

INSECTA MUNDI

A Journal of World Insect Systematics

0708

Additions to the plume moth fauna of The Bahamas
(Lepidoptera: Pterophoridae) with description of four new species

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Date of issue: June 7, 2019

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Insecta Mundi 0708: 1–35

ZooBank Registered: urn:lsid:zoobank.org:pub:1A8C637A-412B-41E9-8395-EA92FA40A239

Published in 2019 by

Center for Systematic Entomology, Inc.
P.O. Box 141874
Gainesville, FL 32614-1874 USA
<http://centerforsystematicentomology.org/>

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Electronic copies (Online ISSN 1942-1354, CDROM ISSN 1942-1362) in PDF format

Printed CD or DVD mailed to all members at end of year. Archived digitally by Portico.

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Layout Editor for this article: Robert G. Forsyth

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Abstract. Records of Bahamas plume moths (Lepidoptera: Pterophoridae) collected since 2011 are summarized and four new species described: *Michaelophorus salensis* Matthews, **new species**, *Oidaematophorus androsensis* Matthews, **new species**, *Hellinsia bahamensis* Matthews, **new species**, and *Hellinsia lucayana* Matthews, **new species**. Species accounts including illustrations of adults and genitalia, diagnoses, larval hosts, habitats, and distributions are provided. Of the 23 species found, new larval host associations are reported for two species while the life histories remain unknown for seven species.

Key words. *Adaina*, *Dejongia*, *Emmelina*, *Exelastis*, *Hellinsia*, hostplants, *Lantanophaga*, life history, *Lioptilodes*, Lucayan Archipelago, *Megalorhipida*, *Michaelophorus*, *Oidaematophorus*, *Postplatyptilia*, *Stenoptilodes*, *Sphenarches*.

Introduction

Matthews et al. (2012) summarized the plume moth fauna of The Bahamas and reported 11 species known from material collected up to and including October 2011. Ongoing Lepidoptera surveys of the Lucayan Archipelago have resulted in new records and species of Pterophoridae as well as other families (e.g. Miller et al. 2015, 2018a, b; Brown et al. 2018; Gilligan et al. 2018; Austin et al. 2019) with the total lepidopteran fauna now approaching 1000 species. Additions to the plume moth fauna including the description of four new species are detailed herein.

Materials and Methods

Abbreviations. Collection codens mentioned in the text are: **AMNH** - American Museum of Natural History, New York, NY; **MGCL** - McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, FL; **USNM** - National Museum of Natural History, Washington, DC; **CNC** - Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Canada. For brevity in material examined sections, the following collector names have been replaced with initials: **DLM** - Deborah L. Matthews, **JYM** - Jacqueline Y. Miller, **MJS** - Mark J. Simon, **GJG** - Gary J. Goss, **TAL** - Terry A. Lott, **RMR** - Richard M. Rozycki. For preserved material examined, the following abbreviations (singular or plural) are used in conjunction with the number of individual specimens in a vial: **L** - larva, **LS** - larval skin/exuvia, **P** - pupa, **PC** - pupa case/exuvia. Miscellaneous abbreviations include: **AUTEC** - Atlantic Undersea Test and Evaluation Center, and **MVL** - mercury vapor lamp, **UV** - ultraviolet or “blacklight”. Abdominal segments are referred to by number preceded by “A”.

Field methods. Adult specimens were obtained by spotting and netting them at night with a head lamp, collecting at sheets illuminated by MVL or UV, hand netting adults flying or perching in the vicinity of larval hostplants, or retrieving emerging adults from plastic bags or vials containing hostplant cuttings. Pupae were preserved directly in 70% isopropanol in four-dram glass vials while larvae were first boiled in water using a metal coffee cup and immersion heater. Thirteen major islands (Abaco, Cat, Crooked, Eleuthera, Exuma, Grand Bahama, Inagua, Long, Mayaguana, New Providence, North Andros, San Salvador, and South Andros) (Fig. 1) were sampled since October 2011, with individual trips covering one or two islands lasting up to 12 days. Multiple sites were sampled daily by searching hostplants while collecting with lights occurred at a different remote location each night in addition to lodging areas. A variety of habitats were sampled such as Caribbean pinelands, various types of coppice, mangrove, beach, coastal rocklands, and disturbed sites.

Morphological study. Genitalia were dissected after tissue maceration in heated 10% KOH, lightly stained in Chlorazol Black E and Eosin Y, and slide mounted in Euparal or Canada balsam. Genitalia slides were photographed at manually selected multiple focal planes using a Canon Rebel T3i camera mounted on a Zeiss Axiophoto transmitted light microscope in conjunction with Canon EOS Utility software. Adults were photographed with a Canon 70D camera and Canon 100mm IS macro lens against a standard gray background in a white reflective light funnel illuminated with OttLite bulbs. Adult images and genitalia images were stacked as needed with Zerene Stacker, version 1.04 using the DMap algorithm and images were assembled on the plates with Adobe Photoshop CS5.1. Adult habitus images are scaled to the same size on plates but with individual scale bars provided for relative size comparison between species. Wing venation nomenclature follows Miller (1970). Color names in descriptions are adapted from Ridgway (1912).

Specimen data. Label data cited in material examined are generally verbatim except collector names are abbreviated and host names simplified to exclude author names. Label data for holotypes are given in full. With the exception of newly identified taxa or specimens recently dissected, label data already reported in Matthews et al. (2012) are not repeated. Voucher specimens will be deposited in MGCL, USNM, CNC, and elsewhere. Primary types are deposited at MGCL.

Results

With the addition of material collected since October, 2011, 23 species are now known to occur in The Bahamas. Islands or districts with the most species recorded were Abaco (13) and Grand Bahama (12). Islands where new, presumed endemic, species were found were Grand Bahama, North Andros, Crooked, Mayaguana, and Inagua, the latter island with only one species collected (Fig. 1). Disturbed habitats and pinelands yielded the most species, 15 and 13 respectively, while fewer species were found in coppice (9), mangrove (2), beach (4), and coastal rock communities (2).

Larval hostplant associations are known for 16 of the 23 species based on their occurrence in Florida and elsewhere. Specific hostplants used in The Bahamas are known for nine pterophorid species, either

from observed larval feeding or from adults collected in direct association with previously known hosts. Most of these moths are only associated with one known host except in the case of *Adaina ambrosiae* (Murtfeldt), where larvae were found feeding on leaves of three different composite hosts.

Species Accounts

Lioptilodes albistriolatus (Zeller, 1871)

Fig. 2, 25a, b, 37.

Diagnosis. Adults are typically drab-gray with the forewing ground color composed of mixed drab-gray and white scales with fuscous spots. Abdomen with pale lateral stripes. The species is recognized by the small paired anterior and posterior fuscous dark spots at the base of the forewing cleft, and one at the middle of the discal cell, and a white costal dash along the costa at the base of the first lobe (Fig. 2). The forewing discal cell is pleated from the middle of the discal cell to the cleft so that in live or unspread specimens, the paired fuscous dots and dark scales along the costa appear contiguous. Male genitalia with symmetrical simple valvae; phallus with aedeagus strongly curved, phallobase with short rounded coecum penis and well-developed ventral process (Fig. 25a, b). Female genitalia (Fig. 37) with posterior half of ductus bursae sclerotized, antrum not differentiated; paired signa thorn shaped.

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay, coppice trail, 26.167000°, -77.181167°, 30.x.2014, DLM, JYM, MJS, RMR (1 ♀); **Cat Island:** Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (1 ♀); **Grand Bahama Island:** Freeport, area SE of Britannia Blvd. & Sunset Hwy., 26.513233°, -78.679429°, 28.x.2014, DLM, JYM, MJS, RMR (2 ♀, slide DM 2150); vic. Barbary Beach, 26.558526°, -78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (1 ♀); **North Andros Island:** Nicholls Town, hammock area, 25.143945°, -78.006715°, 30.x.2011, on *Baccharis*, DLM, GJG, MJS (1 ♂, slide DM 2159, 5 ♀).

Life history. Larvae feed in the flower heads of various composite genera including *Baccharis* L., *Conyza* Less., *Erigeron* L., *Solidago* L., and *Symphytotrichum* Nees (Matthews and Lott 2005), all of which occur in The Bahamas (Correll and Correll 1982). In The Bahamas, adults were observed in association with flowers of *Baccharis dioica* Vahl. *Conyza canadensis* (L.) Cronq., an introduced weed, occurs throughout the islands and is also likely used in The Bahamas as it is in the USA.

Distribution. Widespread in the Neotropical and Nearctic Regions. Recorded in The Bahamas from Abaco, Andros, Cat, and Grand Bahama Islands. Previously reported from The Bahamas on North Andros Island (Matthews et al. 2012).

Lantanophaga pusillidactylus (Walker, 1864)

Fig. 3, 26a, b, 38

Diagnosis. Overall wing patterns are very similar to *Stenoptilodes brevipennis* (Zeller), *Stenoptilodes taprobanes* (Felder and Rogenhofer), and *Postplatyptilia flinti* Gielis, with brown and gray patterned forewings, a costal triangle at the cleft base, and the termen of the forewing second lobe appearing scalloped with a trilobed margin formed from clusters of fuscous spatulate scales in the fringes (Fig. 3). Distinguished from these species by the smaller wing expanse (≤ 11 mm) in Bahamas populations and by having fuscous patches laterally on the fourth abdominal segment. The male genitalia (Fig. 26a, b) are characterized by an elongate, distally projecting, forked saccus (Fig. 26a). Female genitalia with paired sigmoid signa, posteriorly placed within corpus bursae (Fig. 38).

Pinned material examined. BAHAMAS: **Abaco:** Central Abaco, E side of S.C. Bolle Hwy., 3 mi. S of Treasure Cay Rd., 26.656294°, -77.306661°, 2.x.2014, DLM, JYM, MJS, RMR (1 ♀); South Abaco, Schooner Bay Institute, 26.161333°, -77.187667°, 31.v.2016, DLM, JYM, MJS, GJG, adults perching or flying near flowers of *Lantana involucrata* (3 ♀); same data except 4.vi.2016 (1 ♀); Schooner Bay, coppice trail, 26.167000°, -77.181167°, 30.x.2014, DLM, JYM, MJS, RMR (10 ♀, slide DM 2155); **Cat Island:**

vic. Dumfries, 2 mi. SE of Arthur's Town Airport, 24.603249°, -75.643619°, 24.vi.2014, DLM, JYM, GJG, MJS (1 ♀); vic. Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (1 ♀); N of Old Bight Settlement/ E of Moss Town, 24.244333°, -75.379667°, 21.vi.2014, emerged 23.vi.2014, ex. flowers of *L. involucrata*, DLM, JYM, MJS, GJG (1 ♂); SE of Old Bight Settlement, 1.46 mi. from Queen's Hwy. on road to Port Howe, 24.222603°, -75.364922°, 22.vi.2014, flying around *L. involucrata*, DLM, JYM, GJG, MJS (4 ♀); SE of Old Bight Settlement, 2 mi. from Queen's Hwy. on road to Port Howe, 24.220000°, -75.355500°, 25.vi.2014, DLM, JYM, GJG, MJS (3 ♀); **Crooked Island:** Pittstown Point, 22.831211°, -74.348717°, 7.vi.2013, MJS, GJG, at light (1 ♀); same data except 8.vi.2013 (1 ♀); **Eleuthera Island:** Leon Levy Native Plant Pres., 25.187667°, -76.212833°, 27.vi.2014, DLM, JYM, MJS, GJG, P. DeLuca, F. Cartwright, E. Fried (3 ♂, 4 ♀); same data, ex. *L. involucrata* (2 ♂); 1.4 mi. N of Rock Sound Airport, 24.912834°, -76.166422°, 28.vi.2014, DLM, MJS, JYM, GJG, (1 ♂, 2 ♀); **Grand Bahama Island:** Lucayan National Park, S of Grand Bahama Hwy., 26.602538°, -78.400230°, 25.x.2014, DLM, JYM, MJS, RMR, ex. flowers of *Lantana involucrata* (1 ♀); vic. Barbary Beach, 26.558526°, -78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (2 ♀); **Great Exuma Island:** 0.8 mi. SW of Farmer's Hill, Palm Rd. & Sea View Dr., 23.579202°, -75.929259°, 23.v.2014, flowers of *L. involucrata*, DLM, JYM, GJG, MJS (1 ♂); vic. Rolleville, 23.661833°, -75.987333°, 25.v.2014, DLM, JYM, MJS, GJG (2 ♀); **New Providence Island:** Adventure Learning Center Zoo off Marshall Rd., 25.004472°, -77.353807°, 10.iv.2014, M. Mundle, DLM, JYM (1 ♂); W Bay St. & Indigo Dr., Orange Hill Inn, 25.065248°, -77.457152°, 9.vi.2018, DLM (4 ♀); **San Salvador Island:** Gerace Research Centre, Alfred Pike Trail, 24.117166°, -74.463864°, 23.vii.2015, DLM, TAL, R.W. Portell (1 ♂, 3 ♀); same location, 10.vi.2018, DLM, JYM (2 ♀); same data except, netted on vegetation, DLM (2 ♀); Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 22.vi.2015, DLM, TAL, R.W. Portell (1 ♂, 2 ♀); same location, 11.vi.2018 JYM, DLM (1 ♀); 0.25 mi. W of Gerace Research Centre, 24.119145°, -74.469955°, 25.vii.2015, DLM, TAL, R.W. Portell (2 ♂, slide DM 2161, 2 ♀); **South Andros Island:** Kemp's Bay Settlement, vic. Nathan's Lodge, 24.019937°, -77.531602°, 31.iii.2014, ex. flowers of *L. involucrata*, DLM, JYM, MJS, RMR (2 ♂).

Preserved material examined. BAHAMAS: **Eleuthera Island:** Leon Levy Native Plant Pres., 25.187667°, -76.212833°, 27.vi.2014, DLM, JYM, MJS, GJG, P. DeLuca, F. Cartwright, E. Fried, on flowers of *Lantana involucrata* (1 P); lighthouse point, 24.616414°, -76.146781°, 29.vi.2014, DLM, JYM, MJS, GJG, P. DeLuca, F. Cartwright, E. Fried, on flowers of *L. involucrata* (4 L, 2 P); **Great Exuma Island:** 0.8 mi. SW of Farmer's Hill, Palm Rd. & Sea View Dr., 23.579202°, -75.929259°, 23.v.2014, DLM, JYM, GJG, MJS, on flowers of *L. involucrata* (3 L, 1 P, 3 PC); **New Providence Island:** Adventure Learning Center Camp off Marshall Rd., 25.005093°, -77.358966°, 9.iv.2014, DLM, JYM, M. Mundle, on flowers of *L. involucrata* (3 L, 2 P, 1 PC); **South Andros Island:** Kemp's Bay Settlement, vic. Nathan's Lodge, 24.019937°, -77.531602°, 31.iii.2014, DLM, JYM, MJS, RMR, on flowers of *L. involucrata* (16 L, 21 P, 1 PC).

Life history. Larvae feed and pupate within the flower clusters of species of *Lantana* L.. There are seven species of *Lantana* recorded from the Bahamas (Correll and Correll 1982), all of which are likely used by this moth. Adults and larvae were collected in association with *Lantana involucrata* L. and *L. demutata* Millsp., though the two species were easily confused in the field.

Distribution. Known from all faunal regions, generally tropical though extending into southern temperate regions. This species was introduced to Hawaii from Mexico as early as 1902 for biological control of *Lantana camara* (Koebele 1924; Perkins 1924). Though not considered a serious pest, it is easily spread through transport of ornamental varieties of *Lantana*. In The Bahamas, it has been collected on all the major islands sampled except North Andros, Mayaguana, and Inagua, though it most likely occurs throughout the archipelago. Larger specimens, with a wing expanse of up to 18 mm (Greece), have been encountered outside of The Bahamas (C. Gielis, pers. comm.).

Postplatyptilia flinti Gielis, 1991

Fig. 4, 27a, b, 41

Diagnosis. Similar to *Stenoptilodes brevipennis* and *S. taprobanes* in size and wing maculation except costal triangle and other markings somewhat bolder. Best distinguished from these species by paired

cream-colored lateral metathoracic patches (Fig. 4). Male genitalia characterized by symmetrical valvae with divided sacculus and overriding cucullus, and a distally projecting spine-like saccus, longer than uncus (Fig. 27a). Female genitalia characterized by medially notched lamina postvaginalis flanked laterally by sclerotized spade-shaped lobes extending posterad from short apophyses anteriores; Antrum triangular, corpus bursae with paired spine-like signa (Fig. 41).

