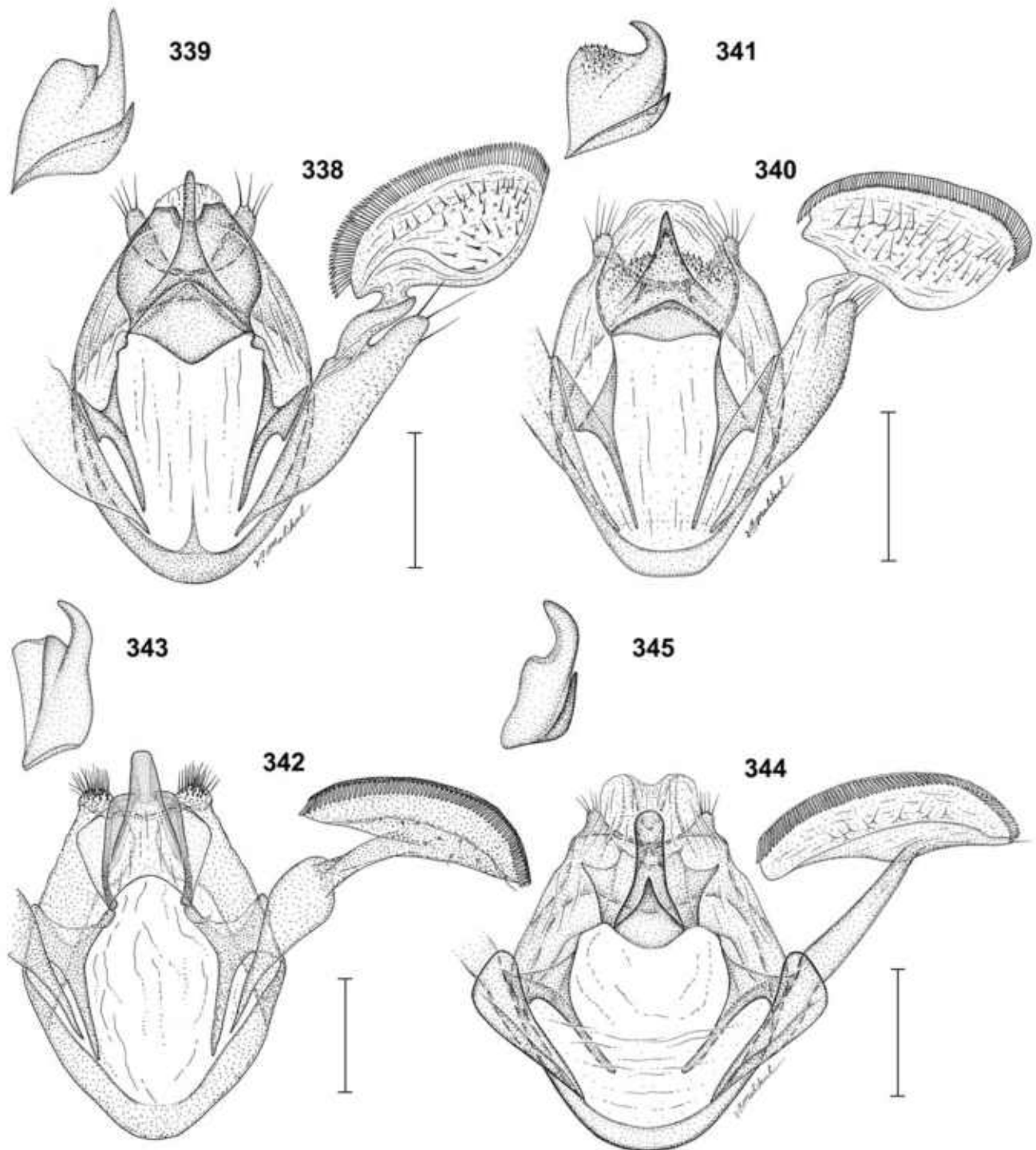


FIGURES 321–329. Male genitalia. *Pseudopostega trinidadensis*: 321, ventral view; 322, gnathos, lateral view. *P. subtila*: 323, ventral view; 324, gnathos, lateral view; 325, apical detail of saccular lobe. *P. acuminata*: 326, ventral view; 327, gnathos, lateral view. *P. tanygnatha*: 328, ventral view; 329, gnathos, lateral view. (All scales = 0.1 mm.)

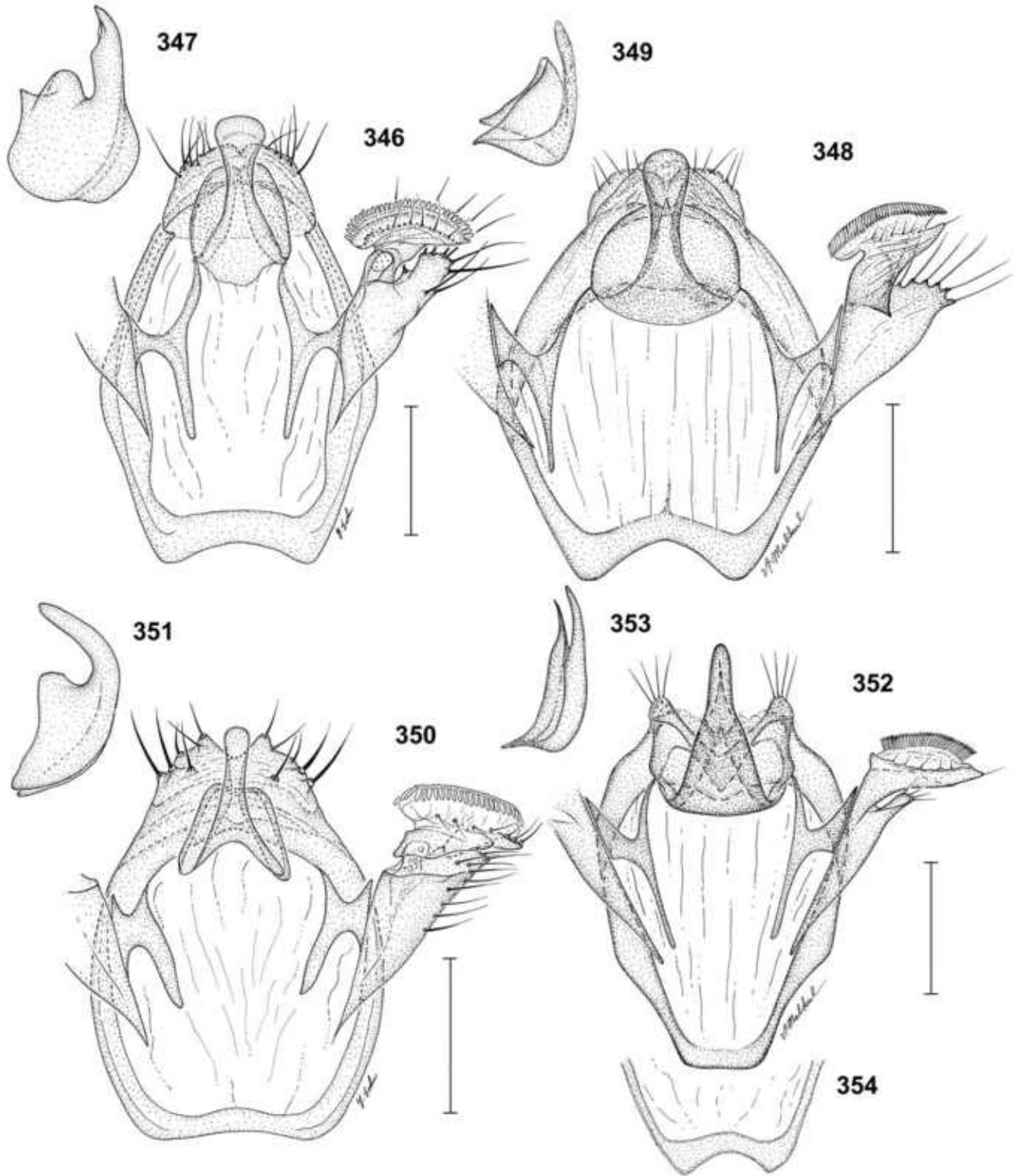


FIGURES 330–337. Male genitalia. *Pseudopostega colognatha*: 330, ventral view; 331, gnathos, lateral view. *P. obtusa*: 332, ventral view; 333, gnathos, lateral view. *P. galapagosae*: 334, ventral view; 335, gnathos, lateral view. *P. saltatrix*: 336, ventral view; 337, gnathos, lateral view. (All scales = 0.1 mm.)

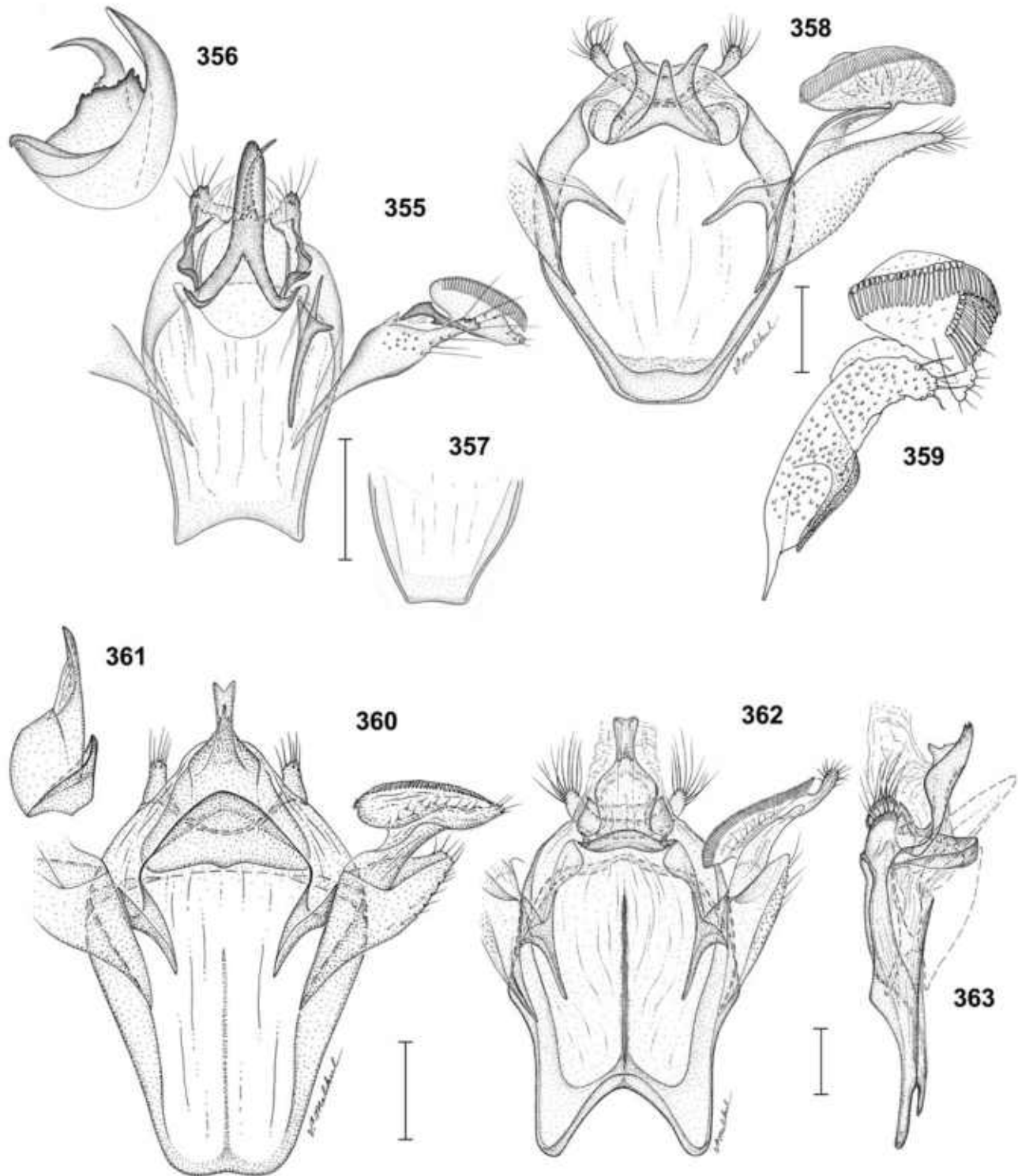




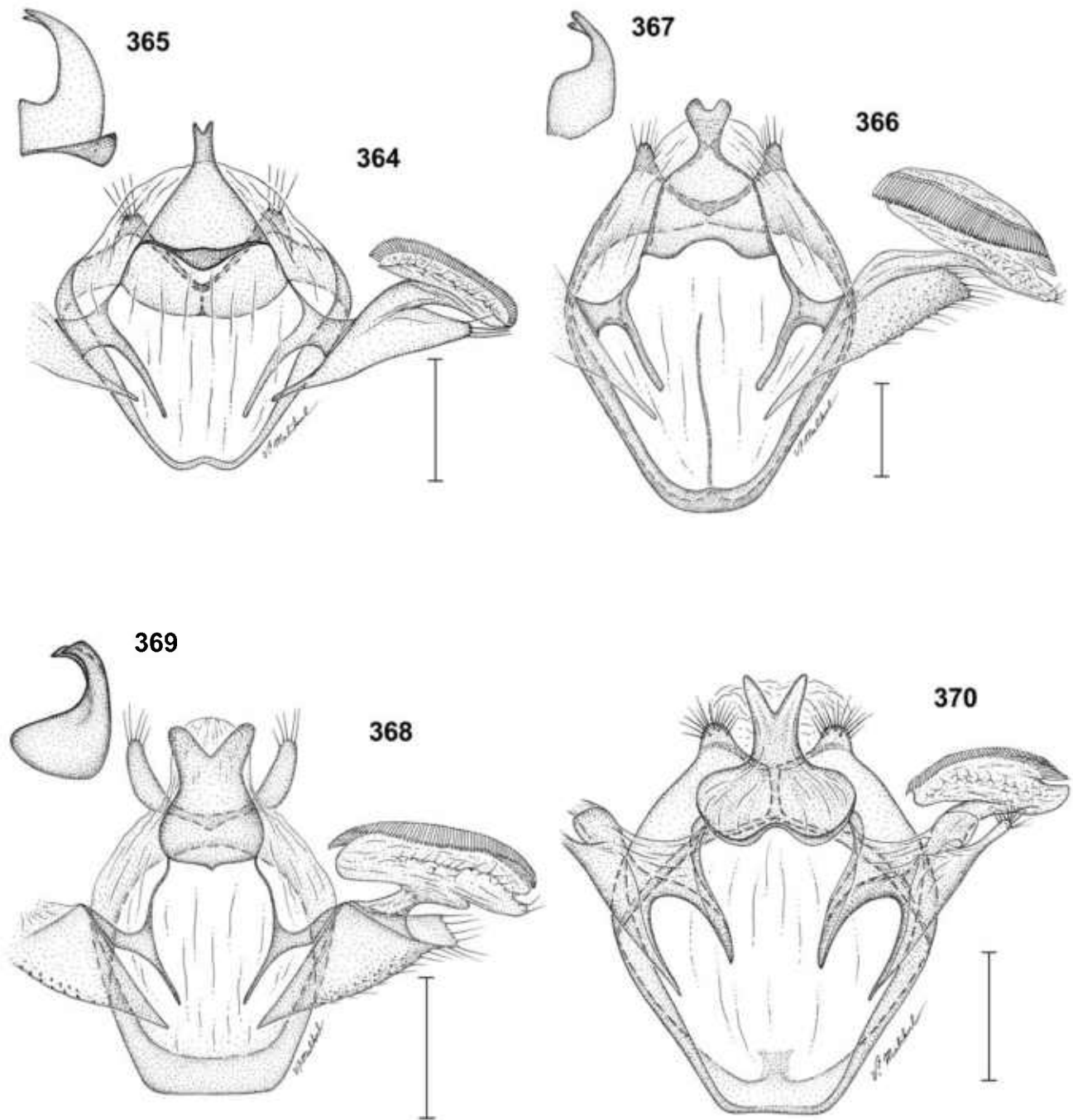
FIGURES 338–345. Male genitalia. *Pseudopostega dorsalis dorsalis*: 338, ventral view; 339, gnathos, lateral view. *P. parakempella*: 340, ventral view; 341, gnathos, lateral view. *P. adusta*: 342, ventral view; 343, gnathos, lateral view. *P. longipedicella*: 344, ventral view; 345, gnathos, lateral view. (All scales = 0.1 mm.)



