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Observations of plume moths on North Andros Island, Bahamas, and notes on new records and species previously recorded from the Bahamas (Lepidoptera: Pterophoridae)

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Observations of plume moths on North Andros Island, Bahamas, and notes on new records and species previously recorded from the Bahamas (Lepidoptera: Pterophoridae)

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Abstract. Recent fieldwork on North Andros Island by the authors resulted in the collection of six species of Pterophoridae (Lepidoptera), five of which were previously unrecorded for the Bahamas in published accounts. Three additional species are noted for the Bahamian fauna based on specimens collected in the 1980s on other islands. Representative specimens are illustrated from North Andros along with genitalic images for species where these are not readily available in other publications. In addition, images of the larva and pupa are provided for a reared species for which the life history was previously unknown.

Key Words. *Adaina perplexus*, Asteraceae, *Baccharis*, *Exelastis*, *Hellinsia*, hostplants, larvae, life history, *Lioptilodes*, *Melanthera*, *Sphenarches*, *Stenoptilodes*.

Introduction

The family Pterophoridae, commonly known as plume moths, includes more than 1136 species worldwide, with well over 100 species described since the publication of Gielis (2003). These tiny moths, with wingspans often less than 20 mm, are easily recognized in the field by their characteristic T-shaped resting posture (Fig. 1). In most genera, the wings are cleft with the forewing divided into two lobes and the hindwing three. The lobes are fringed with long filiform scales, giving the lobes the appearance of feathers or “plumes”. At least 39% of the known species are associated with the plant family Asteraceae as larvae, though 70 plant families have been recorded as larval hosts, including Plantaginaceae, Convolvulaceae, and Fabaceae in the tropics (Matthews and Lott 2005).

Matthews (1989, 2006) worked on life histories of the Nearctic fauna, while Gielis (2006, 2011) has made substantial contributions to our knowledge of the entire Neotropical fauna. As part of broader studies on the biogeography and biodiversity of Lepidoptera in Central America and Caribbean Basin, Matthews and Miller (2010), Miller et al. (2012), and Matthews et al. (in prep.) have included Pterophoridae in work on the Honduran fauna as well as in limited sampling of marsh and dry tropical habitats of Guantanamo Bay, Cuba (Matthews et al., in prep.). Previous surveys and reviews by various authors have included plume moths in specific faunal treatments of the Greater Antilles such as Puerto Rico (Wolcott 1936, 1948) and a few works have included coverage of the Lesser Antilles (Bigot and Etienne 2009, Woodruff et al. 1998). To date, there have been no published treatments on the pterophorid fauna of the Bahamas, with only a few records listed in accounts of specific taxa (Gielis 2006, 2011; Matthews and Landry 2008).

The Bahamas Archipelago is of special interest in biogeographic studies: the various insular faunas reflect the complex geological history of the region, with some taxa derived from Cuban faunas and others from mainland Florida, Central or South America (Miller and Miller 2001). In addition, weather

patterns are a significant factor in more recent dispersal events, and changes in the climate and hydrology are reflected in the flux of species present on various islands (J. Miller et al., unpublished data). In October 2011, the authors visited and collected Lepidoptera on North Andros Island as part of continuing surveys of the Lepidoptera of the Bahamas. This work was initiated in the 1980s by the late Lee D. Miller and colleagues. Observations and collections of Lepidoptera were made at or in the vicinity of seven established localities on North Andros Island, with plume moths collected at four locations. Six species of Pterophoridae were collected, one of which was reared and the host reported for the first time. Details of specimen data and observations are given below, including notes on species previously collected from other islands of the Bahamas.

Materials and Methods

Material from North Andros was collected at or in the vicinity of sheets illuminated by UV or mercury vapor lamps, spotted with a headlamp and netted in flight, or in the vicinity of or on the larval host plant. Specimens examined are deposited at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida [MGCL] and the National Museum of Natural History, Smithsonian, Washington, D.C. [USNM]. Identifications are based on comparison of external characters with known reference specimens and/ or comparison of dissected genitalia with reference slides and published illustrations. Genitalic slides were prepared following standard techniques and slide mounted in Canada balsam. Slides were photographed at the Florida Museum of Natural History with a Zeiss Axiophot transmitted light microscope (40× objective) using Axiocam 3.1 camera software and KS 400 3.0 digital imaging system. Dorsal views of representative adults from North Andros are shown. Specimens from previous Bahamas collections are either too worn or fragmented to warrant illustration or are referenced by previous publications. Male genitalia are imaged from three Bahamas specimens where illustrations are not readily available in published works and are necessary for identification or assessing variation. Reported wingspans for each species are based on Bahamas material but also include specimens from the southeastern United States, examined from various private and museum collections.

Lioptilodes albistriolatus (Zeller, 1871)

Fig. 1, 2a

Material Examined. Bahamas: North Andros, Captain Bill's Blue Hole, 24.742046°, -77.862031°, 29.x.2011, at light, D. Matthews, J. Miller, M. Simon, G. Goss (1 male) [MGCL]; Nicholls Town, hammock area, 25.143945°, -78.006715°, 30.x.2011, on *Baccharis halimifolia* L., D. Matthews, G. Goss, M. Simon (1 male, 5 females) [MGCL].