Pinned material examined. BAHAMAS: **Grand Bahama Island:** vic. Barbary Beach, 26.558526°, -78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (14 ♂, slide DM 2099, 4 ♀, slide DM 2100).

Life history. The larval hostplant is unknown. Adults were all, however, collected while flying and perching in patches of *Scutellaria havanensis* Jacq.

Distribution. This species is known from Argentina, Brazil, and Paraguay (Gielis 2006). In The Bahamas it is thus far only known from one locality on Grand Bahama Island.

Stenoptilodes brevipennis (Zeller, 1874)

Fig. 5, 28a, b, 40

Diagnosis. Forewing mottled with light drab and fuscous scales, with white line across distal third of each lobe similar to *Stenoptilodes taprobanes*, *Postplatyptilia flinti*, and *Lantanophaga pusillidactylus*. The latter two species as previously differentiated above, *S. brevipennis* reliably distinguishable from *S. taprobanes* only by genitalia. Females of *S. brevipennis* differing from *S. taprobanes* by having minute sclerotized tabs laterad on ostium; antrum not differentiated from sclerotized part of ductus bursae, and sternite VII with rounded lateral lobes bearing distinctive fuscous scale tufts which flank ostium (Fig. 40). Male genitalia with cucullus apex sharply pointed; uncus and phallus slender and proportionally more elongate than in *S. taprobanes*; uncus length distinctly exceeding that of anellus arms (Fig. 28a, b).

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Gilpin Point, S of Crossing Rocks, 1.5 mi. SE of Great Abaco Hwy., 26.105899°, -77.18550°, 3.vi.2016, DLM, JYM, MJS, GJG, pinelands (1 ♂, slide DM 2101); **Grand Bahama Island:** vic. Barbary Beach, 26.558526°, -78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (1 ♀); **North Andros Island:** 1 mi. E of Andros Town Int. Airport nr. AUTEK Naval Base (Area 51), 20m, 24.696535°, -77.772421°, 14.vi.2012, at light, tropical mesic forest, MJS, GJG, RMR, Michael Simon (1 ♀); Captain Bill's Blue Hole, 24.742046°, -77.862031°, 29.x.2011, DLM, JYM, MJS, GJG (1 ♀, slide DM 2156); **South Andros Island:** SW of Drigg's Hill Settlement, 24.204092°, -77.599468°, 26.x.2014, DLM, JYM, MJS, RMR (1 ♂, slide DM 2102); **San Salvador Island:** Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 14.vi.2018, DLM, JYM (1 ♀).

Life history. Larvae from Florida are known to feed on various genera of Plantaginaceae including *Bacopa* Aubl., *Mecardonia* Ruiz and Pav., *Scoparia* L., and *Russelia* Jacq. (Matthews and Lott 2005). These genera also occur in The Bahamas (Correll and Correll 1982).

Distribution. This species is pantropical and also extends into the southern temperate regions of the Nearctic Region. In the West Indies, it is known from Cuba, Guadeloupe, Martinique, Puerto Rico, and Trinidad (Bigot and Etienne 2009, Gielis 2006). In The Bahamas it was collected on Abaco, Grand Bahama, North and South Andros, and San Salvador Islands. It was previously reported only on North Andros (Matthews et al. 2012).

Stenoptilodes taprobanes (Felder and Rogenhofer, 1875)

Fig. 6, 39

Diagnosis. Distinguishable from *S. brevipennis* by genitalia only, as noted above. Valvae of male genitalia with blunt tipped cucullus; phallus short and stout; uncus length similar or less than that of anellus arms (Bahamas male not available, see illustration in Gielis (2006)). Female genitalia without lateral lobes flanking ostium and with ductus bursae separated from quadrate antrum by a slight constriction (Fig. 39).

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay, coppice trail, 26.167000°,

–77.181167°, 30.x.2014, DLM, JYM, MJS, RMR (1 ♀); **Grand Bahama Island:** vic. Barbary Beach, 26.558526°, –78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (1 ♀, slide DM 2157).

Life history. Larvae are known to feed on several plant families, especially belonging to the order Lamiales (Matthews and Lott 2005). Known host genera throughout the range which also occur in The Bahamas include: *Bacopa* and *Veronica* L. (Lamiales: Plantaginaceae), *Scutellaria* L. (Lamiales: Lamiaceae), and *Samolus* L. (Ericales: Primulaceae). The specimen from Grand Bahama Island was collected in the vicinity of *Scutellaria havanensis* along with *S. brevipennis*, and *P. flinti*.

Distribution. The species has been recorded from all faunal regions within subtropical and tropical zones. In The Bahamas it is known from Abaco and Grand Bahama Islands.

Michaelophorus salensis Matthews, new species

Fig. 7, 48

Diagnosis. Distinguished from other Bahamas species by the dark, carob brown forewings which distinctly contrast the white and buff metathorax. The abdomen also with distinctive white, opposing parentheses-shaped lines on the second and third segments (Fig. 7). Termen of second forewing lobe appearing bilobed (Fig. 7) as opposed to trilobed in *Stenoptilodes* Zimmerman, *Lantanophaga* Zimmerman, and *Postplatyptilia* Gielis. Distinguished from congeners in the Neotropical and Nearctic Regions by having the combination of a distinct termen on the forewing second lobe, the forewing ground color dark, a white metathorax, and the female genitalia (Fig. 48) with a comparatively long ductus bursae, and small lobes of the lamina antevaginalis compared to *M. indentatus* (Meyrick) and *M. dentiger* (Meyrick) (see comments below).

Description (female). Based on the holotype (female) and two paratypes (female). *Head.* Labial palpi slender, erect, length 1.5× eye diameter. Third (distal) segment nearly as long as middle segment. First segment white admixed with some fuscous or carob brown scales. Second and third segments mottled fuscous or carob brown, mostly white mesally. Front with distal half fuscous, area between antennae drab, some white or pale drab scales laterad on distal margin at antenna base. Vertex mottled with fuscous-tipped gray scales. Occipital fringe comprised of drab elongate spatulate scales with pale gray dentate tips. Antenna with scape and pedicel fuscous; flagellum fuscous, dotted with white. *Thorax.* Mesoscutum and tegulae clothed in drab, fuscous-tipped scales, those on tegulae broadly spatulate. Metascutum white, admixed with some light buff scales. Foreleg coxa and femur mottled tawny, fuscous, and white; tibia and tarsomeres fuscous-black with white longitudinal stripes except for distal three tarsomeres all fuscous-black. Midleg coxa mottled white and cream buff, femur mottled fuscous and white, tibia and spurs fuscous with white stripes. Tarsomeres as on foreleg. Hindleg coxa and femur mottled fuscous and white, tibia obliquely banded white and fuscous with spur tufts mostly fuscous, spurs white and fuscous striped, long, proximal pair about one-half tibia length. First through fourth tarsomere banded white and fuscous, fifth all fuscous. *Forewing.* Length, $\bar{x} = 5.42 \text{ mm} \pm 0.38 \text{ mm}$ ($n = 3$), holotype 5.5 mm. Cleft origin at 0.6× wing length from base, lobe apices acute, both with distinct termen. Ground color appearing carob brown, comprised of gray, fuscous tipped scales. Costa dotted with scattered white scales. Discal cell with obscure small dark spots comprised of solid fuscous scales, one at middle and a pair at distal angles near cleft base. First lobe with thin obscure pale drab transverse line across distal quarter of lobe and a thin white dash along costa at basal third. Lobe fringes drab gray with fuscous spatulate scales forming tuft along termen and scattered with a few white scales in cleft. Second lobe with obscure pale drab oblique line across distal fourth. Cleft fringes as on first lobe, termen with double fuscous scale tuft bisected by minute patch of white scales. Forewing anal margin with two small fuscous scale teeth basad of cleft base. Linear fringe scales pale drab, drab gray to fuscous just basad of tornus. Forewing venter mostly drab gray with transverse white lines of lobes and costal dash bolder than on dorsum. Fringes and spatulate scales as on dorsum. *Hindwing.* Dorsum appearing cinnamon-drab, comprised of fuscous tipped drab scales as on forewing except spaces with more gray apparent. Fringes uniformly drab except third lobe with fuscous triangular scale tooth at apex subtended on each margin with 4–6 scattered broadly spatulate fuscous scales, those on anal margin enlarged and distinctly triangular. Hindwing venter similar to dorsum, third lobe with some white overscaling. Venous scales black-fuscous.

Abdomen. Dorsum of A1 with tawny, fuscous tipped scales centrally, anterior and lateral margins with some white scales. Segments A2–A3 dorsally solid fuscous or chocolate interrupted by paired white opposing parentheses-shaped lines, giving the impression of an X on each segment; laterally mottled drab and fuscous with a small white patch on posterior margin. Segments A4–A7 dorsally with even transverse rows of fuscous tipped drab scales except for a rectangular patch on anterior parts of A4 and A5. Segment A8 elongate and tapered, fuscous with drab sublateral stripes converging posterad. Abdomen venter pale drab with diffuse paired white patches on posterior margins subventrally and single mesal patches forming interrupted longitudinal bands; A7 drab ventrally, white laterally; A8 drab gray.

Female genitalia. Papillae anales moderately setose, weakly sclerotized at base; setae lengths up to 1× length of papillae anales. Apophyses posteriores length about 2.5× that of papillae anales. Apophyses anteriores small pointed triangular projections sublaterally on anterior margin of tergite VIII which is lightly sclerotized and wraps around to venter so that apophyses arise from venter in flattened preparations. Ostium and antrum small, antrum bowl-shaped. Antrum and distal part of ductus bursae partly encased by elongate sclerotized sleeve which is subtended posteriorly by paired elongate sternal sclerites. Ductus bursae long and narrow, extending to near anterior margin of segment A7, about 1.3× length of corpus bursae. Corpus bursae spatulate, with paired small dentate signa. Ductus seminalis filamentous, inception near base of posterior tapered part of corpus bursae.

Types. HOLOTYPE. ♀, with the following labels: ‘BAHAMAS: Great Inagua | 7.4 mi. N of airport | 21.082516°, -73.641644° | 24–25.vii.2014 | M.J. Simon & G. Goss’ [white printed]; ‘HOLOTYPE ♀ | *Michaelophorus* | *salensis* | D. Matthews’ [red printed]; ‘PTERO1370 | Pterophoridae Database’ [white printed with barcode]. The holotype is deposited at MGCL. PARATYPES 2 ♀, BAHAMAS: **Crooked Island:** 0.5 mi. E of Ferry at Church Grove Settlement, 22.758933°, -74.242501°, 8.vi.2013, MJS, GJG, at light (1 ♀); **Great Inagua:** 7.4 mi. N of airport, 21.082516°, -73.641644°, 24–25.vii.2014, MJS, GJG (1 ♀, slide DM 2117).

Life history. Unknown. A related species, *M. indentatus*, has been recorded from *Strelitzia* Ait. (Strelitziaceae) and *Delonix* Raf. (Fabaceae) (Matthews and Lott 2005).

Distribution. Known from Great Inagua and Crooked Islands.

Etymology. The specific epithet is derived from the Latin *sāl* (salt) and the root *-ēnsis* (of or from) and refers to the type locality of Great Inagua where production of sea salt is the main industry.

Comments. The genus *Michaelophorus* Gielis includes seven other species and can be divided into three groups based on external morphology. One group (*M. hogesi* Gielis, *M. shafferi* Gielis, and *M. bahiaensis* Gielis) is characterized by the lack of a distinct termen on the forewing second lobe, the forewing cleft reaching about 0.5× wing length from base, and a pale brown ground color. The second group (*M. dentiger*, *M. indentatus*, *M. margaritae* Gielis, and *M. salensis*, **new species**) is characterized by a distinct forewing second lobe termen with two scale tufts in the fringes giving a bilobed appearance, the dark brown forewing ground color, and the contrasting white metathorax. The third group includes only the type species, *M. nubilus* (Felder and Rogenhofer), which also has a distinct forewing termen and dark forewing ground color but has a similarly dark brown metathorax and abdomen dorsum, scale tufts of the forewing second lobe termen trilobed, and a uniquely shallow cleft between the first and second lobe of the hindwing (Matthews and Miller 2010). Based on the above characters, as well as female genitalia and markings of the second and third abdominal segments, the new species most closely resembles *M. indentatus*.

Sphenarches anisodactylus (Walker, 1864)

Fig. 8, 45

Diagnosis. This species is distinguished from other Bahamas plume moths by the wing patterns and markings of the abdomen and hind tibia (Fig. 8). Forewing cream buff with alternating white, cinnamon-drab, and drab gray bands, second lobe with acute apex and distinctly excavate termen, cleft fringe with mixed white and fuscous spatulate scales. Hindwing cinnamon-drab except third lobe cream buff with a distinct double scale tooth on anal margin (minute scale cluster at apex subtended by larger

triangular scale tuft), and scattered white and fuscous spatulate scales in fringes (Fig. 8). Hind tibia with cinnamon-drab scale tufts at spurs, basal part before proximal spur pair white with alternating oblique cinnamon-drab and white band before tuft, without narrow longitudinal stripe on basal part as seen in *Megalorhipida leucodactylus* (Fabricius) and *Dejongia californicus* (Walsingham) which have similar banding of forewings. Female genitalia (Fig. 45) characterized by a long narrow ductus bursae inserted into a tubular sclerotized collar with an excavate anterior. Male genitalia (Bahamas specimen not available, see illustration in Gielis (2006)) with symmetrical ovate valvae and tegumen distally with acute apex subtended by stout recurved uncus.

Pinned material examined. BAHAMAS: **New Providence Island:** W Bay St. & Indigo Dr., Orange Hill Inn, 25.065479°, -77.457172°, 21.vii.2015, DLM (1 ♀); **North Andros:** Stafford Creek (Love at First Sight motel), 24.901449°, -77.936089°, 28.x.2011, DLM, MJS, JYM, GJG, MGCL Acc. No. 2011-32 (1 ♀, slide DM 2158).

Life history. This species is polyphagous with larval hosts recorded from nine families, especially Fabaceae and Cucurbitaceae (Matthews and Lott 2005).

Distribution. Pantropical. In The Bahamas, known from New Providence Island and previously reported from North Andros (Matthews et al. 2012).

Comments. As noted by Matthews et al. (2012), Bahamas specimens thus far observed have a somewhat paler ground color and lack the bold ochraceous-tawny coloration of mainland specimens.

Megalorhipida leucodactylus (Fabricius, 1794)

Fig. 9, 29a, b, 42

Diagnosis. Forewing cleft extending just beyond one-half wing length, lobes narrow with acute apices (without termen); ground color cinnamon-buff to pale clay with mixed ochraceous-tawny and pecan brown banding on lobes. Diffuse clusters of white scales flanking pecan brown band on first lobe. White, cinnamon-buff, ochraceous tawny, and fuscous spatulate scales forming clusters within lobe fringes. Hindwing vinaceous-brown, third lobe anal margin fringes interspersed with white scales and a minute fuscous scale patch one-third from lobe apex. Distinguished from related taxa by the distinctive oblique dorsal white, cinnamon-buff, and pecan brown banding pattern of the second and third abdominal segments (Fig. 9). Male genitalia with quadrate valvae; tegumen reduced to a narrow band bearing enlarged lobe shaped uncus (Fig. 29a). Female genitalia with small c-shaped antrum and short narrow ductus bursae; corpus bursae oval, with paired small dentate signa (Fig. 42).

Pinned material examined. BAHAMAS: **Crooked Island:** Pittstown Point, 22.831211°, -74.348717°, 6.vi.2014, MJS, Michael Simon, at light (1 ♀); same data except 7.vii.2015 (1 ♀); **Great Exuma Island:** vic. Hoopers Bay, Queens Hwy., 23.530022°, -75.798092°, 27.v.2014, DLM, MJS, GJG, JYM, on *Boerhavia* sp. (4 ♂, slide DM 2160, 2 ♀); **Mayaguana Island:** Pirates Well, Baycaner Beach, 22.435833°, -73.102222°, 31.v-1.vi.2014, MJS, GJG (1 ♂); **San Salvador Island:** Gerace Research Centre, 24.118723°, -74.465246°, 23.vii.2015, DLM, TAL, on *Boerhavia* (3 ♂, 3 ♀); same data except 26.vii.2015 (2 ♂, 4 ♀, slide DM 2154).

