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**A checklist of the hawkmoths (Lepidoptera: Sphingidae) of the Cayman Islands: with implications for the pollination of the ghost orchid *Dendrophylax fawcettii* Rolfe (Orchidaceae: Angraecinae) and consideration of bat predation**

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**Abstract.** This checklist synthesises historic collections of Sphingidae (Lepidoptera) made during the summer months in the Cayman Islands in 1938 and 1975 with modern records drawn from a variety of sources. We report observations and collections made in all seasons of the year and provide natural history and larval food details. Four species, *Phryxus caicus* (Cramer) in all three islands, plus *Isognathus rimosa* (Grote), *Enyo lugubris* (Linnaeus), and *Eumorpha satellitia* (Linnaeus) in Grand Cayman only, are here reported as new records, for a total of 25 sphingid species occurring in the Cayman Islands. Seven species are new records for Grand Cayman, five are added for Little Cayman and two for Cayman Brac. Potential hawkmoth pollinators for the Cayman Islands endemic ghost orchid, *Dendrophylax fawcettii* Rolfe (Orchidaceae: Angraecinae) are reviewed and Cayman records of hawkmoths as prey of the big-eared bat *Macrotus waterhousii minor* Gundlach (Phyllostomidae) are discussed.

**Key words.** Bat roosts, larval food plants, *Macrotus waterhousii*, nectar, new island records, phenology, scent.

**ZooBank registration.** urn:lsid:zoobank.org:pub:E57614B3-ED85-4910-98E3-65BB323863D

## Introduction

The hawkmoths (Lepidoptera: Sphingidae) of the Cayman Islands are the only moths to have received more than passing treatment as a group in the published literature. The catalogue provided by Askew (1994) remains the most recent, and with one exception, is based only on collections made in the early rainy seasons of 1938 and 1975. The results of the Oxford University Biological Expedition to all three Cayman Islands, conducted between April and August 1938, were reported by Jordan (1940), and those of the Royal Society–Cayman Islands Government Expedition to Little Cayman in June–July 1975 by Askew (1980).

These combined lists, to which Askew (1994) was able to add the 1911 specimen of *Pachylia ficus* (Linnaeus) from Grand Cayman deposited at the Natural History Museum, London by T.M. Savage English, resulted in a total of twenty-one species of Sphingidae reported from the Cayman Islands as of 1994.

Since that time, insect collections have been established at the National Trust for the Cayman Islands, the Department of Environment and the Department of Agriculture. The authors have also made personal collections. Particularly since the advent of digital equipment, photographic images of hawkmoths made by resident and visiting naturalists have provided significant primary records and supplemental data.

This checklist synthesises the historic collections and the modern records, reports occurrence for all months of the year, and provides natural history information where available. We assess the larval food plant availability, the affinities and permanence of the sphingid fauna of the islands.

**Review of potential pollinators of the ghost orchid *Dendrophylax fawcettii* Rolfe.** Following the recent identification of multiple potential hawkmoth pollinators of the Florida ghost orchid, *Dendrophylax lindenii* (Lindley) Bentham ex Rolfe (Orchidaceae: Angraecinae) (Danaher et al. 2019; Houlihan et al. 2019) we consider the case for a similar suite of hawkmoth pollinators for the Cayman Islands endemic sister species, *D. fawcettii* Rolfe (Orchidaceae: Angraecinae).

*Dendrophylax fawcettii* is a rare, critically endangered endemic leafless orchid, found only in Grand Cayman (Burton and Roberts 2014) that exhibits the traits of sphingophily—hawkmoth pollination syndrome—white, nocturnally scented, long-spurred flowers. The length of the spur is 11–17 cm, comparable to that of *D. lindenii* (11–17 cm), the most widely studied member of the genus, which occurs in Florida and Cuba (Ackerman 2014). The Darwinian co-evolution hypothesis (Darwin 1862; Johnson and Anderson 2010), was founded on the prediction of a long-tongued hawkmoth pollinator for the Malagasy star orchid *Angraecum sesquipedale* Thouars (Orchidaceae: Angraecinae). This, coupled with a small number of inconclusive observations (Hammer, in Tuttle 2007; Little 2008) and the co-occurrence of flight time, spur/tongue length and larval food plants led to *Cocytius antaeus* (Drury) being postulated to be the pollinator of *D. lindenii* (e.g. Mújica et al. 2018).

This concept of a single, tightly co-evolved pollinator for long-spurred *Dendrophylax* species has been substantially challenged by the discovery of five hawkmoth visitors to *D. lindenii* in Florida: *C. antaeus*, *Pachylia ficus*, *Protambulyx strigilis* (Linnaeus), *Eumorphia fasciatus* (Sulzer) and *Dolba hyloeus* (Drury) (Danaher et al. 2019; Houlihan et al. 2019). Of these *P. ficus* and *D. hyloeus*, with relatively short tongues, were concluded to be effective pollinators and the much longer-tongued *C. antaeus*, a possible pollinator (Danaher et al. 2019, Houlihan et al. 2019). We examine the potential for the species of hawkmoths occurring in Grand Cayman to act as pollinators of *D. fawcettii* in the light of these findings.

**Sphingids as the prey of the bat *Macrotus waterhousii* Gundlach.** We identify sphingid prey of *Macrotus waterhousii minor* Gundlach (Phyllostomidae), the subspecies of the big-eared bat which occurs in the Cayman Islands.

## Materials and Methods

**Sources of the checklist.** The earliest known collections of moths of the Cayman Islands were made by T.M. Savage English in the first year of his three-year residence in Grand Cayman (Savage English 1916). The material, which was deposited in the Natural History Museum, London, yielded a new species of tiger moth, Hampson (Erebidae, Arctiinae) (Hampson 1911) and included the sphingid *Pachylia ficus* (Askew 1994).

The entomological collections made by C. Bernard Lewis and Gerald H. Thompson in 1938 are the foundation of our knowledge of the terrestrial invertebrate biodiversity of the Cayman Islands. In the shadow, and later the reality, of the Second World War, Lewis drove the examination of the collections and the publication of new species descriptions and expedition results. Jordan's (1940) treatment of the Sphingidae was one of the earlier papers.

Lewis and Thompson deployed acetylene light traps in various habitats on successive trips into the districts of Grand Cayman and on both the sister islands of Cayman Brac and Little Cayman. Collecting in Grand Cayman took place between 17 April and 27 August 1938 except when Lewis and Thompson worked in Cayman Brac, from 18 May to 28 May, and in Little Cayman from 28 May to 10 June. Moths were also taken at house lights, and occasionally specimens captured by residents were brought to the team (original Lewis notebooks, in the Cayman Islands National Archive).

Askew took moths in Little Cayman in June and July 1975 with a mercury vapour lamp and at house lights (Askew 1980, 1994). He returned to the islands for short periods in 1985, 1992, 2006, 2008, 2009, 2015 and 2018. His collections, observations and photographs form a thread of continuity since the formal expeditions. In addition, a number of verifiable records, usually photographic, made by resident naturalists have been collected by Askew and Stafford. All photographers are credited in the Acknowledgments, and copies of all photographic records are stored in the first author's personal collection (MCR), and are available upon request.

With the establishment of the government Natural Resources Laboratory in 1974 (later growing to become the Department of Environment) as an offshoot of the Mosquito Research Control Unit (MRCU) (Brunt and Davies 1994, preface) and the non-governmental National Trust for the Cayman Islands in 1987, insect collections were created into which staff, visiting scientists, including W. E. Steiner and J. W. Swearingen in 1993, and resident naturalists have deposited specimens. The NTCI collection survived hurricane Ivan, which devastated much of Grand Cayman in 2004. The Department of Environment's collection was re-established post-Ivan with donations and the remnants of the MRCU's non-mosquito holdings. A small insect collection at the Department of Agriculture is maintained primarily for pest recognition and control purposes. Each of these three collections was examined.

Rose-Smyth began photographic recording of hawkmoths in 2009 and collecting in Lower Valley, Grand Cayman (Fig. 1, locations M and N) with the aid of ultraviolet (uv) and mercury vapour (mv) light from 2015. Simon, Goss and Rozycki collected Lepidoptera in 2017 in Little Cayman (20–23 June) and Grand Cayman (23–28 June), also using uv and mv light.

Lastly, we interrogated the Global Biodiversity Information facility (GBIF) database and recovered details of specimens in the Milwaukee Public Museum (MPM), University of the West Indies Zoological Museum (St. Augustine, Trinidad and Tobago) (UWIZM) and research grade photographic uploads to iNaturalist.org (GBIF.org, GBIF occurrence download <https://doi.org/10.15468/dl.ykyuwz>). We have not personally inspected MPM or UWIZM.

