Plume moths recorded from the United States naval base, Guantanamo Bay, Cuba

Deborah L. Matthews[1], Terry A. Lott[2], Jacqueline Y. Miller[1], James K. Toomey[3] and Roger W. Portell[3]

[1]McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, P.O. Box 112710, Gainesville, FL 32611-2710 **dlott@flmnh.ufl.edu**
[2]Paleobotany Division and University of Florida Herbarium, Florida Museum of Natural History, P.O. Box 110575, University of Florida, Gainesville, FL 32611-0575
[3]Invertebrate Paleontology Division, Florida Museum of Natural History, University of Florida, P.O. Box 117800, Gainesville, FL 32611-7800

INTRODUCTION

Núñez and Barro (2012) published a baseline list of 1,557 species of Lepidoptera comprising the known Cuban fauna. For Pterophoridae, they listed 15 species and Barrow and Núñez (2011) also included three more species identified only to genus, bringing the total to 18. We made two trips to the United States Naval Base (18–25 January 2012 and 3–10 October 2013) in order to inventory all lepidopteran taxa present. Initial results on the butterflies were reported by Matthews et al. (2012). Seven species of Pterophoridae were included in the 334 moth species encountered at the base. These seven species along with collection data and observations are treated below. One species is added to the Cuban fauna and two new host records are reported.

MATERIALS AND METHODS

Adult moths were collected at sheets illuminated by 160 watt self-ballasted mercury vapor lamps, netted after spotting with a head lamp, or captured in vials while perching on or near host plants or other substrate. Larvae and pupae were collected on hosts and preserved in 70% isopropanol. Pupae were placed directly in isopropanol, while larvae are first placed in boiling water to fix proteins. Numbered study sites are mapped and described by Matthews et al. (2012). All genitalia dissections were slide mounted in Euparal. The following abbreviations are used in the text: **GTMO** – Guantanamo Bay Naval Base, **MGCL** – McGuire Center for Lepidoptera and Biodiversity, **m** – male, **f** – female, **L** – larva, **LS** – larval skin (exuvium), **P** – pupa, **PC** – pupal case (exuvium).

RESULTS

Stenoptilodes brevipennis (Zeller, 1874)
(Fig. 1)

Diagnosis – Forewing cleft reaching about one-fourth to wing base. Forewing mottled with tan and dark brown scales, costa dark brown dotted with tan, diffuse dark brown triangle present from costa and extending to cleft base. Forewing lobes traversed with narrow white line. Both lobes with distinct termen and with fringes bearing patches of dark spatulate scales making margin appear scalloped. Hindwing third lobe with scattered dark spatulate scales along anal margin and distinct dark scale patch at apex.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 2, vic. Sherman Ave., 19.91978°, -75.1362° (datum WGS 84), 6.x.2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31 (1 f), MGCL 230776; Site 4, XRAY 02, 19.9347°, -75.0972° (datum WGS 84), 20.i.2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2 (1 m, slide DM 2121), MGCL 172035; same data (1 m, slide DM 2119), MGCL 172069; (2 f) MGCL 172034, 172066; Site 8, E of old airport, 19.90661°, -75.1592° (datum WGS 84), 24.i.2012, D. Matthews, R. Portell, T. Lott, J. Toomey, MGCL Accession # 2012-2 (1 m, slide DM 2120), MGCL 172068; same data (1 m, slide DM 2118), MGCL 172067.