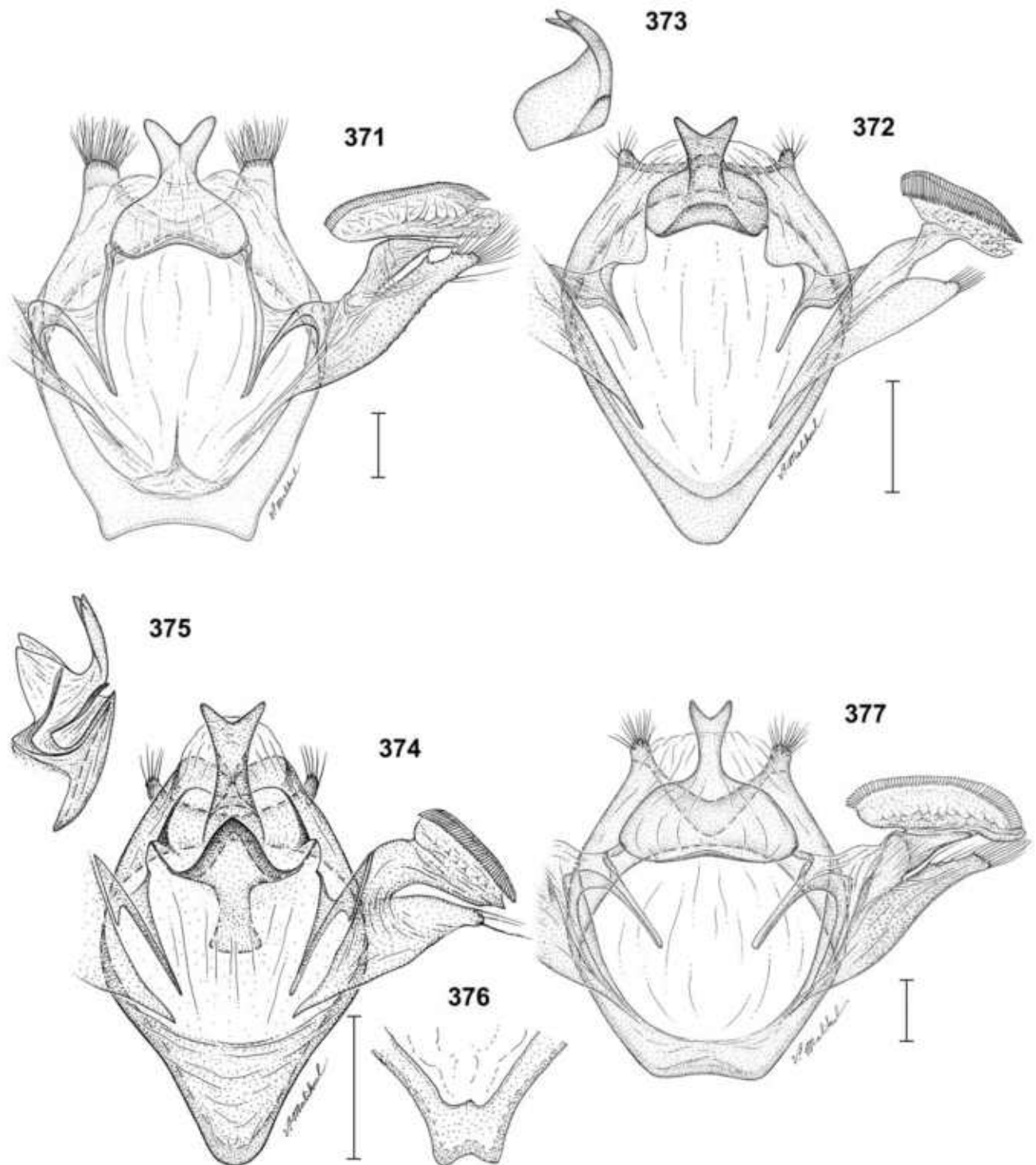
FIGURES 346–354. Male genitalia. *Pseudopostega lobata*: 346, ventral view; 347, gnathos, lateral view. *P. clavata*: 348, ventral view; 349, gnathos, lateral view. *P. sublobata*: 350, ventral view; 351, gnathos, lateral view. *P. duplicata*: 352, ventral view; 353, gnathos, lateral view; 354, anterior rim of vinculum. (All scales = 0.1 mm.)



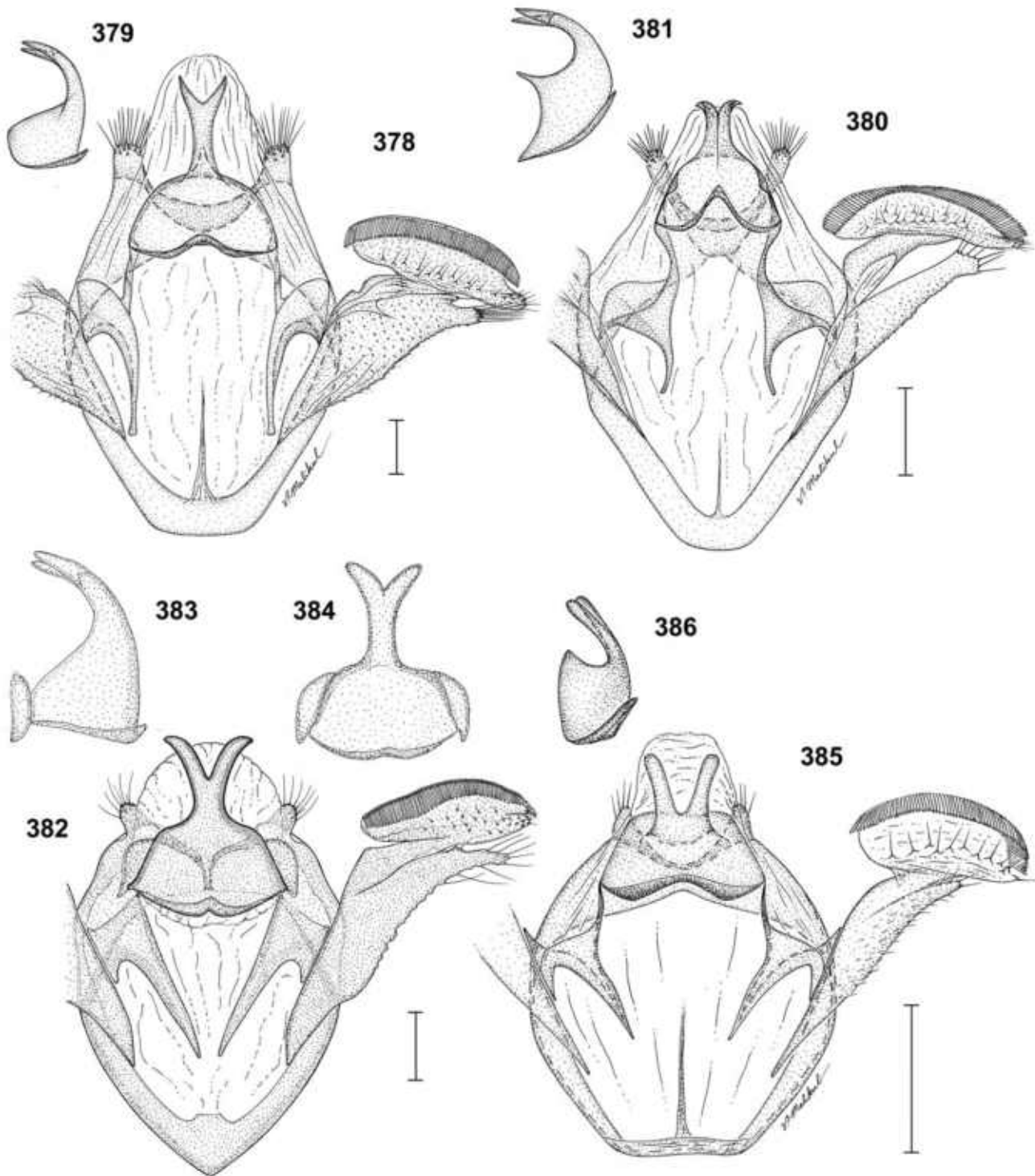
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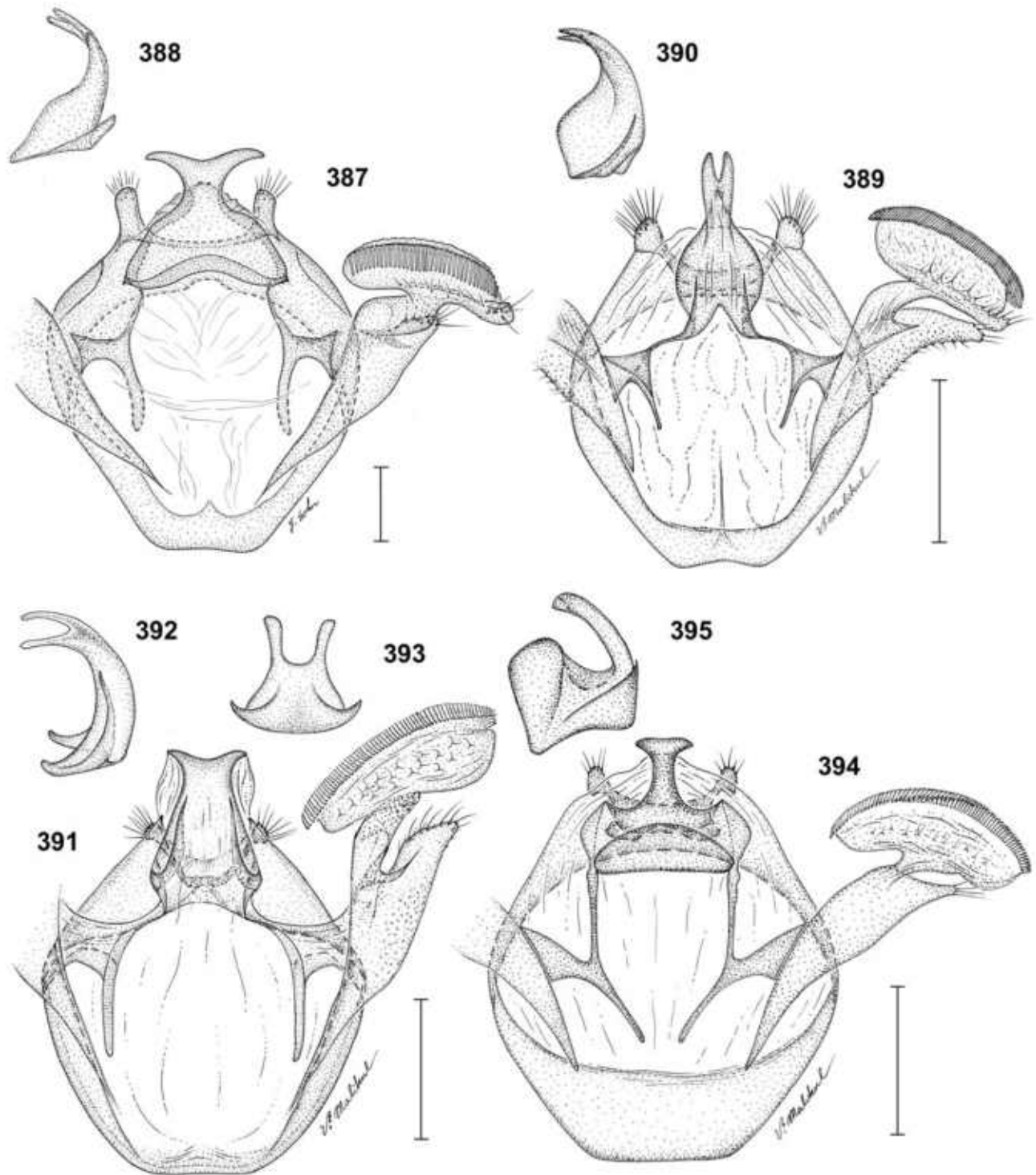
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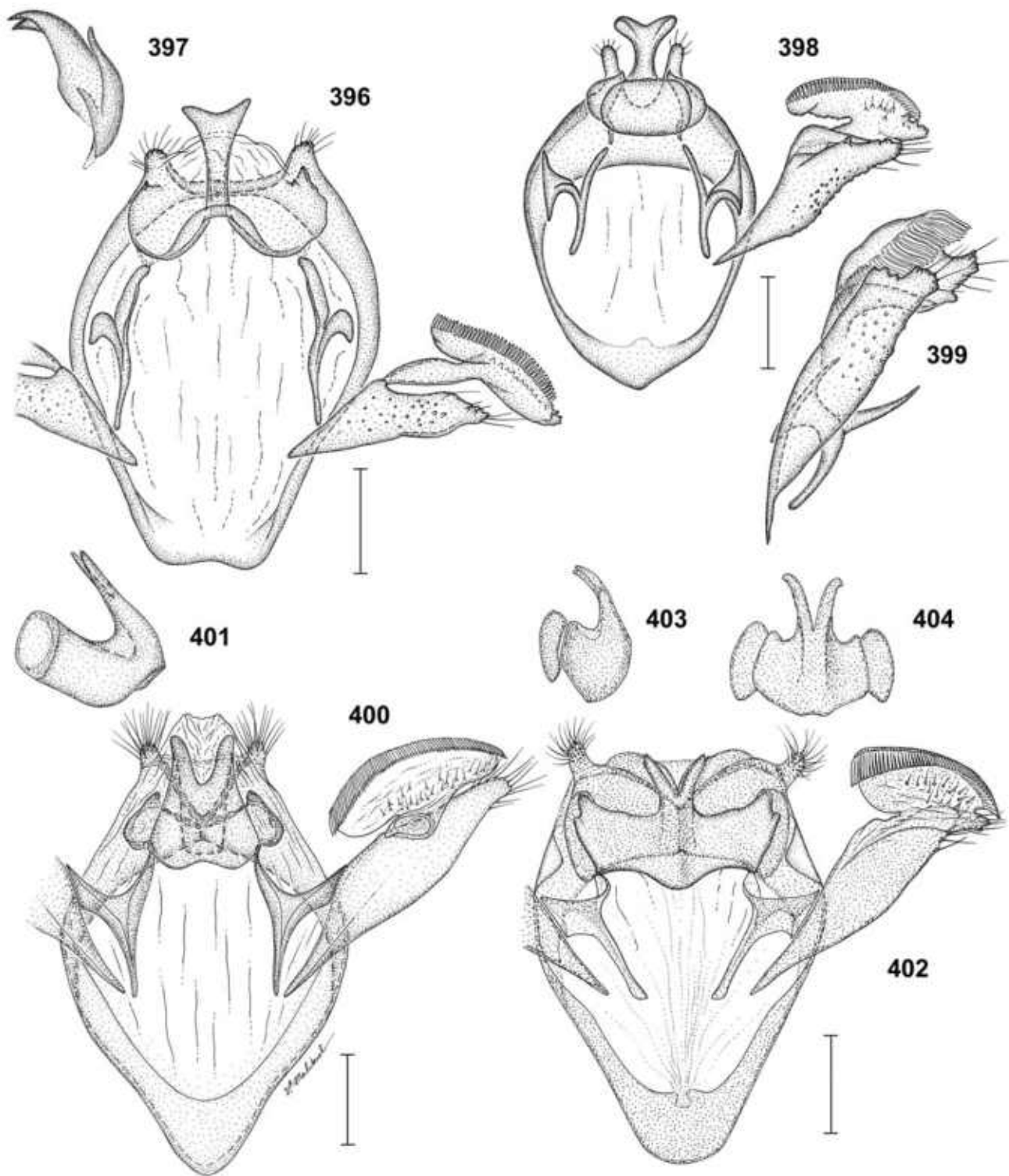
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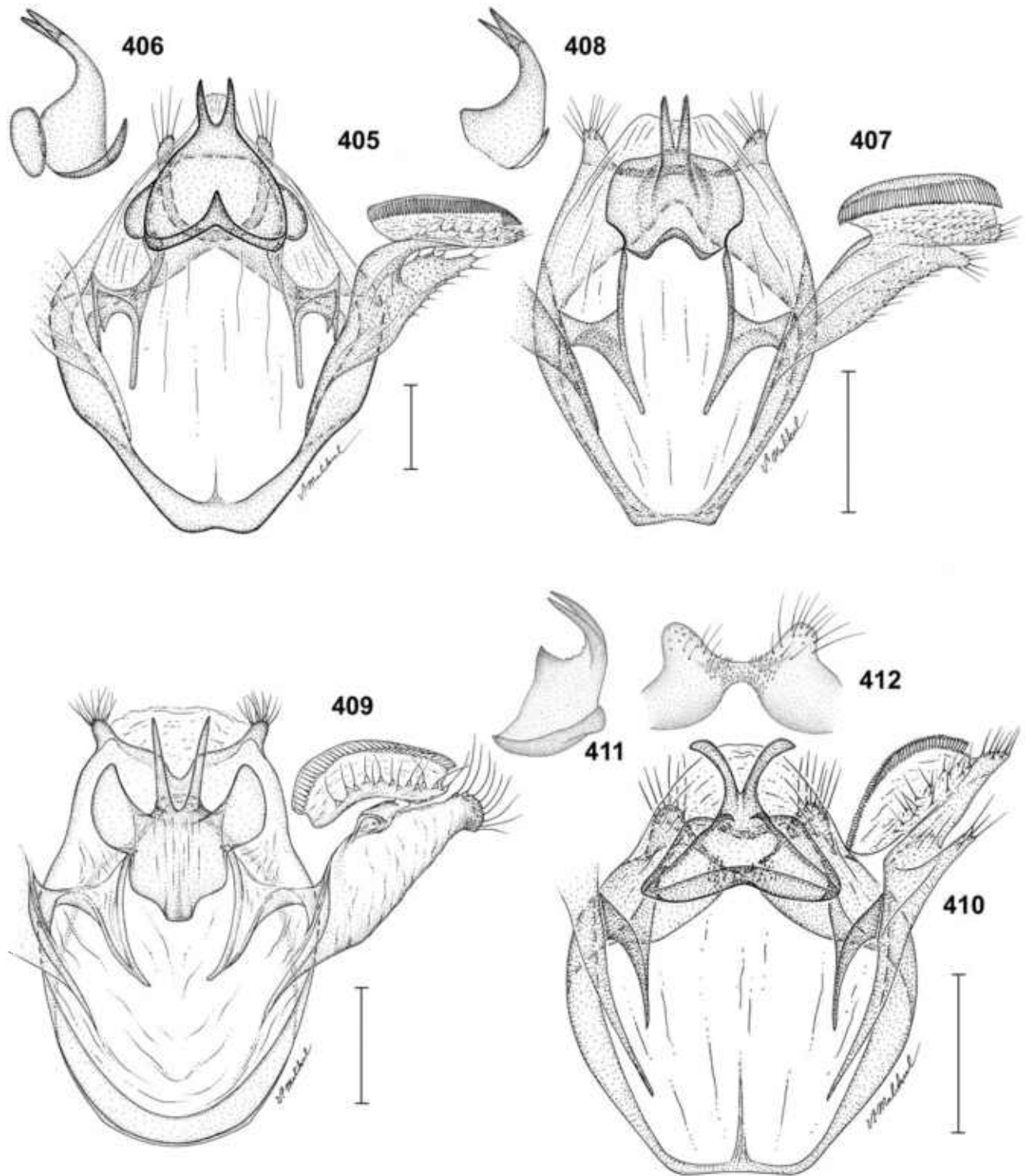