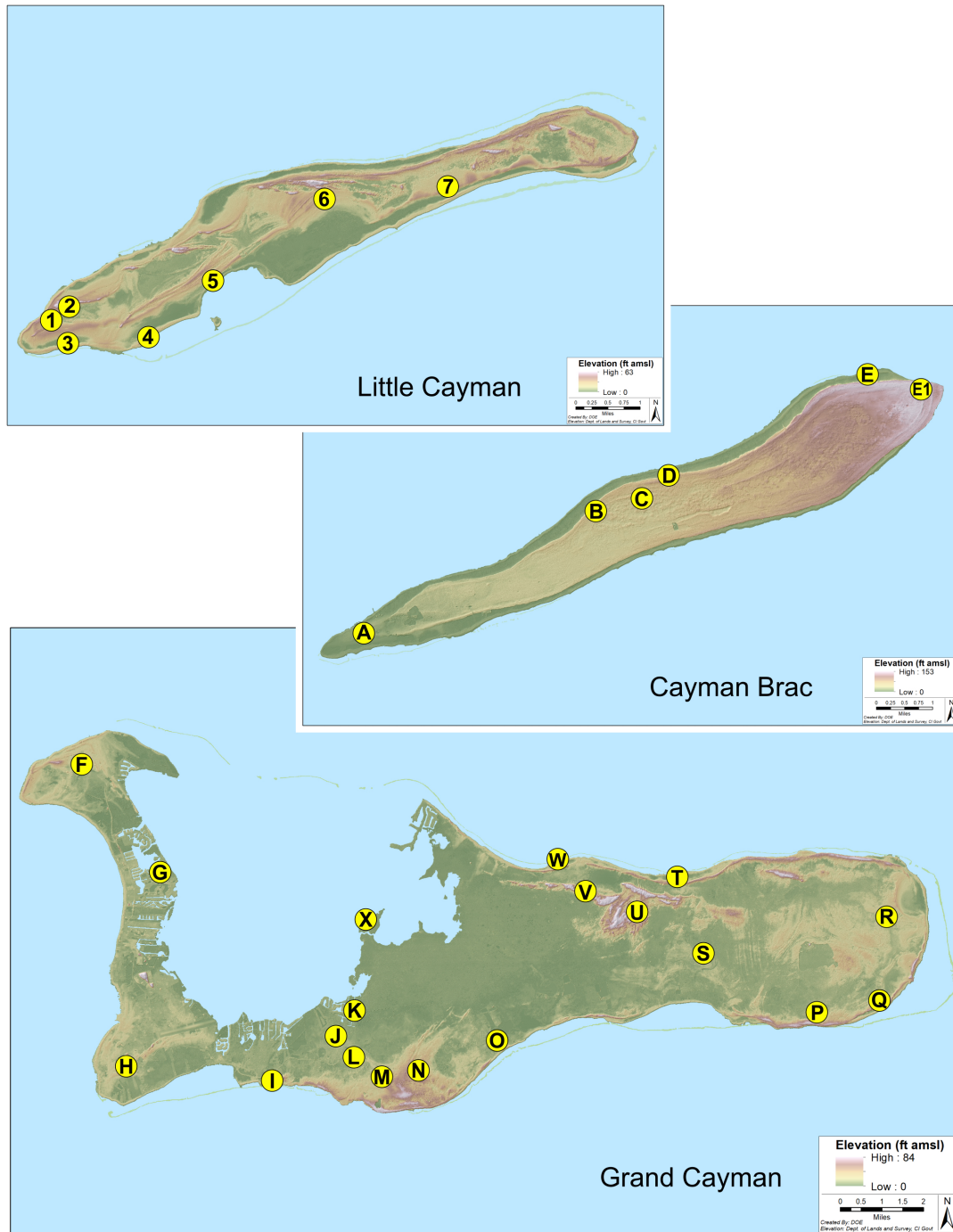
Locations within each island are provided in Figure 1. Biogeographical, habitat and vegetative descriptions of the Cayman Islands may be found in Brunt and Davies (1994), Burton (2008), Proctor (2012), and Thomas et al. (2013). Significantly, these oceanic islands are low-lying and karstic with a dry season from January to May.

**Arrangement of the checklist.** This checklist has its origins in the list drawn up by Askew (1994) according to the arrangement in D'Abrera (1986). Having regard to the more recent treatments by Kitching and Cadiou (2000), Kawahara et al. (2009) and Kitching et al. (2018) we have retained broadly the same format, which also aligns with Tuttle (2007). The checklist is presented as follows: the 1938 and 1975 expedition records are listed first (Jordan (1940) and Askew (1980, 1994) respectively), by island, followed by new country records and later records, also ordered by island and in chronological order therein. Where no number of specimens is indicated, the record may be taken to be of a singleton. Following date, location, time and specimen information, as available, the observer/collector's name is given, followed by nature of record, and depository where applicable, in parentheses.

Key to collections in which specimens are housed, locations and record type:

<b>DAGC</b>	Department of Agriculture, Lower Valley, Grand Cayman
<b>DEGC</b>	Department of Environment, George Town, Grand Cayman
<b>MCR</b>	Rose-Smyth's personal collection, Cayman Islands
<b>MPM</b>	Milwaukee Public Museum, Milwaukee, U.S.A.
<b>NHMUK</b>	The Natural History Museum (formerly British Museum, Natural History, BMNH), London, United Kingdom
<b>NTCI</b>	National Trust for the Cayman Islands, George Town, Grand Cayman
<b>RRA</b>	Askew's personal collection, France
<b>SGR</b>	Simon, Goss and Rozycki collection, U.S.A.
<b>UWIZM</b>	University of the West Indies Zoology Museum, Trinidad and Tobago

Other acronyms: QEII BP = Queen Elizabeth II Botanic Park. P = photographic record, V = video record, uv = ultraviolet, mv = mercury vapour. Times are given according to the 24 hour clock.



**Figure 1.** Collection and observation locations in the Cayman Islands. **Little Cayman:** 1. Nature Trail; 2. Stonewall Dr., Spyglass Hill; 3. Pirates Point; 4. South Town (Blossom Village); 5. Cross the Land Road (now Guy Banks); 6. Central Forest, south of Sparrowhawk Hill; 7. Coppice Rd. **Cayman Brac:** A. West End (Cotton Tree Land); B. Stake Bay (Stakes Bay in Jordan 1940); C. Arlin Reid Drive; D. Earthquake Hole; E. Spot Bay; E1. Lighthouse Trail. **Grand Cayman:** F. West Bay; G. Crystal Harbour; H. George Town (Georgetown in Jordan 1940); I. Ocean Club; J. Newlands; K. North Sound Estates; L. Savannah; M. Agricultural Grounds/Pavilion/Lottery Rd.; N. Valley Gardens; O. Bodden Town; P. High Rock; Q. East End; R. Colliers Wilderness Reserve; S. Queen Elizabeth II Botanic Park; T. Old Man Bay; U. Mastic Trail; V. Hutland (Hut Rd.); W. North Side; X. North Sound, Booby Cay (Booby Bay in Jordan 1940).



The specimens referred to in Jordan (1940) are deposited in NHMUK. Dated specimens were collected by Lewis and Thompson; vouchers dated 1938 only were contributed by the Commissioner, A.W. Cardinall. Specimens referred to in Askew (1975) are held in RRA or NTCI.

Nomenclature follows Kitching (2022a), which was also used to confirm identifications. Records up to February 2021 (March 2020 in respect of nine third party iNaturalist submissions recovered from GBIF) are included. Subspecies are referred to where relevant.

**Larval food plants.** Global larval food plant data were obtained from Ballesteros Mejia et al. (2020) and compared with data on actual plant occurrence in the Cayman Islands drawn from Proctor (2012) to construct a qualitative assessment of larval food plant limitation. Species that are highly polyphagous across the range and with a cross-section of those food plants available in the Cayman Islands were scored as not suffering from larval food plant limitation (LFL), and so also were monophagous species where the food plant is abundant. Species with few or rare larval foods in the Cayman Islands were rated limited. Hawkmoths with mixed outcomes were assigned as possibly experiencing LFL.

**Review of potential pollinators of the ghost orchid *Dendrophylax fawcettii*.** Two small populations of *D. fawcettii* were monitored by Rose-Smyth at least biennially between 2012 and 2020 and one, now-extirpated, population between 2009 and 2010. Flowering plants were censused for pollinia removal and seed set. Individual flowers were photographed using time lapse camera-traps in 2015 at QEIIBP. The third population was visited intermittently between 2009 and 2020.

Records of proboscis lengths for hawkmoths found in Grand Cayman were obtained from Haber and Frankie (1989), Miller (1997), Danaher et al. (2019), and Houlihan et al. (2019).

**Sphingids as the prey of the bat *Macrotus waterhousii*.** *Macrotus waterhousii minor* Gundlach occurs in the Cayman Islands, Cuba, Isle of Pines and the northern Bahamas and roosts in small colonies in caves and abandoned buildings (Morgan 1994). The nominate sub-species occurs in Mexico, Jamaica, Hispaniola and the southern Bahamas (Morgan 1994). *Macrotus waterhousii minor* is disappearing from Grand Cayman due to loss of habitat and disturbance (DaCosta-Cottam et al. 2009). Until 1980 it was a common species in the island. By 2009 it had ceased to occupy four historic roosts (DaCosta-Cottam et al. 2009). It is currently reported from one cave on Grand Cayman (Vaughn Bodden pers. comm.).