Preserved material examined. BAHAMAS: **Abaco:** Central Abaco, Treasure Cay Marina, 26.674277°, -77.282622°, 2.xi.2014, DLM, fruits of *Boerhavia* sp. (1 L); **Great Exuma Island:** vic. of Hoopers Bay, Queens Hwy., 23.530022°, -75.798092°, 27.v.2014, DLM, MJS, GJG, JYM, on *Boerhavia* sp. (1 LS, 1 P); **San Salvador Island:** Gerace Research Centre, 24.117589°, -74.465207°, 22-26.vii.2015, DLM, TAL, on fruits of *Boerhavia* sp. (15 L, 9 LS, 11 P); **South Andros Island:** Kemp's Bay Settlement, vicinity of Nathan's Lodge, 24.019937°, -77.531602°, 31.iii.2014, DLM, JYM, MJS, RMR, on *Boerhavia* fruits (3 L).

Life history. Larvae feed on species of Nyctaginaceae, especially *Boerhavia* L. (Matthews and Lott 2005). In The Bahamas, larvae were found boring in the tiny unripe fruits of *Boerhavia* growing in lawns and untended flower beds. Three species of *Boerhavia* occur in The Bahamas, *B. diffusa* L., *B. coccinea* Mill., and *B. erecta* L. (Correll and Correll 1982). *Commicarpus scandens* (L.) Standl., a recently reported larval host in Cuba (Matthews et al. 2019) is also widespread in The Bahamas (Correll and Corell 1982) but was not encountered during surveys.

Distribution. Pantropical, extending into southern temperate areas. In The Bahamas, the species has been collected on Abaco, Crooked, Exuma, Mayaguana, San Salvador, and South Andros islands.

***Dejongia californicus* (Walsingham, 1880)**

Fig. 10, 30a, b, 44, 60–65

Diagnosis. Forewing cleft extending to about 0.5× length to wing base; lobes narrow with acute apices and no distinct termen. Forewing ground color tawny-olive and drab, mottled with white (Fig. 10). First lobe with alternating fuscous and mottled white bands, second lobe mottled with indistinct white band near base and fuscous band extending from base into discal cell area. Cleft base with tawny-olive dash between fuscous bands at base of lobes. Cleft fringes drab overscaled with white spatulate scales. Anal fringe of second lobe drab admixed with fuscous and tawny-olive spatulate scales, interrupted by two white patches. Hindwing with first and second lobe uniformly drab; third lobe tawny-olive with a double fuscous scale tooth in fringes of anal margin (small cluster at apex), larger triangle one-third from apex. Linear fringe scales drab except white at lobe apex and just basad of larger scale tooth. Scattered white elongate spatulate scales also in fringes basad of scale tooth. Legs banded white, fuscous and, drab, with a thin fuscous stripe on basal part of hind tibia. Fourth abdominal segment with large paired fuscous rectangular patches (Fig. 10). Male genitalia with valvae darkly sclerotized, with recurved tips and a distinctive recessed cavity subapically on the mesal surface (Fig. 30a). Female genitalia with uniformly slender ductus bursae inserted into a midventral darkly sclerotized conical ostium/antrum projecting from beneath sternite VII (Fig. 44). Bahamas specimens noticeably smaller than mainland specimens, appearing more gray as opposed to brown; with more white overscaling of the forewing and banding on lobes fuscous as opposed to benzo brown.

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay Institute, 26.161333°, -77.187667°, 1.vi.2016, DLM, JYM, MJS, GJG, at MVL in morning (1 ♂); South Abaco, vicinity of Sandy Point, 26.008833°, -77.404667°, 1.xi.2014, DLM, JYM, MJS, RMR, ex. shoots of *Ambrosia hispida* (3 ♂, 7 ♀, 5 LS, 9 PC); same data except 4.vi.2016, DLM, JYM (1 ♂, 3 ♀); **Cat Island:** vic. Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (5 ♂, slide DM 1356); same data except 25.vi.2014, DLM, JYM, MJS, GJG, on leaf shoots of *A. hispida* (3 ♀); **Crooked Island:** vic. Seaview Settlement, 22.820375°, -74.280567°, 8.vi.2015, MJS, GJG (1 ♀); **Grand Bahama Island:** Freeport, Sea Gate Ln., 26.502796°, -78.650086°, 24.x.2014, DLM, MJS (1 ♂, 2 ♀); same data except, ex. larva on shoots of *A. hispida* (5 ♂, slide DM 2164, 1 ♀); S of Owls Hole, 26.583820°, -78.467092°, 28.x.2014, DLM, JYM, MJS, RMR, ex. larva on shoots of *A. hispida* (3 ♂, 1 ♀); Xanadu Beach, 23.vi.1987, W.E. Steiner, M.J. & R. Molineaux (1 ♀, slide DM 0095/USNM 106,065) [USNM]; **Mayaguana Island:** Pirates Well, Baycaner Beach, 22.435833°, -73.102222°, 31.vii–1.viii.2014, MJS, GJG (1 ♂); **San Salvador Island:** Brandy Hill Road, SE of lighthouse, 24.090794°, -74.440046°, 13.vi.2018, DLM, JYM (2 ♂, 3 ♀); same data, ex. *A. hispida* (6 ♂, 6 ♀); Gerace Research Centre, 24.119502°, -74.464410°, 24.vii.2015, DLM, on *A. hispida* (2 ♂, 1 ♀); S of Fortune Hill Settlement, vic. Pigeon Creek, 24.011944°, -74.458889°, 12.vi.2018, DLM, JYM, ex. *A. hispida* (1 ♀); vic. Cockburn Town, 24.051031°, -74.532069°, 24.vii.2015, DLM, TAL, beach strand, on *A. hispida* (1 ♀); Graham's Harbour, North Point, 24.125283°, -74.457553°, 26.vii.2015, DLM, TAL, on *A. hispida*, (10 ♂, 10 ♀, slide DM 2151).

Preserved material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay, beach trail vic. coppice, 26.167000°, -77.181167°, 5.vi.2016, DLM, JYM, MJS, GJG, on leaves of *Ambrosia hispida* (4 L); vicinity of Sandy Point, 26.008833°, -77.404667°, 1.xi.2014, DLM, JYM, MJS, RMR, on leaves and shoots of *A. hispida* (8 L, 2 LS, 1 PC), same location, 4.vi.2016, DLM, JYM, on leaves of *A. hispida* (3 L, 1 P, 1 PC); **Cat Island:** vic. Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 25.vi.2014, DLM, JYM, MJS, GJG, larvae on shoots of *A. hispida* (7 L, 4 LS, 1 P, 3 PC); **Grand Bahama Island:** Freeport, Sea Gate Ln., 26.502796°, -78.650086°, 24.x.2014, DLM, MJS, on shoots of *A. hispida* (5 L, 7 LS, 5 P, 1 PC); S of Owl's Hole, 26.583820°, -78.467092°, 28.x.2014, DLM, JYM, MJS, RMR, on leaves and shoots of *A. hispida* (2 L, 1 LS); **San Salvador Island:** beach N & NE of Gerace Research Centre, 24.120114°, -74.461898°, 22–26.vii.2015, DLM, TAL, on leaves of *A. hispida* (18 L); Brandy Hill Road, SE of lighthouse, 24.090794°, -74.440046°, 13.vi.2018, DLM, JYM ex. *A. hispida* (33 L, 3 LS, 3 P, 1 PC);

Graham's Harbour, North Point, 24.125283°, -74.457553°, 26.vii.2015, DLM, TAL, on *A. hispida* (2 L); same data, on leaves of *A. hispida* (16 L, 3 LS, 3 P, 2 PC); same location, 13.vi.2018, DLM, JYM, on *A. hispida* (15 L); vic. Cockburn Town, 24.051639°, -74.532920°, 24.vii.2015, DLM, TAL, R.W. Portell, on leaves of *A. hispida* (58 L, 2 LS, 2 PC); S of Fortune Hill Settlement, vic. Pigeon Creek, 24.011944°, -74.458889°, 12.vi.2018, DLM, JYM, ex. *A. hispida* (33 L, 3 LS, 3 PC).

Life history. In the western USA, larvae feed on species of *Grindelia* Willd. and in Florida, on leaves and shoots of *Heterotheca subaxillaris* (Lam.) Britton and Rusby. In The Bahamas, larvae feed on leaves, shoots, and developing flowers and pollen of *Ambrosia hispida* Pursh (Fig. 59). Populations can be locally dense, with several individuals infesting the same shoots or racemes. Larvae (Fig. 63–65) are bright red, in contrast to the green leaves, with the final instar (about 5 mm in length) turning green prior to pupation. Larvae are quite remarkable in having long clear setae with inflated tips which, as in *M. leucodactylus*, exude a sticky secretion. Pupae (Fig. 61–62) also have primary and secondary setae with swollen tips. The larval and pupal chaetotaxy of Bahamas specimens are identical to Florida specimens, yet pupae in Florida have a more distinct bright reddish trapezoidal spot on the dorsum of second and third abdominal segments. In The Bahamas, this species is found in coastal areas where the hostplant grows such as disturbed sites, coastal rock communities, and beach dunes. The adults (Fig. 10, 60) cling to the plants in windy conditions and are best spotted at night in taller plants protected behind sea oat dunes.

Distribution. This species is known to occur across the USA from Florida to California and north into Nebraska. In The Bahamas it has been collected on Abaco, Cat, Crooked, Grand Bahama, Mayaguana, and San Salvador Islands. It is also reported to occur in Cuba (Núñez and Barro 2012).

Comments. COI barcoding and analysis (BOLD, Kimura 2 model) place The Bahamas specimens in the same BIN (barcode index number) as mainland *D. californicus*. Pairwise distances between Florida and Bahamas specimens range between 1.48–2.01% with greater variation within the BIN. Additional studies of haplotype networks may further delineate population segregates across the range of the species.

Exelastis pumilio (Zeller, 1873)

Fig. 11, 31a, b, 46

Diagnosis. Forewing cleft extending to about one-third from wing apex to base; with a small fuscous discal spot and diffuse spot at cleft (Fig. 11). Ground color variable, ranging from pale caramel brown to drab with scattered white overscaling. Small fuscous scale tufts present in fringes of forewing, absent on hindwing. Posterior third of mesothorax, metathorax, and first abdominal segment dorsally pale buff or pale yellow. Valvae of male genitalia symmetrical, with curved tong-like tips bearing stout spines (Fig. 31a). Female genitalia with small sclerotized cup-like antrum, narrow ductus bursae, and round to oblong corpus bursae without signa (Fig. 46).

Pinned material examined. BAHAMAS: **Abaco:** Central Abaco, E side of S.C. Bolle Hwy., 3 mi. S of Treasure Cay Rd., 26.656294°, -77.306661°, 2.x.2014, DLM, JYM, MJS, RMR (1 ♂); **New Providence Island:** W Bay St. & Indigo Dr., Orange Hill Inn, 25.065479°, -77.457172°, 21.vii.2015, DLM (4 ♂, slide DM 2163, 2 ♀); same data except 25.065248°, -77.457152°, 9.vi.2018, DLM (1 ♂, 3 ♀); **North Andros Island:** Captain Bill's Blue Hole, 24.742046°, -77.862031°, 13.vi.2012, MJS, GJG, RMR, Michael Simon (1 ♀); **San Salvador Island:** Gerace Research Centre, vic. library, 24.118742°, -74.465230°, 13.vi.2018, DLM (1 ♂, 1 ♀); Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 11.vi.2018, DLM, JYM (2 ♀, slide DM 2149); same data except, 14.vi.2018 (1 ♂, 1 ♀).

Life history. Recorded larval hostplants are various Fabaceae, especially species of *Desmodium* Desv. (Matthews and Lott 2005). Adults from New Providence and San Salvador islands were collected in association with *Desmodium* growing in mowed lawns.

Distribution. This species occurs throughout the new and old world tropics and subtropics. In the West Indies it is known from The Bahamas, Cuba, Guadeloupe, Jamaica, Puerto Rico, and the Virgin Islands. In The Bahamas, the species has been collected from Abaco, New Providence, North Andros, and San Salvador islands. Previously recorded from North Andros (Matthews et al. 2012).

***Exelastis montischristi* (Walsingham, 1897)**

Fig. 12, 47

Diagnosis. Forewing cleft extending just beyond one-third from apex to wing base; ground color pale olive buff to light grayish brown, fringes with small fuscous scale tufts present. Hindwing drab, noticeably darker than forewing (Fig. 12). Third lobe anal fringe with mixed pale buff spatulate scales along entire length and some fuscous spatulate scales along basal third. Valvae of male genitalia symmetrical, rounded; sacculus terminating in recurved spine (Bahamas specimen not available, see illustration in Gielis (2006)). Female genitalia characterized by oblong corpus bursae with symmetrical paired blade-like signa (Fig. 47).

Pinned material examined. BAHAMAS: **Cat Island:** SE of Old Bight Settlement, 2 mi. from Queen's Hwy. on road to Port Howe, 24.220000°, -75.355500°, 25.vi.2014, DLM, JYM, GJG, MJS (1 ♀, slide DM 2113); **Grand Bahama Island:** Freeport, area SE of Britannia Blvd. & Sunset Hwy., 26.513233°, -78.679429°, 25.x.2014, on *Rhynchosia*, DLM, JYM, (1 PC, pinned); **South Andros Island:** W of The Bluff Settlement, 24.106939°, -77.557659°, 29.iii.2014, DLM, JYM, MJS, RMR (1 ♀).

Preserved material examined. BAHAMAS: **Grand Bahama Island:** Freeport, area SE of Britannia Blvd. & Sunset Hwy., 26.513233°, -78.679429°, 25.x.2014, DLM, JYM, on leaves of *Rhynchosia minima* (3 L); **New Providence Island:** W Bay St. & Indigo Dr., Orange Hill Inn, 25.065479°, -77.457172°, 8–9.iv.2014, DLM, JYM, on leaves of *R. minima* (1 L, 2 PC).

Life history. Larvae feed on the leaves and shoots of *Rhynchosia minima* (L.) DC. This vine trails along the ground and climbs fences and other vegetation.

Distribution. Ecuador: Galapagos Islands; West Indies: Bahamas, Cayman Islands, Cuba, Jamaica, Grenada, Haiti, Virgin Islands; United States: Gulf Coastal plain from Florida to Texas. In The Bahamas the species has been collected on Cat, Grand Bahama, and New Providence islands.

***Exelastis dowi* Matthews and Landry, 2008**

Fig. 13, 32, 43

Diagnosis. Similar to *E. montischristi* except for paler light buff to ochraceous-buff ground color, with more distinct fuscous paired spots at forewing cleft base, and hindwing with row of spatulate fuscous scales within fringes of third lobe anal margin which extends for most of lobe length (Fig. 13). Male genitalia with asymmetrical valvae; apex of right valve with rounded plate-like sclerite (Fig. 32). Female genitalia distinguished from *E. montischristi* by the presence of a median plate on sternite VII (Fig. 43).

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Gilpin Point, S of Crossing Rocks, 1.5 mi. SE of Great Abaco Hwy., 26.105899°, -77.18550°, 3.vi.2016, pinelands, DLM, JYM, MJS, GJG (1 ♀, slide DM 2114); Schooner Bay, coppice trail, 26.167000°, -77.181167°, 30.x.2014, DLM, JYM, MJS, RMR (1 ♂); Schooner Bay Institute, 26.161333°, -77.187667°, 14–18.v.2018, MS, GG (1 ♀); **Grand Bahama Island:** vic. Owl's Hole, 26.587496°, -78.469854°, 27.x.2014, DLM, JYM, MJS, RMR (1 ♂, slide DM 2165).

Life history. Unknown. Larvae most likely feed on a species of legume (Fabaceae).

Distribution. Originally described from the Florida Keys, Grand Bahama, and Belize (Matthews and Landry 2008). The distribution now also includes South Abaco Island.