Diagnosis. Wingspan 9.5–16.5 mm. Adults of this species are typically light gray and recognized by the paired anterior and posterior dark spots at the base of the forewing cleft, a pale costal mark at the base of the first lobe of the forewing, with the forewings pleated basad of the cleft in live specimens.

Life History. Larvae feed on developing flowers and unripe seeds within the flower heads of several genera of Asteraceae including *Baccharis* L., *Conyza* Less., *Erigeron* L., *Solidago* L., and *Symphotrichum* Nees (Matthews 2006, Matthews and Lott 2005). On North Andros, adults, primarily females, were observed in association with *Baccharis halimifolia* L. var. *angustior* DC. Adults hovered or perched on plants bearing developing inflorescence heads (Fig. 1) and flew for a short distances and settled again on the same plant when disturbed. While we did not notice females actively ovipositing, eggs of this species are typically deposited on the floral bracts. *Baccharis* was by far the most common composite observed on the island. Larvae have simple short to medium length primary setae and are beige with pink or reddish longitudinal bands. Pupation occurs within flower heads or within a spun mass of silk and floral debris attached to the inflorescence pedicles.

Distribution. This species is widely distributed in the neotropics and has been recorded from Argentina, Bermuda, Brazil, Chile, Costa Rica, Cuba, Ecuador, Guatemala, Honduras, Mexico, Paraguay,



Figure 1. *Lioptilodes albistriolatus* adult resting on larval host plant, *Baccharis halimifolia*.

the costa near the cleft base. The anal fringes of the hindwing third lobe also bear a distinct dark scale tuft. Males of this species are distinguishable from *Stenoptilodes taprobanes* (Felder and Rogenhoffer) by genitalia only. The aedeagus and uncus are both slender and proportionally longer in *S. brevipennis* compared to *S. taprobanes*. Females can be easily distinguished from *S. taprobanes* by external characters, in this case the presence of a pair of distinct dark scale tufts on the ventral surface, flanking the ostium.

Life History. Larvae feed on the shoots and flower buds of certain genera of Plantaginaceae including *Mecardonia* Ruiz & Pav., *Scoparia* L., *Bacopa* Aubl., and *Russelia* Jacq. Nickrent et al. (1988) list one of the host species, *Bacopa monnieri* (L.) Pennell as occurring on Andros and include *Mecardonia* and *Russelia* as other taxa occurring elsewhere in the Bahamas. Larvae and pupae are described and illustrated by Matthews (2006).

Distribution. This species is widespread in the Neotropical Region but previously unknown from the Bahamas. In the southeastern United States it has been recorded from Florida and Mississippi. In the West Indies, it is known from Cuba, Guadeloupe, Martinique, Puerto Rico, and Trinidad (Bigot and Etienne 2009, Gielis 2006).

Comments. The female specimen from North Andros (Fig. 2b) is exceptionally worn but with the genital scale tufts intact, allowing the identification. Matthews and Watkins (2011) illustrate the forewing of *S. brevipennis* in comparison with similar species. Illustrations of both male and female genitalia are included in Gielis (2006). The specimen examined was spotted with a head lamp and netted while flying in low vegetation.

***Sphenarches anisodactylus* (Walker, 1864)**

Fig. 2c

Material Examined. Bahamas: North Andros, Stafford Creek (Love at First Sight motel), 24.901449°, -77.936089° 28.x.2011 D. Matthews, M. Simon, J. Miller, G. Goss, MGCL Acc. No. 2011-32 (1 female) [MGCL].

Peru, and Puerto Rico as well as Hawaii. In the Nearctic Region it occurs across the southern United States from Florida to California and extending north on the east coast to Maryland. We are not aware of previous records from the Bahamas.

***Stenoptilodes brevipennis* (Zeller, 1874)**
Fig. 2b

Material Examined. Bahamas: North Andros, Captain Bill's Blue Hole, 24.742046°, -77.862031°, 29.x.2011 D. Matthews, J. Miller, M. Simon, G. Goss (1 female) [MGCL].

Diagnosis. Wingspan 11.0–17.0 mm. Adults of this genus as well as *Lantanophaga* Zimmerman, and *Anstenoptilia* Zimmerman, are recognized by a distinct termen on both lobes and with fringe scales along the second lobe termen forming a scalloped or tri-lobed margin. A faint triangular mark is present along