We inventoried the hawkmoth remains deposited in NTCI labelled 'In *M. waterhousii* roost, ii 1998' and a box of wings which are mostly from hawkmoths but includes some from Noctuidae and Orthoptera. These remains were collected by Anne-Louise Band, possibly at the bat roost mentioned above.

## Results and Discussion

**Distribution and phenology.** Twenty-five species of Sphingidae are now known to occur across all three islands combined, 23 of which have been recorded on Grand Cayman, 16 in Little Cayman and eight in Cayman Brac. Four species: *Isognathus rimosa* (Grote), *Phryxus caicus* (Cramer) (in all three islands), *Enyo lugubris* (Linnaeus), and *Eumorpha satellitia* (Linnaeus), are here reported as new records. In addition to the four noted above, *Erinnyis alope* (Drury), *Eumorpha vitis* (Linnaeus) and *Xylophanes tersa* (Linnaeus) are further new records for Grand Cayman. Five species are added for Little Cayman: *Protambulyx strigilis* (Linnaeus), *Erinnyis oenotrus* (Cramer), *Phryxus caicus*, *Erinnyis obscura* (Fabricius) and *Xylophanes pluto* (Fabricius). *Phryxus caicus* and *Pseudosphinx tetrio* (Linnaeus) are new records for Cayman Brac. Two species, *Madoryx pseudothyreus* (Grote, 1865) and *Hyles lineata* (Fabricius, 1775), have so far only been recorded in the sister islands.

The detailed checklist is provided in Appendix 1. Table 1 summarises the data for sphingid presence in the Cayman Islands by island and by month. Three of the four newly reported species are frequent to common. *Eumorpha satellitia posticatus* (Grote, 1865), is represented by a single individual.

Only two of the modern records for *Phryxus caicus* coincide with the time period of the historic surveys, which may explain why *P. caicus* was not recorded by either. In Florida *P. caicus* is taken most frequently between August and November (Tuttle 2007). Larval food plants are in Apocynaceae, genera *Echites* P. Br and *Rhabdadenia* Muell. Arg., but in Florida only *R. biflora* (Jacq.) Muell. Arg. (swamp vine / mangrove rubber vine) has been

**Table 1.** Summary of distribution among the three Cayman Islands (left) and presence/absence by month (right) for all sphingid species here reported. G = Grand Cayman, L = Little Cayman, B = Cayman Brac, lower case g = Grand Cayman by Oxford Expedition within the date range but otherwise not specified by Jordan 1940. Species in bold are those not previously recorded from the Cayman Islands. Species for which larval records have been reported are underlined.

Species	Distribution			Monthly Occurrence											
	G	L	B	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Agrius cingulata</i>	✓	✓		G	G			GL	G					G	
<i>Cocytius antaeus</i>	✓			G	G	G	G		G		G				G
<u><i>Manduca paphus</i></u>	✓	✓	✓				G	GB	G	L		G	G		G
<i>Manduca rustica</i>	✓						G								
<i>Manduca brontes</i>	✓	✓			G			GL	GL	GL	G				
<i>Protambulyx strigilis</i>	✓	✓		G	G			g	gL	g		G			G
<u><i>Pseudosphinx tetrio</i></u>	✓	✓	✓	G	G	G		GB	GL	GBL	G	G	GB		B
<b><i>Isognathus rimosa</i></b>	✓			G	G	G		G	G		G	G			
<u><i>Erinnyis alope</i></u>	✓		✓	G				GB	G						
<u><i>Erinnyis ello</i></u>	✓	✓	✓	G				B	GL	GL	GL				
<i>Erinnyis oenotrus</i>	✓	✓		G	G	G			GL	G		G			G
<i>Erinnyis obscura</i>	✓	✓		G				G	GL	G	G				
<b><u><i>Phryxus caicus</i></u></b>	✓	✓	✓	G	G	G			GL		GB	G		G	G
<u><i>Pachylia ficus</i></u>	✓			G	G	G	G	G	G	G	G				G
<i>Madoryx pseudothyreus</i>		✓									L				
<i>Aellopos tantalus</i>	✓	✓		G	GL	G			GL	GL	G	G	G	G	G
<b><i>Enyo lugubris</i></b>	✓			G	G		G	G	G	G	G	G	G		G
<i>Cautethia grotei</i>	✓	✓	✓				G	B	GL	GL		G			
<u><i>Eumorpha vitis</i></u>	✓	✓	✓					GB		BL					
<i>Eumorpha fasciatus</i>	✓				G			g	g	g					
<u><i>Eumorpha labruscae</i></u>	✓			G	G			G	G	G	G				G
<b><i>Eumorpha satellitia</i></b>	✓								G						
<i>Xylophanes pluto</i>	✓	✓		G	G	G	G	G	GL	G	G				G
<i>Xylophanes tersa</i>	✓	✓			G			L	GL	L					
<i>Hyles lineata</i>		✓	✓					B	L	L					
<b>Totals (all islands 25)</b>	<b>23</b>	<b>16</b>	<b>8</b>												

proven to support larvae (Tuttle 2007). Present in both Grand Cayman and Little Cayman, *R. biflora* is absent from Cayman Brac (Proctor 2012) suggesting that if *P. caicus* is breeding in that island, the host plant would be likely to be *Echites umbellatus* Jacq., which is present there in addition to Grand Cayman.

Neither *Enyo lugubris lugubris* nor *Pachylia ficus* were collected by the Oxford Expedition between April and August in 1938. The records obtained by this study show that both of these species are present in Grand Cayman in at least nine months of the year (Table 1). Both species were collected in August 1968 by Wayne W. Klopp. The Milwaukee Public Museum contains 14 hawkmoths of six species collected by Klopp in Grand Cayman. Klopp, a biological supplier based in Chicago, had advertised a two-month entomological collection trip to Jamaica in the notices section of the Michigan Entomological Society Newsletter (Klopp 1967) which appears to have been extended to Grand Cayman.

*Pachylia ficus* has been recorded in all months from December through August with collections and observations in each decade since the late 1960's. The specimen in the UWIZM was collected by Fred D. Bennett in 1970, when he visited Grand Cayman in connection with the introduction of the cactus moth (*Cactoblastis cactorum* Berg; Pyralidae) as a biological control of *Opuntia* spp. (Cactaceae) in cow pastures (Habeck et al. 2016). Larvae have been observed in August and December including predation on larvae by the Mangrove Cuckoo, *Coccyzus minor* Gmelin (Cuculidae). A possible explanation of the absence in 1938 of *P. ficus* and *E. lugubris* is that the Oxford Expedition took place less than six years after the devastating hurricane of November 1932.

The sole Cayman specimen of *E. satellitia posticatus* was collected in June 2017. The subspecies breeds in Cuba and has been reported from the Bahamas (Tuttle 2007). The larval food in Cuba is reported to be *Vitis* spp. (Gundlach 1881), particularly *V. tiliifolia* Humb. and Bonpl. ex Schult. (Bruner et al. 1975). No species of *Vitis* are known from the Cayman Islands and three species of *Cissus* are the only representatives of the Vitaceae recorded (Proctor 2012).

Whilst *Xylophanes pluto* has proved to be present in Grand Cayman throughout much of the year, *X. tersa* appears to continue to be a species largely occurring in Little Cayman (Table 1), notwithstanding that the species has a considerable neotropical range and is known to feed on a very wide range of food plants including but not limited to the Rubiaceae, including species represented in all the Cayman Islands (Table 2).

The lower number of species recorded for Cayman Brac is almost surely an artefact of the more limited collecting that has been carried out in that island to date.

**Affinities.** Nineteen of the twenty-six distinct taxa of Sphingidae recorded for the Cayman Islands are members of the nominate taxon, eleven of which contain no subspecies and four are cases where the only other subspecies is the population occurring in the Galapagos (Table 2).

All of the six taxa that are referable to a subspecies other than the nominate are confined to the West Indies and Florida. *Cautethia grotei apira* and *C. g. hilaris* are the only endemic members of the Cayman Islands sphingid fauna. Distributed in the Greater Antilles and Florida, *C. grotei* has diversified in at least two other locations in the West Indies: Jamaica and the Bahamas (Melichar et al. 2016).

Two taxa are examples of the Cuban resident subspecies within the taxon: *Manduca rustica cubana* (Wood, 1915), and *Eumorpha satellitia posticatus*. *Manduca brontes cubensis* (Grote, 1865) is the most widespread of the subspecies of *M. brontes*. *Aellopos tantalus zonata* (Drury, 1773) is the West Indian subspecies of that species, the nominate occurring on the mainland. We could not determine the affinity of the Little Cayman *Madoryx pseudothyreus* (Grote, 1865) specimens to island subspecies level but the species as a whole is limited to Cuba, the Bahamas and Florida (Melichar and Řezáč 2013). All of the Cayman specimens of *Isognathus rimosa* are attributable to *I. rimosa rimosa*. The nominate subspecies is otherwise known only from Cuba (Cary 1951).