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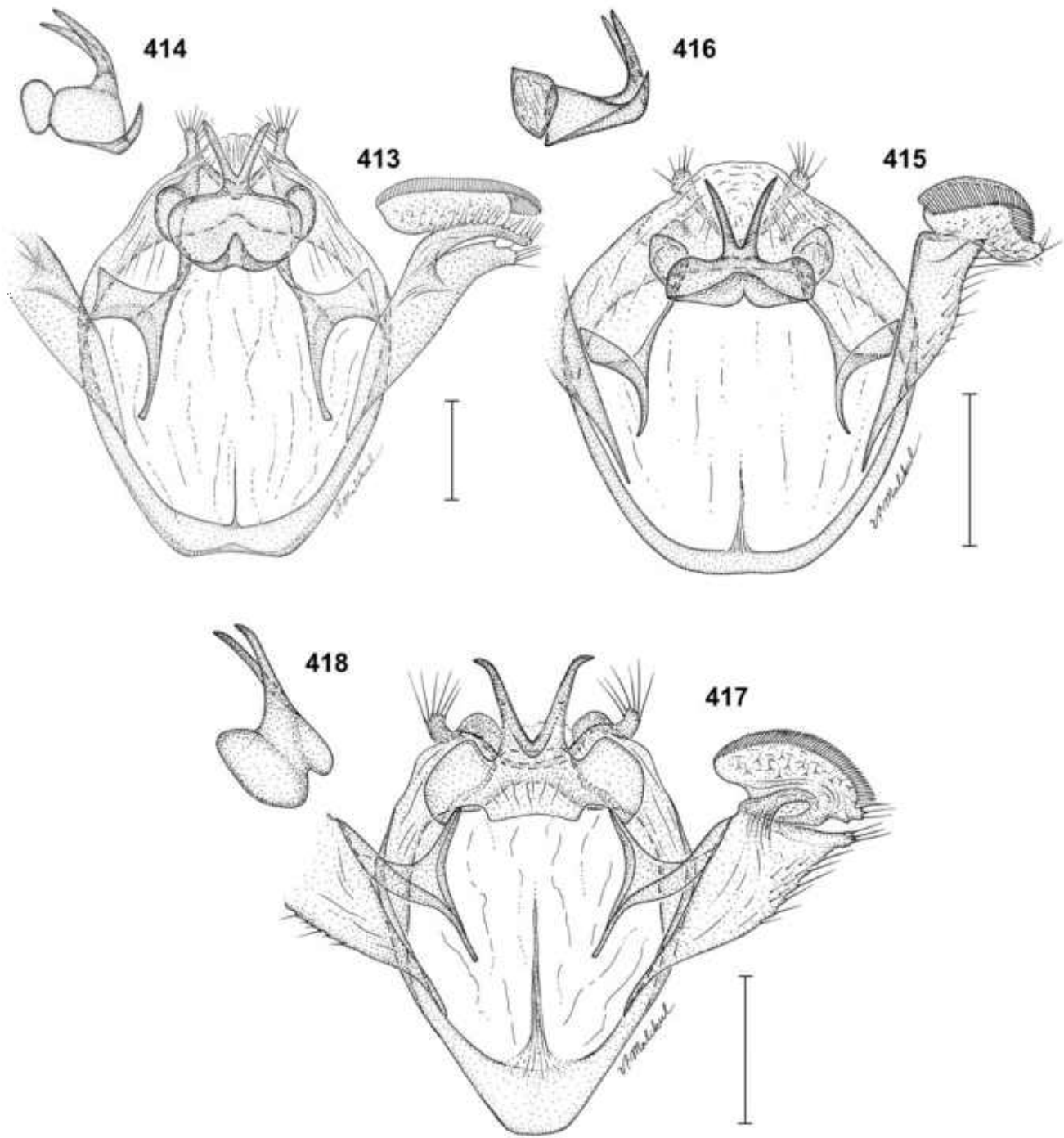


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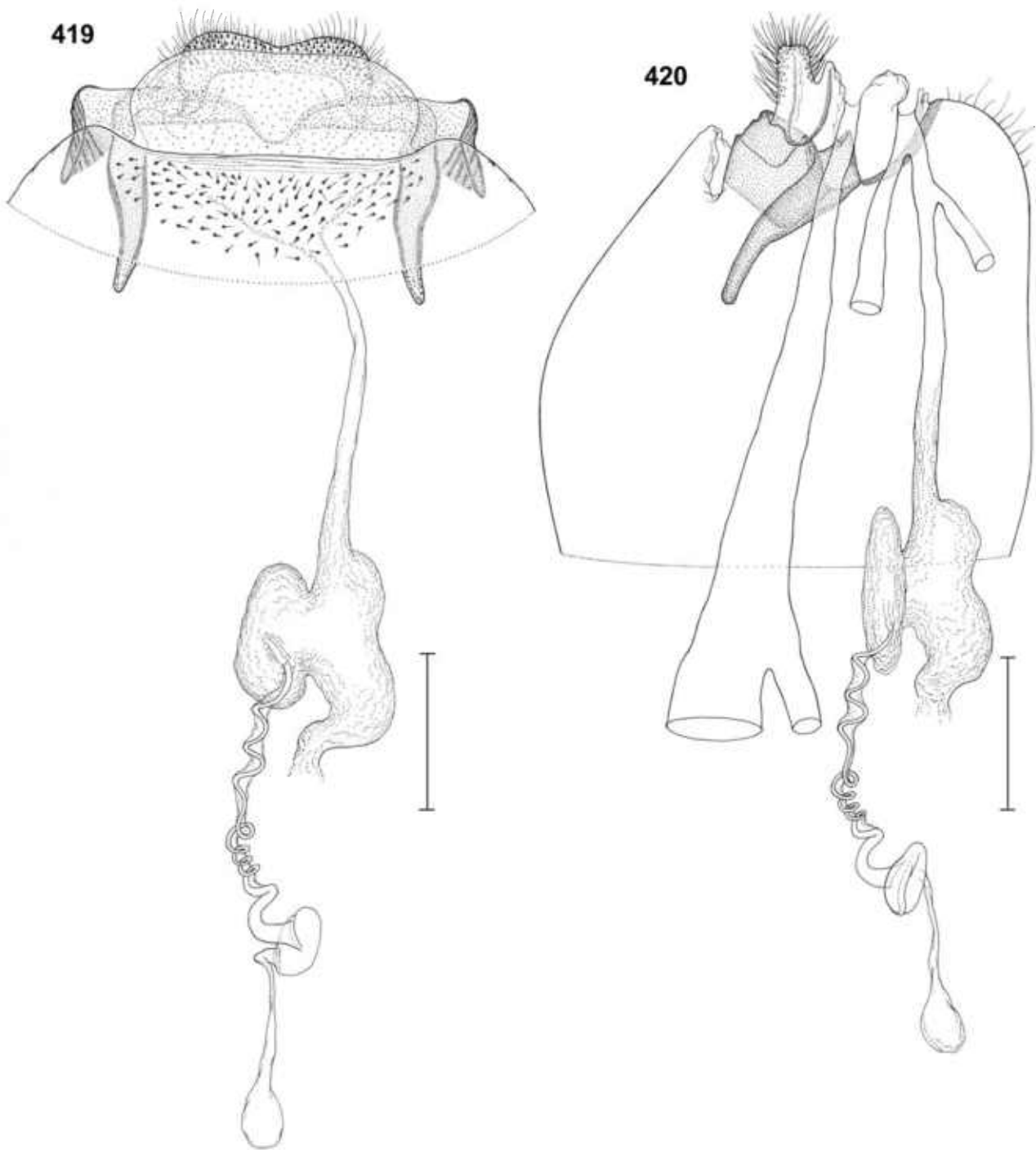