***Emmelina buscki* (Barnes and Lindsey, 1921)**

Fig. 14, 54

Diagnosis. Forewing cleft reaching 0.6× wing length from base, first lobe narrow and curved posterad; ground color of Bahamas specimen pale olive buff. Fuscous scales scattered within forewing cell, and along veins 1A and Cu₂; Cleft preceded by oblique fuscous mark at cell end which extends partway into first lobe (Fig. 14). Male genitalia with asymmetrical valvae, left valve with long curved saccular process,

right valve with ear-like broad rim on costa and saccular margins, each bearing a short blunt central spine (Bahamas male specimen not available, see illustration in Gielis (2011)). Female genitalia with long narrow ductus bursae arising from left side of a flattened disc-shaped antrum (Fig. 54).

Pinned material examined. BAHAMAS: **Grand Bahama Island:** vic. Owl's Hole, 26.587496°, -78.469854°, 27.x.2014, DLM, JYM, MJS, RMR (1 ♀, slide DM 2092).

Life history. Larvae are known to feed on *Ipomoea indica* (Burm.f.) Merr in southern Florida and sweet potato, *I. batatas* (L.) Lam. in Puerto Rico (Matthews and Lott 2005). Both species occur in The Bahamas along with 12 other species of *Ipomoea* L. and other Convolvulaceae (Correll and Correll 1982).

Distribution. This species is primarily neotropical, occurring in Colombia, Costa Rica, Honduras, Jamaica, Mexico, and Puerto Rico. In The Bahamas it is known from a single specimen from Grand Bahama Island (Matthews and Lott 2005; Gielis 2011).

Oidaematophorus androsensis Matthews, new species

Fig. 15, 53

Diagnosis. This species is distinguished from other species of the archipelago by the relatively broad forewings, prominent midleg tibial tufts (Fig. 15), and the distinctive antrum of the female genitalia (Fig. 53). The shape of the antrum, specifically the truncate anterior part, also distinguishes it from mainland nearctic and neotropical species.

Description (female). Based on the holotype. *Head.* Labial palpi erect, overall length just exceeding eye diameter, first (basal) and second segment mottled with chestnut-brown tipped buff scales; third segment white and cream buff. Front and vertex scaled with drab tipped white scales, uniformly white between antennae. Occipital fringe scales elongate, bifid, drab. Antenna with scape and pedicle white. Flagellum dorsum dotted white and drab basally, shading to all drab distally, venter cream buff, minutely ciliate. *Thorax.* Dorsum including tegulae white with drab tipped scales, some chestnut-brown tipped scales near head. Foreleg coxa and femur mottled drab and cream buff, distal part of coxa terminating in weak tuft of elongate chestnut-brown scales; tibia proximally white, distally with tuft of elongate drab scales; tarsomeres banded white and cream buff. Midleg coxa and femur mottled drab and cream buff; tibia drab and cream buff with distinct drab tuft at middle and terminus (Fig. 15); spurs white and drab, longitudinally striped; tarsomeres banded white and cream buff. Hindleg coxa and femur white; tibia white near base shading to drab, some chestnut-brown scales near base of both spur pairs, distinct scale tufts absent. *Forewing.* Length 7.5 mm. Cleft origin at 0.63× wing length from base. Ground color drab with scattered drab, chestnut-brown tipped scales and all white or white, drab tipped scales. A line of chestnut-brown scales trailing along vein Sc. Scattered chestnut-brown and white scales in discal cell. A diffuse chestnut-brown transverse dash along terminus of cell near cleft base. Costal margin of first lobe with distinct chestnut-brown dash at R₂ terminus followed distally by two smaller drab dashes each flanked by subequal patches of white scales. Cleft fringe drab with a small white patch at R₅ terminus. Second lobe with patch of 2–5 chestnut-brown scales marking terminus of M₃, Cu₁, and Cu₂; fringes drab except mixed with some white at terminus of Cu₁ and Cu₂. Forewing venter uniformly drab except fringes and first lobe costa dashes visible as on dorsum. Hindwing and fringes uniformly drab dorsally and ventrally. Venous scales chestnut-brown. *Abdomen.* Mixed drab and white, scales mostly white with drab tips.

Female genitalia. Papillae anales moderately setose, weakly sclerotized at base. Apophyses posteriores length about 2× that of papillae anales. Apophyses anteriores indistinct in preparation, appearing as curved lateral projections of anterior margin of tergite VIII. Anterior margin of tergite VIII a broad irregular band of double layered integument. Ostium not differentiated from antrum, a broad pocket-like infolding along sternite VII. Antrum weakly sclerotized, bell-shaped with anterior third truncate and posterior two-thirds flared with anterior extending in a curved tail on right side, overall length at least twice that of papillae anales. Anterior part of antrum opening into membranous broad juncture of bursa copulatrix and ductus seminalis. Bursa copulatrix not differentiated into ductus and corpus bursae, instead forming a short lobe-like branch about as long as antrum. Ductus seminalis at least

5× length of bursa copulatrix, broad at base, midsection diameter similar to anterior part of antrum, anterior part coiled.

Type. HOLOTYPE. ♀, with the following labels: 'BAHAMAS: North Andros, | 2.4 mi. S of Staniard Creek, | 24.797594°, -77.888264° | 11.vi.2012 at light' [white printed]; 'Mark Simon, Gary | Goss, Rick Rozycki | & Michael Simon' [white printed]; 'M. Simon | MGCL Accession | No. 2012-28' [white printed]; 'D. MATTHEWS | GENITALIA | PREP. #1670' [white printed]; 'HOLOTYPE ♀ | *Oidaematophorus* | *androsensis* | D. Matthews' [red printed]; 'PTERO1277 | Pterophoridae Database' [white printed with barcode]. The holotype is deposited at MGCL.

Life history. Unknown.

Distribution. Known only from the female holotype from North Andros Island. The type locality is an unpaved track through Caribbean pine forest (*Pinus caribaea* Morelet).

Etymology. The specific epithet refers to the type locality. Andros is politically known as one island, the largest of The Bahamas, although it is actually an archipelago of many islets and cays as well as larger islands. These islands are grouped into three large districts (North Andros Island, Mangrove Cay, and South Andros Island) which are separated by major saltwater waterways known as bights.

Comments. This species is placed in the genus *Oidaematophorus* Wallengren based on the wide bell-shaped antrum of the female genitalia. The coiled ductus seminalis and prominent scale tufts at the midleg tibial spurs are also typical for the genus.

***Hellinsia paleaceus* (Zeller, 1873)**

Fig. 16, 33a, b, 50

Diagnosis. Forewing cleft extending to 0.6× wing length from base, lobes broad; ground color white to light buff interspersed with cream-buff. Costa, second lobe and wing base with faint lines of cinnamon-drab scales. Distinguished from *Hellinsia unicolor* (Barnes and McDunnough) by the presence of a drab or olive-brown spot near forewing cleft base (Fig. 16). Hindwing cinnamon-drab. Male genitalia with asymmetrical valvae; left valve larger with short laterally recurved saccular process (Fig. 33a). Female genitalia with long swollen part of ductus seminalis curving over the anterior part of corpus bursae; anterior margin of tergite VIII wrapped around to venter as short medially projecting apophyses anteriores (Fig. 50).

Pinned material examined. BAHAMAS: **Abaco:** North Abaco, 1 mi. S of Blackwood Village, 26.785155°, -77.431319°, 6.vi.2016, recently burned pinelands, adults in vicinity of *Vernonia blodgettii*, DLM, JYM, MJS, GJG (11 ♂, 9 ♀, slide DM 2148); same data, adult nectaring on *V. blodgettii* (2 ♂, slide DM 2115); South Abaco, vicinity of Sawmill Sink, 26.218346°, -77.210170°, 2.vi.2016, DLM, JYM, MJS, GJG (2 ♂, 1 ♀).

Life history. Larvae have been recorded feeding on the leaves of five species of *Vernonia* Schreb. (Asteraceae) in the USA (Matthews and Lott 2005). Although larval specimens have not yet been collected in The Bahamas, adults were found in association with *Vernonia blodgettii* Small growing in recently burned pinelands. These adults were found flying in close proximity to the plants, perching on the plants, and in two cases, nectaring on the flowers. Three other species of *Vernonia* occur in The Bahamas, two endemic and one widespread in the tropics and subtropics (Correll and Correll 1982).

Distribution. This species is widespread across the USA and ranges north into Canada. In The Bahamas it has only been collected on North and South Abaco. In the neotropics it has also been reported in Puerto Rico (Möschler, 1890).

***Hellinsia chlorias* (Meyrick, 1908)**

Fig. 17

Diagnosis. Similar to *H. paleaceus* with white to light buff forewing ground color and a small drab or fuscous spot at cleft base (may be diffuse) (Fig. 17). Hindwing pale drab. Distinguished from *H. paleaceus*

by drab or fuscous scales marking terminus of forewing veins R_4 , R_5 , M_3 , Cu_1 , and Cu_2 . Left valve of male genitalia enlarged and bearing long curved saccular process (figured in Matthews et al. 2012). Female genitalia distinguished from related species by characteristic shape and sclerotization of tergite VIII anterior margin and anterior apophyses (Bahamas specimen not available, Florida specimen figured by Matthews (1989) as *Hellinsia* sp. B).

Life history. Larvae are stem borers on *Croptilon divaricatum* (Nutt.) Raf., *Conyza canadensis* (L.) Cronquist, and *Heterotheca subaxillaris* (Lam.) Britton and Rusby in Florida. *Conyza canadensis* occurs throughout most of The Bahamas (Correll and Correll 1982).

Distribution. This species has been collected sporadically across the USA with most records from the southeastern states. In The Bahamas it is known from only one specimen collected on Crooked Island and was previously reported by Matthews et al. (2012).

Comments. No additional specimens have been collected in The Bahamas. The Crooked Island specimen (Fig. 17) has more scattered drab scales basad of the forewing cleft spot than is typical of Florida individuals but falls within the range of variation seen for the species.

Hellinsia unicolor (Barnes and McDunnough, 1913)

Fig. 18, 49

Diagnosis. Forewing ground color light buff to pale olive-buff; veins traced with drab scales, especially on lobes (Fig. 18). Hindwing ground color similar to forewing or slightly darker. Distinguished from *H. paleaceus* and *H. chlorias* by the complete lack of spots at cleft base and vein terminals. Male genitalia with a short thorn-like saccular process of the left valve (Figured in Matthews et al. 2012). Female genitalia recognized by the convex, angled anterior margin of tergite VIII and short straight anterior apophyses (Fig. 49).

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay, coppice trail, 26.167000°, -77.181167°, 1.vi.2016, high limestone ridge adjacent to coppice trail, adult resting on vegetation, DLM, JYM, MJS, GJG (1 ♂, slide DM 2116); Schooner Bay Institute, 26.161333°, -77.187667°, 1.vi.2016, at MVL in morning, DLM, JYM, MJS, GJG (1 ♂); Gilpin Point, S of Crossing Rocks, 1.5 mi. SE of Great Abaco Hwy., 26.105899°, -77.18550°, 3.vi.2016, DLM, JYM, MJS, GJG, pinelands, (1 ♂, 1 ♀, DM 2096); **Cat Island:** vic. Ocean Dream Resort, E of Smith Town, 24.323273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (1 ♂); **Mayaguana Island:** Pirates Well, Baycaner Beach, 22.435833°, -73.102222°, 31.vii–1.viii.2014, MJS, GJG (1 ♂, slide DM 2095).

Life history. Larvae in Florida are stem borers in *Eupatorium capillifolium* (Lam.) Small and *E. compositifolium* Walter. The former occurs in The Bahamas along with eight other species of *Eupatorium* L. (Correll and Correll 1982).

Distribution. This species is known to occur in the USA from Florida west to Texas and north into North Carolina. The species status west of Texas is uncertain (see comments). In The Bahamas, it has been collected on South Abaco, Cat, Long, and Mayaguana islands.

Comments. This species was previously reported (Matthews et al. 2012) from Long Island. While the morphology of the female genitalia falls within the range of variation seen in Florida *H. unicolor*, males from The Bahamas are consistent in having a slightly more elongated saccular process of the left valve. This difference is not unusual when compared to variation seen for this species across the USA, yet suggests a distinct segregate restricted to the island populations. At this time, it is best to treat *H. unicolor*, *H. rigidus* (McDunnough), *H. inconditus* (Walsingham), *H. caudelli* (Dyar), and possibly others as a species complex until DNA sequencing and further morphological study tests the species-level status of Bahamas and other segregate populations.

***Hellinsia bahamensis* Matthews, new species**

Fig. 19, 52

Diagnosis. This species is distinguished from congeners in The Bahamas by the distinct triangular patch at the cleft base and abdominal markings including a fuscous middorsal stripe and lateral patches (Fig. 19). The middorsal process on the anterior margin of tergite VIII along with the recurved anterior half of the ductus seminalis are also distinctive in the female genitalia (Fig. 52). Male genitalia unknown.

Description (female). Based on the holotype. *Head.* Labial palpi erect, length about 1.25× eye diameter, pale ochraceous-tawny, white (or Ridgway “cartridge buff”) ventrally on first (basal) and second segment; white mesally on third segment. Front with distal half white, proximal half (adjacent to antennae) pale ochraceous-tawny. Vertex and area between antennae white with some light buff basally. Occipital fringe mixed white and light buff elongate bifid scales. Antenna scape and pedicel white, flagellum white scaled dorsally, minutely ciliate ventrally. *Thorax.* Dorsum white, shading to light buff on posterior half of tegulae and mesoscutum. Metathorax dorsum light buff with pale ochraceous-tawny along anterior margin and white laterally. Coxa and femur of legs mixed white and light buff with weak ochraceous-tawny longitudinal stripes. Tibia of fore- and midleg white with elongate light buff scales forming weak tuft at epiphysis of foreleg, middle of midleg tibia, and midleg tibial spurs; tibial spurs white, a few fuscous scales near base. Tibia of hindleg white, without distinct tufts at spurs; spurs white with some fuscous scales at base. *Forewing.* Length holotype 6.5 mm. Cleft origin at 0.6× wing length from base. Ground color white admixed with light buff. A distinct fuscous triangular patch at cleft base, and two elongate patches of scattered fuscous scales along anal margin just basad of cleft and in discal cell about one-third from wing base to cleft (Fig. 19). Costa with weak line of ochraceous-tawny scales along vein Sc. First lobe with a small cluster of ochraceous-tawny scales at R_2 terminus on costa subtended by a light drab patch extending obliquely toward cleft base. A smaller light drab patch near R_5 terminus. Cleft fringes light drab except for a small white patch of elongate scales at R_5 terminus flanked by similar patches of fuscous scales. Second lobe with few scattered ochraceous-tawny scales near base and a patch of light drab scales near apex; fringes light drab, mixed with white along termen. Ventral forewing uniformly light drab except white near first lobe apex. *Hindwing.* Dorsum and venter including fringes uniformly light drab. Venous scales black. *Abdomen.* Dorsum white with mixed light buff; segments A1–A3 with narrow middorsal fuscous stripe; A2–A3 with narrow subdorsal ochraceous-tawny stripe, A4–A5 with broad fuscous lateral patch. Venter of abdomen mottled white, light buff, and ochraceous-tawny, with diffuse midventral and lateral ochraceous-tawny stripes.

Female genitalia. Papillae anales conspicuously setose; setae lengths similar to that of papillae anales. Apophyses posteriores length just exceeding 2× that of papillae anales. Apophyses anteriores absent. Anterior margin of tergite VIII with very short sclerotized middorsal projection. Ostium a small pocket-like infolding along sternite VII with short lateral extensions. Antrum small, length just less than that of papillae anales, with obscure paired sclerites. Juncture of bursa copulatrix and ductus seminalis at anterior part of antrum. Bursa copulatrix undifferentiated into corpus and ductus bursae, length similar to that of segments VII and VIII combined, width twice that of antrum, slightly enlarged anterad, rounded at terminus. Ductus seminalis length at least 2× that of bursa copulatrix, width of basal half 0.5× that of bursa copulatrix, distal half swollen, recurved, midsection similar in width to bursa copulatrix, apex tapered into filamentous extension.