The apparent limitation of records of *Hyles lineata* to the sister islands may indicate that the Cayman Islands only receives strays during population explosions of this widespread North American hawkmoth.

**Larval food plants.** The results of the larval food plant assessment are presented in Table 2. Larvae of ten species have been recorded, the highly conspicuous caterpillar of *Pseudosphinx tetrio* being most frequent. Of the twenty-five species of Sphingidae recorded from the Cayman Islands twenty were assessed to be not limited by larval food plant availability because they are either polyphagous and a cross-section of food plants is available in the Cayman Islands or, in the cases of monophagous *Isognathus rimosa*, *Manduca brontes* and *Madoryx pseudothyreus*, the food plant is abundant.

At the coarse scale of the larval food plant limitation analysis, those five species clustering in the categories of estimated actual or possible LFL (*Hyles lineata*, *Xylophanes tersa*, *Eumorpha vitis* (Linnaeus), *Eumorpha fasciatus* (Sulzer, 1776) and *Eumorpha satellitia posticatus*) were also among the eight rarest species. In each case, other than *E. s. posticatus*, the species is broadly distributed. Though *H. lineata* and *X. tersa* are overall moderately to strongly polyphagous, actual food plant availability is more limited in the Cayman Islands. The *Eumorpha* species are less polyphagous and accepted species available in the Cayman Islands are further limited. We suggest that these species are strays from the mainland or larger Greater Antillean islands that may attempt to establish, as the occurrence of an *E. vitis vitis* larva in Cayman Brac attests.

In contrast, three of the rarest species of sphingid in the Cayman Islands were rated as not limited by larval food availability and the rarity of each may be as a result of distinctly different factors. *Manduca rustica*

**Table 2.** Larval food plant data for Cayman Islands Sphingidae. Explanation of columns: **1)** Species name, including subspecies where relevant; **2)** Larvae observed; **3)** Global larval food, taken from Ballesteros Mejia et al. (2020) – f/g/s refers to the number of families/general/species of plants used by the respective hawkmoth; **4)** Number of food plant species in Cayman Islands; **5)** Plant species names, names in bold are species on which Cayman hawkmoths have been observed or collected from; **6)** Comments; **7)** Qualitative estimate of whether the sphingid is larval food limited (LFL) or not in the Cayman Islands, based on the preceding data, allocated to three categories of no, maybe, and yes; **8)** Distribution of the hawkmoths at the species level summarised from GBIF (2022) and Kitching (2022a). Species were broadly categorised, first by LFL, second by distribution, third according to the food plant availability within, and outside of, the Cayman Islands. The names of the eight species least frequently observed or collected in the Cayman Islands are marked in bold. \* denotes species in which the only subspecies, other than the nominate, is a subspecies confined to the Galapagos Islands. <sup>1</sup> Burton 2008. <sup>2</sup> Oehlke 2022b.

Sphingid species	Larval records	Global larval food f/g/s	# Food species CI	Food species in Cayman Islands	Comments	Larval food limited	Distribution
<i>Manduca rustica cubana</i>		23/55/121	7	<i>Tecoma stans</i> , <i>Merremia umbellata</i> , <i>Crescentia cujete</i> , <i>Duranta erecta</i> , <i>Lippia alba</i> , <i>Stachytarpheta jamaicensis</i> , <i>Aegiphila elata</i>	Tuttle (2007) adds <i>Cordia</i> and <i>Lantana</i> ; all common species other than <i>Aegiphila</i>	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Manduca papus</i>	YES	11/28/91	7	<b><i>Solanum lycopersicum</i></b> , <i>S. americanum</i> , <i>Physalis angulata</i> , <i>Ipomoea batatas</i> , <i>Aegiphila elata</i> , <i>Capsicum spp</i>	Natives + cultivated species, <i>Aegiphila</i> very rare; if any <i>Solanum</i> five native species available	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Erinnyis ello ello</i> *	YES	14/39/73	10 or 12	<b><i>Solanum lycopersicum</i></b> , <i>Codiaeum variegatum</i> , <i>Euphorbia heterophylla</i> , <i>Hippomane mancinella</i> , <i>Jatropha curcas</i> , <i>Manihot esculenta</i> , <i>Ficus</i> , <i>Carica papaya</i> , <b><i>Conocarpus erectus</i></b> , <i>Ricinus communis</i> , <i>Psidium guajava</i> , <i>Thevetia</i>	Common natives or cultivated	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Agrius cingulata</i>		4/11/34	6	<i>Ipomoea batatas</i> , <i>I. indica</i> , <i>I. pes-caprae</i> , <i>I. triloba</i> , <i>Merremia dissecta</i> , <i>M. umbellata</i>	Common natives or cultivated	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Erinnyis obscura obscura</i>		2/13/23	3	<b><i>Sarcostemma clausum</i></b> , <i>Manihot esculenta</i> , <i>Nerium oleander</i>	Common natives or cultivated	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Enyo lugubris lugubris</i> *		4/11/27	2 or 3	<i>Cissus verticillata</i> , <i>Randia aculeata</i> , <i>Spermacoce sp.</i>	Common natives, 2 additional <i>Cissus</i> spp also native	NO	5 – Broadly neotropical including West Indies, to temperate Americas

Sphingid species	Larval records	Global larval food f/g/s	# Food species CI	Food species in Cayman Islands	Comments	Larval food limited	Distribution
<i>Eumorphia labruscae</i>	YES	4/18/23	2	<i>Chromolaena</i> (= <i>Eupatorium</i> ) <i>odorata</i> , <b><i>Cissus verticillata</i></b>	Natives, <i>Chromolaena</i> common, <i>C. verticillata</i> small population size <sup>1</sup> , two additional <i>Cissus</i> spp also native	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Erinnyis alope alope</i> *	YES	4/11/18	3	<i>Jatropha curas</i> , <i>Carica papaya</i> , <i>Manihot esculenta</i>	<i>J. curas</i> not currently occurring in the Cayman Islands, others cultivated	NO	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Protambulyx strigilis</i>		5/13/24	4	<i>Spondias dulcis</i> , <i>S. mombin</i> , <i>S. purpurea</i> , <i>Comocladia</i>	Bill Oehlke <sup>2</sup> cites <i>C. dentata</i> , a common native in Grand Cayman and present in Little Cayman where <i>Metopium toxiferum</i> (also Anacardaceae) is common	NO	4 – Neotropical, Central America West Indies, South America
<i>Pseudosphinx tetrio</i>	YES	2/9/20	4	<b><i>Plumeria obtusa</i></b> , <b><i>P. rubra</i></b> , <i>Nerium oleander</i> , <i>Manihot esculenta</i>	Common natives or cultivated	NO	4 – Neotropical, Central America West Indies, South America
<i>Erinnyis oenotrus</i>		2/17/18	3 or 5	<i>Asclepias curassavica</i> , <i>Echites</i> sp., <i>Manihot esculenta</i> , <i>Nerium oleander</i> , <i>Tabernaemontana</i>	Common natives or cultivated	NO	4 – Neotropical, Central America West Indies, South America
<i>Pachylia ficus</i>	YES	4/13/49	3	<i>Ficus aurea</i> , <i>F. citrifolia</i> , <b><i>Maclaura tinctoria</i></b>	Common natives or cultivated	NO	4 – Neotropical, Central America West Indies, South America
<i>Phryxus caicus</i>	YES	2/6/6	2 or 3	<i>Rhabdadenia biflora</i> , <i>Carica papaya</i> , <i>Echites</i> sp.	Common natives or cultivated; larva found on ground in area with <i>Rhabdadenia</i>	NO	4 – Neotropical, Central America West Indies, South America
<i>Xylophanes pluto</i>		2/13/20	5 or 7	<i>Faramaea occidentalis</i> , <i>Hamelia patens</i> , <i>Spermacoce</i> sp., <i>Erythroxylum</i> sp., <i>Morinda royoc</i> , <i>Chiococca alba</i> , <i>Morinda citrifolia</i>	Common natives except for <i>Faramaea</i>	NO	3 – Neotropical, centred on Central America and West Indies
<i>Aellopos tantalus zonata</i>		2/4/4	2	<i>Randia aculeata</i> , <i>Conocarpus erectus</i>	Common natives	NO	3 – Neotropical, centred on Central America and West Indies