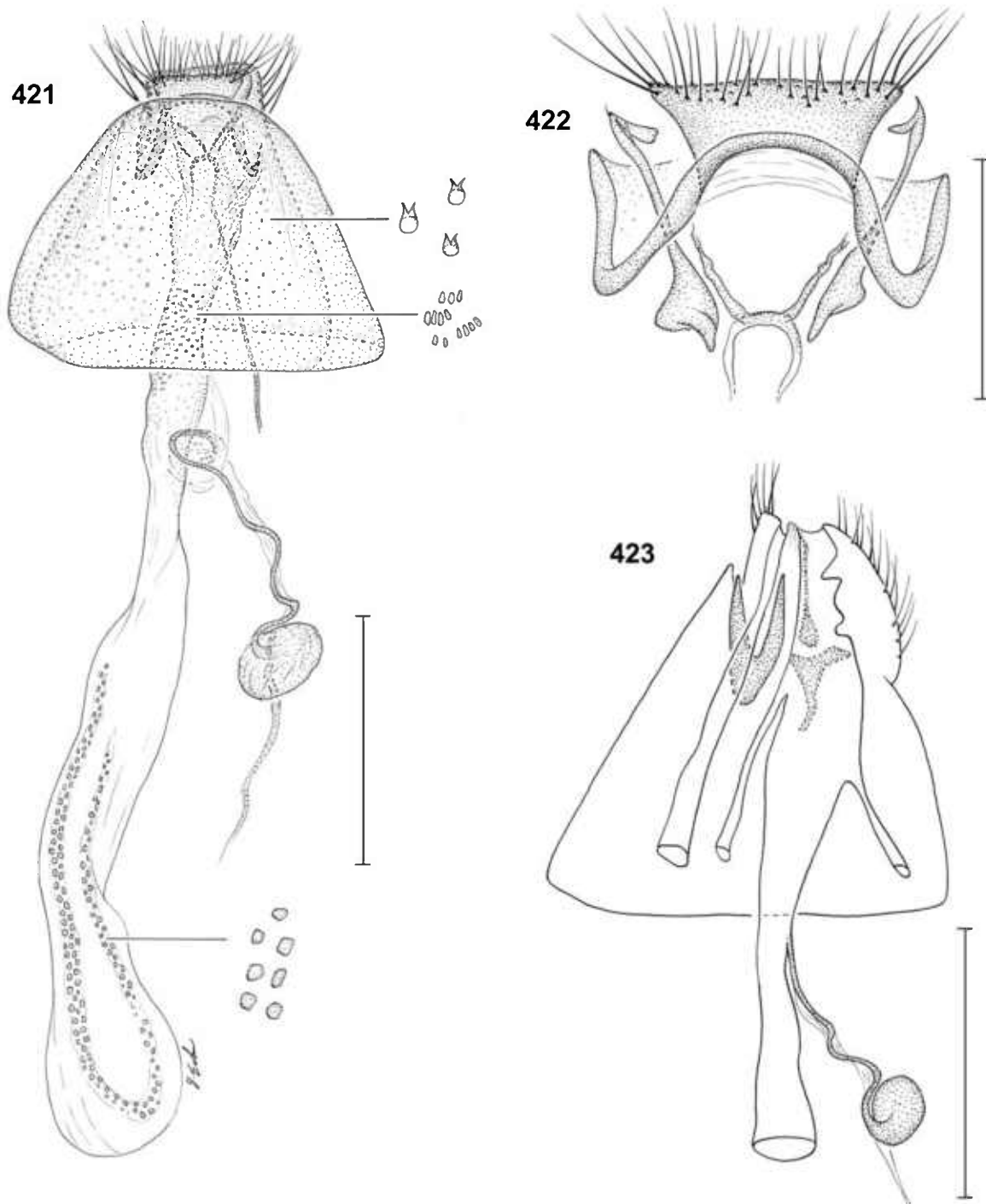
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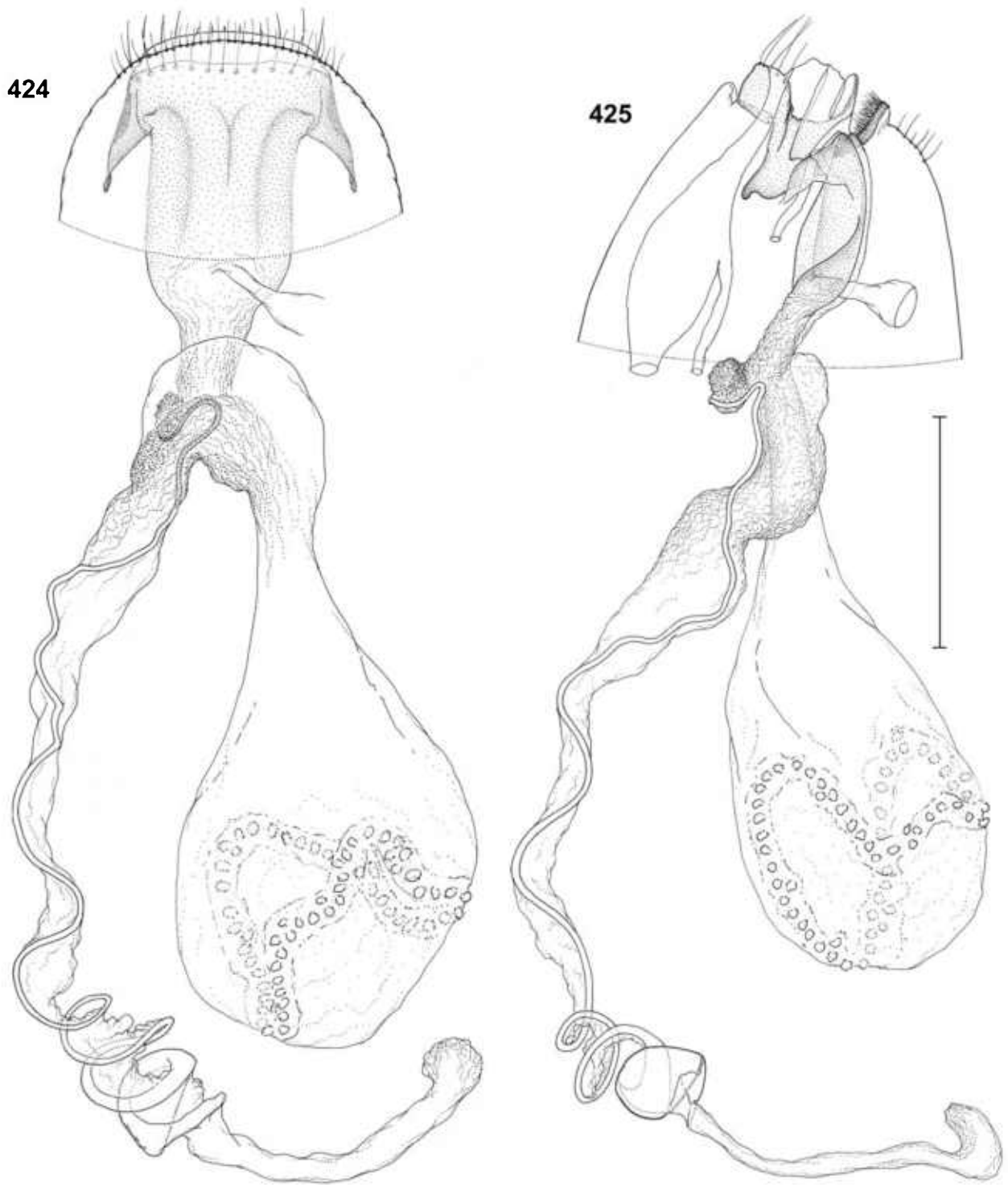
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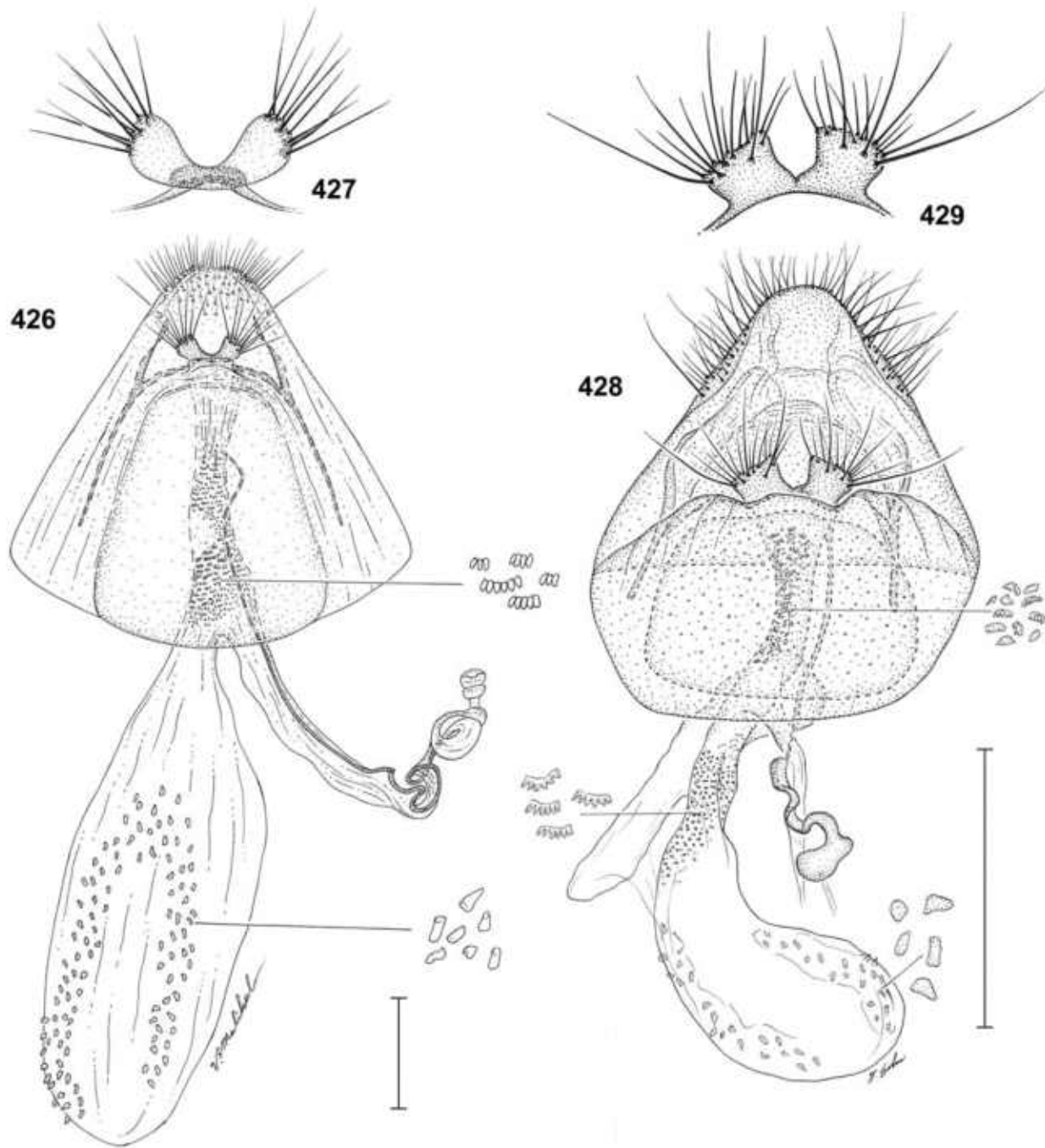
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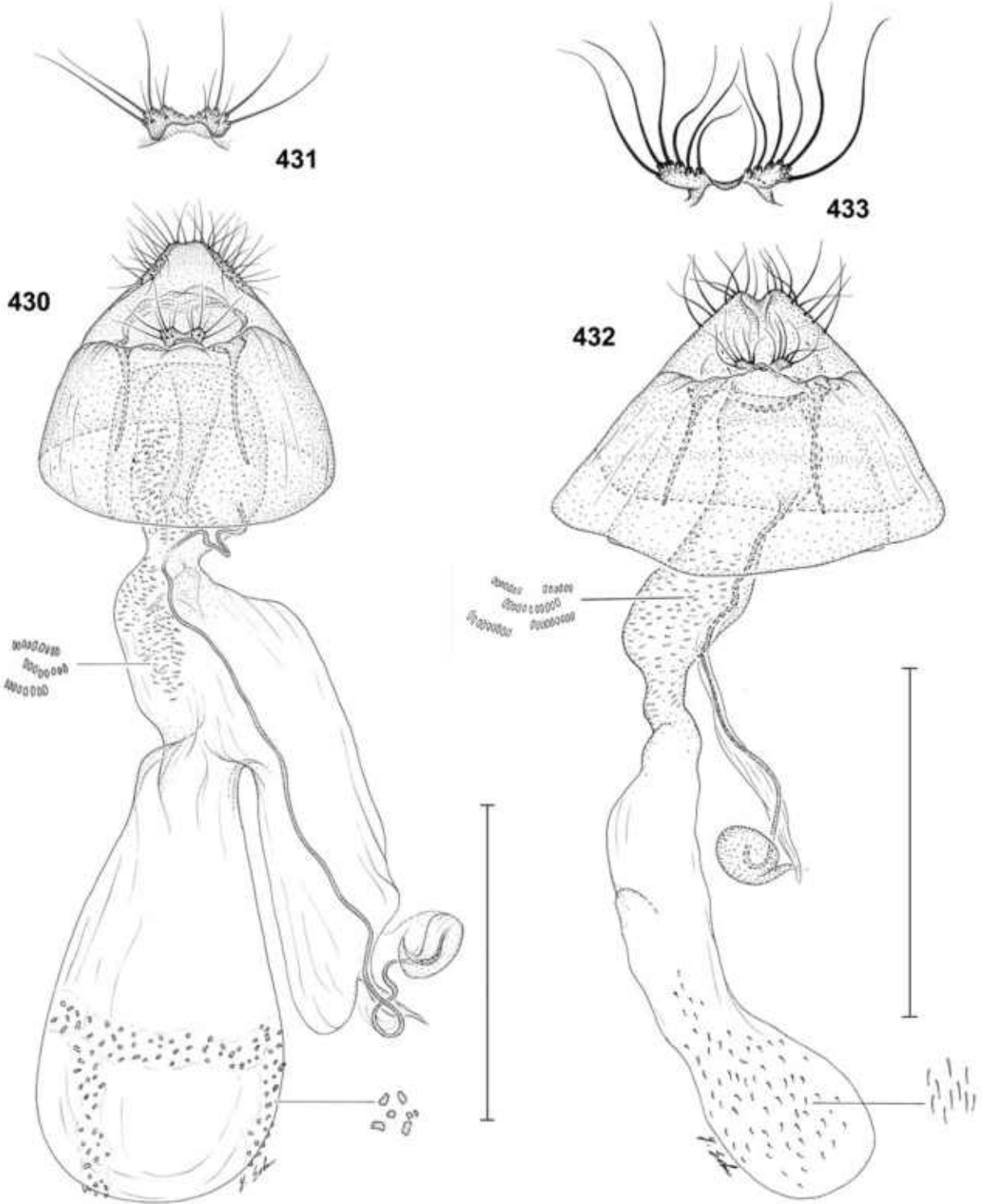
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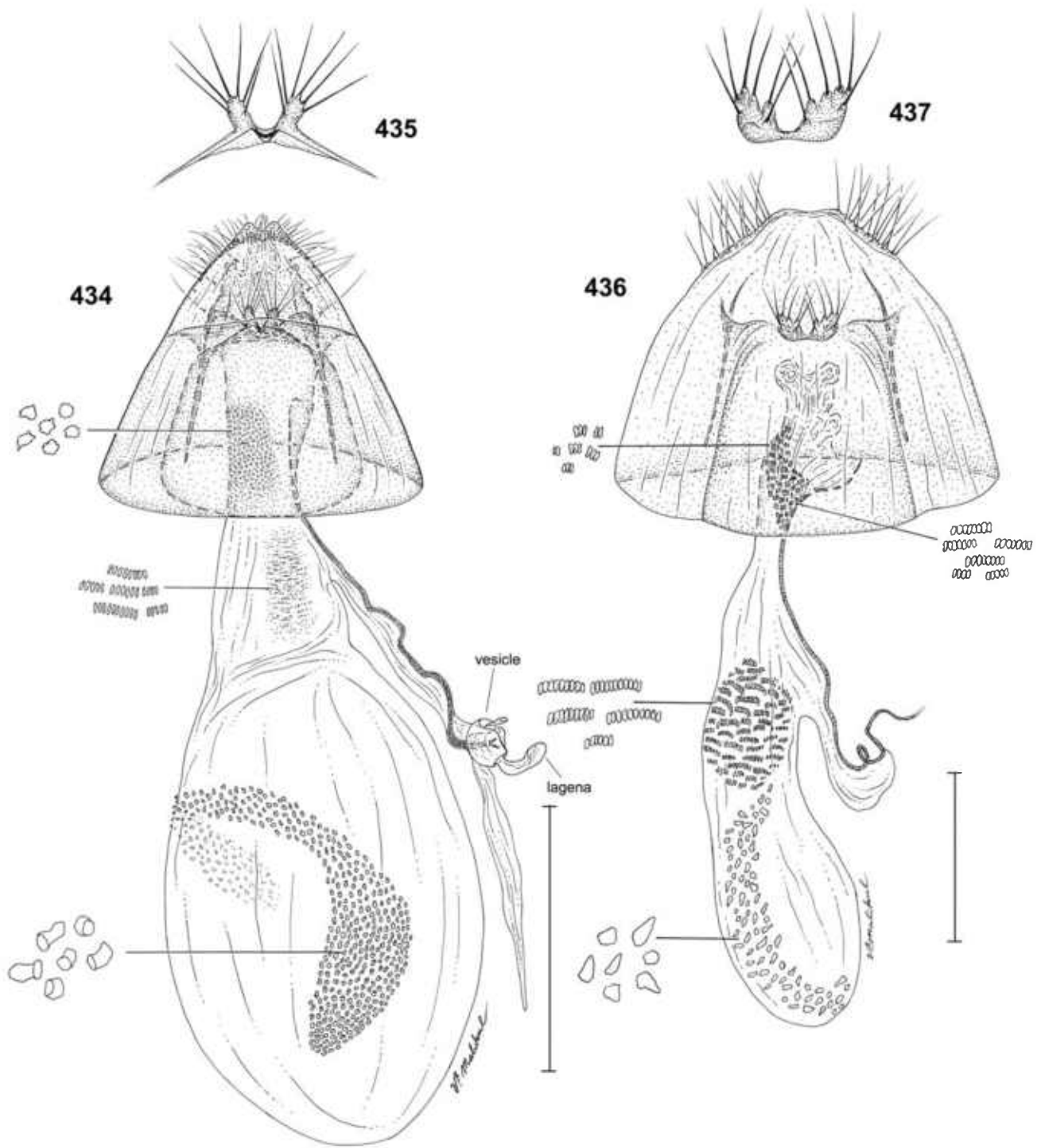
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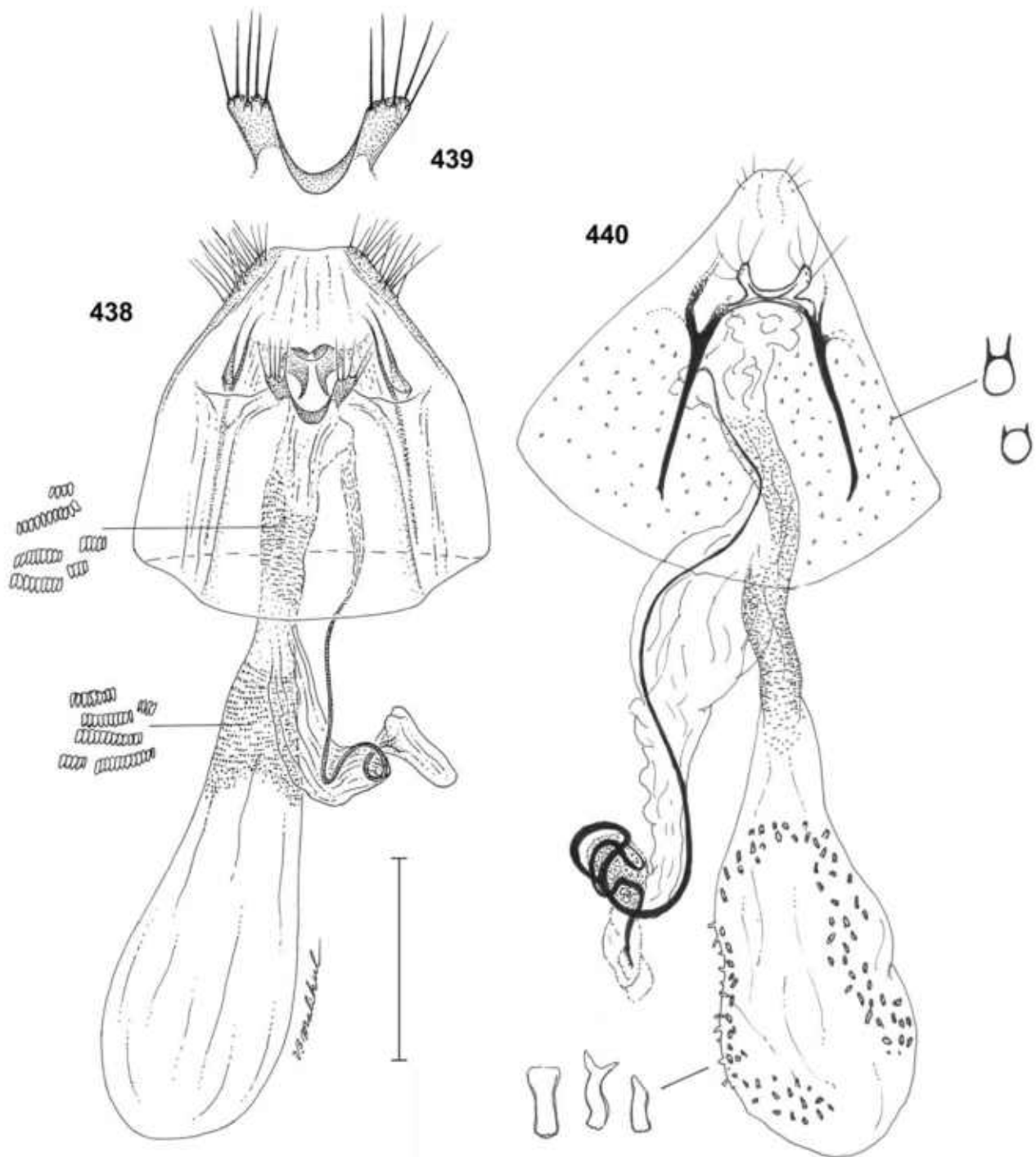