Types. HOLOTYPE. ♀, with the following labels: ‘BAHAMAS: Grand Bahama | Island, vic. Owl’s Hole | 26.587496°, -78.469854° | 27.x.2014 D. Matthews w/ J. | Miller, M. Simon, R. Rozycki’ [white printed]; ‘D. MATTHEWS | GENITALIA | PREP. #2093’ [white printed]; ‘HOLOTYPE ♀ | *Hellinsia | bahamensis* | D. Matthews’ [red printed]; ‘PTERO1459 | Pterophoridae Database’ [white printed with barcode]. The holotype is deposited at MGCL.

Life history. Unknown.

Distribution. Known only from the holotype from Grand Bahama Island. The type locality is an area of managed pinelands adjacent to a popular diving sinkhole.

Etymology. The specific epithet refers to the occurrence of this species in The Bahamas as well as the specific island type locality of Grand Bahama.

***Hellinsia lucayana* Matthews, new species**

Fig. 20, 34a, b, 51

Diagnosis. This species is characterized by the presence of alternating white and light buff or drab longitudinal stripes tracing veins on forewing lobes combined with fuscous spots at vein terminals and at cleft base (Fig. 20). Male genitalia with short thorn-like saccular process on left valve; juxta with pair of distinctive sclerotized support rods converging at juncture with anellus arms (Fig. 34a). Female genitalia with elongate tapered antrum and simple elongate bursa copulatrix (Fig. 51).

Description (male, female). Based on the holotype (male) and 7 paratypes (6 males, 1 female). *Head.* Labial palpi erect, about 2× eye diameter, first (basal) segment white, second and third segments white with narrow fuscous lateral stripes. Front white distally, light buff adjacent to antennae, white between antennae. Vertex light buff, slightly paler than on front. Occipital fringe scales white, elongated scales simple. Antenna scape and pedicel white with narrow fuscous stripe dorsad and mesad. Flagellum longitudinally striped with double row of fuscous scales flanked by white scales in a double row anterad and single row posterad; venter without scales, minutely ciliate. *Thorax.* Dorsum white and light buff, mesoscutum light buff to white, tegulae white; metascutum white to pale buff. Legs white with fuscous longitudinal stripes, foreleg coxa with single stripe, femur with double stripe, tibia with single stripe and partial stripes near epiphysis tuft. Tarsomeres white with single stripe on basal segment. Midleg similarly patterned with single fuscous stripe on spurs and partial stripe on first tarsomere. Hindleg with tibia white except for partial fuscous lateral stripe proximad of outer tibial spur; distal spur pair each with partial stripe. *Forewing.* Length, males $\bar{x} = 6.1 \text{ mm} \pm 0.4$ ($n = 7$), holotype 6.5 mm, female 7.0 mm ($n=1$). Cleft origin at 0.45× wing length from base. Ground color white (Ridgway “cartridge buff”) with light buff. Costa with drab line along vein Sc. Discal cell with scattered drab and pale drab scales and small diffuse drab scale patch at cleft base. First lobe white including costal margin, with single row of light buff scales tracing veins R_3 and R_4 . Vein R_2 traced by drab scales appearing as short longitudinal dash in basal third of lobe. Vein R_3 terminus at costa marked by 2–3 drab to fuscous scales. Apex of lobe with small gray patch subtended by 2–3 fuscous scales at R_5 terminus. Cleft fringes drab. Second lobe with distinctive alternating lines of white and light buff along veins (three white, two light buff). Terminus of veins M_3 , Cu_1 , and Cu_2 each marked with a minute patch of fuscous scales. Anal margin white basally, distal third light buff. Fringes drab, admixed with some white or light buff along termen. Forewing venter drab except white along costa and anterior half of first lobe. Terminus of veins R_5 , M_3 , Cu_1 , Cu_2 and posterior half of first lobe a slightly darker shade of drab. *Hindwing.* Dorsum uniformly drab to light buff, fringes drab; venter drab except for basal third to half of third lobe white. Venous scales ferruginous.

Male genitalia ($n = 4$). Uncus slightly curved, tapered, length similar or just exceeding that of tegumen. Tegumen with lightly sclerotized median rod on distal two-thirds, tapered anterad. Valvae subequal or right valve slightly shorter than left. Left saccular process short, thorn-like, apex curved toward meson. Overall process length including base similar to that of uncus, base with heavily sclerotized area laterally (Fig. 34a). Right valve with saccular margin a sclerotized ridge with a minute dentate process projecting from middle (Fig. 34a). Juxta with pair of moderately sclerotized support rods basally, converging at anellus. Anellus arms asymmetrical, with right arm slightly longer. Phallus (Fig. 34b) just exceeding half left valva length, slightly curved, tapered at apex; coecum penis, about 0.18× phallus length.

Female genitalia ($n = 1$). Papillae anales with weakly sclerotized band at base, moderately setose, longest setae exceeding length of papillae anales. Apophyses posteriores length about 2.5× that of papillae anales. Apophyses anteriores absent. Anterior margin of tergite VIII simple. Ostium width about 0.5× length of papillae anales. Antrum, elongate, tapered anterad, length about 2× ostium width, interior with weak sclerite. Bursa copulatrix and ductus seminalis joined near anterior part of antrum. Bursa copulatrix undifferentiated, elongate and slightly enlarged at anterior, length about 1.3× that of papillae anales. Ductus seminalis simple, about as wide as middle of antrum, exceeding bursa copulatrix in length by about 1× antrum length.

Types. HOLOTYPE. ♂ - with the following labels: 'BAHAMAS: Crooked Is. | vic. Seaview Settlement | 22.820375°, -74.280567° | 8.vi.2015 | M. Simon, G. Goss' [white printed]; 'Bahamas Survey | M. Simon Coll. | MGCL Accession | No. 2015-53' [white printed]; 'HOLOTYPE ♂ | *Hellinsia* | *lucayana* | D. Matthews' [red printed]; 'PTERO1493 | Pterophoridae Database' [white printed with barcode]. The holotype is deposited at MGCL. PARATYPES 6 ♂, 1 ♀ - BAHAMAS: **Crooked Island:** vic. Seaview Settlement, 22.820375°, -74.280567°, 8.vi.2015, MJS, GJG (1 ♂, slide DM 2109); N side of Horseshoe Beach nr. Gun Bluff, 22.835432°, -74.323017°, 6.vi.2013, MJS, GJG, at light (1 ♂, slide DM 2112); **Mayaguana Island:** vic. Curtis Creek, 22.404722°, -72.976389°, 29.vi.2014, MJS, GJG (4 ♂, slides DM 2098, DM 2111, 1 ♀, DM slide 2110).

Life history. Unknown.

Distribution. This species is known from Crooked and Mayaguana Islands. Habitats in the vicinity of collecting localities included coastal coppice, beach, and coastal rock communities.

Etymology. This species is named for the Lucayans, descendants of the Taino people of the Caribbean, who inhabited The Bahama (or Lucayan) Archipelago prior to the arrival of Columbus.

Comments. Worn specimens do not always show the distinctive markings of the forewing second lobe.

Adaina perplexus (Grossbeck, 1917)

Fig. 21, 55

Diagnosis. Distinguished from *Adaina ambrosiae* by the light buff as opposed to mottled fuscous and white ground color on the wing base; discal spot and cleft spot small and well defined as opposed to diffusing into ground color; occipital fringe ochraceous-tawny as opposed to drab; dorsum of thorax with scales solid cartridge or light buff as opposed to light buff with drab tips; abdomen without fuscous lateral patches on segments A4 and A5. Male genitalia (figured by Matthews et al. 2012) are characterized by a distinct saccular process with a flattened blade-like base and narrow curved distal portion as opposed to a more lobed process in *A. ambrosiae*. The female genitalia (Fig. 55) are distinct from *A. ambrosiae* in having a pair of elongate signa.

Pinned material examined. BAHAMAS: **Abaco:** Central Abaco, vic. Wilson City, 26.372500°, -77.010667°, 1.xi.2014, DLM, JYM, MJS, RMR, ex. larva on leaves of *Melanthera* (1 ♂); **Cat Island:** vic. Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (1 ♀); **Long Island:** Stella Maris, 1 mi. SE of airport, 23.575317°, -75.247100°, 31.v-1.vi.2014, DLM, JYM, MJS, GJG, ex. *Melanthera* sp. (12 ♂, 8 ♀); same data except 31.v.2014, resting on *Melanthera* sp. (1 ♀); same data except, 1.vi.2014, resting on *Melanthera* sp. (2 ♀); **South Andros Island:** W of the Bluff Settlement, 24.106939°, -77.557659°, 29.iii.2014, DLM, JYM, MJS, RMR, ex. larva on *Melanthera* (23 ♂, 12 ♀, slide DM 2152); **San Salvador Island:** Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 14.vi.2018, DLM, JYM (1 ♂).

Preserved material examined. BAHAMAS: **Long Island:** Stella Maris, 1 mi. SE of airport, 23.575317°, -75.247100°, 31.v.2014, DLM, JYM, MJS, GJG, feeding on leaves of *Melanthera* (20 L, 1 LS, 2 P, 1 PC); same data except 31.v-1.vi. 2014 (17 L, 4 LS); **South Andros Island:** W of the Bluff Settlement 24.106939°, -77.557659°, 29.iii.2014, DLM, JYM, MJS, RMR, feeding on leaves of *Melanthera* (14 L, 6 LS, 3 P) (27 L, 5 LS, 5 P) {2 vials}.

Life history. Larvae feed externally on the leaves of *Melanthera aspera* (Jacq.) Small [Asteraceae]. Unlike *A. ambrosiae*, which also feeds on *Melanthera* Rohr, larvae loosely fold or draw together leaves with silk. The larva and pupa were illustrated by Matthews et al. (2012).

Distribution. Bahamas: Abaco, Cat, Long, San Salvador and North and South Andros Islands; Cuba: Varadero (Gielis 2011); Trinidad; United States: Florida, Monroe and Sarasota counties.

Comments. Previously reported from North Andros Island (Matthews et al. 2012).

***Adaina thomae* (Zeller, 1877)**

Fig. 22, 57

Diagnosis. Forewing cleft at about 0.5–0.6× wing length from base; mottled drab and white; variable, with some individuals noticeably whiter. Costa with two fuscous dashes on first lobe near terminals of vein R_2 and R_3 . R_2 dash obliquely connected to small spot at cleft base as a diffuse drab or fuscous mark. Small fuscous spots marking terminus of R_4 (apex), R_5 on first lobe and, M_3 (apex), Cu_1 in darker specimens. Hindwing drab. Male genitalia recognized by elongate, subequal anellus arms, a long saccular process equal or just exceeding length of left valve, and a small spine on the right valve saccular margin (Bahamas specimen not available, see illustration in Gielis (2011)). Female genitalia (Fig. 57) with a centrally placed funnel-shaped antrum, very short ductus bursae, and round corpus bursae lined with stellate spicules. Inception of ductus seminalis on anterior part of corpus bursae.

Pinned material examined. BAHAMAS: **Crooked Island:** 1.5 mi. E of Landrail Pt., 22.813263°, -74.321186°, 7.vi.2015, MJS, GJG (1 ♀, slide DM 2097); **North Andros Island:** 2.4 mi. S of Staniard Creek, 24.797594°, -77.888264°, 27.x.2011, DLM, JYM, MJS, GJG (1 ♀, slide DM 1624).

Life history. Unknown.

Distribution. In the West Indies, this species is known from The Bahamas, Cuba, Puerto Rico, and the Virgin Islands. In The Bahamas it has been collected on Crooked and North Andros islands. In south Florida it has been recorded from the Florida Keys and Florida City. Gielis (2011) also indicates records from Brazil and Mexico.

Comments. The specimen from North Andros was previously reported by Matthews et al. (2012) as “*Adaina* sp.” Study of additional specimens from Cuba and Florida support the current species level determination.

***Adaina simplicius* (Grossbeck, 1917)**

Fig. 23, 35a, b, 56

Diagnosis. Forewing cleft to just less than 0.5× wing length from base; lobe apices acute; ground color white to cream color; a small fuscous or drab spot at cleft base and at terminals of veins R_2 , R_3 , R_5 , M_3 , Cu_1 , and Cu_2 . Spots at cleft base and R_2 usually the most pronounced, the others often absent in worn specimens. Hindwings white or pale drab. Male genitalia (Fig. 35a, b) distinguished from *A. bipunctatus* (Möschler, 1890) by the hook-shaped saccular process of the left valve. Female genitalia (Fig. 56) with long straight (as opposed to spiraled in *A. bipunctatus*) ductus seminalis, somewhat swollen at posterior end; apophyses anteriores bifurcate, with a short, straight anterior projecting branch and a similar length curved branch extending mediad along the anterior margin of tergite VIII.

Pinned material examined. BAHAMAS: **Abaco:** South Abaco, Schooner Bay, coppice trail, 26.167000°, -77.181167°, 30.x.2014, DLM, JYM, MJS, RMR (3 ♂, 2 ♀, slide DM 2103); same location, 1.vi.2016, DLM, JYM, MJS, GJG, adults perching on or flying near *Neurolaena lobata* (4 ♂, slide DM 2094, 4 ♀); **Cat Island:** vic. Ocean Dream Resort, E of Smith Town, 24.232273°, -75.454536°, 23.vi.2014, DLM, JYM, MJS, GJG (1 ♂); **Eleuthera Island:** Leon Levy Native Plant Pres., 25.187667°, -76.212833°, 27.vi.2014, DLM, JYM, MJS, GJG, P. DeLuca, F. Cartwright, E. Fried (1 ♂, slide DM 2106); **Grand Bahama Island:** vic. Barbary Beach, 26.558526°, -78.536983°, 26.x.2014, DLM, JYM, MJS, RMR (2 ♀, slide DM 2107); vic. Owl’s Hole, 26.587496°, -78.469854°, 27.x.2014, DLM, JYM, MJS, RMR (1 ♀); **San Salvador Island:** Gerace Research Centre, Alfred Pike Trail, 24.117166°, -74.463864°, 23.vii.2015, DLM, TAL, R.W. Portell (1 ♀); Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 22.vii.2015, DLM, TAL, R.W. Portell (2 ♀, slide DM 2105); **South Andros Island:** Black Point, along Steven’s Rd., 23.997568°, -77.560616°, 27.iii.2014, DLM, JYM, MJS, RMR, flying around “*Pluched*” [*Neurolaena lobata*] (1 ♂, slide DM 2108, 1 ♀); farm road N of The Bluff, 24.130088°, -77.590680°, 30.iii.2014, DLM, JYM, MJS, RMR, flying nr. flowers *N. lobata* (4 ♂, slide DM 2104, 6 ♀).

Preserved material examined. BAHAMAS: **South Andros Island:** Black Point, along Steven’s Rd., 23.997568°, -77.560616°, 27.iii.2014, DLM, JYM, MJS, RMR, larvae feeding on flowers of *Neurolaena*

lobata (12 L, 1 PC); farm road north of The Bluff, 24.117283°, -77.608451°, 30.iii.2014, DLM, JYM, MJS, RMR, larvae feeding on flowers of *N. lobata* (10 L).

Life history. In the southeastern USA, larvae bore into the flower heads of various Asteraceae such as *Carphephorus* Cass., *Conoclinium* DC., and *Pluchea* Cass. (Matthews and Lott 2005). In The Bahamas, larvae were found boring in the flower heads of *Neurolaena lobata* (L.) R.Br. ex Cass. (formerly *Pluchea symphytifolia* (Mill.) Gillis). This shrub occurs throughout the West Indies and in parts of Florida, Mexico, and northern South America (Correll and Correll 1982).

Distribution. The known distribution of *A. simplicius* is complicated by the uncertainty in determinations based on external features. Confirmed specimens examined are from the southeastern USA, Cuba, and The Bahamas. In The Bahamas, the species has been collected on Abaco, Cat, Eleuthera, Grand Bahama, San Salvador, and South Andros islands. In addition, Gielis (2011) includes Brazil, Costa Rica, Ecuador, Paraguay, and Puerto Rico in the distribution, though some of these records may refer to *A. bipunctatus* or related species (see comments).