Spingid species	Larval records	Global larval food f/g/s	# Food species CI	Food species in Cayman Islands	Comments	Larval food limited	Distribution
<i>Manduca brontes cubensis</i>		1/1/1	1	<i>Tecoma stans</i>	Common native	NO	3 – Neotropical, centred on Central America and West Indies
<i>Cocytius antaeus</i>	YES	1/7/27	3	<i>Ammonia glabra</i> , <i>A. muricata</i> , <i>A. squamosa</i>	Native <i>A. glabra</i> rare, others cultivated	NO	3 – Neotropical, centred on Central America and West Indies
<i>Isognathus rimosus rimosus</i>	YES	1/1/1	1	<b><i>Plumeria rubra</i></b>	<i>P. obtusa</i> is a much more common native, suspect it is used	NO	2 – Central America and West Indies
<i>Cautetia grotei apira</i> & <i>C. g. hilaris</i>		1/3/3	2 or 3	<i>Ciococca alba</i> , <i>Erithalis fruticosa</i> , <i>Exostemma</i> sp.	Common natives, <i>Exostemma caribaeum</i> also native	NO	1 – West Indies and Florida
<i>Madoryx psuedothyreus</i>		1/1/1	1	<i>Avicennia germans</i>	Single species specialist, plant habitat limited	NO	1 – Cuba, Florida Keys and Bahamas
<i>Hyles lineata</i>		35/65/106	5	<i>Solanum lycopersicum</i> , <i>Boerhavia coccinea</i> , <i>B. diffusa</i> , <i>Mirabilis jalapa</i> , <i>Portulaca oleracea</i>	All islands, except <i>B. diffusa</i> is LC and CB only, plants small herbs reduced in dry season, and cultivated tomato	Maybe	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Xylophanes tersa</i>		10/25/51	4 or 5	<i>Hamelia patens</i> , <i>Spermacoce</i> , <i>Psychotria nervosa</i> , <i>Morinda royoc</i> , <i>Ipomoea batatas</i> ,	<i>Hamelia patens</i> and a <i>Spermacoce</i> sp. in Little Cayman others not, but many Rubiaceae	Maybe	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Eumorphia fasciatus fasciatus*</i>		2/5/20	3	<i>Ludwigia erecta</i> , <i>L. octovalis</i> , <i>L. affinis</i>	All of limited distribution in Grand Cayman only, low wet pastures	YES	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Eumorphia vitis vitis</i>	YES	3/6/18	1	<b><i>Cissus verticillata</i></b>	Native but small population size <sup>1</sup> , two additional <i>Cissus</i> spp also native	YES	5 – Broadly neotropical including West Indies, to temperate Americas
<i>Eumorphia satellita posticatus</i>		2/7/20	1	<i>Cissus verticillata</i>	Native but small population size <sup>1</sup> , two additional <i>Cissus</i> spp also native	YES	5 – For the species as a whole. 1 – Subspecies limited to breeding in Cuba, and strays Florida and Bahamas

(Fabricius, 1775), despite being widely distributed at the species level and the most polyphagous of all the species studied, has only been recorded once. The 1938 Grand Cayman record is of *M. rustica cubana* and thus likely a vagrant from that island-delimited population.

*Madoryx pseudothyreus* is a single species specialist on *Avicennia germinans* (L.) (black mangrove) with a distribution limited to Cuba, the Bahamas and the Florida Keys. The larval food plant is common in both Grand Cayman and Little Cayman. The habitat has not been sampled in any detail. In Grand Cayman mangrove wetlands continue to be subject to some aerial spraying of insecticides by the Mosquito Research and Control Unit and historically more intensively between 1971 and the late 1980s when larvicides became the preferred means of suppression (Davies 1994). Nevertheless, we suspect that the two occurrences in Little Cayman, recorded in July 1975, represent strays from Cuba.

*Erinnyis alope* (Drury, 1773) was assigned to the non LFL category but it should be noted that the food species available in the Cayman Islands are exclusively cultivated fruit and root crops, which would not have existed in the islands prior to the late 17<sup>th</sup> century when permanent settlement began (Craton 2003).

Larvae of eight of the seventeen most commonly occurring species have been recorded (Tables 1 and 2). We expect that systematic searching of the larval food plants would turn up confirmation of resident breeding status of most of the rest. Whilst the records show that most species are present in many months of the year, more regular monthly observations and searches for larvae are needed to make more meaningful statements on breeding, seasonal occurrence and abundance.

Images of new record species and selected rarities (Figures 2–11) are provided on the next page.

**Review of potential pollinators of the ghost orchid *Dendrophylax fawcettii*.** A single occurrence of a *Cocytius antaeus* in an orchid shade house at the QEIIBP in proximity to blooming *D. fawcettii* was recorded by Rose-Smyth on 06.iv.2011. However, neither the shade house plants nor anywhere else in the garden's small ex-situ population under observation were pollinated that year. No other direct or camera-trap observations of sphingid activity (or any other potential pollinator) in proximity to flowers are known to us. No pollinia extractions were noted among the several hundred flowers examined by Rose-Smyth in the years 2010–2019; all wilted with the pollinia undisturbed.

We are only aware of three cases of natural pollination. In 2008 a pod formed on an individual in the QEI-IBP rescue population that was not attributable to attempts at hand pollination (Susan Gibb pers. comm.). In July 2009 Stafford observed a single seed pod in a part of the Ironwood Forest population. The third occurred in 2013 in QEIIBP.

Twenty species of hawkmoth have been recorded in the main flowering months of March to May in Grand Cayman (Table 1), of which *Pachylia ficus*, and *Protambulyx strigilis* are the most frequently encountered of the species reported by Houlihan et al. (2019) and Danaher et al. (2019). *Cocytius antaeus* occurs with relative frequency and *Eumorphia fasciatus* appears to be rare in Grand Cayman, although the 2018 record of *E. fasciatus* did occur in suitable habitat.

Tongue lengths of all these species were recovered from the literature review. Figure 12 illustrates that in addition to the potential visitors/pollinators identified by Houlihan et al. (2019) and Danaher et al. (2019) any of the species could serve as a pollinator on the basis of proboscis length alone. This is reinforced by the fact that *Dolba hyloeus* (Drury, 1773), the second confirmed pollinator (together with *Pachylia ficus*) in Florida, but which does not occur in the Cayman Islands, has a tongue length of 3.2 cm (Miller 1997).

If as many as four hawkmoth species are possible pollinators of *D. fawcettii* in Grand Cayman the paucity of actual pollination in the populations under study becomes an even greater conundrum than it was before.

Visual, olfactory and energetic factors may play significant roles in an orchid's capacity to attract effective pollinators. Nectar rewards tend to be greater in longer-tubed flowers, which, it is argued, counteract inconstancy by polyphagous long-tongued moths (Johnson et al. 2017). Elsewhere it has been demonstrated that minimal nectar (Ackerman et al. 1994) or nectar gradients (Martins and Johnson 2007) may influence pollinator behaviour.

*Manduca sexta* (Linnaeus) serves as a model experimental study system for hawkmoth physiology and behaviour. This species is able to learn to associate nectar rewards with floral odour (Daly and Smith 2000). It has been demonstrated to require simultaneous visual floral display and olfactory stimuli to initiate feeding (Raguso and Willis 2002). Haverkamp et al. (2016) have shown that it prefers species of *Nicotiana* L. (Solanaceae) whose