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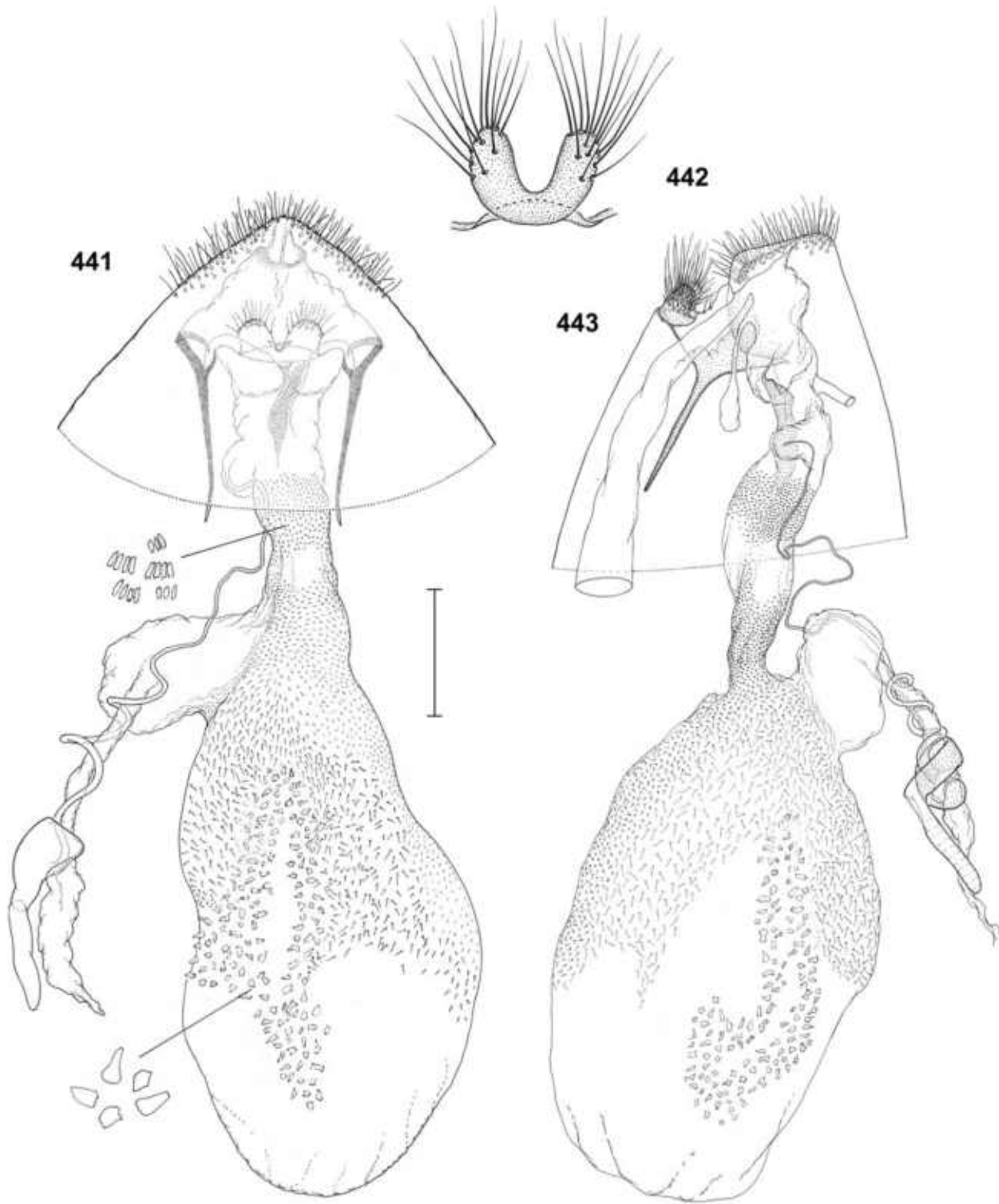


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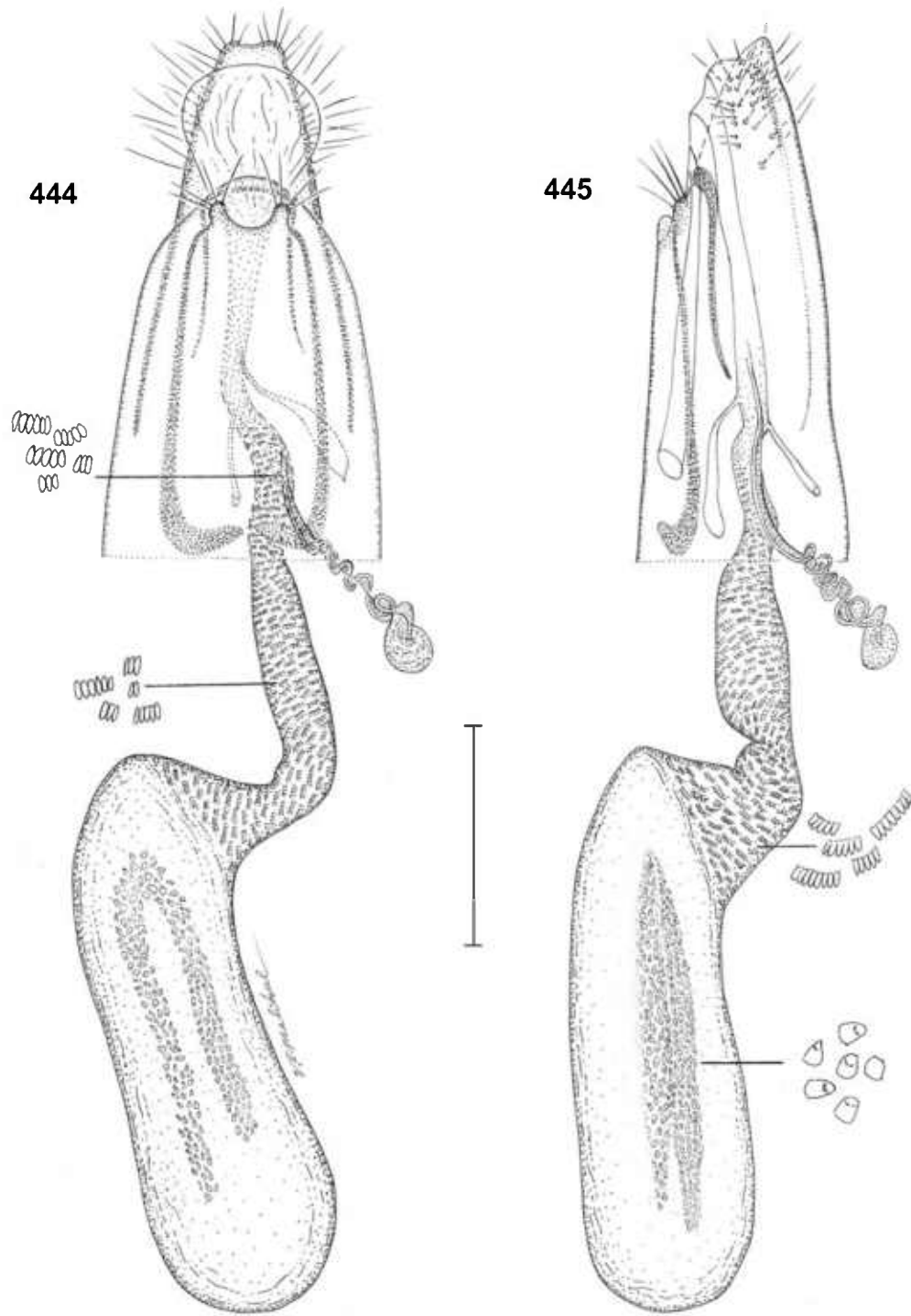