Comments. *Adaina bipunctatus* (Möschler, 1890) and *A. simplicius* are frequently confused and are indistinguishable without genitalia dissection. The latter species was also considered a synonym of *A. bipunctatus* by Barnes and Lindsey (1921), adding to the confusion. Both species occur in the southeastern United States and while sympatric, *A. bipunctatus* is less frequently encountered (DLM, personal observations). All Bahamas specimens dissected and associated with *Neurolaena lobata* (n=7) are *A. simplicius* and match reared specimens from Florida as well as the holotype female (AMNH) from Florida. Gielis (2011) lists Bahamas in the distribution of *A. bipunctatus*, though without a specific locality or label data. *Adaina bipunctatus* was described by Möschler (1890) from Puerto Rico. According to Gielis (2011) the type, from Zoologisches Museum, Humboldt-Universität, Berlin, Germany was probably lost. Since *A. bipunctatus* does occur in Florida and was described from Puerto Rico, it may indeed occur in The Bahamas but remains unconfirmed.

Adaina ambrosiae (Murtfeldt, 1880)

Fig. 24, 36a, b, 58, 67–71

Diagnosis. Distinguished from *A. perplexus* by the usually darker, mottled fuscous and white ground color and fuscous lateral patches on abdominal segments A4 and A5. Male genitalia with a small circular sclerotized disc protruding from the ventral margin of the right valve near the apex which can often be seen without dissecting specimens (Fig. 36a). Female genitalia with a short stout ductus bursae and broad irregularly shaped corpus bursae without signa (Fig. 58).

Pinned material examined. BAHAMAS: **Abaco:** Central Abaco, vic. Wilson City, 26.372500°, -77.010667°, 3.vi.2016, DLM, JYM, MJS, GJG, ex. leaves of *Neurolaena lobata* (2 ♂, 1 ♀); South Abaco, Schooner Bay Institute, 26.161333°, -77.187667°, 31.x.2014, DLM, JYM, MJS, RMR (1 ♂); Schooner Bay, coppice trail, 26.167000°, -77.181167°, 6.vi.2016, DLM, JYM, MJS, GJG, ex. *Melanthera* leaves (1 ♂); vic. ferry landing SE of Lobster Rd., 25.995000°, -77.398500°, 1.xi.2014, ex. *Melanthera*, DLM, JYM, MJS, RMR (1 ♀); **Eleuthera Island:** 4.3 mi. S of Palmetto Pt., 25.109584°, -76.151370°, 29.vi.2014, DLM, JYM, MJS, GJG, on leaves of *N. lobata* (9 ♂, 10 ♀); **Grand Bahama Island:** Lucayan National Park, S of Grand Bahama Hwy., 26.602538°, -78.400230°, 25.x.2014, ex. *Melanthera* sp., DLM, JYM, MJS, RMR (1 ♂); S of Owl's Hole, 26.583820°, -78.467092°, 28.x.2014, ex. leaves of *N. lobata*, DLM, JYM, MJS, RMR (3 ♂, 3 ♀); **Long Island:** Deadman's Cay, vic. airport, 23.175500°, -75.096333°, 29.v.2014, ex. *Melanthera* sp., DLM, JYM, MJS, GJG (1 ♂, 1 ♀); **San Salvador Island:** 0.25 mi. W of Gerace Research Centre, 24.119145°, -74.469955°, 12.vi.2018, JYM, DLM (1 ♂); Brandy Hill Road, SE of lighthouse, 24.090794°, -74.440046°, 13.vi.2018, DLM, JYM (1 ♂, 2 ♀, slide DM 2153); Gerace Research Centre, Alfred Pike Trail, 24.117166°, -74.463864°, 10.vi.2018, DLM, JYM, ex. leaves of *Wedalia bahamensis* (1 ♂); Gerace Research Centre, vic. Water Tanks, 24.117589°, -74.465207°, 22.vii.2015, DLM, TAL, R.W. Portell (1 ♂, slide DM 2162, 1 ♀); same location, 11.vi.2018, JYM, DLM (1 ♀).

Preserved material examined. BAHAMAS: **Abaco:** Central Abaco, Public Beach access of Treasure Cay Road, 26.696815°, -77.303424°, 7.vi.2016 DLM, JYM, MJS, GJG, on leaves of *Neurolaena lobata* (3

L); vic. Wilson City, 26.372500°, -77.010667°, 3.vi.2016, DLM, JYM, MJS, GJG, on leaves of *N. lobata* (4 L); South Abaco, Schooner Bay Institute, 26.161333°, -77.187667°, 30.x.2014, DLM, JYM, MJS, RMR, on leaves of *N. lobata* (15 L); same location, 1.vi.2016, DLM, JYM, MJS, GJG, on leaves of *N. lobata* (1 L); same data except 4.vi.2016 (1 L); vic. ferry landing SE of Lobster Rd., 25.995000°, -77.398500°, 4.vi.2014, DLM, JYM, MJS, GJG, on leaves of *N. lobata* (1 L); same data except on leaves of *Melanthera* (1 L); **Eleuthera Island:** 4.3 mi. S of Palmetto Point, 25.109584°, -76.151370°, 29.vi.2014, JYM, MJS, GJG, DLM, larvae feeding on leaves of *N. lobata* (10 L); **Grand Bahama Island:** S of Owl's Hole, 26.583820°, -78.467092°, 28.x.2014, DLM, JYM, MJS, RMR, on leaves of *N. lobata* (3 L, 1 LS); **San Salvador Island:** Brandy Hill Road, SE of lighthouse, 24.090794°, -74.440046°, 13.vi.2018, DLM, JYM, on leaves of *Wedalia bahamensis* (5 L, 1 LS, 1 PC); Gerace Research Centre, Alfred Pike Trail, 24.117166°, -74.463864°, 10.vi.2018, DLM, JYM, on leaves of *N. lobata* (1 L); same data except on leaves of *W. bahamensis* (2 L); Gerace Research Centre, Lucayan Trail, 24.114762°, -74.465374°, 14.vi.2018, DLM, on leaves of *W. bahamensis* (1 L); Gerace Research Centre, vic. water Tanks, 24.117589°, -74.465207°, 22–26.vii.2015, DLM, TAL, on leaves of *W. bahamensis* (11 L); same data except, on leaves of *N. lobata* (6 L).

Life history. In the USA, larvae feed on the leaves of several genera of composites including *Ambrosia* L., *Borrchia* Adans., *Helianthus* L., *Melanthera* Rohr, *Pluchea* Cass., *Rudbeckia* L., and *Xanthium* L. (Matthews and Lott 2005). In The Bahamas, larvae were found feeding on the upper surface of leaves of *Melanthera aspera* (Jacq.) Small, *Wedalia bahamensis* (Britt.) O.E. Schulz, and *Neurolaena lobata* (L.) R.Br. ex Cass. Larvae have the peculiar habit of chewing out a resting groove, usually along a leaf midvein, from which the larva stretches out to feed on surrounding leaf tissue or makes forays to other parts of the leaf, then returns when not feeding (Fig. 67, 68). These grooves are visible on leaves many weeks after larvae have matured and moved to another leaf to pupate. Larvae were most commonly found on *N. lobata* (Fig. 66). Usually only one larva is found on a leaf. In rare cases, several larvae may be found on the same leaf, also favoring the midvein (Fig. 67). Pupation occurs on the hostplants with the larval skin usually adhering to silk near the tip of the abdomen (Fig. 70, 71). Adults come to light and may also be found perching in the vicinity of the hosts (Fig. 69).

Distribution. This species is known from Bermuda, the Dominican Republic, Ecuador, Mexico, Puerto Rico, USA, and the Virgin Islands. It was not previously recorded in The Bahamas, and has now been collected on Abaco, Eleuthera, Grand Bahama, Long, and San Salvador Islands.

Discussion

Of the 23 species of Pterophoridae collected in The Bahamas, ten also occur in Cuba and 18 in Florida where the life histories have been extensively studied (Matthews 1989). Most of the known life histories of Bahamas species are based on knowledge of Florida populations and specimens found by searching particular larval hosts which occur in both Florida and The Bahamas. As expected, more than half of the species are associated with composites, and four with the order Lamiales. This corresponds to the worldwide pattern of about 40% Asteraceae and 20% Lamiales (Matthews and Lott 2005).

In three cases, *Dejongia californicus* on *Ambrosia hispida*, *Adaina ambrosiae* on *Neurolaena lobata*, and *Adaina perplexus* on *Melanthera aspera*, the hostplants were first found in The Bahamas. One endemic Bahamas plant, *Wedalia bahamensis*, was also discovered as one of several hosts of *Adaina ambrosiae*. Life histories and hostplants remain unknown for the four newly described Bahamas plume moths and these species are presumed to be endemic, if not to The Bahamas, then to the West Indies. Larval hosts are also unknown for three other species which also occur elsewhere in the neotropics (*Exelastis dowi*, *Postplatyptilia flinti*, and *Adaina thomae*), though plant orders and families can be targeted in searches based on associations of their congeners (Fabaceae, Lamiales, Asteraceae, respectively).

Plume moth diversity in the various island habitats sampled naturally corresponds to the presence of larval hosts. As most of the hostplants are opportunistic weedy species, it is not surprising that disturbed habitats were the most diverse, yielding 15 species, followed by pinelands (13), coppice (9), beach (4), mangrove (2), and costal rockland (2). Pterophorid species appearing somewhat restricted to specific habitats only included *Dejongia californicus*, in which the host thrives in beach and coastal

rocklands. *Exelastis dowi* and *Hellinsia paleaceus* have thus far only been collected in pinelands so it will be interesting to see if these are eventually found on the more eastern islands without pines.

Considering the diversity of species found on the islands sampled (Fig. 1), it appears there are fewer species on the more eastern islands. This pattern may eventually prove true based on island size and distance from mainland yet for now can be explained by sampling bias since some islands have been visited multiple times (e.g. Crooked Island). Also, the majority of specimens collected were found by actively searching for adults with a net and headlamp as opposed to a lighted sheet only (Crooked, Inagua, Mayaguana). Additional sampling is needed on these more remote islands, especially the Turks and Caicos Islands, which have not yet been included in our moth surveys and for which there are no known records of Pterophoridae. Based on neighboring faunas (Florida 43, Cuba 18), Matthews et al. (2012) predicted at least 20 species of Pterophoridae to occur in The Bahamas. Though our recent survey efforts have slightly exceeded previous expectations, we anticipate the possibility of additional taxa, as well as a more complete record of individual island faunas, as our surveys continue.

Acknowledgments

Our sincere thanks go to Terry A. Lott and Roger W. Portell for assisting with fieldwork on San Salvador Island and likewise to Rick Rozycki for help with surveys on South Andros, Grand Bahama, and Abaco. We also thank the following individuals for their hospitality and local assistance with island logistics: Nancy and Michael Albury (Abaco), Troy Dexter and Tom Rolfus (Gerace Research Centre, San Salvador), Marsha Mundle (New Providence), Nathan Adderley (South Andros), Sheila Blatch (North Andros), Erika Gates (Grand Bahama), Ethan Fried, Falon Cartwright, Paul DeLuca (Leon Levy Preserve, Eleuthera). Philip S. Weech, Director, and Stacy Lubin-Gray of the Bahamas Environment, Science and Technology (BEST) Commission granted permission to conduct scientific research in The Bahamas. We also thank Mr. Simeon Pinder, Director of Agriculture, and Luceta Hanna for their assistance in providing export permits. Field work conducted in 2014 was supported in part by National Geographic Scientific Research Grant # 9439-14. Museum visits to study comparative material were facilitated by M. Alma Solis (USNM) and Jean-François Landry (CNC). Special thanks are also due to Jean-François Landry for providing COI barcodes for Bahamas *Dejongia* specimens. Finally, we thank Cees Gielis, Héctor A. Vargas, and Terry A. Lott for their reviews and helpful comments on the manuscript.

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Received May 7, 2019; accepted May 21, 2019.

Review editor David Plotkin.

