A review of the Jamaican webworm moths (Yponomeutoidea; Attevidae)

Thomas Turner [1] and Vaughan A. Turland [2]

1. 12 Kingfishers Cove, Safety Harbor, Florida, 34695. Research Associate, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, FL 32611. E-mail: cwpublications17@gmail.com. 2. P.O. Box 774, Santa Cruz, St. Elizabeth, Jamaica, W. I. Research Associate, Windsor Research Centre, Windsor, Trelawny, Jamaica, W.I. E-mail: v.turland@gmail.com.

Date of issue online: 18 October 2024
Electronic copies (ISSN 2575-9256) in PDF format at: https://journals.flvc.org/troplep; https://zenodo.org; archived by the Institutional Repository at the University of Florida (IR@UF), http://ufdc.ufl.edu/ufir; **DOI**: 10.5281/zenodo.13920072

Abstract: In his 2009 review of New World *Atteva* Walker, Becker lists five species of Attevinae (= Attevidae), from Jamaica: *Atteva pustulella* (Fabricius), *A. aurea* (Fitch), *A. siderea* (Walsingham), *A. sidereoides* Becker, and *A. fulviguttata* (Zeller). There has been no recent collection of *A. pustulella* and *A. siderea* and their presence on the island needs reconfirming. *Atteva fulvigutta* has also not been found, but a similar species which is present is now recognized as *A. glaucopidella* Guenée, 1879, **status revalidated**, this name formerly being treated as synonymous with *A. fulvigutta* (Becker, 2009).

Key words: Day flying; endemic species; Jamaica; microlepidoptera; New World.

INTRODUCTION

Becker (2009) noted that of some 50 pantropical species in the genus *Atteva*, just fifteen are found in the New World. Becker (2009) also noted that the genitalia are very similar throughout the genus and are often unreliable for identification, but that wing color patterns are distinct and these characters, together with geographical distribution, can facilitate identification of species.

At the time of initiation of this present study, five species of the colorful, mostly day-flying moths in the genus *Atteva* had been listed from Jamaica, as summarized by Becker (2009) in his review of the New World Attevinae, now recognized as Attevidae (van Nieukerken *et al*., 2011). Of these, *A. fulviguttata* (Zeller, 1873), which was attributed to Jamaica (Walsingham 1892; Becker, 2009), is not present in the island, and this name has been incorrectly assigned to a different Jamaican species. The presence of *A. pustulella* (Fabricius, 1787) in Jamaica is also questionable, as a result of recent DNA studies reported by Dan Janzen to Becker (Becker, 2009, p. 350).

The diagnostic color patterns of each forewing for the Jamaican species are illustrated. When available, photographs of pinned and living specimens are also provided to aid identification.

MATERIALS AND METHODS

Species within this genus are not commonly observed in Jamaica. The specimens reported were observed by chance sightings during the day while visiting flowers or resting on shrubs, or at night when attracted by light sources. The adults were only occasionally present during repeated visits to the same locations. Surveys have not been completed, so the island-wide distribution of each species is not yet fully known. This is a project that can now be undertaken and expanded using this publication as a guide.

Adults were photographed in the field during the day using a Nikon D850 camera with an AF-S VR Micro-NIKKOR 105mm f/2.8G IF-ED lens, and at night using the same equipment with the addition of a Nikon Speedlight SB-800 Electronic Flash. Voucher specimens were photographed using a Sony Cyber-shot 20.4 megapixels with 30X optical zoom to permit more detailed examination of color patterns.

Adults were collected from light sources at night using either a Honda Ex350 generator with 110/350VA output, ballast and regulator, and 125W clear bulb; or 110/120V AC mains supply to BioQuip #2819 Rain Shield and #2818S Poly Skirt lantern with E23 Clear 275W, mercury vapor (MV) 120V, self-ballasted bulb, or with use of a #2804 AC/DC black light. These lights were placed in front of a large white collection sheet.