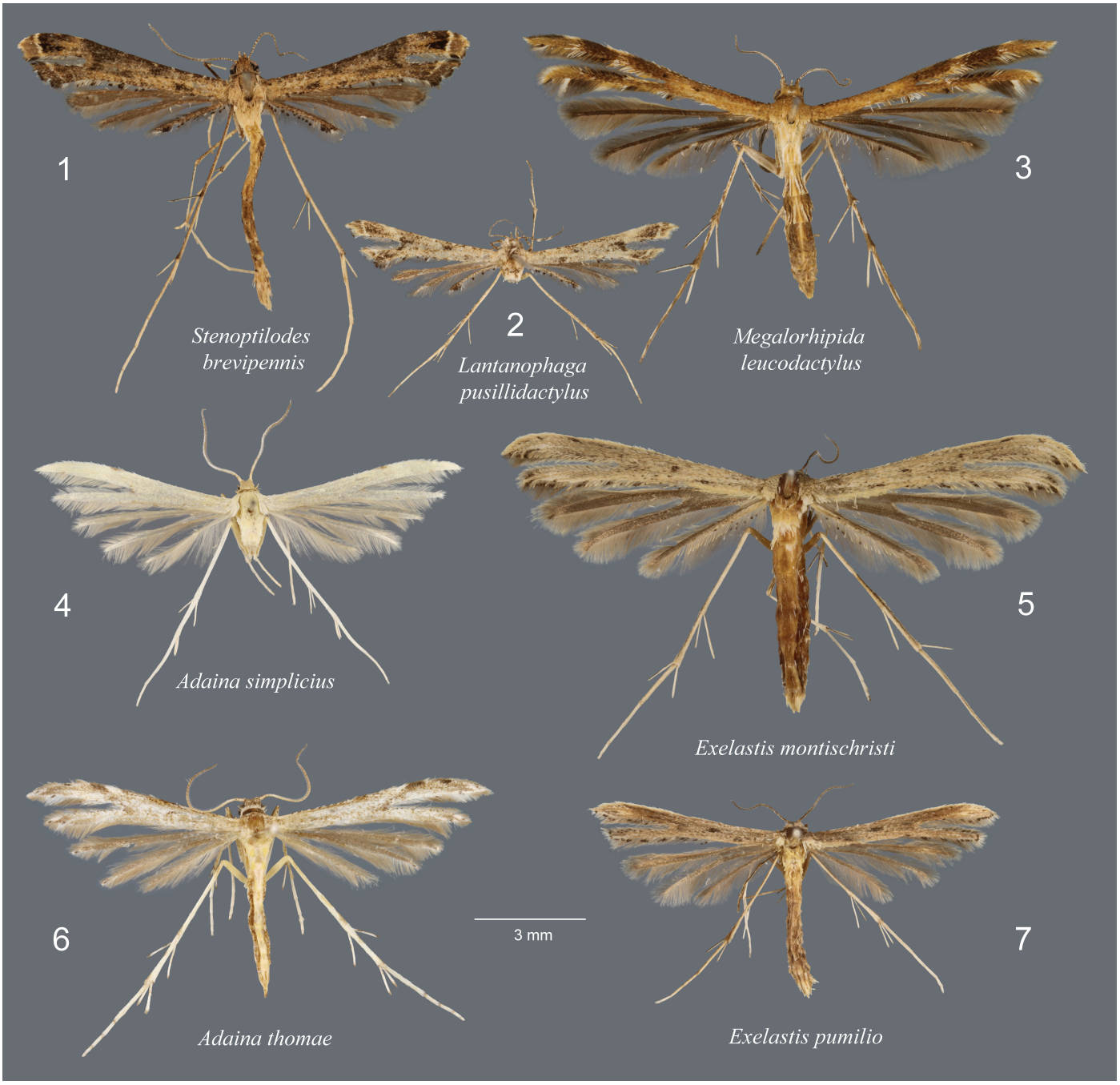
Comments – Larvae are known to feed on various genera of Plantaginaceae including *Bacopa*, *Mecardonia*, *Scoparia*, and *Russelia* (Matthews and Lott 2005). At GTMO, adults were collected in association with moist areas where *Stemodia maritima* L. (Plantaginaceae) was present. While a likely hostplant, no larvae were actually found.

This species is difficult to distinguish from *Stenoptilodes taprobanes* which has not yet been recorded from Cuba. Females of *S. brevipennis* bear conspicuous lateral scale tufts ventrally on the abdomen which flank the ostium. Males must be dissected for positive identification. All four males collected at GTMO were dissected and confirmed to be *S. brevipennis*.

Distribution – This species is pantropical and also extends into the southern temperate regions of the Nearctic Region.

Lantanophaga pusillidactylus (Walker, 1864)
(Fig. 2)

Diagnosis – Overall wing patterns are very similar to *S. brevipennis*. Distinguished from the latter by the much smaller wing expanse (≤ 1.0 cm) and by having dark brown patches laterally on the fourth abdominal segment.