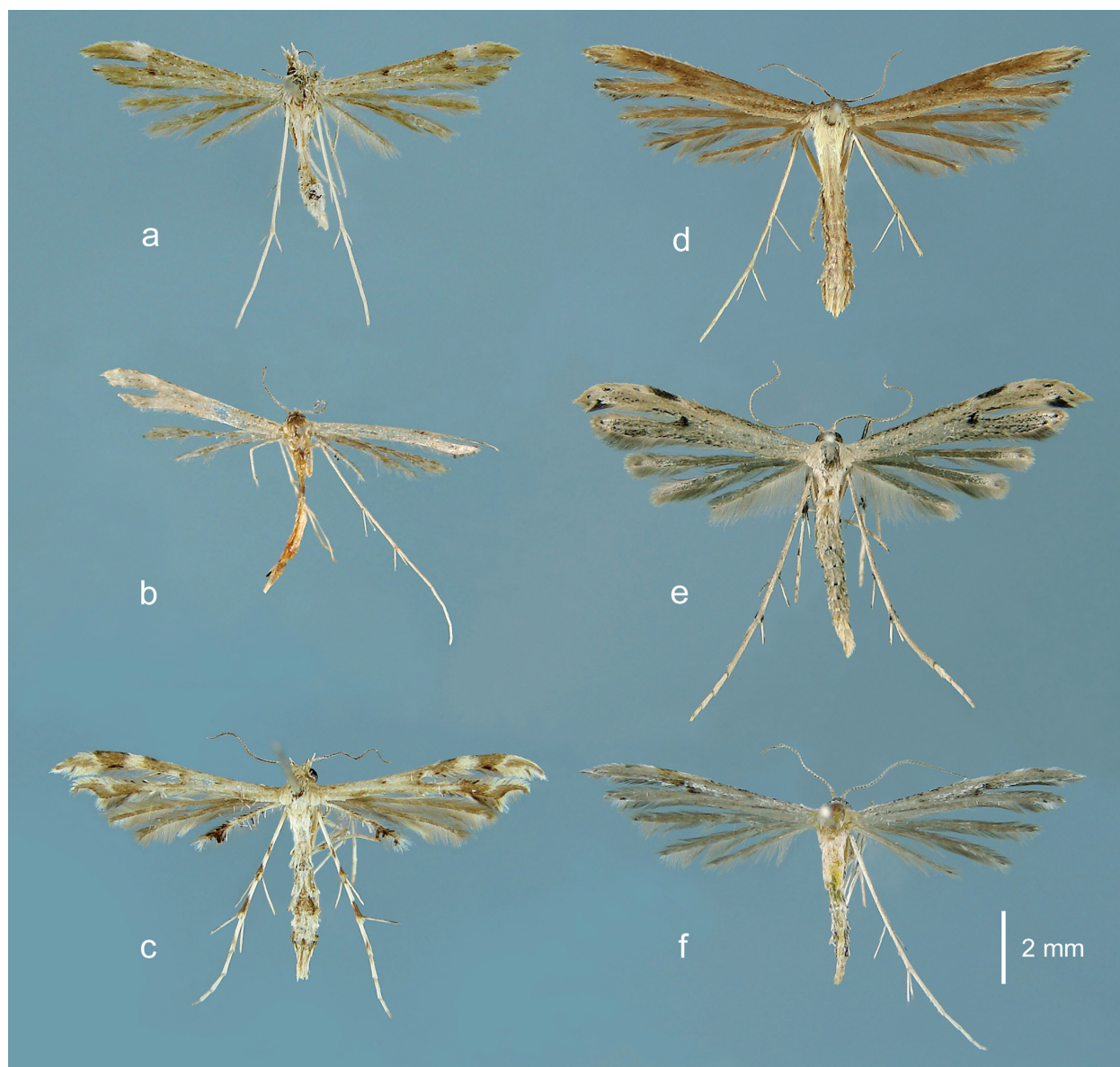


Figure 2. Pterophoridae from North Andros Island: **a)** *Lioptilodes albistriolatus*; **b)** *Stenoptilodes brevipennis*; **c)** *Sphenarches anisodactylus*; **d)** *Exelastis pumilio*; **e)** *Adaina perplexus*; **f)** *A. sp.*

Diagnosis. Wingspan 12.0–18.0 mm. Adults are easily distinguished from other species on the island by the distinctly banded hind tibiae, alternating brown and pale bands on the forewing anterior lobe (Fig. 2c) and the deep forewing cleft extending to nearly half the forewing length. The terminus of both forewing lobes is acute but the outer margin (termen) of the second lobe is distinctly excavate. The hindwing third lobe bears a dark double scale-tooth with the inner scale cluster more or less triangular in shape and much larger than the terminal cluster. The dorsum of the abdomen is also distinctly patterned in fresh specimens.

Life History. This species is one of the most notably polyphagous of the Pterophoridae, with larval hosts recorded from at least nine plant families (Matthews and Lott 2005), especially Fabaceae and Cucurbitaceae. In Florida, the moth is most commonly associated with the aquatic monocot *Thalia geniculata* L. [Marantaceae]. The bionomics and life history were described by Cassani et al. (1990). Throughout the tropics, this species is well known as a pest on food crops of pigeon pea, *Cajanus cajan* (L.) Millsp. and *C. bicolor* DC., various squashes and gourds (*Cucurbita* L., *Lagenaria* Ser., *Luffa* Mill.), as well

as the ornamental, hyacinth bean, *Lablab purpureus* (L.) Sweet. On Andros, this moth is most likely well established on pigeon peas as this is a staple food crop on the island which is traditionally served with rice (Nickrent et al. 1988). Larvae are typically flower feeders or pod borers on the various hosts.

Distribution. This species is pantropical and was reported from Nassau, Bahamas by Gielis (2003, 2006). In the West Indies it has been recorded from Cuba, Dominica, Grenada, Guadeloupe, Martinique, Virgin Islands, St. Thomas, St. Vincent and the Grenadines, and Puerto Rico. In the United States it occurs in Florida, Mississippi, Louisiana, and Texas.

Comments. The North Andros specimen is paler than usual for this species but this is partly accounted for by the worn condition of the individual. The maculation of both the wings and abdomen are distinctive and there is no question as to the identity of the specimen. The specimen was collected in the morning, resting on asparagus fern in the general vicinity of a mercury vapor lamp which was on through the previous night.