Collection at night was more recently conducted using a LepiLED Maxi Switch moth trap, backed by a collecting sheet. The light emitted by the eight Nichia Power LEDs contained in the LepiLED Maxi Switch directly corresponds to the three sensitivity peaks of most nocturnal insects (UV, blue and green in the electromagnetic spectrum). Since nocturnal insects respond most strongly to UV radiation, four of the LEDs emit at the UV sensitivity peak at 365 nm. Power at 5V was provided to the lamp by a rechargeable power bank battery with 26 Ah (=26,000 m Ah) and QC 3.0 output USB power pack. Typically, this gave power for around 2.5 hours. A larger Jackery Power Station 518 Wh/500 w was also used, with just 12% energy depletion for the entire night.

Full generic and species synonymies given by Becker (2009) are not repeated here. Brief species descriptions are provided in order of year of discovery, which do not necessarily reflect any phylogenetic relationships. Wing measurements are provisional as statistical samples have not yet been examined, but these initial measurements do provide a guide to size differences between species.

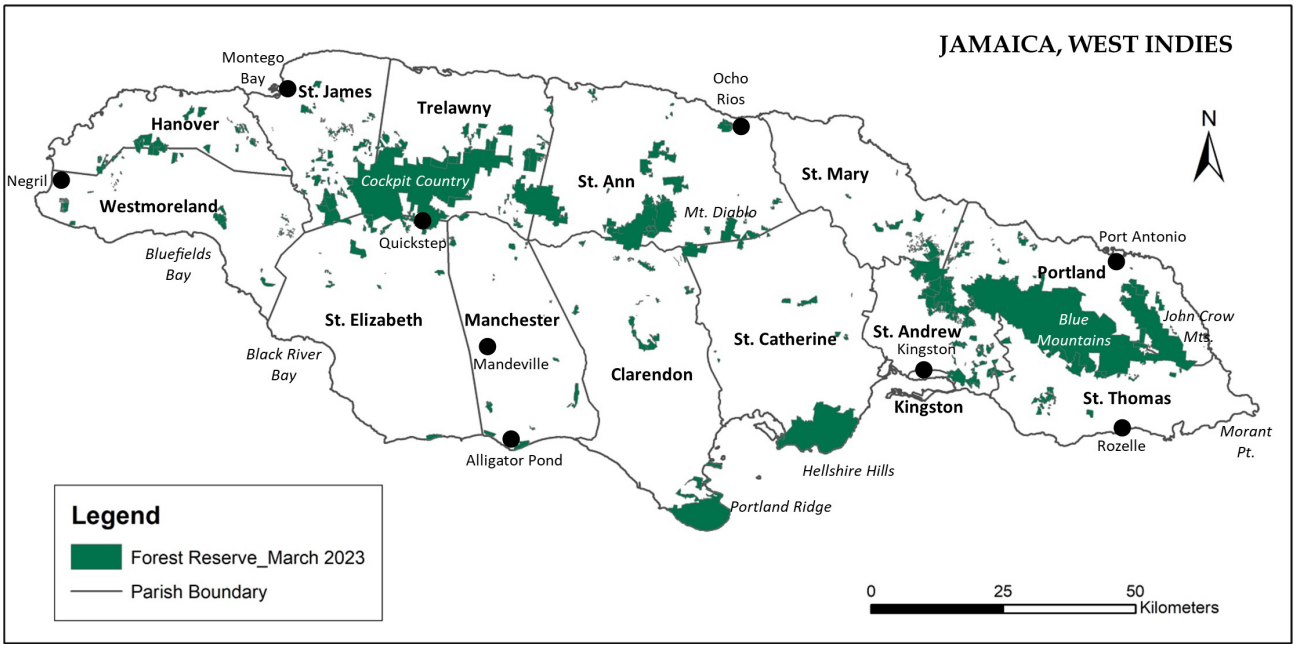

Figure 1. Map of Jamaica showing parishes and forest reserves.