Figures 1–7. Adult plume moths collected at GTMO: 1) *Stenoptilodes brevipennis* male, MGCL 172069; 2) *Lantanophaga pusillidactylus*, female, MGCL 172043; 3) *Megalorhipida leucodactylus*, female, MGCL 172032; 4) *Adaina simplicius*, male, MGCL 172041; 5) *Exelastis montischristi*, female, MGCL 230775; 6) *Adaina thomae*, male, MGCL 230774; 7) *Exelastis pumilio*, female, MGCL 172040.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 7, vic. Stephens Ave., 19.92296°, -75.12894°, 23.i.2012 (datum WGS 84), D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2 (1 f, slide DM 1628) MGCL 172043.

Comments – Larvae feed in the flower clusters of various species of *Lantana*. Both *L. camara* L. and *L. involucrata* L. are present at GTMO (Areces-Mallea, 2010). The single female specimen collected at GTMO was worn and was dissected in order to confirm the identification.

Distribution – Recorded from all faunal regions, generally tropical though extending into southern temperate regions. This species was introduced to Hawaii from Mexico as early as 1902 (Koebele 1924, Perkins 1924) for biological control of *Lantana camara*. Though not considered a serious pest, it is easily spread through transport of ornamental varieties of *Lantana*.

Megalorhipida leucodactylus (Fabricius, 1794)
(Fig. 3)

Diagnosis – Forewing cleft extending just beyond one-half wing length, lobes narrow with acute apices (without termen); ground color pale brown with brown banding on lobes. White and dark brown scales within forewing fringes. Hindwing ash brown, third lobe anal margin with fringes interspersed with white scales and a minute dark brown scale patch one-third from lobe apex. Distinguished from related taxa by the distinctive oblique dorsal white and brown banding pattern of the second and third abdominal segments.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 2, vic. Sherman Ave., 19.91978°, -75.1362° (datum WGS 84), 5.x. 2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession 2013-31 (1f), MGCL 230772; Site 4, XRAY 02, 19.9347°, -75.0972° (datum WGS 84), 20.i.2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2, (1 m), MGCL 172051, (5 f), MGCL 172046, 172048, 172052, 172053, 172062; Site 7, vic. Stephens Ave., 19.92296°, -75.1289° (datum WGS 84), 23.i. 2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MCGL Accession # 2012-2, (3 f), MGCL 172055172057; Site 7b, vic. Stephens Ave., 19.92206°, -75.1297° (datum WGS 84), 7.x. 2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31 (1 m), MGCL 230779, (2 f), MGCL 230777, 230780; Site 11, E of Sherman Ave., vic. Library, 19.91368°, -75.1399° (datum WGS 84), 19.i.2012, D. Matthews & T.A. Lott, ex. *Boerhavia*, MGCL Accession # 2012-2 (2 m) MGCL 172058, 172061, (2 f) MGCL 172031, 172059; same data except 20.i.2012, (2 m) MGCL 172047, 172060, (5 f) MGCL 172032, 172033, 172045, 172049, 172050; same data except 22.i.2012, (1 m), MGCL 172054.

Figures 8–10. Habitat and host of *Megalorhipida leucodactylus*: 8) GTMO Site 5 with *Commicarpus scandens* growing in a cactus pile; 9) mature larva of *M. leucodactylus* on dry fruits of *C. scandens* (Note – larvae feed on green fruits, this one is either looking for food or a pupation site); 10) *C. scandens*.

Preserved Material – CUBA: Guantanamo: GTMO Naval Base, Site 5, dry wash off Kittery Rd., 19.91809°, -75.1018° (datum WGS 84), 21.i.2012, D. Matthews, R. Portell, J. Toomey, T. Lott, ex. *Commicarpus scandens*, (5 L, 1 LS); Site 7, vic. Stephens Ave., 19.922061°, -75.129662°, 7.x.2013, D. Matthews, R. Portell, J. Toomey, J. Miller, on *Boerhavia diffusa* fruits (1 L, 1 LS, 1 P), vic. Navy Lodge, 19.919778°, -75.136222° (datum WGS 84), 19.i.2012, D. Matthews & T.A. Lott, ex. *Boerhavia diffusa* (6 L, 1 LS, 1 P); Stephens Ave, vic. Public Works Dept., 19.92296°, -75.12894° (datum WGS 84), 23.i.2012, D. Matthews, T.A. Lott, R. Portell, & J. Toomey, ex *Boerhavia diffusa* (1 L, 1 PC).