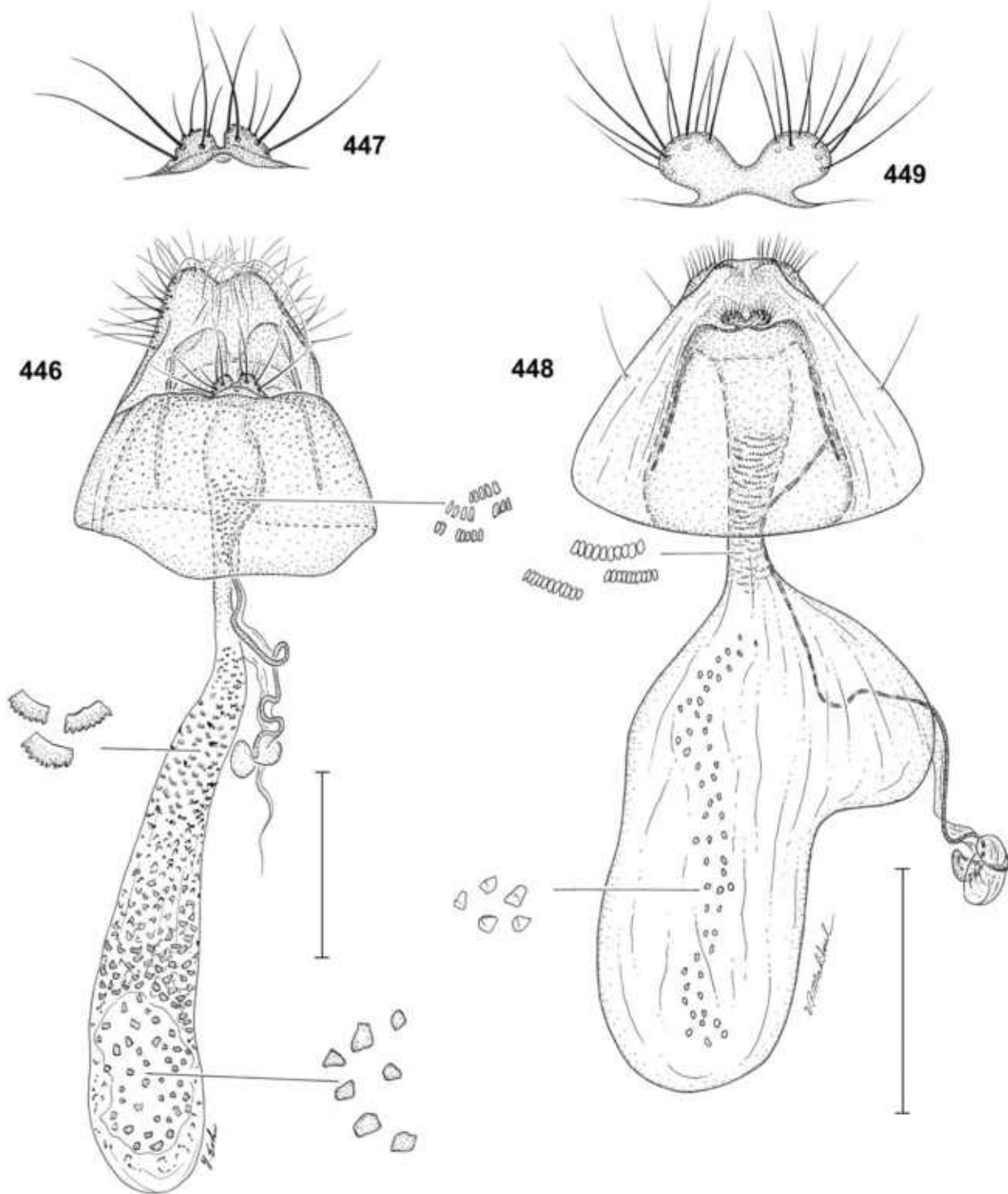
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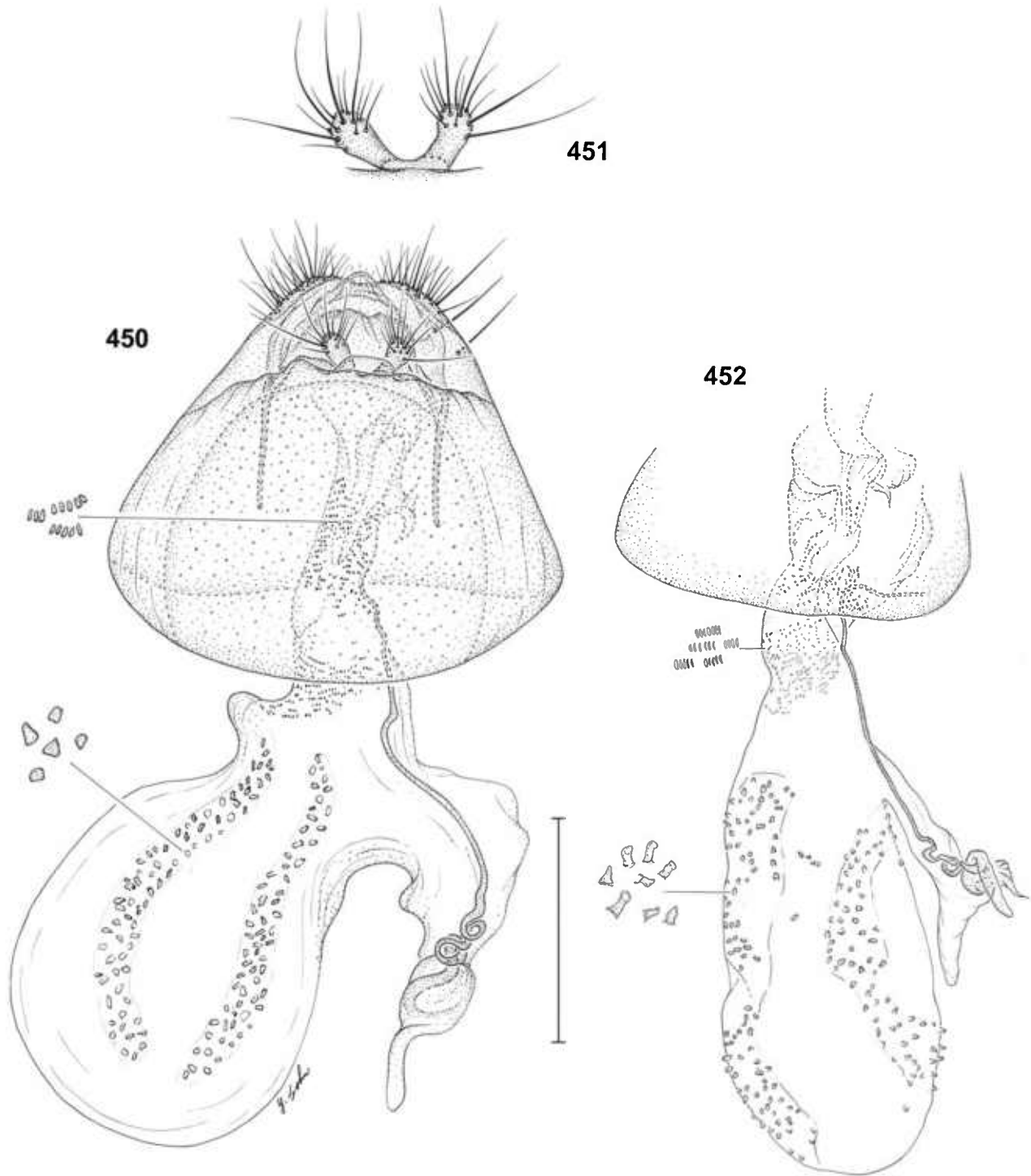
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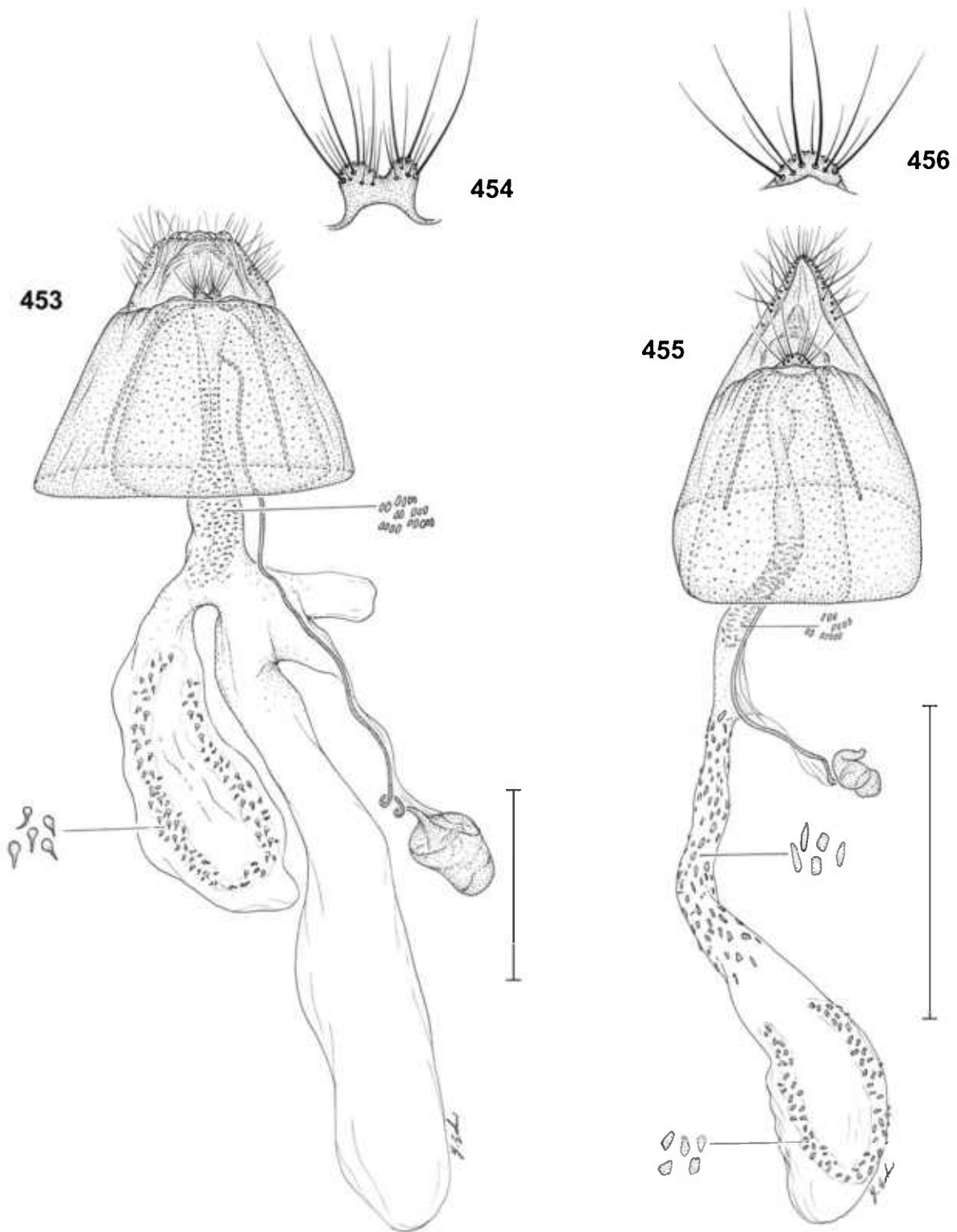
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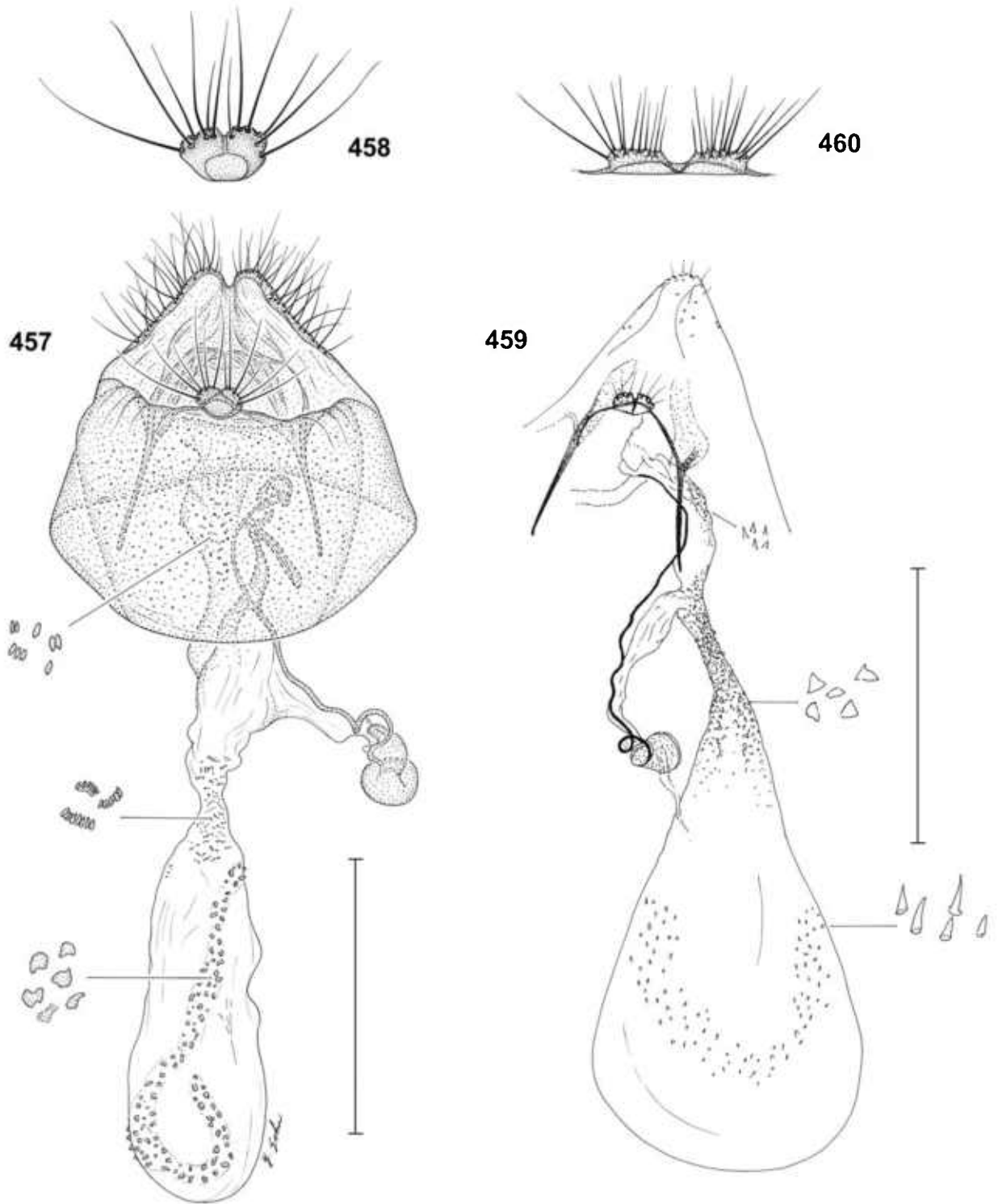
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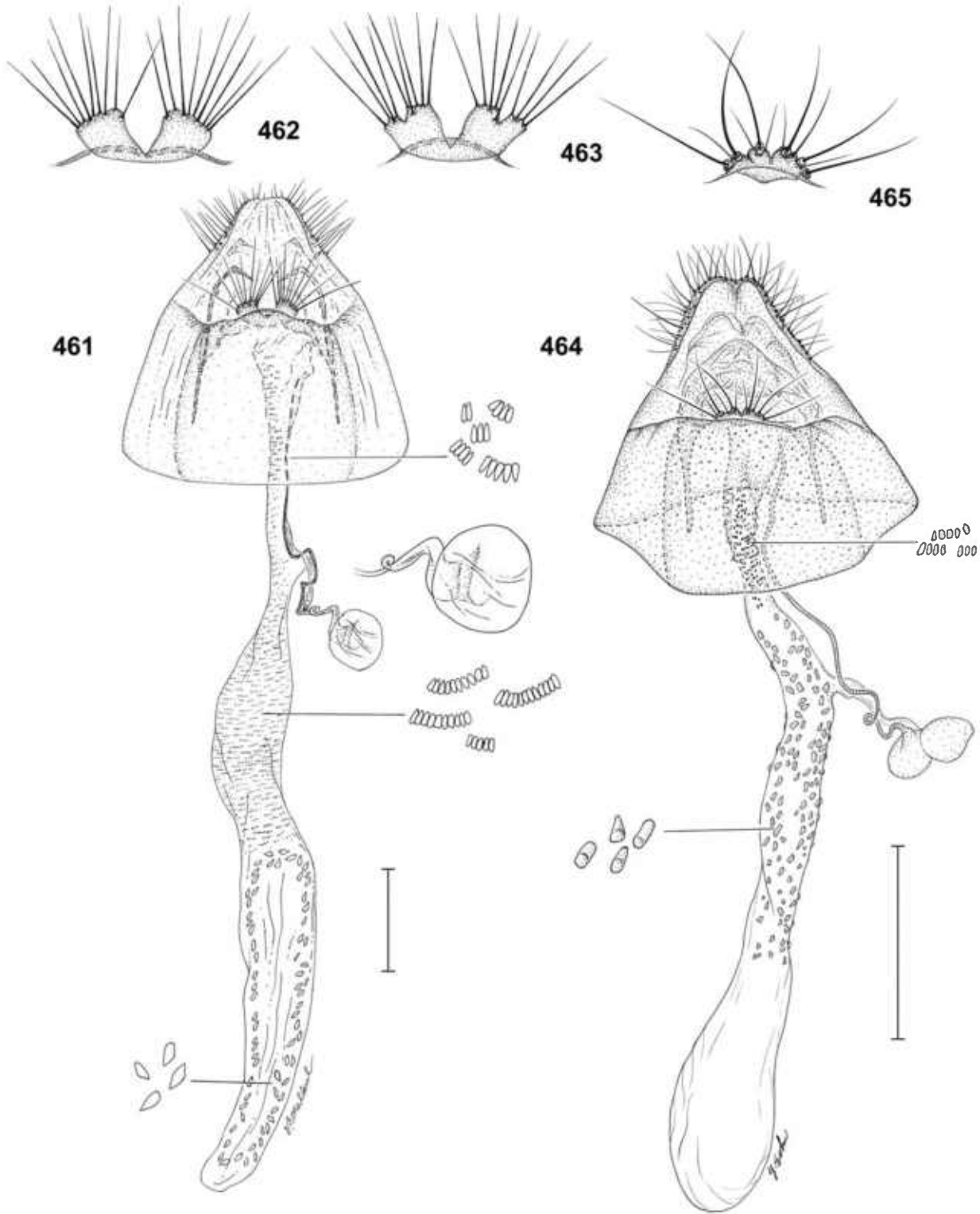
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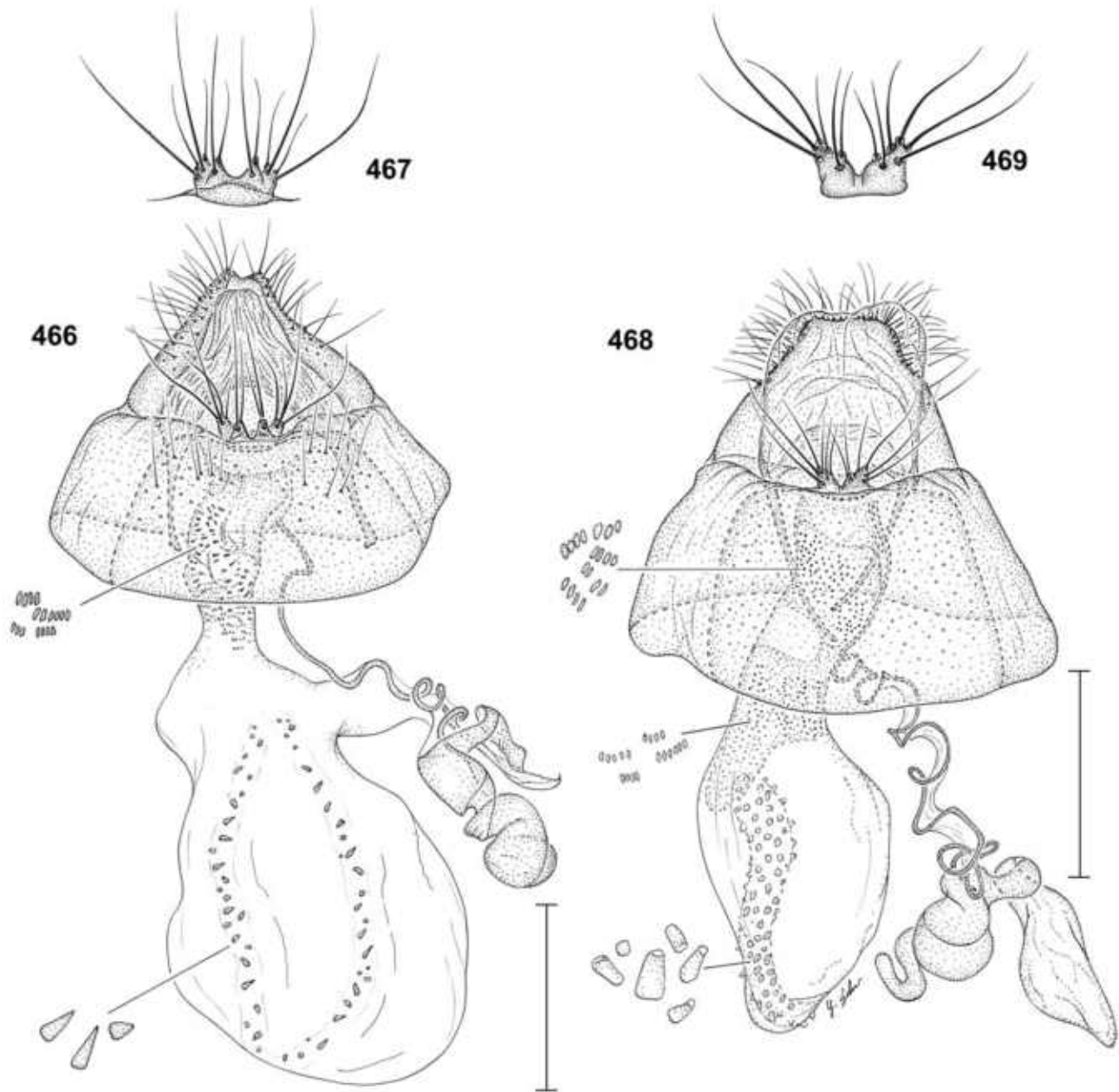