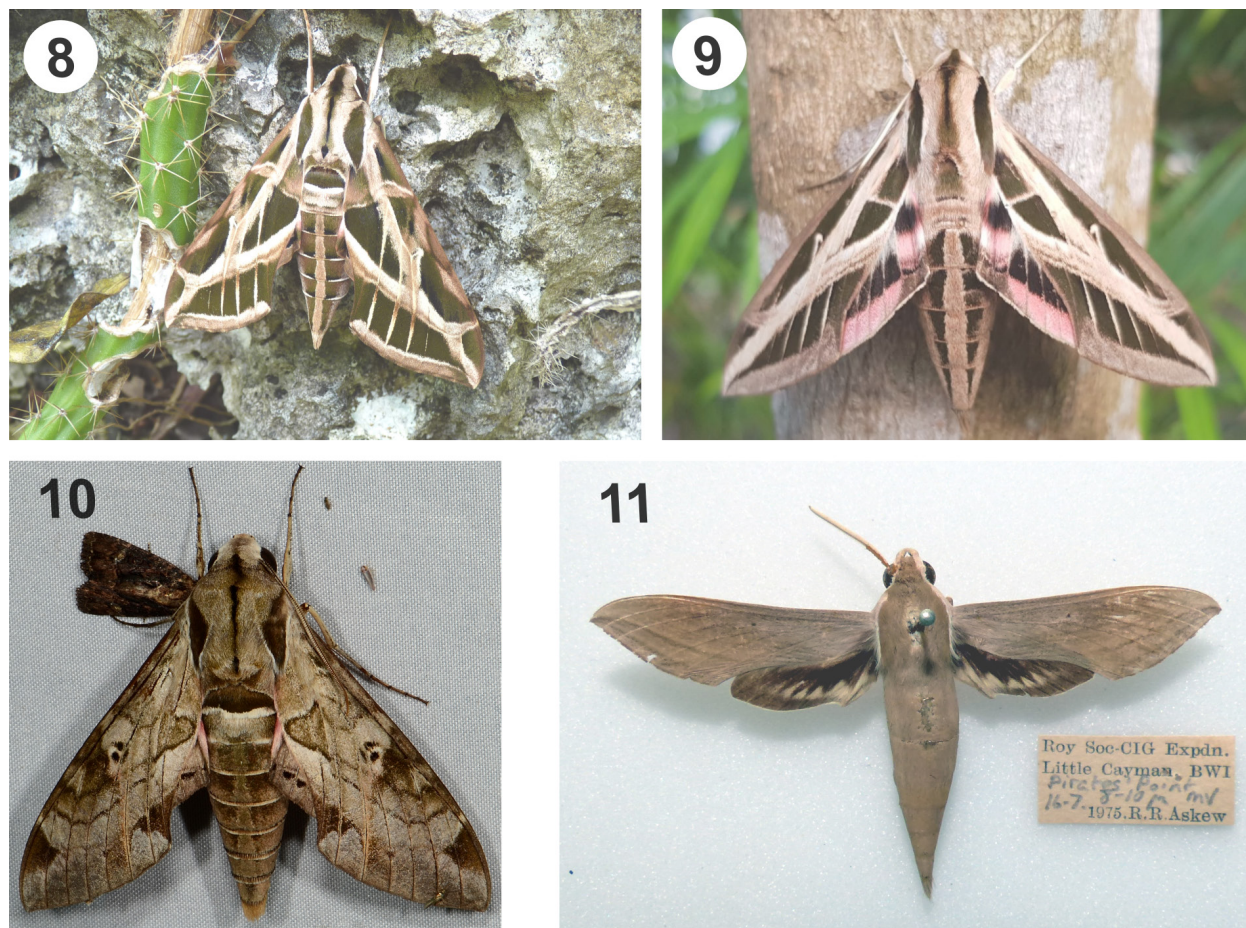


**Figures 2–7.** Cayman Islands Sphingidae. 2) *Isognathus rimosa*. 3) *Erinnyis obscura*. 4) *Phryxus caicus*. 5) Predation of *Pachylia ficus* larva by Mangrove Cuckoo, *Coccyzus minor*. 6) *Pachylia ficus*. 7) *Enyo lugubris*. Photographic credits: M.C. Rose-Smyth (2, 27.i.2017; 3, 08.viii.2018; 4, 24.xiii.2015, 6, 05.iv.2018; 7, 13.ii.2018), Yves-Jacques Rey-Millet (5, 29.xii.2012).

flowers have tube length most closely matched with the moth's tongue, which they attribute to the moth realising the highest net-energy reward. Such physiological and behavioural traits may be expected to also play roles in how other hawkmoth species respond to *Dendrophylax* species.

The scent of *D. lindenii* is made up of eight primary volatile compounds (Sadler et al. 2011). Those authors found it to be a sweet and somewhat fruity smell, intensifying at dusk and detectable at close range. Three of the compounds were among the five common to greater than 66% of plant families; the other five, except for one, are known to be emitted by other Orchidaceae that are moth-pollinated (Knudsen et al. 2006; Sadler et al. 2011). The





**Figures 8–11.** Cayman Islands Sphingidae. **8)** *Eumorpha vitis*. **9)** *Eumorpha fasciatus*. **10)** *Eumorpha satellitia posticatus*. **11)** *Xylophanes tersa*. Photographic credits: Stuart Mailer (8, 12.v.2010), Peter and Norma Davey (9, 10.ii.2018), Gary J. Goss (10, 26.vi.2017), M.C. Rose-Smyth (11, NTCI collection).

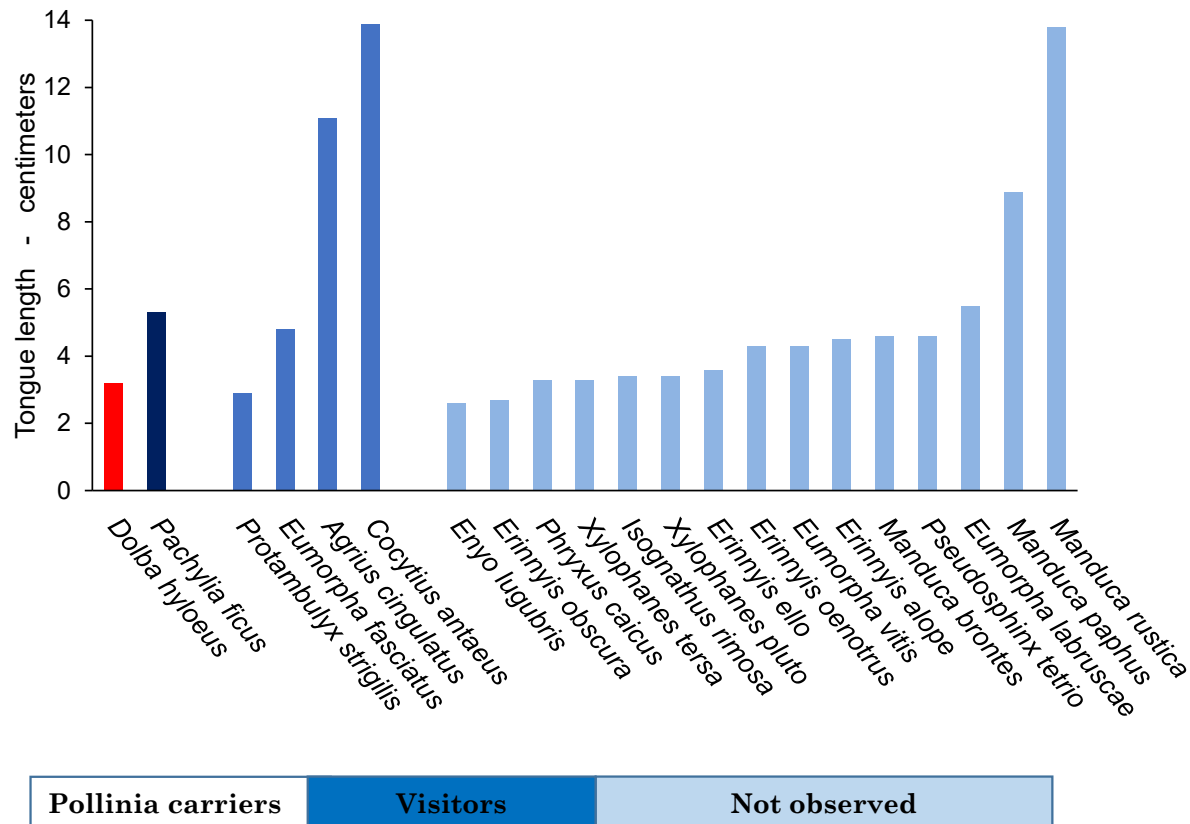
composition of the scent of *D. fawcettii* is unknown. One of us describes it as a sweet rose-like fragrance similar to *Citharexylum spinosum* L. (white fiddlewood; Verbenaceae) and *Carissa macrocarpa* (Eckl.) A. DC. (Natal plum; Apocynaceae) detectable within 2 m., after sunset (P.A.B. Stafford unpublished data).

The extent to which either *D. fawcettii* or *D. lindenii* offer meaningful nectar rewards also remains to be demonstrated. In the case of *D. lindenii* Danaher et al. (2019) noted unpublished data that suggests that the spur may be only  $\frac{1}{3}$ – $\frac{2}{3}$  full.

Future work on *D. fawcettii* should include the characterisation of its floral scent to determine its capacity as a semiochemical attractant to hawkmoths, as well as determining the quality and quantity of its nectar and the timing of its production. The results could have application for luring natural pollinators to the plants for conservation purposes.

**Sphingids as the prey of the bat *Macrotus waterhousii*.** The drawer labelled ‘In *M. waterhousii* roost, ii 1998,’ contained whole single specimens of *Erinnyis oenotrus* and *Phryxus caicus*. Fragmented remains collected at bat roosts were:

- *Erinnyis oenotrus*: 5♀ left forewings, 3♀ right forewings, 4♂ left forewings, 3 unsexed left hindwings, 2 unsexed right hindwings. These are from a minimum of 5♀♀ and 4♂♂.
- *Phryxus caicus*: 1 right forewing.
- *Eumorpha labruscae*: 1 left forewing, 1 right forewing.



**Figure 12.** Tongue lengths of twenty of the twenty-three species of hawkmoth found in Grand Cayman, plus that of *Dolba hyloeus*. Data from: Miller (1997) supplemented by Haber and Frankie (1989), Houlihan et al. (2019); and Danaher et al. (2019). Species are grouped by “pollinia carriers” and “visitors to flowers” in Florida, according to Houlihan et al. (2019) and Danaher et al. (2019) and “not observed”. Colour codes are: red = species not occurring in Grand Cayman; blue = species occurring in Grand Cayman.