Comments – Larval hosts include several species of Nyctaginaceae (Matthews and Lott 2005). At GTMO larvae were found feeding on both *Boerhavia diffusa* L. and *Commicarpus scandens* (L.) Standl. The latter host (Figs. 8–10) has not been previously recorded. Adults were also found perching on the plants and pupae were attached to stems. On both plants, the larvae bore holes in the sides of the fruits and feed on the developing ovules. *Boerhavia diffusa* was found growing in regularly mowed areas, whereas *C. scandens* was found clambering over other fallen vegetation (Fig. 8) or brush and debris piles.

Distribution – pantropical, extending into southern temperate areas.

Exelastis montischristi (Walsingham, 1897)
(Fig. 5)

Diagnosis – Forewing cleft extending just beyond one-third from apex to wing base, lobe apices acute, ground color pale olive buff to light grayish brown with mixed beige scales and some scattered dark brown scales. Dark brown scales mixed in fringes and a small dark discal spot present. Hindwing uniformly drab, darker than forewing. Third lobe anal fringe with mixed pale buff spatulate scales along entire length and some dark brown spatulate scales in basal third.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 2, vic. Sherman Ave., 19.91978°, -75.1362° (datum WGS 84), 6.x.2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31, (1 m), MGCL 230778; Site 4, XRAY 02, 19.9347° , -75.0972° (datum WGS 84), 3.x.2013, em. 7.x.2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, ex. *Rhynchosia*, 2013-31, (1 f, w/ PC), MGCL 230775; Site 5, dry wash off Kittery Rd., 19.91809, -75.1018°, 21.i.2012°, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2, (1 m), MGCL 172037; Site 7x, vic. Stephens Ave., nr. School, 19.91966°, -75.1314° (datum WGS 84), 24.i.2012, D. Matthews & T. A. Lott, ex. *Rhynchosia*, 2012-2, (1 m) MGCL 172036, (2 f) MGCL 172063, 172065; same data except 25.i.2012, (2 f), MGCL 172038, 172064.

Comments – Adults were found at multiple locations and were most common at Site 7x where a dense stand of the larval hostplant, *Rhynchosia minima* (L.) DC. (Fig. 11) blanketed a grassy berm surrounding a school parking lot. This plant has been previously reported (Matthews et al. 1994) and is the only known host for *E. montischristi*, throughout its range. While no larvae were found at GTMO, a pupa found attached to one of the leaves emerged during our stay.

Figure 11. *Rhynchosia minima* at GTMO Site 7, larval hostplant of *Exelastis montichristi*.

Distribution – Ecuador: Galapagos Islands; West Indies including Bahamas, Cayman Islands, Cuba, Jamaica, Grenada, Haiti, Virgin Islands; United States: Gulf Coastal plain from Florida to Texas.

Exelastis pumilio (Zeller, 1873)
(Fig. 7)

Diagnosis – Forewing with cleft extending one-third to base, lobe apices acutely rounded, ground color pale brown to drab with scattered white scales, a small dark brown discal spot and lobe fringes interspersed with spatulate dark brown scales. Hindwings uniformly drab, without spatulate scales in fringes. Posterior third of mesothorax, metathorax and first abdominal segment dorsally cream or pale yellow.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 4, XRAY 02, 19.9347°, -75.0972° (datum WGS 84), 20.i.2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2, (2 m), MGCL 172039, 172070; GTMO Naval Base, site 6, mangroves, vic. Chapel off Sherman Ave., 19.92048°, -75.1407° (datum WGS 84), 22.i.2012, T.A. Lott, D. Matthews, J. Toomey, R. Portell, MGCL Accession # 2012-2, (1 f), MGCL 172040; Site 15, marsh area nr. Ridge trail, 19.92278°, -75.1327° (datum WGS 84), 4.x.2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31, (1 f), MGCL 230773.

Comments – Recorded larval hostplants are various Fabaceae, especially species of *Desmodium* (Matthews and Lott 2005). Numerous herbaceous legumes such as *Desmodium triflorum* (L.) DC. and *Centrosema virginianum* (L.) Benth. are present at GTMO (Areces-Mallea 2010), however no larvae were collected.