The location of Jamaican parishes mentioned and forest reserves are shown on the map (Fig. 1). Collection of specimens was made possible by the granting of permit # 18/27 issued by the National Environmental Protection Agency (NEPA), Kingston, Jamaica. The following collection abbreviations are used: **CMNH**: Carnegie Museum of Natural History, Pittsburgh, USA; **CNC**: Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada; **NEPA**: National Environment Protection Agency, Kingston, Jamaica; **NHM, Copenhagen**: Natural History Museum, University of Copenhagen, Denmark; **NHMUK**: Natural History Museum, London [formerly BM(NH)], UK; **PWD**: Public Works Department, Kingston, Jamaica; **USNM**: United States National Museum, Washington, D.C., USA; **UWI**: University of the West Indies, Jamaica.

Superfamily Yponomeutoidea
Family Attevidae Mosher, 1916
Genus *Atteva* Walker, 1854: 526

Type species: *Atteva niveigutta* Walker, 1854: 526.
Type locality: Bangladesh. Becker (2009) notes that the type species is an Indo-Australian species and that if the New World species prove not to be congeneric with the species of that region, the name *Oeta* Grote, 1865, would be the oldest valid generic name to apply to the New World Attevidae.

Atteva pustulella (Fabricius, 1787)
(Fig. 2)

Type locality: Illustrated by Stoll (1871: 164) from a specimen collected in Surinam.
Type deposition: Undetermined. A neotype was designated from Costa Rica by Wilson *et al*., (2010) and deposited at the USNM.

Figure 2. *Atteva pustulella*, Trinidad, West Indies.

Distribution: Found from Uruguay and Argentina northwards to Costa Rica and in the Antilles, including Dominica, Martinique, Hispaniola, and reported from Jamaica (Becker, 2009; Wilson *et al*., 2010).

Brief description of the adult

Size: Approximately 12 mm overall length; forewing length approximately 10 mm.

Differentiated from next species, *A. aurea* (Fitch), by bolder black wing markings surrounding white wing spots and with orange areas reduced.

Male and female, similar. dorsal head white, marked with a mid-dorsal black spot; antennae black, with an off-white section four fifths of distance from base to tip. Prothoracic segment white with a transverse black dorsal bar connecting to a median black spot immediately to posterior; meso-thoracic and meta-thoracic segments orange; abdomen dark brown, approaching black. Tegulae orange; dorsal forewings orange, with four series of white compound spots edged with bold black borders, also reducing extent of orange ground color. Dorsal hindwing, opaque variably off-white or tinged with gray, with darker gray border, expressed more boldly at apex.

Discussion: No specimens from Jamaica have been found in this present survey, although surveys are incomplete. There are specimens identified as this species from Jamaica at the USNM,

but the presence of this insect on the island needs reconfirming.

Jamaican records are few, and Becker (2009) notes that there is no clear evidence to separate *Atteva pustulella* Fabricius and *Atteva aurea* and that the genitalia exhibit no differences. However, DNA barcoding (Wilson *et al*., 2010) indicated that the population from Costa Rica south to Argentina and Uruguay should be regarded as *A. pustulella*, and those from northern Costa Rica north to Canada, including those from Jamaica, should be regarded as *A. aurea*. If both species are present in Jamaica this would suggest that both *A. pustulella* and *A. aurea* were present on the proto-island of Jamaica as it split off from Central America during the Miocene. Alternatively, there would need to have been two separate invasions to account for the presence of both *A. pustulella* and *A. aurea* on Jamaica. It has also been postulated that the original island of Jamaica submerged and that the present island of Jamaica has only been emergent from the sea during the last twelve million years (Porter *et al*., 1982). If so, this would also require separate invasions for each species.

A reported larval food plant for *A. pustulella* in Costa Rica is *Simarouba amara* Aubl. (Simaroubaceae), a rainforest species (Wilson *et al*., 2010). This is the same species of *Simarouba* found in Jamaica, here known as *Simarouba glauca* DC., which is "common in woodlands on limestone" from sea level up to 610 m (Adams, 1972; Carnevali Fernández-Concha *et al.,* 2010).

Atteva aurea (Fitch, 1856)
(Figs. 3, 4)

Type locality: Savannah, Georgia, USA.
Type deposition: Original Fitch specimens not found (Becker, 2009). Neotype from Florida designated by Wilson *et al*. (2010), deposited in the CNC.