***Exelastis pumilio* (Zeller, 1873)**

Fig. 2d

Material Examined. Bahamas: North Andros, Captain Bill's Blue Hole, 24.742046°, -77.862031°, 29.x.2011, at MVL, D. Matthews, J. Miller, M. Simon, G. Goss (1 female) [MGCL].

Diagnosis. Wingspan 10.5–17.5 mm. This species is recognized by the caramel to grayish brown dorsal ground color of the wings with a contrasting pale buff metathorax and upper abdominal segments. Small dark scale tufts are present along the termen of both forewing lobes along with three or four scale clusters mixed within the fringes of the forewing anal margin. Scale tufts or “teeth” are absent on the hindwing.

Life History. Members of the genus are associated with hosts of the plant family Fabaceae. The larvae of this species are covered with both primary and secondary setae and variable in color, ranging from purplish-red to green depending on the plant parts consumed. Descriptions of the larvae and pupae are available in Matthews et al. (1994) and Matthews (2006). Several leguminous hosts are known, but the most common are *Desmodium incanum* DC. and *D. tortuosum* (Sw.) DC. Both occur in the Bahamas (Correll and Correll 1982, Nickrent et al. 1988) but the former is listed under the synonym *D. canum* (G. F. Gmel.) Schinz et Thell. Larvae were not collected on North Andros but *D. incanum* was notably abundant as a lawn forb in the Stafford Creek area.

Distribution. This species is known from both the Old and New World tropics but not previously reported in the Bahamas. In the United States, it occurs primarily in the southeastern region, occurring as far west as Texas and north along the coast into New Jersey. In the West Indies it is known from Barbados, Cuba, Grenada, Guadeloupe, Jamaica, Martinique, Puerto Rico, St. Croix, and St. Vincent.

Comments. The diagnostic dark scale tufts of the forewing are present but difficult to distinguish on the right forewing of the North Andros specimen (Fig. 2d). A Florida specimen with more complete scaling is illustrated by Matthews and Landry (2008).

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

Material Examined. Bahamas: Mayaguana Island, 0–3 mi. N of Abrahams Bay 2.x.1987 M. Simon & L. Miller, Acc. No. 1987-20 (1 female, slide DM 182).

Diagnosis. Wingspan 12.0–19.5 mm. Adults are recognized by the presence of scattered spatulate dark and light scales mixed in with fringe scales along the anal margin of the hind wing third lobe as in *Exelastis dowi* Matthews and Landry. The forewing ground color is grayish-brown as opposed to light buff or ochraceous-buff. Worn specimens can be distinguished by genitalia characters as illustrated in Matthews and Landry (2008).

Life History. Larvae feed on leaves and shoots of *Rhynchosia minima* (L.) DC [Fabaceae]. The larvae are green with pale cream colored dorsal longitudinal bands. Both primary and secondary setae are noticeably bifurcate tipped, with abundant secondary setae both scattered and grouped on tubercles.

Distribution. Bahamas: Mayaguana Island; Barbados; Cayman Islands; Cuba; Dominican Republic; Ecuador: Galapagos Islands; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; Virgin Islands; United States: Florida and Texas.

Comments. Images of the adults and genitalia are available in Matthews and Landry (2008).

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

Material Examined. Bahamas: Grand Bahama Island, Freeport 20–27.vi.1987 W.E. Steiner, M. J. & R. Molineaux, Malaise trap in Caribbean pine & palmetto scrub (genitalia prep DM 169) (1 male) PARATYPE [USNM].

Diagnosis. Wingspan 12.0–18.5 mm. This species is distinguished from *E. pumilio* and *E. montischristi* by the light buff to ochraceous-buff ground color as opposed to caramel to grayish brown ground color in *E. pumilio* and grayish brown in *E. montischristi*. It is further distinguished from *E. pumilio* by the presence of scattered dark basal scales in the fringes of the hindwing third lobe.

Life History. The life history of this species is unknown but it is most likely associated with a legume species [Fabaceae].

Distribution. Bahamas: Grand Bahama Island; Belize; United States: Florida: Monroe County: Key Largo and Big Pine Key.

Comments. Images of the adults and genitalia are available in Matthews and Landry (2008).

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

Fig. 3a, b

Material Examined. Bahamas: Crooked Island, 1.0 mi. E of Colonel Hill 20.ix.1988 (at UV) L. D. Miller and M. Simon, Acc. No. 1988-55 (1 male, slide DM 717) [MGCL].

Diagnosis. Wingspan 14.0–21.0 mm. Adults have a cream colored body and forewing with a contrasting pale gray hindwing. The forewing is marked with a distinct small dark brown spot at the cleft base and a few dark scales at the terminus of veins R_4 , R_5 , M_3 , Cu_1 , and Cu_2 . Similar stem boring species known from the Nearctic Region, such as the goldenrod borer, *H. kellicottii* Fish, have more beige forewings but all are best confirmed with characters of the genitalia. In *H. chlorias*, the males have a curved saccular process (Fig. 3) that is not finely drawn to a thread-like terminus as in *H. kellicottii*.