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.

Adaina simplicius (Grossbeck, 1917)
(Fig. 4)

Diagnosis – Forewing cleft extending to just less than half forewing length, lobes with acute apices. Forewing white with traces of tan scales along primary veins. Base of cleft with small dark brown spot. Terminals of veins R_2, R_5, M_3, Cu_1, Cu_2 marked with minute dark brown spot. A larger dark brown spot at R_3 terminus, similar in size to spot at cleft base. Hindwing white. Worn specimens (as in Figure 4) appearing entirely white or with only a trace of the R_3 spot and spot at cleft base.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 2, vic. Sherman Ave., 19.91978°, -75.1362°

(datum WGS 84), 18.i. 2012, D. Matthews, T. Lott, R. Portell, J. Toomey, MGCL Accession # 2012-2, (1 m, slide DM 1626), MGCL 172041.

Preserved Material – CUBA: Guantanamo: GTMO Naval Base, Site 23, vic. Navy Lodge (behind dry cleaners), 19.915320°, -75.141168° (datum WGS 84), 23.i.2012, D. Matthews & T.A. Lott, on flowers of *Neurolaena lobata* (2 L, 1 P); same data except 25.i.2012, (12 L, 6 P).

Comments – Larvae bore into the flower heads of various Asteraceae such as *Carphephorus*, *Conoclinium*, and *Pluchea* (Matthews and Lott 2005). At GTMO larvae were found boring in the flower heads of *Neurolaena lobata* (L.) R.Br. ex Cass. (formerly *Pluchea symphytifolia* (Mill.) Gillis) (Figs. 12–13). This shrub occurs throughout the West Indies and in parts of Florida, Mexico, and northern South America (Correll and Correll 1982). Areces-Mallea (2010) incorrectly identified this shrub at GTMO as *Pluchea carolinensis* and suggested it was a recent invader. *Neurolaena lobata* is a previously unreported hostplant for *A. simplicius*.

Figures 12-13. *Neurolaena lobata*, *Adaina simplicius* larval host, Site 23: 12) inflorescence cluster; 13) TAL searching for larvae in flowers.

Adaina simplicius and *A. bipunctata* have been confused in literature accounts. The two species are often sympatric and indistinguishable based on wing patterns. The males can be recognized by the distinctly recurved tip of the left saccular process in *A. simplicius* (Matthews and Maharajh 2009) and the females by the shape of the anterior apophyses and the ductus seminalis, the latter spiraled as opposed to straight in *A. bipunctata*. Núñez (2004) first reported *A. bipunctata* as a new record for Cuba from three locations in Sancti Spíritus. Both species likely occur in Cuba as they do in Florida. However, the specimens from Sancti Spíritus should be dissected to determine if one or both species are present there. The male specimen from GTMO was dissected and confirmed as *A. simplicius* and larvae were likewise identified by comparison with Florida material. Without the benefit of examining the specimens from Sancti Spíritus firsthand, we accept these as determined by Núñez and report *A. simplicius* from GTMO as a provisional new record for the country.

Distribution – The known distribution of *A. simplicius* is complicated by the uncertainty in determinations based on external features. In addition to the material from GTMO, we have confirmed records from the Bahamas, and the southeastern USA. In addition, Gielis (2011) includes Brazil, Costa Rica, Ecuador, Paraguay, and Puerto Rico in the distribution.

Adaina thomae (Zeller, 1877)
(Fig. 6)

Diagnosis – Forewing cleft extending just beyond one-third from apex to wing base. Ground color white with scattered pale drab scales. First lobe with drab scaling extending in a diffuse trace along cleft base. Costa bearing two dark brown dashes on first lobe near terminals of vein R_2 and R_3. Hindwings uniformly pale drab. Distinguished from *A. simplicius* by the distinct mottled coloration along with the costal dashes.

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 4, XRAY 02, 19.9347°, -75.0972° (datum WGS 84), 3.x. 2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31, (1 m, slide DM 2122), MGCL 230774; Site 8, E of old airport, 19.90661°, -75.1592° (datum WGS 84), 24.i. 2012, D. Matthews, T. Lott, R. Portell, J. Toomey, MGCL Accession # 2012-2, (1 m, slide DM 1627), MGCL 172042.