*Macrotus waterhousii* eats only large, slow-flying insects; prey are gleaned from foliage or the ground and carried to the roost for consumption where certain body-parts not eaten are discarded (Dunkle and Belwood 1982). Despite *M. waterhousii* creating middens accessible to sampling, identification of prey to the species level is sparse. In a relatively low-lying arid habitat in Querétaro, central Mexico, moths were the most significant group among a suite of prey taken in the month of July, a quarter of which were Sphingidae (Sánchez and Wilson 2016). Five species reported co-occur in the Cayman Islands (*Erinnyis ello*, *E. alope*, *E. obscura*, *Xylophanes pluto* and *Agrius cingulata*) and comprised 12% of the sphingid individuals taken in the Mexico sample. However, none of those species were represented in the samples taken at *M. waterhousii* roosts in Grand Cayman. Whilst *M. waterhousii* may have been secondarily attracted to the flowering silk cotton tree at which *Isognathus rimosa*, *Pseudosphinx tetrio*, *E. obscura* and *Phryxus caicus* were taken in Grand Cayman in January 2017, the most numerous bat visitors on that occasion were two species of Phyllostomidae that are specialised feeders on nectar and pollen: *Brachyphylla nana nana* (Miller) and *Erophylla sekekorni syops* (Allen) (Morgan 1994).

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## Appendix 1

### Checklist of the Sphingidae of the Cayman Islands

#### Subfamily Sphinginae Latreille, [1802]

#### Tribe Sphingini Latreille, [1802]

#### *Agrius cingulata* (Fabricius, 1775)

Jordan (1940) **Grand Cayman** 1♀ 14.v.1938 in light trap; **Little Cayman** 1♂ 2.vi.1938 in light trap. Askew (1980) **Little Cayman** Pirates Point (1♂ vii.1975 at uv light, 1♂ 22.vii.1975 at house light (RRA)).

Later records

#### **Grand Cayman**

2, 21.ii.1993 3km west of Colliers at black light (W.E. Steiner & J.W. Swearingen, NTCI)

61, 13.vi.2005 West Bay, on house wall at security light (Sonny Rivers, P)

14.i.2014 Valley Gardens 08:33, fresh individual caught by adult male *Anolis conspersus* Garman (Squamata: Dactyloidae), held by rear abdomen and struggling to escape before being dragged out of sight (Rose-Smyth, P, V)

19.v.2016 Valley Gardens 03:53 uv light, fresh individual (Rose-Smyth, P, MCR)

24.vi.2017 Colliers Wilderness Reserve, at gate (SGR)

18.xi.2017 Grand Cayman (Stafford, P)

07.v.2018 Valley Gardens 21:14 uv light (Rose-Smyth, P, MCR)

11.v.2018 Valley Gardens 22:13 (Rose-Smyth, P)

***Cocytius antaeus* (Drury, 1773)**

Jordan (1940) **Grand Cayman** 1♀ 27.viii.1938 Georgetown.

Later records

**Grand Cayman**

- 03.ii.1985 George Town, MRCU (Geddes Hislop, NTCI)
- 2.xii.2003 George Town (Stafford, NTCI)
- 2003 North Side, Hutland Road (Mars Van Liefde, NTCI)
- 20.vi.2006 George Town, Walkers Road, larva on *Annona squamosa* L. (sweetsop; Annonaceae) P, Stafford, NTCI)
- 14.ii.2010 QEIIBP (Rose-Smyth)
- 06.iv.2011 QEIIBP in orchid shade house in proximity to blooming *Dendrophylax fawcettii* (Rose-Smyth, P)
- 21.ii.2015 George Town (iNaturalist #1635258, P)
- 27.vi.2015 Valley Gardens 06:57 (Rose-Smyth, P)
- 01.iii.2016 West Bay, larva collected from non-native, cultivated *A. squamosa* (sweetsop) (Carole Jones, Rose-Smyth, P)
- 22.i.2017 Valley Gardens 22:10 on west house wall, uv light (Rose-Smyth, P)
- 27.xii.2017 Valley Gardens 15:05 on east porch column in full sun, being watched by adult male *Anolis conspersus*, but the anole left and any subsequent interaction was not observed. (Rose-Smyth, P)
- 01.iv.2018 Valley Gardens 21:42 on west porch, uv light; tip of abdomen missing (Rose-Smyth, P).

***Manduca paphus* (Cramer, 1779)**

Jordan (1940) attributed to *M. sexta jamaicensis* Butler, 1877 **Grand Cayman** 1♂ 18.iv.1938, 1♂ 30.iv.1938, 1♀ 13.v.1938, all Georgetown in light trap; **Cayman Brac** 18.v.1938 dusk at light, 2♂♂ 25 & 26.v.1938 in light trap. Askew (1980) **Little Cayman** 6 10–30.vii.1975 Pirates Point at mv light of which 1♀ on 14.vii, 1♂ on 18.vii and 1♂ on 19.vii.1975 (RRA).

Later records

**Grand Cayman**

- 02.xii.2007 George Town, larvae on tomato (*Solanum lycopersicum* L. Solanaceae) (Stafford)
- 06.v.2009 Valley Gardens, larva on tomato (Rose-Smyth)
- x.2009 Valley Gardens, larvae on tomato, both yellow and green (Rose-Smyth)
- 13.ix.2015 Valley Gardens 20:45, on west house wall, uv light (Rose-Smyth, P, MCR)
- 14.v.2018 Valley Gardens 21:30, uv light (Rose-Smyth, P, MCR)

Haxaire and Mielke (2019) re-instated *Manduca paphus* as a full species, raising it from a South American sub-species of *Manduca sexta*, on the basis of distinctions in the male genitalia and barcoding. The consequent reduction of *M. sexta jamaicensis* to a synonym of *M. paphus*, notwithstanding the overall darker appearance of West Indian populations and their less distinct hind wings, implies that the Cayman Islands specimens should also be considered to be *M. paphus*.

***Manduca rustica cubana* (Wood, 1915)**

Jordan (1940) attributed to *M. r. cubana* (Wood, 1915). **Grand Cayman** 1♂ 29.iv.1938 Georgetown (Boilers inland from Jackson), 2♀♀ 1938 Georgetown.

Later records

None found.

***Manduca brontes cubensis* (Grote, 1865)**

Jordan (1940) attributed to *M. b. cubensis* (Grote, 1865). **Grand Cayman** 1♂ 01.vii.1938 East End in light trap; **Little Cayman** 5♂♂ 1♀ 29, 30 & 31.v.1938 mostly in light trap, 2♂♂ 02 & 08.vi.1938 coast at South Town. Askew (1980) **Little Cayman** 17 10–30.vii.1975 Pirates Point at mv light of which 1♂ on 18.vii, 1♂ on 19.vii, 1♂ on 27.vii and 1♀ on 30.vii.1975, RRA, and 1 on 21.vii.1975 at house light, NTCI.

Later records

**Grand Cayman**

- 21.ii.1993 3km west of Colliers at black light (W.E. Steiner & J.W. Swearingen, NTCI)
- 24.vi.2017 Colliers (SGR)
- 06.v.2018 Valley Gardens 21:05 uv light (Rose-Smyth, P, MCR)
- 28.iii.2020 Valley Gardens 22:20 mv light (Rose-Smyth, P)

**Little Cayman**

- 22.vi.2017 Stone Wall Rd. (SGR)
- 23.vi.2017 Pirate's Point (SGR)

**Subfamily Smerinthinae Grote and Robinson, 1865**

**Tribe Ambulycini Butler, 1876**

***Protambulyx strigilis* (Linnaeus, 1771)**

Jordan (1940) **Grand Cayman** 1♂1♀1938 Georgetown.

Later records

**Grand Cayman**

- 03.ix.2009 George Town (Mat Cottam, DEGC)
- 27.ii.2009 Valley Gardens (Rose-Smyth)
- 01.i.2010 Valley Gardens, found in house (Rose-Smyth)
- 2012 George Town (Courtney Platt, P)
- 31.xii.2016 Valley Gardens 08:24, flew out of potted plants when watered (Rose-Smyth, P, MCR)

**Little Cayman**

- 22.vi.2017 Stone Wall Rd. (SGR)

**Subfamily Macroglossinae Harris, 1839**

**Tribe Dilophonotini Burmeister, 1878**

***Pseudosphinx tetrio* (Linnaeus, 1771)**

Jordan (1940) **Grand Cayman** 1♂ 29.vi.1938 East End, 1♂ 09.viii.1938 Georgetown; **Little Cayman** 4♀♀ collected on 'jasmine' as larvae, pupated 05–07.vi.1938 emerged 25–27.vi.1938 Cross-the-Land Road (west end). Askew (1980) **Little Cayman** 5 10–30.vii.1975 Pirates Point of which 1♀ on 19.vii and 1♀ on 30.vii.1975 at mv light, and 1♂ 25.vii.1975 at house light (RRA), larvae on frangipani (*Plumeria* sp. Apocynaceae).