Distribution: This species occurs from Costa Rica north to the southern United States, including southern California, northeast to Nova Scotia and southeastern Canada; also, on the islands of Cuba and Jamaica (Becker, 2009; Wilson *et al*., 2010).

Brief description of the adult

Size: Approximately 12-13 mm overall length; forewing length 9-10.5 mm (n= 5).

The wings of *A. aurea* exhibit a similar pattern of colors to those of *A. pustulella*, but with the black wing markings narrow or reduced and with more extensive areas of orange. Variations are illustrated by Wilson *et al*. (2010).

Male and female similar. Dorsal head black, but almost obscured by three pairs of white spots. Antennae black, but with an off-white section, four fifths of distance from base to tip. Dorsal prothorax with median paired black anterior spots merging into two white spots, extending into two small black spots with tapered white posterior dashes; mesothoracic segment light orange; metathorax gray-black. Legs black with white bands. Dorsal abdomen gray to brownish-gray. Tegulae light orange; dorsal forewing light orange with four series of white conjoined spots, each edged narrowly in black. Hindwings opaque, light gray with darker gray margin. Lateral and ventral thorax dark gray with white spots. Ventral abdomen gray with dull white spots on each segment.

Discussion: DNA barcoding of specimens in Costa Rica determined that *A. pustulella* and *A. aurea* should be recognized as distinct (Wilson *et al*., 2010). The status of the Jamaican populations should be further investigated as it is not certain that *A. pustulella* occurs on the island.

Figure 3. *Atteva aurea*, Portland Ridge, Clarendon Parish, 22 May 2023.

Figure 4. *Atteva aurea*, Rozelle, St. Thomas Parish.

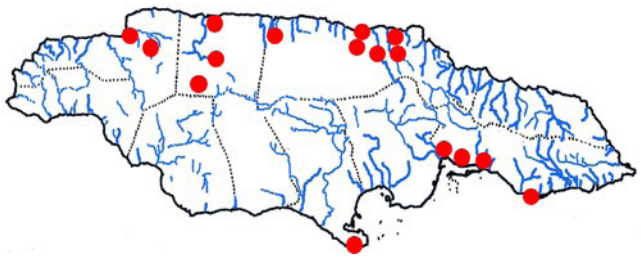

Figure 5. *Atteva aurea* distribution map.

Atteva aurea is found primarily in lowland dry limestone scrub subject to seasonal rains, for example in coastal St. Thomas and St. Andrew parishes, and at the dry limestone habitat of Portland Ridge, Clarendon Parish, and is the most frequently seen species of *Atteva* in Jamaica. Specimens have also been recorded from more mesic locations in the parishes of St. Ann, Trelawny, and St. James (Fig. 5). *Atteva aurea* has been reared on *Simarouba glauca* DC., in Mexico (Becker, 2009), from both *S. glauca* and *S. amara* Aubl., in Costa Rica (Wilson *et al*., 2010), and in Honduras (Passoa *et al*., 2022). *Simarouba amara* and *S. glauca* are now regarded as being synonymous (Carnevali Fernández-Concha *et al.*, 2010), so both *A. pustulella* and *A. aurea* utilize the same species of *Simarouba* as a larval foodplant.

Atteva glaucopidella Guenée, 1879, **status revalidated**
(Figs. 6, 7, 8)

Type locality: Jamaica.
Type deposition: NHMUK.

Distribution: Jamaica. Endemic.

Brief description of the adult

Size: Overall length approximately 11.5-12 mm; forewing length approximately 9-10 mm (n= 2).

Female dorsal head, eyes, palps and antennae, black. Prothorax with a median inverted 'Y-shaped' black marking abutting head; remainder of thoracic segments burnt-orange. Legs black with narrow white bands. Wings black with a deep blue-indigo sheen. Three large, irregularly shaped orange spots arranged along each wing - basal, postbasal, and subtornal, with an extensive scattering of small white spots of different sizes on dark portions of each wing. Distal end of wing fringed with gray scales. Hindwing dark gray trending to black toward apex and outer margins; lighter median, almost opaque, including cell. Male and female similar.