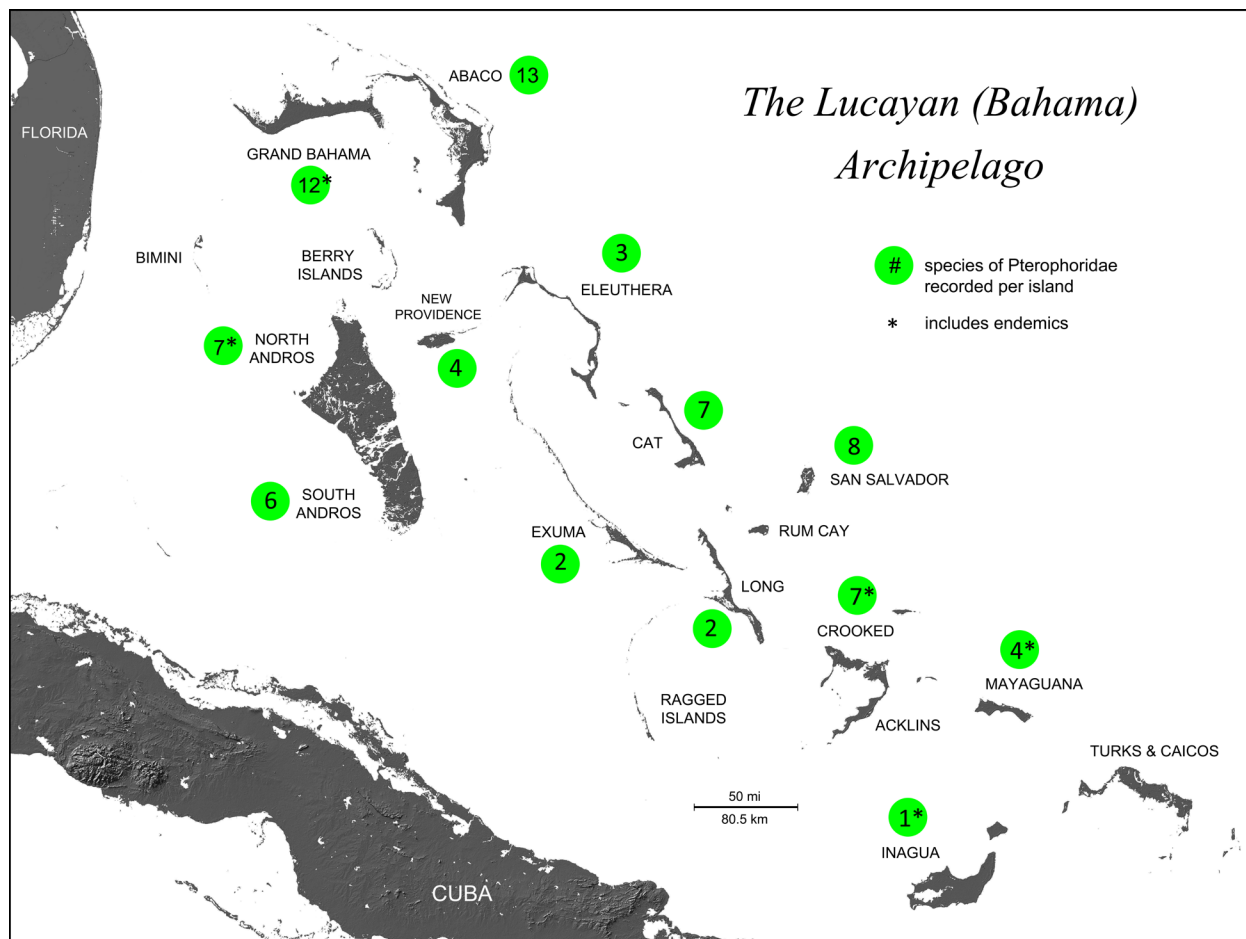
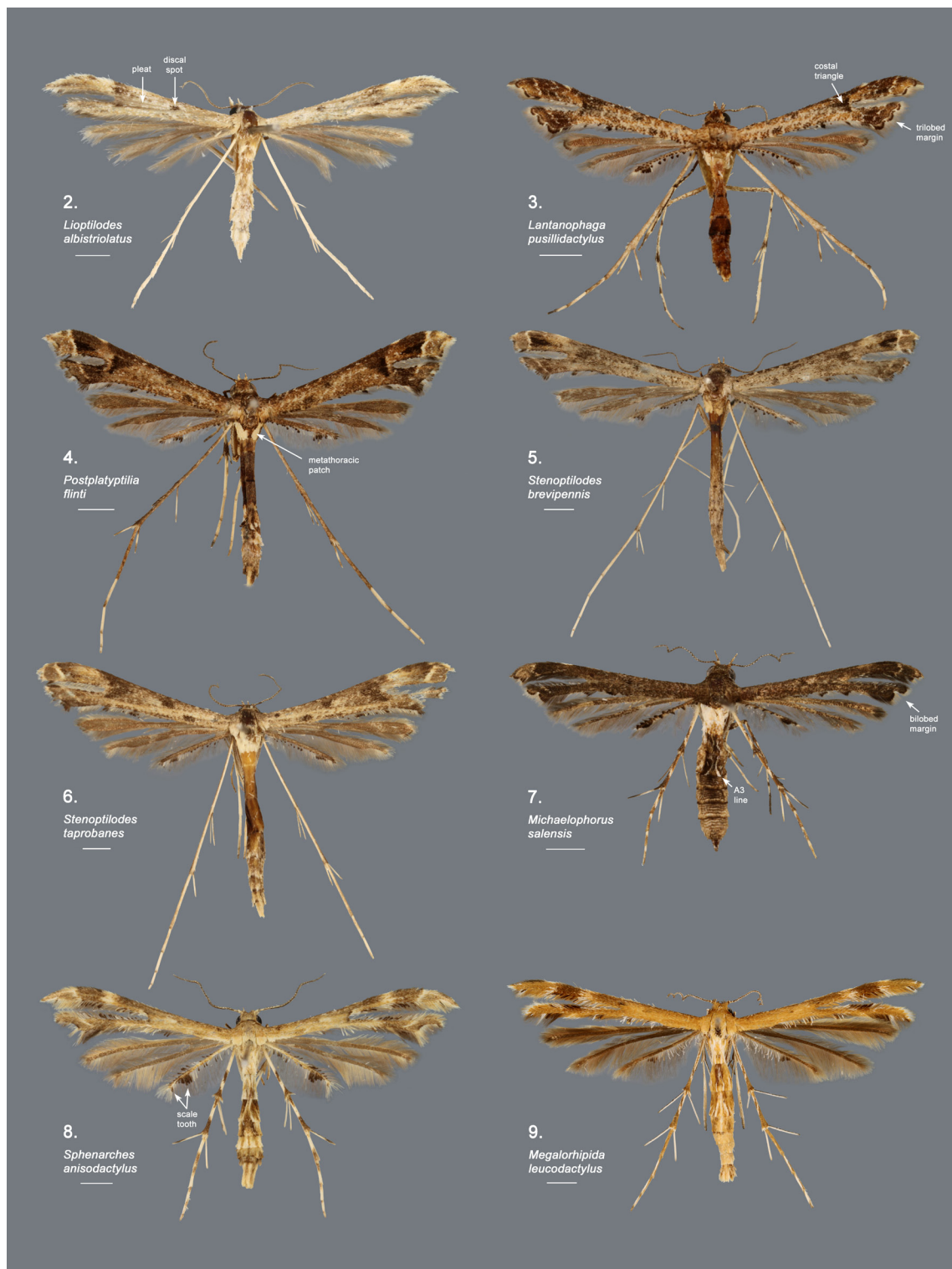
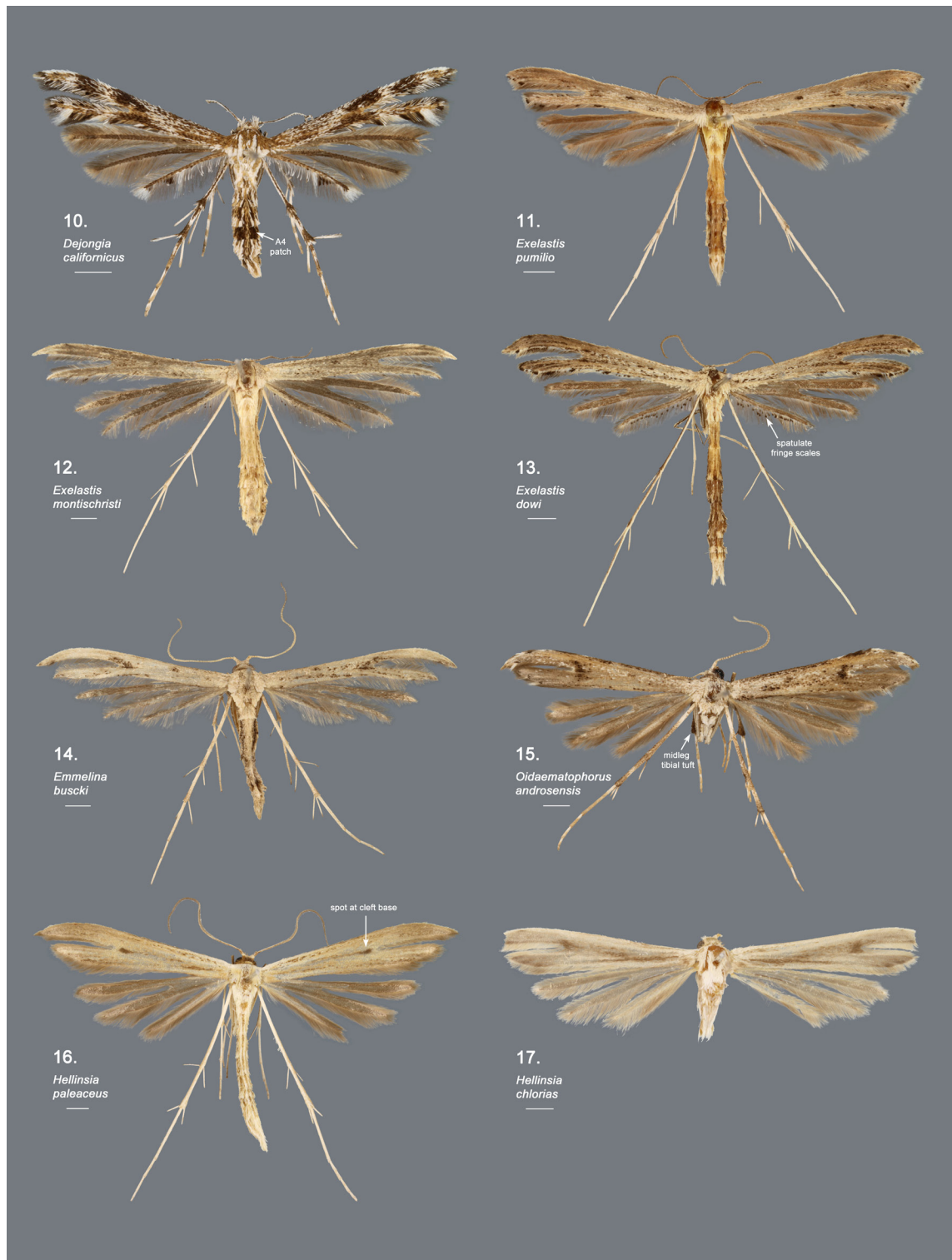


Figure 1. Map of the Lucayan (Bahama) Archipelago showing the number of species recorded for each island and islands where new, presumed endemic, species were collected.



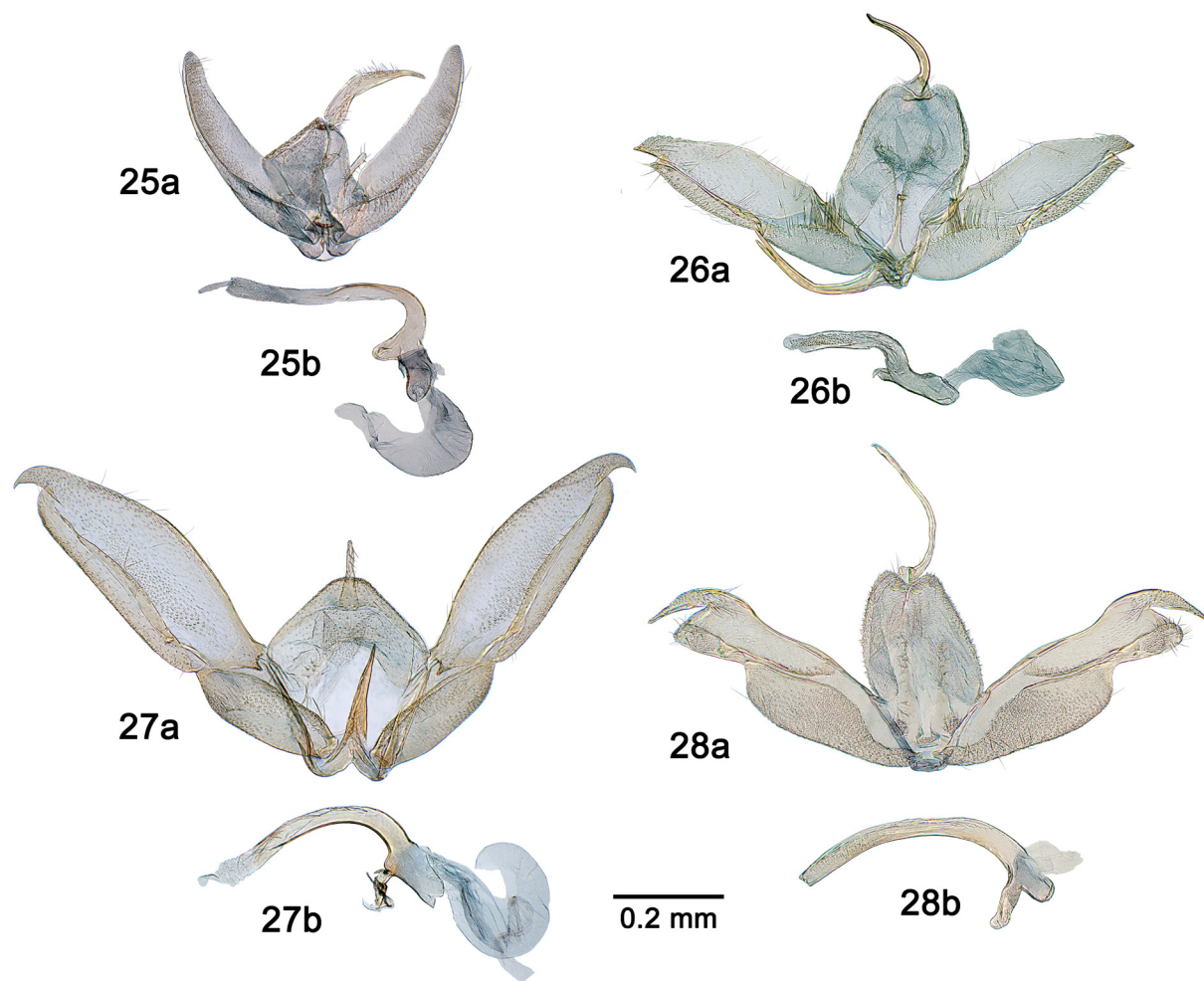
Figures 2–9. Bahamas Pterophoridae pinned adults. **2)** *Lioptilodes albistriolatus* ♀, Cat Island, 23.vi.2014. **3)** *Lantanophaga pusillidactylus* ♂, South Andros Island, 31.iii.2014. **4)** *Postplatyptilia flinti* ♀, Grand Bahama Island. **5)** *Stenoptilodes brevipennis* ♀, Grand Bahama Island. **6)** *Stenoptilodes taprobanes* ♀, Abaco. **7)** *Michaelophorus salensis* Matthews, **new species**, ♀, holotype, Great Inagua, 24–25.vii.2014. **8)** *Sphenarches anisodactylus* ♀, New Providence Island. **9)** *Megalorhipida leucodactylus* ♀, San Salvador Island, 23.vii.2015. Scale line below each name equals 1 mm.



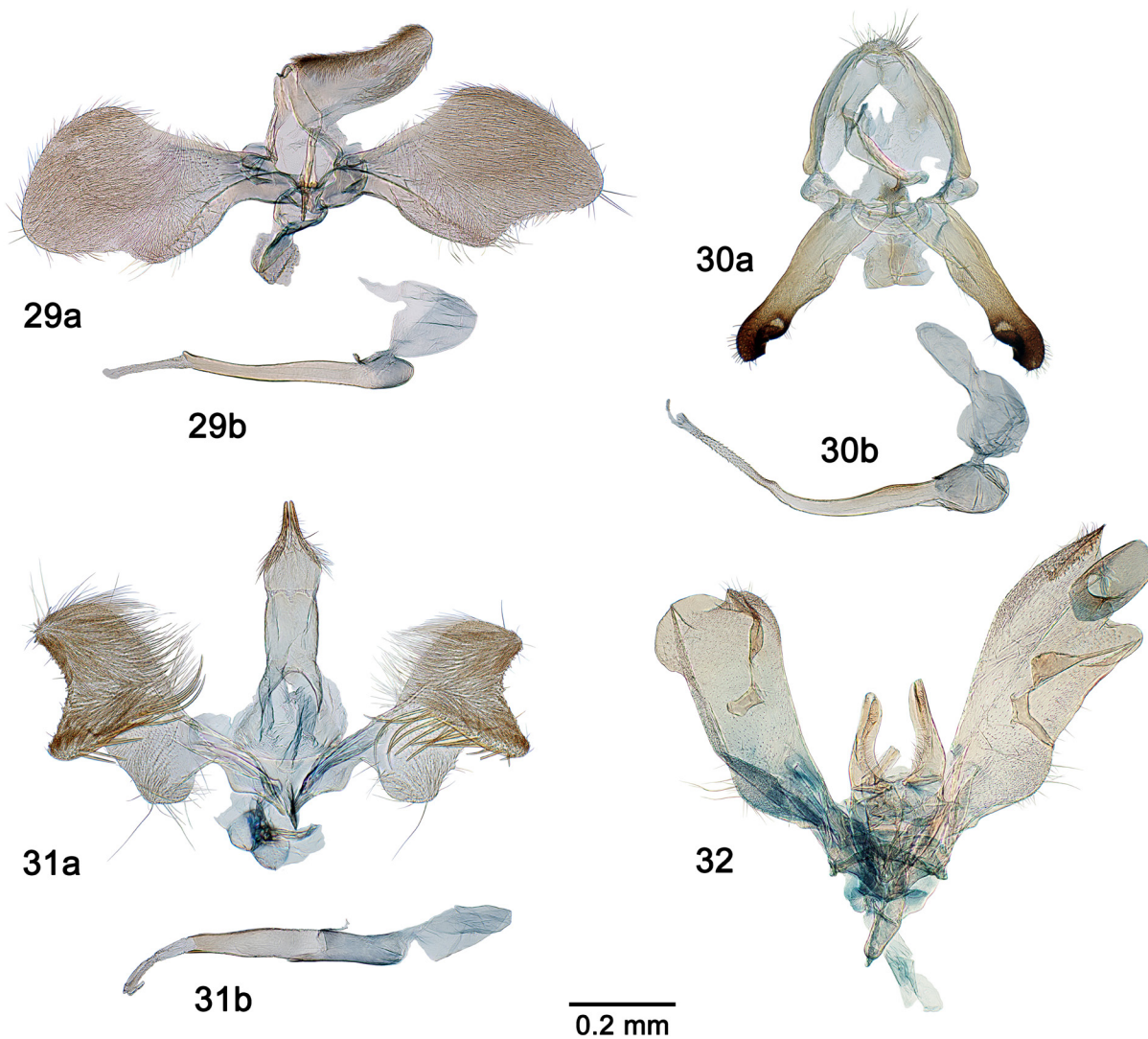
Figures 10–17. Bahamas Pterophoridae pinned adults. **10)** *Dejongia californicus* ♀, San Salvador Island, 26.vii.2015. **11)** *Exelastis pumilio* ♂, Abaco, 2.xi.2014. **12)** *Exelastis montischristi* ♀, Cat Island, 25.vi.2014. **13)** *Exelastis dowi* ♂, Abaco, 30.x.2014. **14)** *Emmelina buscki* ♀, Grand Bahama Island, 27.x.2014. **15)** *Oidaematophorus androsensis* Matthews, **new species**, ♀, holotype, North Andros Island, 11.vi.2012. **16)** *Hellinsia paleaceus* ♂, Abaco, 6.vi.2016. **17)** *Hellinsia chlorias* ♂, Crooked Island, 20.ix.1988. Scale line below each name equals 1 mm.