Life History. In Florida, larvae of this species are stem borer in three species of Asteraceae: *Croptilon divaricatum* (Nutt.) Raf., *Conyza canadensis* (L.) Cronquist, and *Heterotheca subaxillaris* (Lam.) Britton & Rusby. Potential hosts occurring in the Bahamas are *C. canadensis* (L.) Cronquist var. *pusilla* (Nutt.) Cronquist, and *C. parva* (L.) Cronquist. Larvae are cream to tan colored with pale reddish longitudinal bands. Setae are unmodified, short and sparse except on the anal plate. Along with a fringe of short to long setae, the circular anal plate bears two thorn-like projections. Pupation occurs within the stem. The larvae are fully described and illustrated by Matthews (2006).

Distribution. This species is previously unknown from the Bahamas and the Neotropical Region. In the Nearctic Region it is primarily found in the southeastern states: Alabama, Georgia, Florida, Louisiana, Mississippi, and South Carolina. The species was described from Colorado and is also recorded from Kansas.

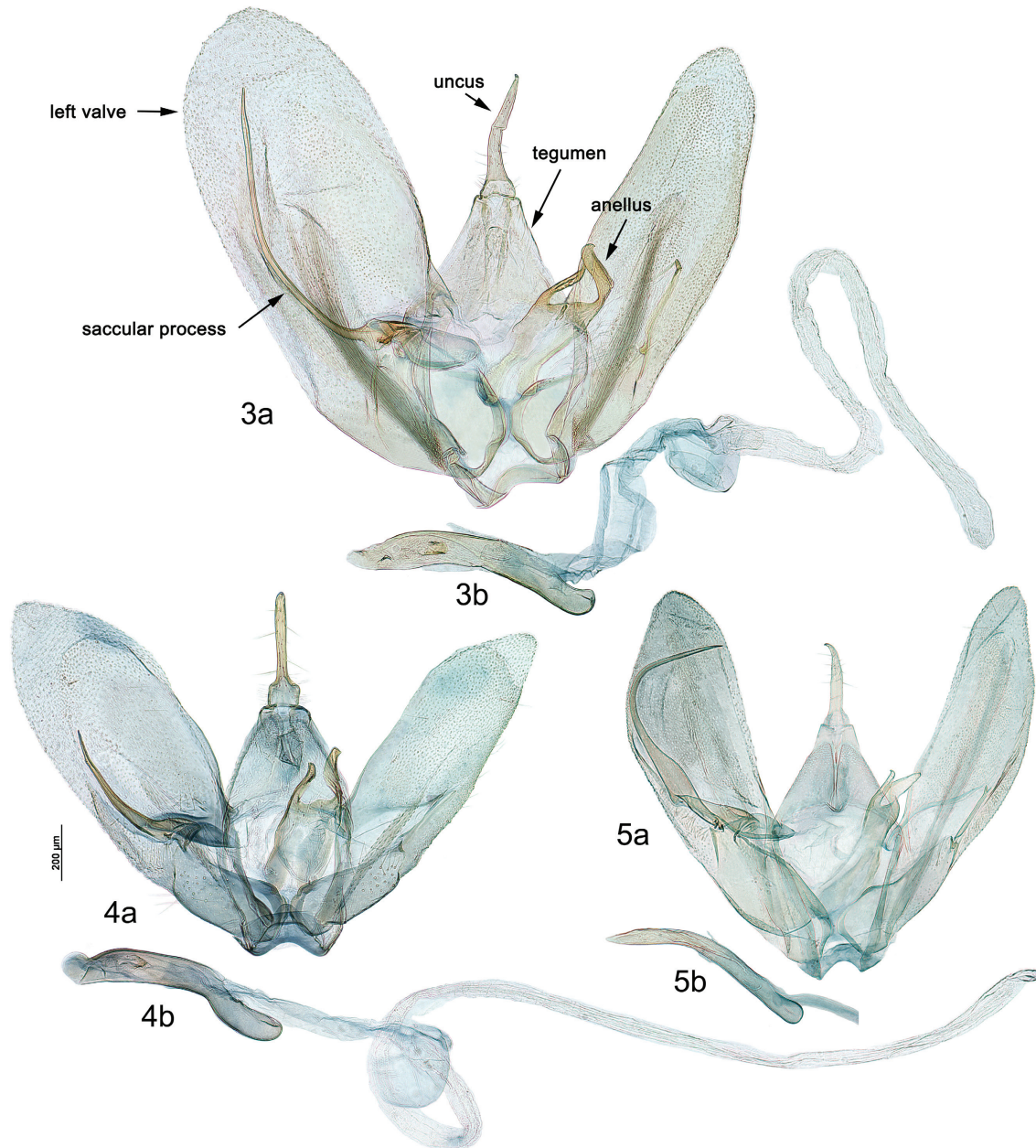


Figure 3–5. Male genitalia of *Hellinsia* and *Adaina*: **3a)** *H. chlorias*, slide DM 717; **3b)** aedeagus, same individual; **4a)** *H. unicolor*, slide DM 536; **4b)** aedeagus, same individual; **5a)** *A. perplexus*, slide DM 1625; **5b)** aedeagus, same individual.

Comments. While the morphological characters appear consistent, genetic sequencing may clarify the status and relationship of western vs. southeastern populations of this species and related borers of the genus.

***Hellinsia unicolor* (Barnes and McDunnough, 1913)**

Fig. 4a, b

Material Examined. Bahamas: Long Island, Stella Maris 28.ix.1988, at light, L. D. Miller and M. J. Simon, Acc. No. 1988-73 (1 male, slide DM 536).