Discussion: Becker (2009: 352) treated the populations of *Atteva fulviguttata* (Zeller, 1873) on Jamaica and Hispaniola as the same species, accepting the decision by Walsingham (1892: 17) to synonymize *A. glaucopidella* (Guenée 1879: 289), described from Jamaica, with *A. fulviguttata* Zeller, described from Hispaniola in 1873.

Becker (2009) stated: "This species (*A. fulviguttata*) resembles (*Atteva*) *gemmata* (Cuba) and *intermedia* (Antigua); differing from both by lacking the white dots on forewings and terga," then continues, "the species is known only from Jamaica and Hispaniola." The illustration examined by Becker was from the NHMUK and is shown as Fig. 11 in Becker's review. This specimen, from the Dominican Republic collected in 1992, exhibits four orange spots and very minimal white spotting on the black forewing with just four tiny white spots visible, and is a specimen of *A. fulvigutta.*

However, the color patterns on specimens from Hispaniola and Jamaica differ, suggesting that Walsingham's decision to synonymize *A. fulvigutta* and *A. glaucopidella* should be reevaluated. Becker (2009: 349) referencing the genus *Atteva,* states, "The combination of color pattern with geographical distribution enables easy recognition of the species, whereas characters of the genitalia are very similar throughout the genus so are unreliable for determination." In agreeing with this observation, we consider that Jamaican and Hispaniolan specimens are separate species with the Jamaican species being *Atteva glaucopidella* as originally described by Guenée (1879: 289).

The most significant differences between the Hispaniolan *A. fulviguttata* and Jamaican *A. glaucopidella* are the number, size, and distribution of white and orange spots on the forewings. On each forewing of *A. fulviguttata* there is a narrow orange spot toward the wing base, a large median orange spot, followed by a small orange submarginal spot, and then a fourth medium-sized sub-tornal orange spot. In *A. glaucopidella* (Fig. 8) there are three large orange spots of approximately equal size found basally, postbasally, and subtornally across the wing, along with more extensive white speckling (Fig. 6). There are no obvious similarities between Jamaican specimens of *A. glaucopidella*

Figure 6. *Atteva glaucopidella*, north of Quickstep into Trelawny Parish, 26 October 2019.

Figure 7. *Atteva glaucopidella*, female, Marshall's Pen, near Mandeville, Manchester Parish, 24 June 2022.

Figure 8. *Atteva glaucopidella*, showing right forewing detail from figure 7.

Figure 9. *Atteva glaucopidella* distribution map.

and *A. gemmata* Grote, or *A. intermedia* Becker as suggested by Becker (2009). These are smaller insects with more extensive orange markings and white spotting on the forewings.

Atteva glaucopidella is found in mesic lowland broadleaf forest north of Quickstep into Trelawny Parish, and seasonally mesic upland broadleaf forest near Mandeville, Manchester Parish, in west central Jamaica (Fig. 9). Additional surveys are required to determine the complete distribution in the island.

Atteva siderea (Walsingham, 1892)

Type locality: San Domingo, Dominican Republic.
Type deposition: NHMUK.

Distribution: Series of this species were collected in the Dominican Republic between 1973 and 2004 (Becker, 2009). There are also two male specimens at the CMNH with labels stating "Jamaica" with no further information (K. Keegan, pers. comm.).

Brief description of the adult

Size: Overall length estimated to be approximately 11 mm; forewing length 9 mm.

Male dorsal head white; thoracic segments black with fine white spots; dorsal abdomen black, with five pairs of paired white spots and two terminal pale bands. Tegula orange; dorsal forewing black with numerous small white spots and four orange markings - a basal orange dash; a round spot near hind margin just beyond cell; an orange dash posterior of cell; and a submarginal orange marking crossing wing beginning just below anterior margin and meeting hind margin.

Discussion: In the Dominican Republic this species has been found in both arid thorn scrub and within "weedy regrowth with coffee, cacao" (Becker, 2009). Although there are no recent records of this species from Jamaica, this genus has not been the focus of any recent investigations or systematic surveys of suitable habitats in which this species might be found. We therefore consider *A. siderea* as being possibly present until proven otherwise. However, there is no information on where in Jamaica the specimens were collected, and it is possible that the CMNH specimens from "Jamaica" are mislabeled.