Comments – The life history of this species is unknown. Like its congeners, hostplants are likely species of Asteraceae.

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

DISCUSSION

The presence and distribution of the pterophorid species at GTMO are largely dependent on where the larval host plants are growing. Of the seven species encountered, *M. leucodactylus* is the most widely distributed and present in both disturbed and native habitats. *Stenoptilodes brevipennis*, on the other hand, was found only in association with moist areas.

With the exception of *Adaina thomae*, the species encountered are all very common and widely distributed in the tropics and subtropics, with four occurring in both new and old world faunal regions. *Adaina thomae*, an apparent Caribbean endemic, should be sought after as it is the least well known, with no life history information available.

Given the variety of habitats including mountainous terrain, we expect the Cuban fauna should come close to that of neighboring Florida (43) and at least exceed that of the Bahamas (23) (DML, pers. observations). We expect additional species are present at GTMO, though not yet encountered.

ACKNOWLEDGEMENTS

We thank José B. Montalvo (GTMO Natural Resources Officer) and Michael R. McCord (GTMO Public Works Department-Environmental) for assisting with access, logistics, support, and hospitality during this project. Thanks also to Colonel Turk McCleskey (Virginia Military Institute) who arranged and assisted RWP and JKT during initial visits to GTMO for paleontological studies. We also thank the late Thomas C. Emmel and the Florida Biodiversity Foundation for financial support.

REFERENCES

Areces-Mallea, A. E. 2010. Investigation of grazing impacts on native flora, identification of invasive flora abundance and distribution, and presence of rare, native flora at Naval Station Guantanamo Bay, Cuba. Report Prepared for Naval Facilities Engineering Command Southeast, Jacksonville, Florida. xii + 174 p.

Barro, A. and R. Núñez. 2011 (eds.). Lepidópteros de Cuba. Spartacus Foundation and Sociedad Cubana de Zoología, Habana. 230 pp.

Correll, D.S. and H.B. Correll. 1982. Flora of the Bahama Archipelago. A.R.G. Ganter Verlag KG., FL-9490 Vaduz. 1692 pp.

Gielis, C. 2011. Review of the Neotropical species of the family Pterophoridae, part II: Pterophorinae (Oidaematophorini, Pterophorini) (Lepidoptera) Zoologische Mededelingen 85 (10): 589–824.

Koebele, A. 1924. Report on enemies of *Lantana camara* in Mexico, and their introduction into the Hawaiian islands. Bulletin of the Experiment Station of the Hawaiian Sugar Planters' Association, Entomological Series 16: 54-71.

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 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., J.Y. Miller, T.A. Lott, R.W. Portell, and J.K. Toomey. 2012. Biogeographic affinities of Guantanamo butterflies and a report on species recorded from the United States Naval Base, Cuba. Bulletin of the Allyn Museum 164: 1–51.

Núñez, R. 2004. Lepidoptera (Insecta) de Topes de Collantes, Sancti Spíritus, Cuba. Boletín de la Sociedad Entomológica Aragonesa, 34: 151–159.

Núñez, R. and A. Barro. 2012. A list of Cuban Lepidoptera (Arthropoda: Insecta). Zootaxa 3384: 1–59.

Perkins, R.C.L. 1924. Introduction of *Lantana* Insects. Bulletin of the Experiment Station of the Hawaiian Sugar Planters' Association, Entomological Series 16: 1–49.

2019 Lepidopterists' Society Election Results

Total ballots returned: **327**

President:

Maria Alma Solis **303**

Write-ins: John Shuey (1), Andrew Brower (1), Paul Opler (1), Todd Gilligan (1)

Vice-Presidents:

Andrew V. Z. Brower (USA)	**253**	(1st VP)
André V. L. Freitas (Brazil)	**225**	
James E. Hayden (USA)	211	
Jeffrey M. Marcus (Canada)	**231**	

Members-at-Large:

Charles E. Harp	**259**
Elizabeth Long	**246**
Christopher E. Looney	149
Deborah L. Matthews	**274**

Elymnias vasudeva burmana (Painted Jezebel), Nymphalidae, Satyrinae, Chiang Dao (Chiang Mai, Thailand), 17 November 2018, photo by Antonio Giudici.