Diagnosis. Wingspan 14.0–23.5. Forewings light buff or beige throughout or with area between veins Sc and radius with ecru or brownish gray scaling in fresh specimens. Within forewing lobes, veins R_5 , M_3 , Cu_1 , and Cu_2 , likewise traced with darker brownish gray scaling in fresh specimens. Hindwings brownish gray, body. Antennae, legs, and body light buff. Head with brownish gray to ochraceous basal scales. Abdomen with longitudinal brownish gray middorsal and subdorsal lines.

Life History. Larvae are stem and shoot borers of *Eupatorium capillifolium* (Lam.) Small. This plant occurs throughout most of the Bahamas archipelago, except for the extreme southeastern portion (Great Inagua, Turks and Caicos) (Correll and Correll 1982). Young larvae feed in the shoots but re-enter the lower stem and roots as they mature. As in *H. chlorias*, reddish longitudinal bands may be present and the circular anal plate bears a pair of thorn-like projections. The larvae are distinct from the latter species in having a patterned head with the sculpted adfrontal sclerites and epicranial suture bordered by a contrasting pale, smooth area (Matthews 2006). As in *H. chlorias*, larvae pupate within the stem gallery.

Distribution. Bahamas: Long Island; United States: Florida, Kansas, Louisiana, Mississippi, North Carolina, and Texas.

Comments. The diagnosis is based primarily on Florida specimens. The Long Island specimen is worn and bears only faint markings. The left valve saccular process is somewhat variable but within the range of variation seen in Florida specimens. In Florida, *E. compositifolium* Walter is an occasional host and additional hosts are used in the western states (Matthews and Lott 2005).

***Adaina perplexus* (Grossbeck, 1917)**

Fig. 2e, 5a,b, 6a-d

Material Examined. Bahamas: North Andros, Stafford Creek (Love at First Sight motel), 24.901449°, -77.936089° 31.x.2011 D. Matthews, J. Y. Miller, M. Simon, G. Goss, ex. *Melanthera aspera* (1 male, slide DM 1625) [MGCL].

Diagnosis. Wingspan 11.0–14.0 mm. This species is recognized by the pale gray ground color of the forewings with scattered dark scales along the costa and especially in the second forewing lobe. Dark brown to black spots mark the terminus of the radial veins on the first lobe with that of the first vein extended as a dark dash along the costa. The species is easily mistaken for pale or worn specimens of *Adaina ambrosiae* but can be distinguished by the smaller dark spot at the forewing cleft base which does not extend medially. The costal dash at the first radial vein is also proportionally longer than in *A. ambrosiae*. The male genitalia (Fig. 5) have distinct saccular process with a flattened blade-like base and narrow curved distal portion as opposed to a more lobed process in *A. ambrosiae*. Several characters distinguish the female genitalia from *A. ambrosiae*, in particular, a pair of elongate signa.

Life History. The larva (Fig. 6a,b) found on North Andros was feeding externally on the leaves of *Melanthera aspera* (Jacq.) Small [Asteraceae]. Feeding damage was present from other larvae but only one individual of *A. perplexus* was found. The larval host for this species was previously unknown. Larvae of *Adaina ambrosiae* (Murtfeldt) also feed on *Melanthera* Rohr along with numerous other composites. The larvae of *A. perplexus* have middorsal setae present on the prothorax that are absent in *A. ambrosiae*. Another distinguishing feature is the exceedingly long lateral setae in *A. ambrosiae*, which exceed twice the segment width. In contrast, the lateral setae of *A. perplexus* do not exceed the segment width. The pupa (Fig. 6c,d) of *A. perplexus* is generally similar to that of *A. ambrosiae* but with shorter setae overall and with the spiracles on the second abdominal segment darkly sclerotized and surrounded by a dark sclerotized patch.

Distribution. Bahamas: North Andros; Cuba: Varadero (Gielis 2011); Trinidad; United States: Florida: Monroe and Sarasota counties.



Figure 6. Larva and pupa of *Adaina perplexus*: **a)** larva (prepupa), dorsal view; **b)** larva (prepupa) lateral view; **c)** pupa, dorsal view; **d)** pupa, lateral view.

Comments. While *A. ambrosiae* has not been recorded from the Bahamas, it occurs in Florida, the Dominican Republic, and elsewhere in the West Indies, thus making it necessary to check the genitalia of suspected *A. perplexus* specimens for positive identification. As more material becomes available and larvae and pupae can be preserved, descriptions and additional characters may help distinguish the immatures of the two species.

***Adaina* sp.**

Fig. 2f

Material Examined. Bahamas: North Andros, 2.4 mi. S of Staniard Creek, 24.797594°, -77.888264° 27.x.2011 D. Matthews, J. Miller, M. Simon, G. Goss (1 female, slide DM 1624).

Diagnosis. Wingspan 13 mm. The female genitalia are very similar to those of *A. thomae* (Zeller, 1877) and will be illustrated in a subsequent publication. The adult maculation differs from *A. thomae* in having a light gray as opposed to gray-white ground color of both wings. A loose aggregation of dark brown to black scales is present near the forewing base cleft and scattered along the costa, with a minute dark scale spot at the Cu_1 terminus of the second lobe. A line of scattered white scaling is present on the forewing from near the anterior lobe base, extending midway from the cleft to the forewing base. The metathorax and abdomen are white in contrast to the wings with some dark scaling laterally on the abdomen.

Life History. Unknown.