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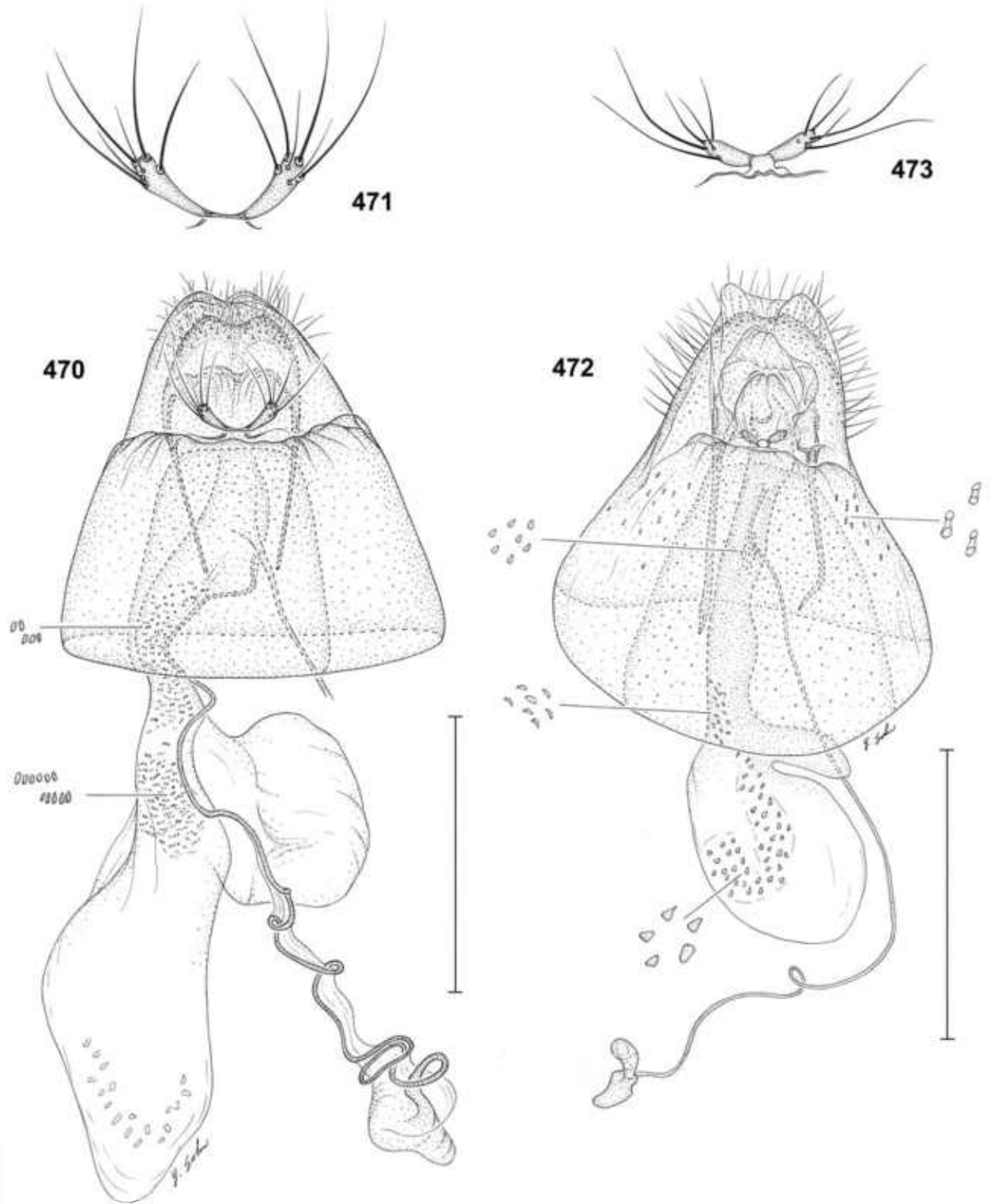


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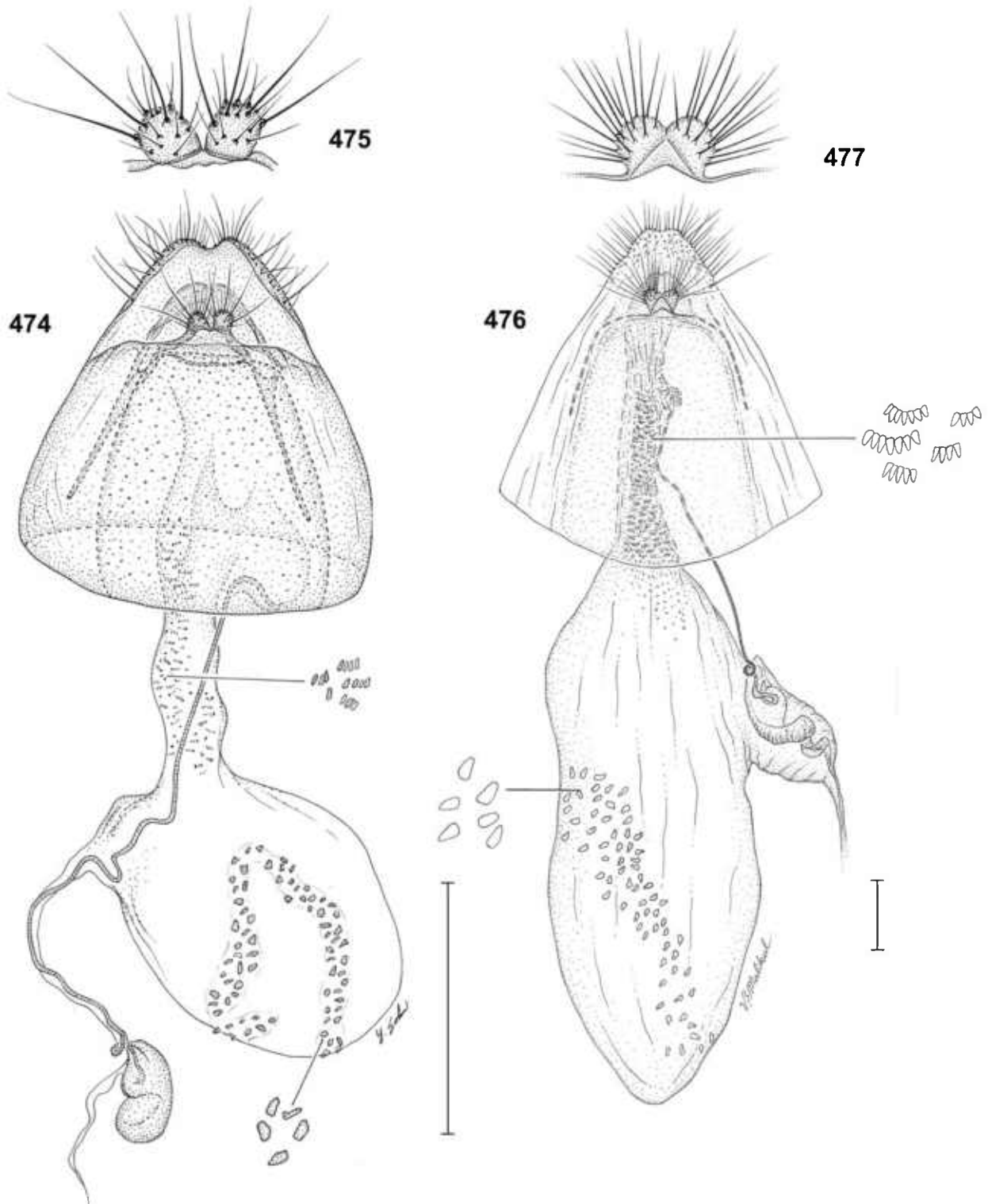