Atteva sidereoides Becker, 2009
(Fig. 10)

Type locality: Runaway Bay Caves, St. Ann Parish.
Type deposition: USNM.

Distribution: Jamaica. Endemic. So far known only from the type collected near the Runaway Bay Caves, St. Ann Parish, and a male specimen closely resembling this species collected in dry limestone forest at Portland Ridge, Clarendon Parish (17°44'22"N, 77°09'27"W) (Fig. 11).

This species was first recognized and described by Becker (2009) from a male specimen collected by D. & M. Davis in 1973 and deposited at the USNM.

Brief description of the adult

Size: Overall length 10 mm; forewing length 8 mm (n=2). The female has not yet been collected or described.

Figure 10. *Atteva sidereoides*, Portland Ridge, Clarendon Parish, 18 February 2023.

Male dorsal head white; palps and antennae black. Prothorax with a pair of black spots; mesothorax white, with a large median black marking; metathorax with a small median black spot. Dorsal abdomen black. Forewing black with a pair of orange bars near wing base and a larger orange bar near end of cell and numerous fine white spots and markings on distal quarter of wing. Dorsal hindwings opaque, edged with gray scales, densest toward apex.

Portland Ridge specimen (Fig. 10): head white with a small median mid-dorsal black spot; palpi black with one white segmental band; antennae black, 5.7 mm in length; two median and two lateral black spots at base of each tegula on mesothorax; metathorax with a triangular median black spot; legs black with fine white banding, but ventrally displaying white more extensively; forecoxae of forelegs each have an orange ventral spot; dorsal abdomen blue-black; ventral abdomen black with six anterior segments marked with a white segmental band, each expanded mid-ventrally; claspers edged with white. Dorsal forewing bluish black with a diffuse white basal bar, a pair of joined basal orange spots, another elongated orange discal spot, with an additional orange spot near hind margin below orange spot at end of cell; a diffuse white postdiscal dash in addition to extensive white subapical to apical markings on distal third of wing matching distribution of white markings present on type. Dorsal hindwing opaque with gray margins, densest gray toward apex. Ventral forewing and hindwing black with a few minute white marginal spots.

Discussion: While there are some small differences between the two specimens, these insects are very small and some features can be difficult to discern after pinning. Additional specimens or molecular investigations are required to confirm whether or not these are the same or separate species.

The type specimen was found in dry limestone forest habitat at an elevation of approximately 15 m on Jamaica's north coast. The Portland Ridge specimen was also found in dry limestone forest on the south coast at an elevation of 157 m (Fig. 11). Both specimens were found in arid habitats receiving

Figure 11. *Atteva sidereoides* distribution map.

less than 125 mm rainfall per month for nine months of the year and between 125-250 mm per month between October and December (Nancoo *et al*., 1963).

ACKNOWLEDGMENTS

We thank Dr. Ann Haynes-Sutton for both hosting and joining our moth trapping adventures at night to photograph and/or collect specimens at Marshall's Pen near Mandeville, Manchester Parish. We also thank the PWD Gun Club for permission to set up our traps at Portland Ridge, Clarendon Parish and also, again, to Dr. Ann Haynes-Sutton for coordinating the arrangements. Special thanks to Dr. Amy Deacon, UWI, St. Augustine, for the photograph of *Atteva pustulella* from Trinidad and Tobago. Distribution records from the iNaturalist website for Jamaican moths have also been noted, last accessed June 30, 2023. None of this would have been possible without the granting of a permit by the National Environment Protection Agency, Kingston, Jamaica.

LITERATURE CITED

Adams, C. D. 1972. *Flowering plants of Jamaica. With contributions by Proctor, G. R., Read R. W.* Mona, University of the West Indies. 848 pp.

Becker, V. O. 2009. A review of the New World *Atteva* (Walker) moths (Yponomeutidae, Attevinae). *Revista Brasileira de Entomologia* 53(3): 349-355.