Distribution. North Andros Island. The aforementioned similar species, *A. thomae*, is recorded from Brazil, Mexico, Puerto Rico, the Virgin Islands, as well as Monroe County, Florida.

Comments. The specimen collected was not attracted to light, but rather spotted in flight with a headlamp and netted. The species is currently undetermined. Further accounts will be published as more material is obtained.

***Adaina bipunctatus* (Möschler, 1890)**

This species is reported from the Bahamas by Gielis (2011) but a specific island is not mentioned. While *A. bipunctatus* probably occurs sporadically throughout the West Indies and the Bahamas as it does in Florida, it is often confused with the related species *A. simplicius* (Grossbeck, 1917). The latter has been treated as a synonym of *A. bipunctatus* in earlier works such as the Hodges (1983) checklist. The two species are sympatric in some areas and only distinguishable by genitalia characters. Matthews and Maharajh (2009) illustrated the left valve saccular process of males for both species and illustrations of male and female genitalia are included in Gielis (2011). No specimens from the Bahamas were available for study.

Diagnosis. Wingspan 9.0–12.0 mm. Both *A. bipunctatus* and *A. simplicius* are relatively small for the family. The wings and body are white to cream, with a minute dark spot near the base of the forewing cleft and a few dark scales at the terminus of veins in both forewing lobes. The body length in both species is typically shorter than the forewing length. Males of *A. simplicius* are distinct from *A. bipunctatus* in having a hook-shaped saccular process of the left valve as opposed to a weakly curved process. Females of *A. bipunctatus* are distinguished by having a helical versus straight ductus seminalis as well as in the shape of the anterior apophyses as illustrated in Matthews and Maharajh (2009).

Life History. Larvae feed within the flower heads of various composites. Gielis (2011) lists hosts from 17 different genera of Asteraceae. At least two of these records, however, refer to *A. simplicius* larvae. The latter species has been reared on three genera including *Carphephorus*, *Conoclinium*, and *Pluchea* (Matthews and Lott 2005). Larvae and pupae of *A. bipunctatus* have not been described morphologically. The other flower borers of this genus are generally plump and grub-like in shape with reduced prolegs and either entirely cream-colored or with reddish longitudinal bands.

Distribution. *Adaina bipunctatus* was described from Puerto Rico. In addition to the Bahamas, it is recorded from Brazil, Ecuador, the Virgin Islands and the eastern United States as far north as Maryland. *Adaina simplicius* appears to have a more limited range, occurring in Puerto Rico, Trinidad, and in the United States: Alabama, Florida, and Mississippi. Additional localities from both species are reported in the literature but not reported here because of the difficulty in distinguishing between the species and confirming published accounts.

Discussion

The Florida plume moth fauna includes 43 species (Matthews 1989, Matthews et al. 1990, Matthews and Gielis 2011, Matthews and Watkins 2011). As North Andros Island represents a neighboring insular fauna, we expect fewer total species on Andros, up to about 20 based on the habitats and known larval host plants present (Nickrent et al. 1988, Matthews and Lott 2005). As seen with butterfly faunas (Miller and Miller 2001), a few species derived from the Central American and the Greater Antillean faunas are also anticipated. Of the six species collected, four, *Lioptilodes albistriolatus*, *Sphenarches anisodactylus*, *Exelastis pumilio*, and *Stenoptilodes brevipennis*, are widespread and common across the Neotropical Region and all but the first also occur in the Old World tropics. *Adaina perplexus* is less well known but also occurs in South Florida and Cuba. The reared specimen of the latter species represents a significant record as the life history of this species was previously unknown. Up to six

species of Pterophoridae are associated with the same host plant in the Neotropical Region (Matthews and Miller, in prep.), making it especially desirable to be able to distinguish between the immatures of each where they are sympatric. Collection of additional material will be necessary to fully describe and differentiate between the immatures of these species.

There is some question as to the identity of the specimen presently determined as *Adaina* sp. As additional material is available, we will further address this species in a subsequent publication. We expect to find several additional species on North Andros and other islands based on the flora present. Potential species include *Stenoptilodes taprobanes* (Felder and Rogenhofer, 1875) on *Samolus ebracteatus* Kunth, *Megalorhipida leucodactylus* (Fabricius, 1794), on *Boerhavia* spp., *Hellinsia balanotes* (Meyrick, 1908), on *Baccharis*, *Adaina primulacea* Meyrick, 1929 on *Chromolaena odorata* L., *A. ambrosiae* (Murtfeldt, 1880), on *Ambrosia*, *Borrchia*, and *Melanthera*, and *Adaina simplicius* (Grossbeck, 1917) on *Pluchea* or *Ageratum*.

Thus far, six of the 11 known Bahamian species also occur in Cuba. With the possible exception of the *Adaina* sp., these widespread species have the potential to recolonize islands with the introduction of hostplants or other dispersal events, especially in the case of *Sphenarches anisodactylus* and *Stenoptilodes brevipennis* where several hosts are used and include ornamental or crop plants. Although only 11 species are included in the present work, progress has been made in surveying the fauna, and we anticipate additional discoveries as fieldwork continues.