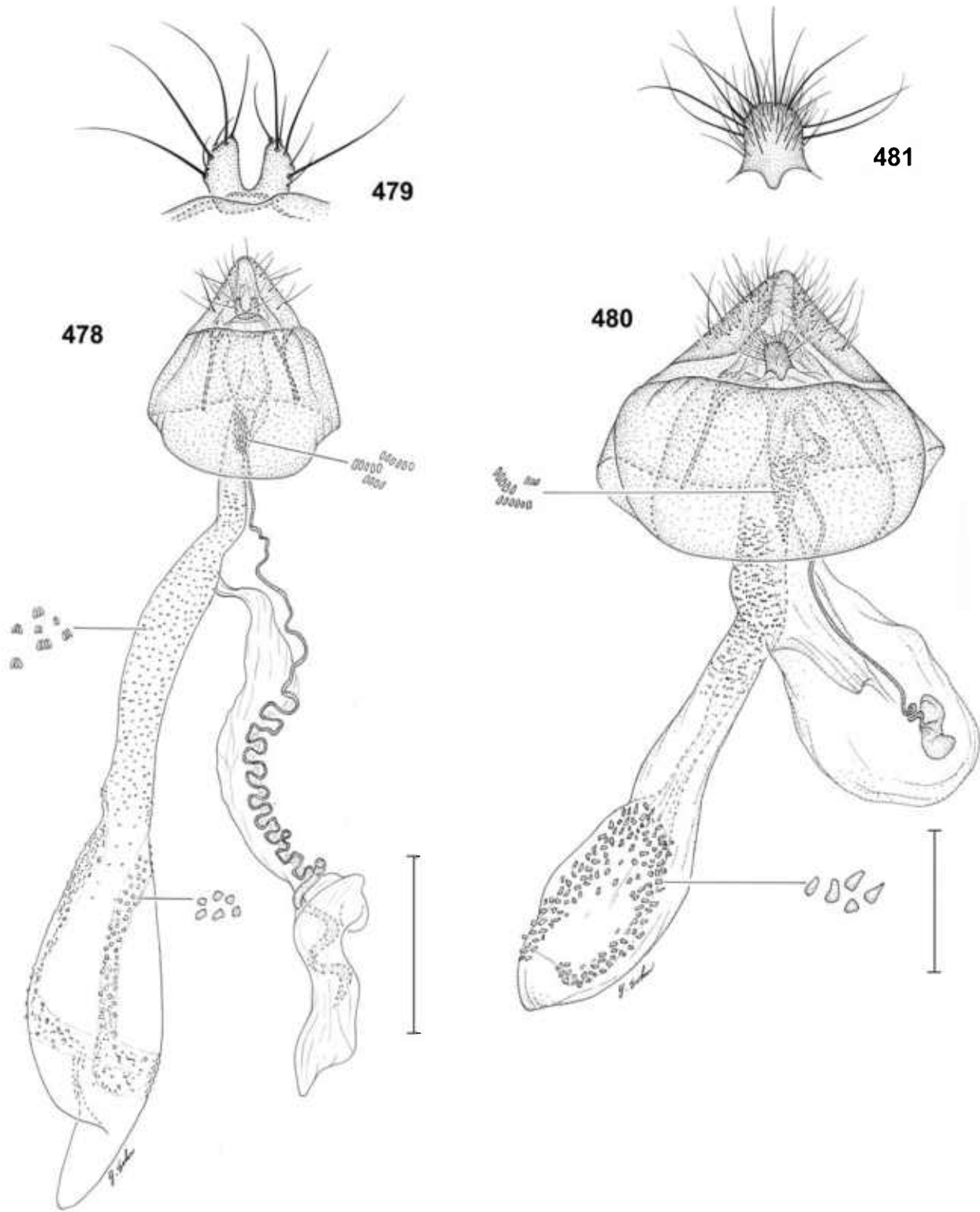
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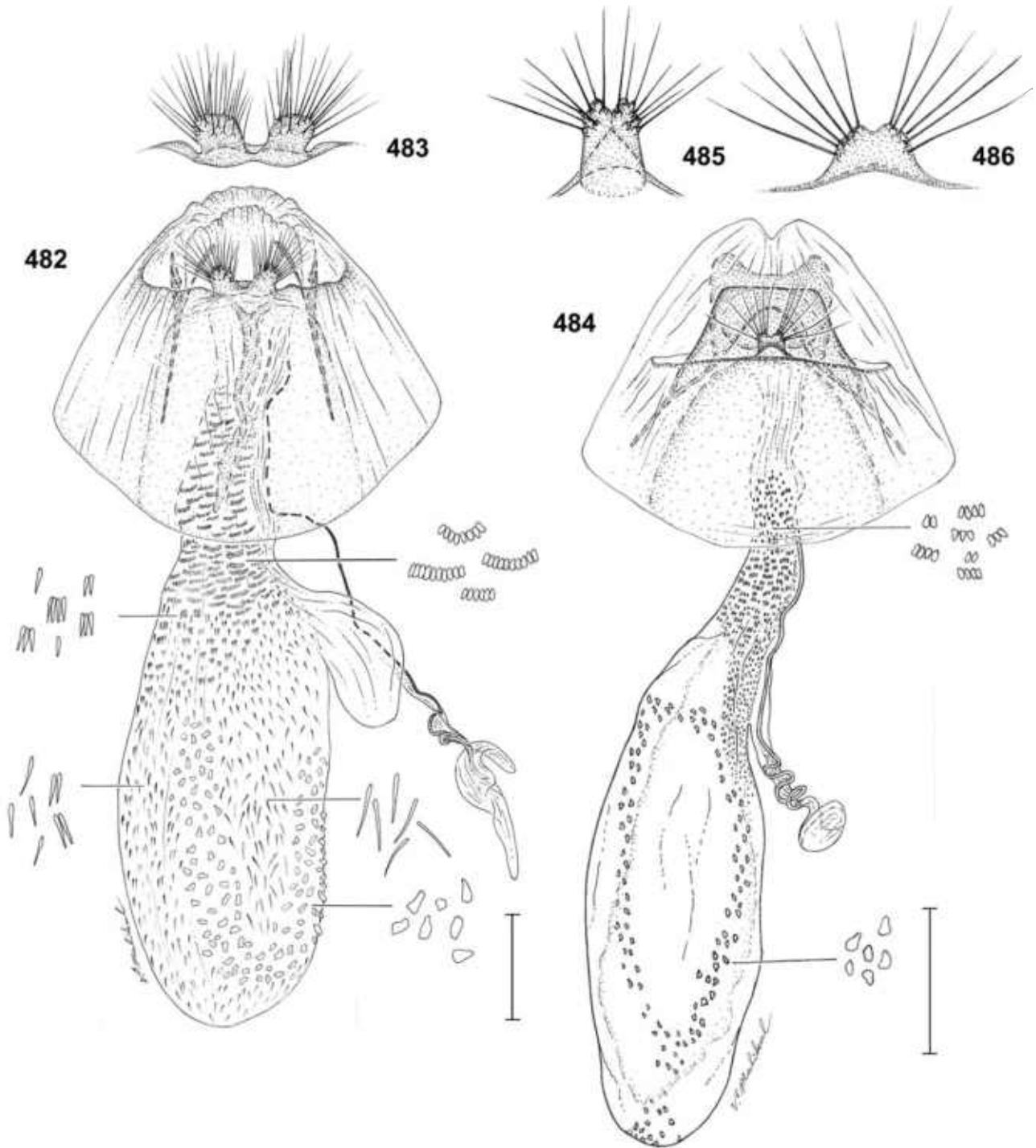
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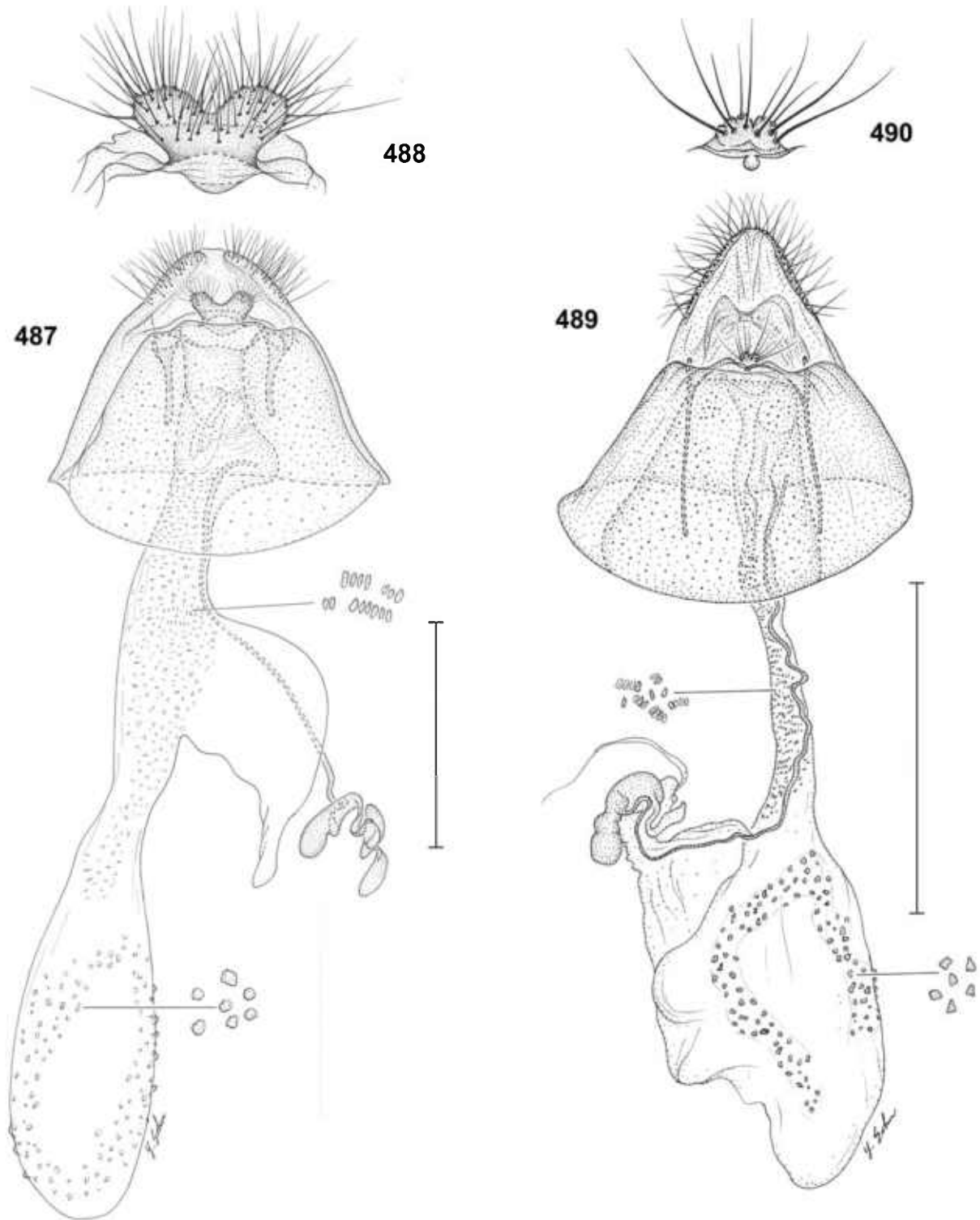
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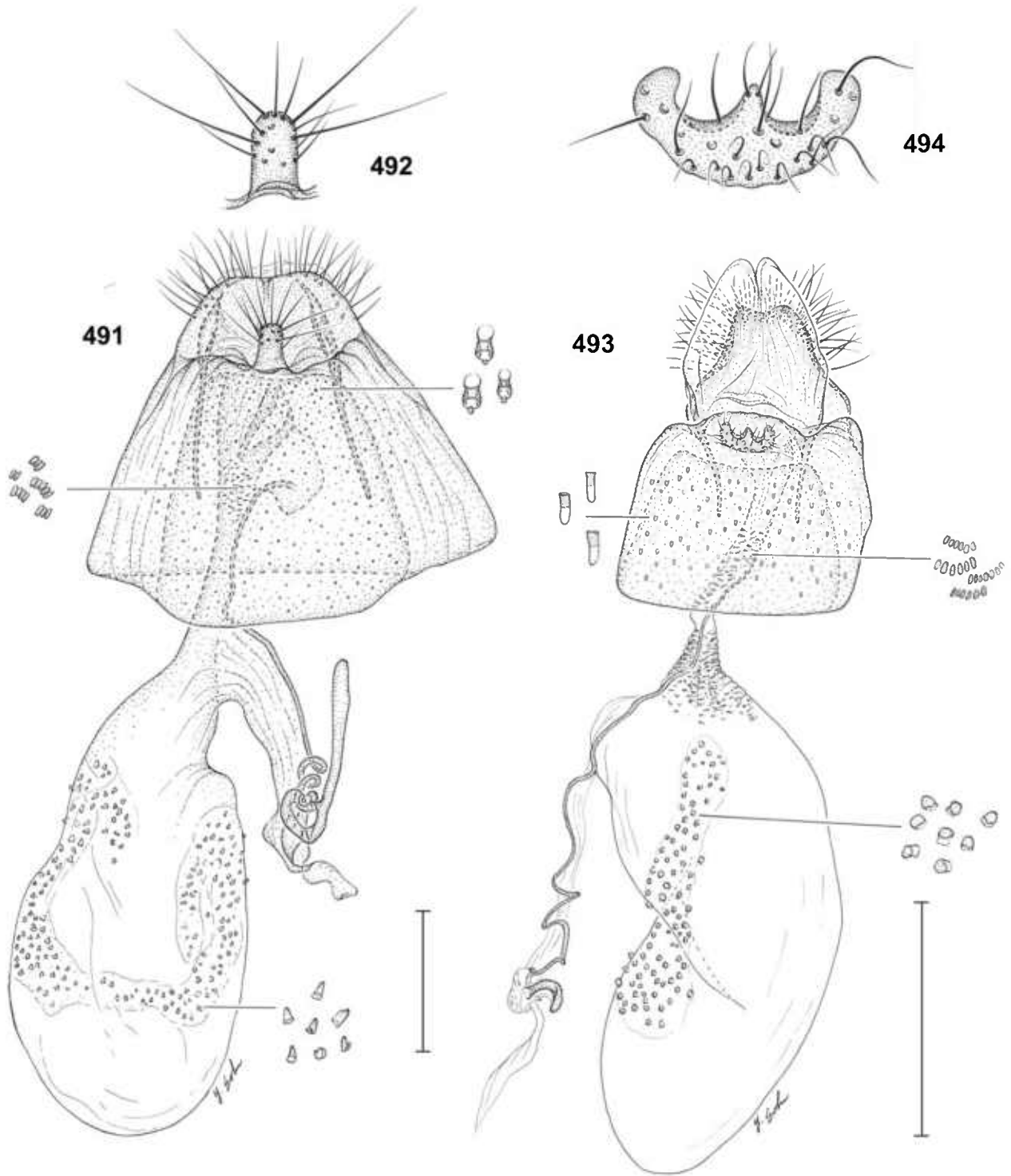
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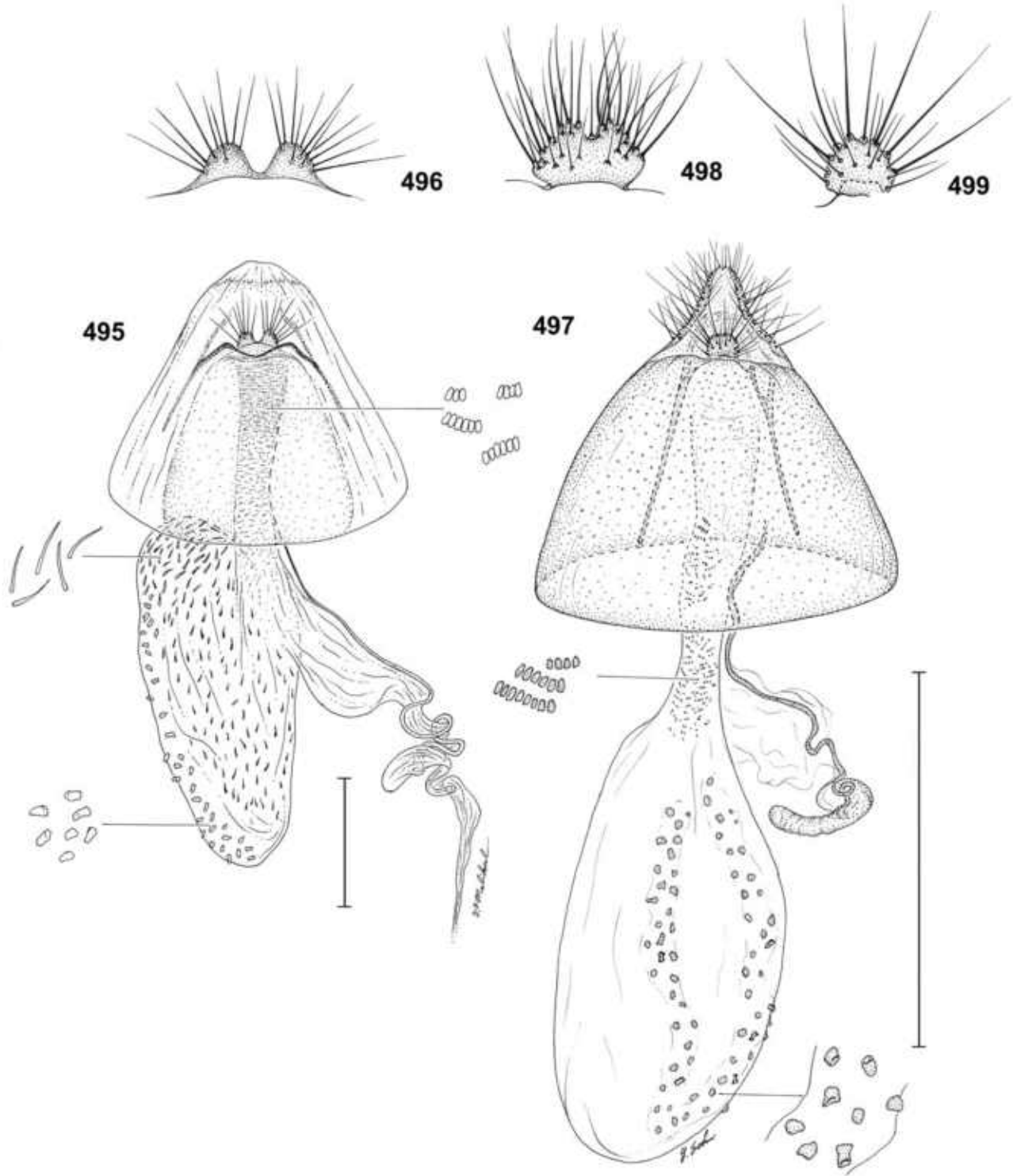
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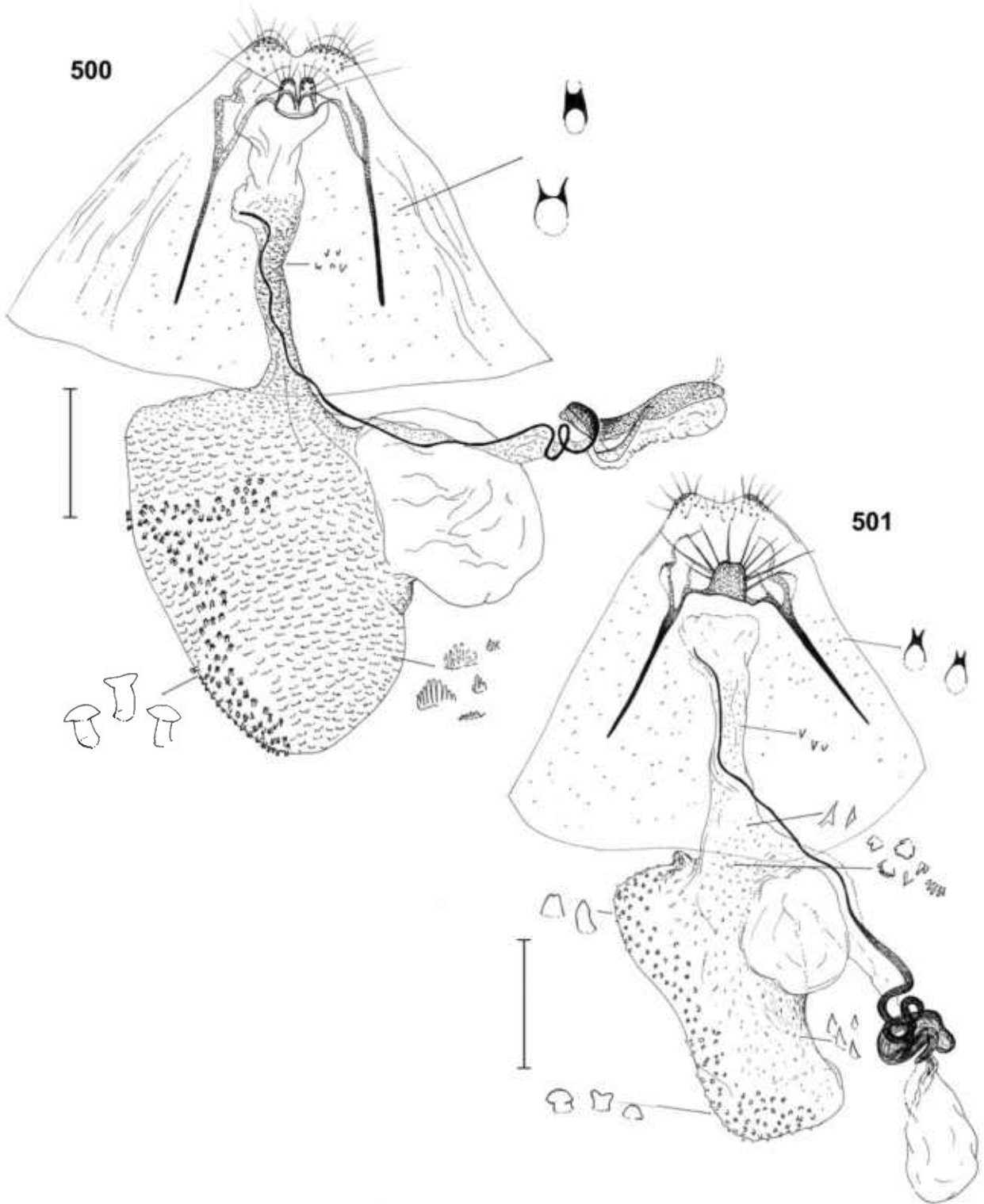


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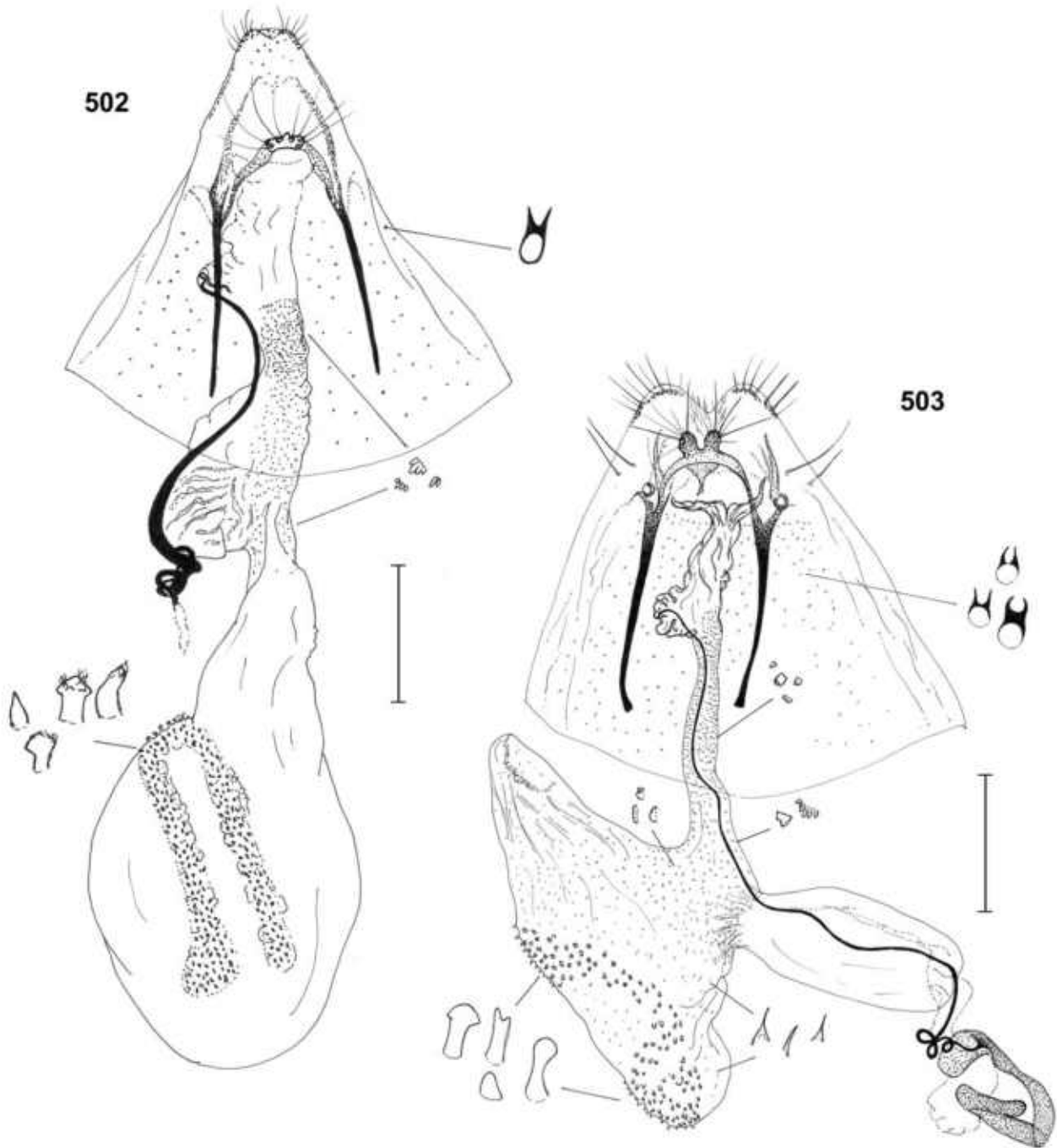


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