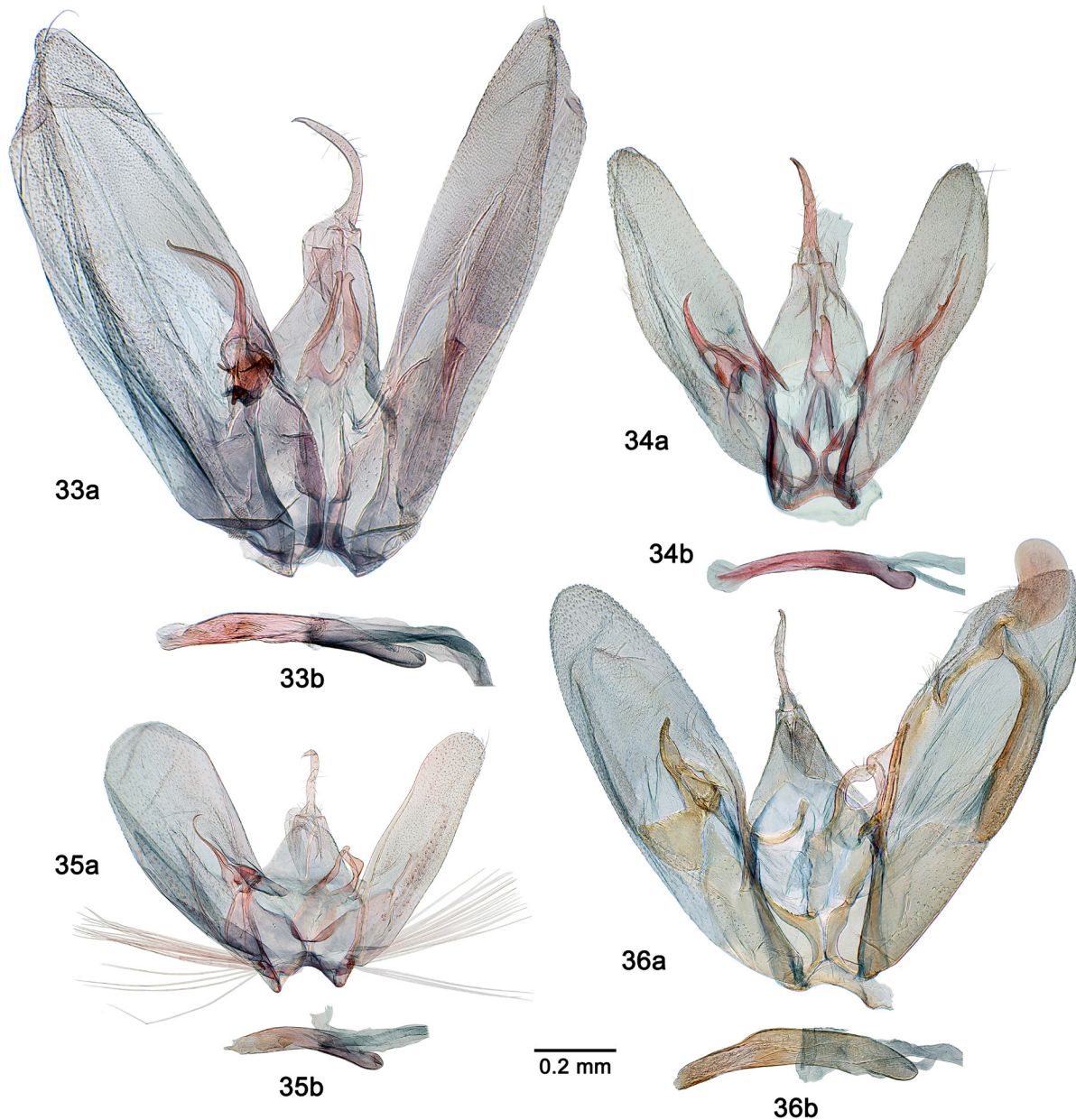
Figures 18–24. Bahamas Pterophoridae pinned adults. **18)** *Hellinsia unicolor* ♂, Abaco, 1.vi.2016. **19)** *Hellinsia bahamensis* Matthews, **new species**, ♀, holotype, Grand Bahama Island, 27.x.2014. **20)** *Hellinsia lucayana* Matthews, **new species**, ♂, holotype, Crooked Island, 8.vi.2015. **21)** *Adaina perplexus* ♀, Long Island, 31.v–1.vi.2014. **22)** *Adaina thomae* ♀, Crooked Island, 7.vi.2015. **23)** *Adaina simplicius* ♂, Abaco, 30.x.2014. **24)** *Adaina ambrosiae* ♀, Abaco, 3.vi.2016. Scale line below each name equals 1 mm.



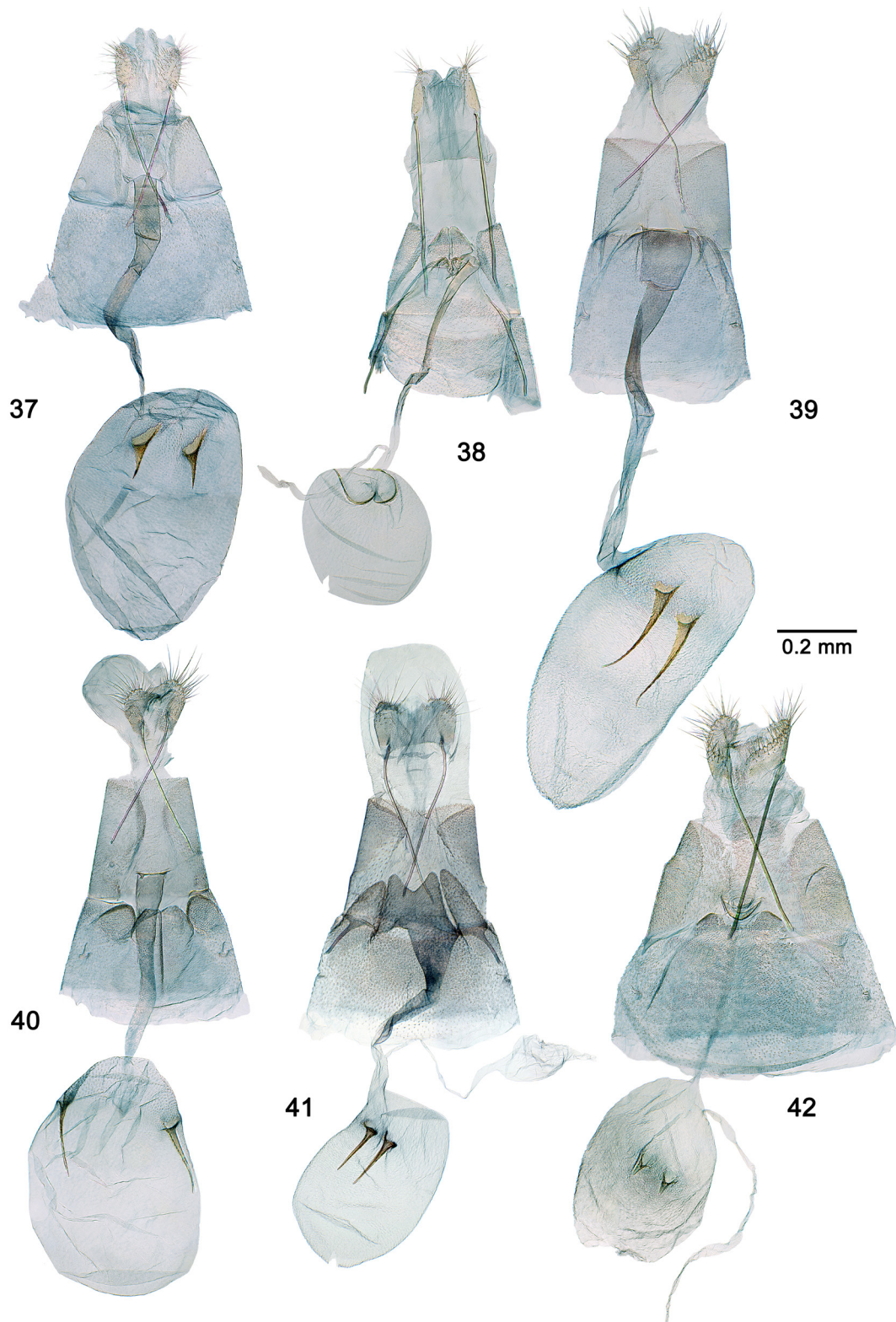
Figures 25–28. Bahamas Pterophoridae male genitalia. **25a)** *Lioptilodes albistriolatus*, slide DM 2159. **25b)** phallus, same individual. **26a)** *Lantanophaga pusillidactylus*, slide DM 2161. **26b)** phallus, same individual. **27a)** *Postplatyptilia flinti*, slide DM 2099. **27b)** phallus, same individual. **28a)** *Stenoptilodes brevipennis*, slide DM 2101. **28b)** phallus, same individual.



Figures 29–32. Bahamas Pterophoridae male genitalia. **29a)** *Megalorhipida leucodactylus*, slide DM 2160. **29b)** phallus, same individual. **30a)** *Dejongia californicus*, slide DM 2164. **30b)** phallus, same individual. **31a)** *Exelastis pumilio*, slide DM 2163. **31b)** phallus, same individual. **32)** *Exelastis dowi*, slide DM 2165, phallus in situ.



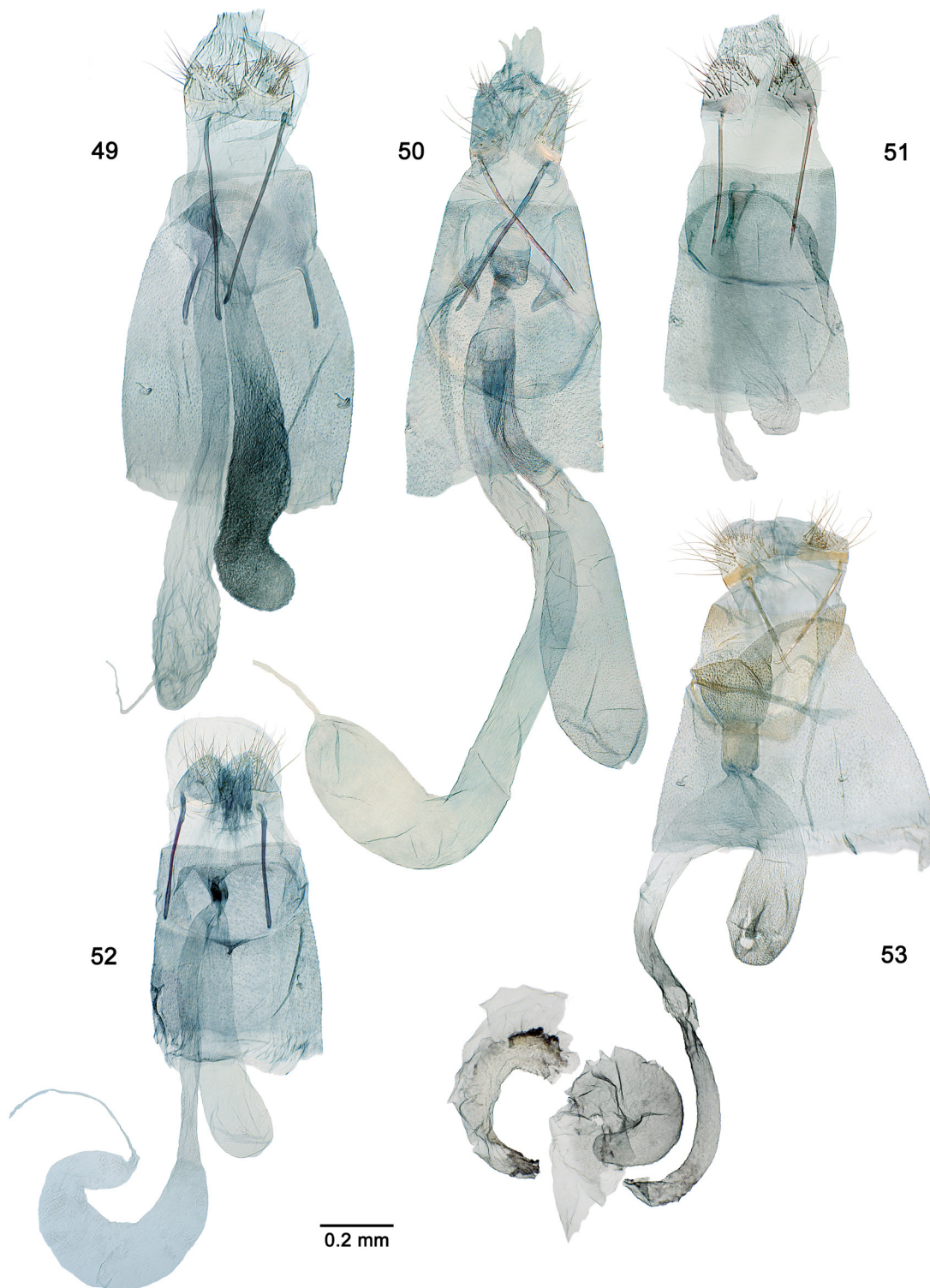
Figures 33–36. Bahamas Pterophoridae male genitalia. **33a)** *Hellinsia paleaceus*, slide DM 2115. **33b)** phallus, same individual. **34a)** *Hellinsia lucayana* Matthews, **new species**, paratype, slide DM 2111; **34b)** phallus, same individual. **35a)** *Adaina simplicius*, slide DM 2104. **35b)** phallus, same individual. **36a)** *Adaina ambrosiae*, slide DM 2162. **36b)** phallus, same individual.



Figures 37–42. Bahamas Pterophoridae female genitalia. **37)** *Lioptilodes albistriolatus*, slide DM 2150. **38)** *Lantanophaga pusillidactylus*, slide DM 2155. **39)** *Stenoptilodes taprobanes*, slide DM 2157. **40)** *Stenoptilodes brevipennis*, slide DM 2156. **41)** *Postplatyptilia flinti*, slide DM 2100. **42)** *Megalorhipida leucodactylus*, slide DM 2154.



Figure 43–48. Bahamas Pterophoridae female genitalia. **43)** *Exelastis dowi*, slide DM 2114. **44)** *Dejongia californicus*, slide DM 2151. **45)** *Sphenarches anisodactylus*, slide DM 2158. **46)** *Exelastis pumilio*, slide DM 2149. **47)** *Exelastis montischristi*, slide DM 2113. **48)** *Michaelophorus salensis* Matthews, **new species**, paratype, slide DM 2117.



Figures 49–53. Bahamas Pterophoridae female genitalia. **49)** *Hellinsia unicolor*, slide DM 2096. **50)** *Hellinsia paleaceus*, slide DM 2148. **51)** *Hellinsia lucayana* Matthews, **new species**, paratype, slide DM 2110. **52)** *Hellinsia bahamensis* Matthews, **new species**, holotype, slide DM 2093. **53)** *Oidaematophorus androsensis* Matthews, **new species**, holotype, slide DM 1670.



Figures 54-58. Bahamas Pterophoridae female genitalia. **54)** *Emmelina buscki*, slide DM 2092. **55)** *Adaina perplexus*, slide DM 2152. **56)** *Adaina simplicius*, slide DM 2107. **57)** *Adaina thomae*, slide DM 2097. **58)** *Adaina ambrosiae*, slide DM 2153.



Figures 59–65. Life history of *Dejongia californicus*. **59)** Coastal rockland habitat with larval host, *Ambrosia hispida* in the foreground, North Point, Graham’s Harbour, San Salvador Island, June 2018. **60)** Adult *D. californicus*, perching on hostplant, South Abaco Island, June 2016. **61)** Dorsal view of pupa, San Salvador Island, June 2018. **62)** Lateral view, same individual. **63)** Frontal view of larva on leaf shoot of host, San Salvador Island, June 2018. **64)** Lateral view of larva feeding on developing flowers and pollen, same location. **65)** Lateral view of larva, showing glandular setae, same location.



Figures 66–71. Life history of *Adaina ambrosiae*. **66)** Larval hostplant, *Neurolaena lobata*, Gerace Research Centre, San Salvador Island, June 2018. **67)** Larvae of *A. ambrosiae* resting along leaf midvein, Eleuthera Island, June 2014. **68)** Larva of *A. ambrosiae* feeding from “resting groove”, Long Island, June 2014. **69)** Adult *A. ambrosiae* perching on vegetation, San Salvador Island, June 2018. **70)** Dorsal view of *A. ambrosiae* pupa, San Salvador Island, June 2018. **71)** Lateral view of pupa, same individual.