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Literature Cited

- Bigot, L., and J. Etienne. 2009.** Les Pterophoridae de L'île de la Guadeloupe (Lepidoptera). Bulletin de la Société Entomologique de France 114(4): 463–467.
- Cassani, J., D. H. Habeck, and D. L. Matthews. 1990.** Life history of a plume moth *Sphenarches anisodactylus* (Lepidoptera: Pterophoridae). Florida Entomologist 73(2): 257–266.
- Correll, D. S., and H. B. Correll. 1982.** Flora of the Bahama Archipelago: (Including the Turks and Caicos Islands). J. Cramer; Hirschberg, Germany. 1692 p.
- Gielis, C. 2003.** Pterophoridae & Alucitoidea. *In*: World Catalogue of Insects 4: 1–198.
- Gielis, C. 2006.** Review of the Neotropical species of the family Pterophoridae, part I: Ochyroticinae, Deuterocopinae, Pterophorinae (Platyptiliini, Exelastini, Oxyptilini) (Lepidoptera). Zoologische Mededelingen, Leiden 80-2 (1): 1–290.
- Gielis, C. 2011.** Review of the Neotropical species of the family Pterophoridae, part II: Pterophorinae (Oidaematophorini, Pterophorini) (Lepidoptera). Zoologische Mededelingen, Leiden 85(10): 589–824.
- Hodges, R. W. (ed.) 1983.** Checklist of the Lepidoptera of America north of Mexico. E.W. Classey Limited and the Wedge Entomological Research Foundation; London, 284 p.
- Matthews, D. L. 1989.** The plume moths of Florida (Lepidoptera: Pterophoridae). Unpublished MS Thesis. University of Florida; Gainesville. 347 p.
- Matthews, D. L. 2006.** Larvae and pupae of Nearctic Pterophoridae: A synopsis of life histories, morphology, and taxonomy (Lepidoptera: Pterophoroidea). Unpublished PhD Dissertation. University of Florida; Gainesville. 959 p.
- Matthews, D. L., and C. Gielis. 2011.** *Adaina ipomoeae* Bigot and Etienne, 2009, new records for Florida and the West Indies (Lepidoptera: Pterophoridae). Insecta Mundi 0156: 1–3.
- Matthews, D. L., D. H. Habeck, and D. W. Hall. 1990.** Annotated checklist of the Pterophoridae (Lepidoptera) of Florida including larval food plant records. Florida Entomologist 73: 613–621.

- Matthews, D. L., D. H. Habeck, and B. Landry. 1994.** Immature stages of *Exelastis* plume moths in Florida (Lepidoptera: Pterophoridae: Platyptiliinae). *Tropical Lepidoptera* 5: 43–53.
- Matthews, D. L., and B. Landry. 2008.** Description of a new species of *Exelastis* (Lepidoptera: Pterophoridae) from the neotropics, with keys to adults of the four species occurring in Florida. *Tropical Lepidoptera Research* 18(2): 62–70.
- Matthews, D. L., and T. A. Lott. 2005.** Larval hostplants of the Pterophoridae (Lepidoptera: Pterophoroidea). *Memoirs of the American Entomological Institute* 76: 1–324.
- Matthews, D. L., and B. V. Maharajh. 2009.** *Adaina primulacea* Meyrick, 1929: a gall-inducing plume moth of Siam weed from South Florida and the Neotropics (Lepidoptera: Pterophoridae). *Tropical Lepidoptera Research* 19(2): 64–70.
- Matthews, D. L., and J. Y. Miller. 2010.** Notes on the cacao plume moth in Honduras and description of the larvae and pupae (Lepidoptera: Pterophoridae). *Tropical Lepidoptera Research* 20(1): 28–34.
- Matthews, D. L., and R. A. Watkins. 2011.** Extralimital records of the sage plume moth, *Anstenoptilia marmarodactyla* (Lepidoptera: Pterophoridae). *Southern Lepidopterists' News* 33(4): 175–177.
- Miller, J. Y., D. L. Matthews, A. D. Warren, M. A. Solis, D. J. Harvey, P. Gentili-Poole, R. Lehman, T. C. Emmel, and C. V. Covell, Jr. 2012.** An annotated list of the Lepidoptera of Honduras. *Insecta Mundi* 0205: 1–72.
- Miller, J. Y., and L. D. Miller. 2001.** The biogeography of West Indian butterflies (Lepidoptera: Papilionoidea, Hesperioidea): a vicariance model. Chapter 10, p. 127–156. *In: C.A. Woods and F.E. Sergile* (Eds.). *Biogeography of the West Indies: patterns and perspectives*, 2nd ed. CRC Press; Boca Raton, Florida. 582 p.
- Nickrent, D. L., W. H. Eshbaugh, and T. K. Wilson. 1988.** The vascular flora of Andros Island, Bahamas. Kendall/Hunt Publishing Company; Dubuque, Iowa. 211 p.
- Wolcott, G. N. 1936.** “Insectae Borinquenses”, revised annotated check-list of the insects of Puerto Rico. *Journal of Agriculture of the University of Puerto Rico* 20(1): 1–600.
- Wolcott, G. N. 1948.** The Insects of Puerto Rico. *Journal of Agriculture of the University of Puerto Rico* 32(3): 417–1748.
- Woodruff, R. E., B. M. Beck, P. E. Skelley, C. Y. L. Schotman, and M. C. Thomas. 1998.** Checklist and bibliography of the insects of Grenada and the Grenadines. Center for Systematic Entomology, Gainesville, Florida. *Memoir* 2: 1–1286.

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