Carnevali, Fernández-Concha, G., Tapia-Muñoz, J. L., Duno de Stefano, R., Ramírez-Morillo, I. M. 2010. *Flora ilustrada de la Peninsula de Yucatán. Listado Floristico.* Mérida, Centro de Investigación Científica de Yucatán. 1-326.

Fabricius, J. C. 1787. *Mantissa Insectorum*. Copenhagen, Proft. 382 pp.

Fitch, A. 1856. Third report on the noxious and other insects of the State of New York. *Transactions of the New York State Agricultural Society* 16: 315-490.

Grote, A. R. 1865. Notes on the Bombycidae of Cuba. *Proceedings of the Entomological Society of Philadelphia* 5: 227-255.

Guenée, A. 1879. Études sur les Yponomeutides. *Annales de la Société Entomologique de France* 48: 281-290.

Nancoo M., Rogers, O. B., Saunders, L. E. 1963. *The Rainfall of Jamaica; data 1870-1960 prepared by the Meteorological Office, Palisadoes, and sponsored by the Scientific Research Council, Jamaica*. London, The Whitefriars Press Ltd. 13 pp.

van Nieukerken, E. J., Kaila, L., Kitching, I. J., Kristensen, N. P., Lees, D. C., Minet, J., Mitter, C., Mutanen, M., Regier, J. C., Simonsen, T. J., Walberg, N., Yen, S-H, Zahiria, R., Adamski, D., Baixeras, J., Bartsch, D., Bengtsson, B., Brown, J.W., Bucheli, S. R., Davis, D. R., De Prins, J., Epstein, M. E., Gentili-Poole, P., Gielis, C., Hättenschwiler, P., Hausmann, A., Holloway, J. D., Kallies, A., Karsholt, O., Kawahara, A. Y., Koster, S. (J.C.), Kozlov, M. V., Lafontaine J. D., Lamas, G., Landry, J-F, lee, S., Nuss, M., Park, K-T., Penz, C., Rota, J., Schintimeister, A., Schmidt, B. C., Sohn, J-C., Solis, M. A., Tarmann, G. M., Warren, A. D., Weller, S., Yakovlev, R. V., Zolotuhin, V. V., Zwick, A. 2011. Order Lepidoptera Linnaeus, 1758, pp. 212-221. *In*: Zhang, Z.-Q. (Ed.), Animal biodiversity: an outline of higher classification and survey of taxonomic richness.. *Zootaxa* 3148: 1-237.

Passoa, S., Young, J., Van Den Berghe, E. 2022. Hosts, morphological notes, distribution records, and systematics of three common Honduran moths, *Atteva aurea* (Attevidae), *Mesophleps adustipennis* (Gelechiidae), and *Hyblea puera* (Hyblaeidae). *Journal of the Lepidopterists' Society* 76(4): 268-278.

Porter, A. R. D., Jackson, T. A., Robinson, E. 1982. *Minerals and Rocks of Jamaica*. Kingston, Jamaica Publishing House. 174 pp.

Stoll, C. 1781. {Lepidoptera}, pp. 91-164. *In*: Cramer, P.. *De Uitlandsche Kapellen* III. Amsterdam, J. S. Baalde. 252 pp.

Walker, F. 1854. *List of the specimens of lepidopterous insects in the collection of the British Museum, Part II. Catalogue of Lepidoptera Heterocera. British Museum (Natural History), Department of Zoology, by order of the Trustees.* London, Edward Newman. pp. 279-581.

Walsingham, Lord [T. de Grey]. 1892. On the micro-lepidoptera of the West Indies. *Proceedings of the Zoological Society of London* 1891: 492-548.

Wilson, J. J., Landry, J-F., Janzen, D., Hallwachs, W., Nazari, V., Hajibabaei, M., Hebert, P. 2010. Identity of the ailanthus webworm moth (Lepidoptera, Yponomeutidae), a complex of two species: evidence from DNA barcoding, morphology and ecology. *ZooKeys* 46: 41-60.

Zeller, P. C. 1873. Beiträge zur Kenntniss der nordamericanischen Nachtfalter, besonders der Microlepidopteren. *Verhandlungen der Kaiserlich-Königlichen zoologisch-botanischen Gesellschaft in Wien* 23: 201-334.