Later records

**Grand Cayman**

- 06.ix.1997 Hutland, 2 reared from larvae on *Plumeria obtusa* L. (Mars Van Liefde, NTCI)
- ii.1998 North Side (Mars Van Liefde, NTCI)
- 24–31.vii.2002 George Town, larvae on *Plumeria* sp. (Stafford)
- 2004 George Town, larvae on *Plumeria* sp. (Courtney Platt)
- 4.ii.2004 George Town (Stafford)
- 14.i.2012 George Town, Websters Estates early-stage larvae on *Plumeria* sp. (Rose-Smyth)
- 26.vii.2012 North Side, larva (iNaturalist #1212618, Mark Rosenstein, P)
- 8.iii, 10 & 11.v.2014 George Town (Stafford)
- 18.x.2014 Queen Elizabeth II Botanic Park, larva (iNaturalist #15803185, David J. Ringer, P)
- 12.ii.2016 Grand Harbour, Hurley's parking lot, 17:00 dead (Stuart Mailer, MCR)
- 28.i.2017 Valley Gardens 20:30–22:00, during new moon, many moths and bats at flowering silk cotton tree (*Ceiba pentandra* (L.) Gaertn., Malvaceae); uv light under mango 10 meters from the cotton tree (Rose-Smyth, P, MCR)
- 27.v.2017 Colliers Wilderness Reserve, mature larvae on *Plumeria obtusa* and searching for pupation sites (Rose-Smyth, P)

21 & 26.vi.2017 Colliers (SGR)

June and July 2018 Valley Gardens, mature larvae on *Plumeria* cultivar (Rose-Smyth)

3, 17.viii.2018 Valley Gardens adults, uv light (Rose-Smyth, P, MCR)

20.vi.2019 North Side, larva (iNaturalist #27360229, P)

13.x.2019 North Side, larva (iNaturalist #34798240, P)

#### **Cayman Brac**

18.x.2006 Eastern Bluff, Lighthouse trail, mature larvae on *Plumeria obtusa* (Rose-Smyth, P, MCR)

19.x.2010 on the Bluff above Stake Bay, larva (iNaturalist #3568565, Alan Franck, P)

12.vii.2018 Arlin Reid Dr., north of Cayman Brac Power and Light plant 11:15, mature larva on shrubs, under *Plumeria obtusa* tree (Rose-Smyth, P)

07.xii.2018 Eastern Bluff, Lighthouse trail, larva (iNaturalist #25791484, P)

24.iii.2019 Eastern Bluff, Lighthouse trail, larva (iNaturalist #24890580, P)

31.i.2020 Valley Gardens (Rose-Smyth, P, MCR) Little Cayman

21.vi.2017 Coppice Rd., east (SGR)

The native larval food plant is *Plumeria obtusa* (jasmine, frangipani) (Apocynaceae). In the Queen Elizabeth II Botanic Park the endemic blue iguana (*Cyclura lewisi* (Grant) Burton, Reptilia: Iguanidae), which is ordinarily ground-dwelling as an adult, has been observed to climb into a tree to feed on *P. tetrio* larvae (Goodman 2007) and to congregate under trees when fully grown larvae are descending to pupate (Andrew Guthrie pers. comm, 8.ii.2008). Consumption of *P. tetrio* larvae has been recorded in two other West Indian cyclurids, *C. cornuta* (Bonaterre) (Hispaniolan rhinoceros iguana) and *C. stejnegeri* Barbour & Noble (Mona Island rhinoceros iguana) (Hines 2016).

#### ***Isognathus rimosa rimosa* (Grote, 1865)**

Not recorded by Jordan (1940) or Askew (1980).

New records

#### **Grand Cayman**

2 21.iii.2002 at North Sound Estates (Joan Steer, DAGC)

16.v.2014 Valley Gardens 06:00, east side (Rose-Smyth, P)

20.ii.2016 North Side, northern end of Mastic Trail, found dead (Stuart Mailer, MCR)

20.i.2017 Valley Gardens 06:00, west side (Rose-Smyth, P, MCR)

5, 27.i.2017 at Valley Gardens 20:30-22:00, during new moon, many moths and bats at flowering silk cotton tree (*Ceiba pentandra*); uv light under mango 10 meters from the cotton tree (Rose-Smyth, P, MCR) Fig. 2.

3, 28.i.2017 at Valley Gardens 20:30-21:30, as above (Rose-Smyth, P, MCR)

29.i.2017 Valley Gardens 20:30-21:30, as above (P, Rose-Smyth, MCR)

24.vi.2017 Colliers (SGR)

27.vi.2017 East End, Compass Point (SGR)

17.viii.2018 Valley Gardens 20:50, west side (Rose-Smyth, P)

05.ix.2018 Valley Gardens 04:40, west side (Rose-Smyth, P, MCR)

11.ii.2021 George Town, Leguinea Circle, larva on *Plumeria* cultivar (Coote, P)

#### ***Erinnyis alope alope* (Drury, 1773)**

Jordan (1940) **Cayman Brac** 1♂1♀ 18.v.1938, 1♀ 26.v.1938 Stakes Bay at female flowers of paw-paw [*Carica papaya* L.] at dusk.

Later records

#### **Grand Cayman**

pre-2004 2 without data (NTCI)

2008 without locality (DEGC)

12.v.2010 North Side, Mastic Trail 10:37, larva, food plant not identified (Stuart Mailer, P)

04.i.2015 George Town larva, pupated and eclosed on 23.i.2015 (Jonathan Bodden, P)



05.i.2017 Valley Gardens 18:18, at ornamental white *Ixora* L. (Christine Rose-Smyth, P)  
 2017 Valley Gardens (Rose-Smyth, MCR)  
 26.vi.2017 Colliers (SGR)

### ***Erinnyis ello ello* (Linnaeus, 1758)**

Jordan (1940) **Grand Cayman** 2♀♀ 15 & 17.vii.1938 Hut Road, 1♀ Georgetown. **Cayman Brac** 26.v.1938 Stakes Bay, on male flowers of paw-paw [*Carica papaya*]. Askew (1980). **Little Cayman** 10–30.vii.1975 Pirates Point, 5 at mv light plus 2♀♀ reared from larvae on *Conocarpus erectus* L. (Combretaceae), 1 pupated 20.vii emerged 3.viii.1975 and 1 pupated 23.vii emerged 6.viii.1975 (RRA); 28.vii.1975 central forest south of Sparrowhawk Hill at mv light.

Later records

#### **Grand Cayman**

2, 5 & 9.viii.1968 George Town (Wayne Klopp, MPM)  
 1985 1♀ George Town mv light trap (RRA) (Askew 1994)  
 1997 North Side (NTCI)  
 19.i.2010 1♀ George Town, Mary Street (Rose-Smyth)  
 24.i.2010 1♂ Valley Gardens 19:30, flew into house (Rose-Smyth, P)  
 01.vi.2017 1♀ Valley Gardens 21:24 (Rose-Smyth, P, MCR)  
 24.vi.2017 Colliers (SGR)

#### **Little Cayman**

21.vi.2017 Coppice Rd., east (SGR)

The Little Cayman record of rearing on *Conocarpus erectus* (buttonwood) is one of two such reports, the other in Brevard County Florida (Oehlke 2022a).

### ***Erinnyis oenotrus* (Cramer, 1780)**

Jordan (1940) **Grand Cayman** 1♂ 19.vi.1938 South Sound in light trap.

Later records

#### **Grand Cayman**

19.ii.1992 1♀ George Town (Askew, NTCI)  
 18.ii.1993 1♂ 1.5km south of Hutland, black light in forest (W.E. Steiner, J.W. Swearingen & F.J. Burton, NTCI)  
 ii.1998 wings at *Macrotus waterhousii* (big-eared bat) roost (NTCI)  
 1♀, 8.ii.2008 1♀ Old Man Bay (RRA)  
 05.ix.2009 Valley Gardens 18:52, nectaring at white ornamental *Ixora* (Rose-Smyth, P)  
 12.iii.2011 2 unsexed Valley Gardens (Rose-Smyth, P)  
 14.xii.2012 Valley Gardens (P, Rose-Smyth)  
 10.ii.2014 Valley Gardens 07:27, on east wall (Rose-Smyth, P)  
 i.2017 1♂ Valley Gardens (Rose-Smyth, MCR)  
 24.vi.2017 Colliers (SGR)  
 27.vi.2017 East End, Compass Point (SGR)  
 14.ii.2018 Valley Gardens 20:47, at uv light, on west wall (Rose-Smyth, P)  
 23.ii.2018 Valley Gardens 22:40, at uv light, on west wall (Rose-Smyth, P)  
 02.vii.2018 Valley Gardens 07:30, in covered shadehouse, on orchid slab (Rose-Smyth, P)

#### **Little Cayman**

21.vi.2017 Coppice Rd., east (SGR)  
 22.vi.2017 Stone Wall Rd. (SGR)

### ***Erinnyis obscura obscura* (Fabricius, 1775)**

Jordan (1940) **Grand Cayman** 1♂ 06.v.1938 North Sound Booby Bay (sic) in light trap, 1♂ 01.vii.1938 East End in light trap, 1♀ 1938 Georgetown.

## Later records

**Grand Cayman**

14.viii.1968 George Town (Wayne Klopp, MPM)

27.i.2017 Valley Gardens 20:30-22:00, during new moon, many moths and bats at flowering silk cotton tree (*Ceiba pentandra*); uv light under mango 10 meters from the cotton tree (Rose-Smyth, MCR) Fig. 3.

26.vi.2017 Colliers (SGR)

**Little Cayman**

22.vi.2017 Stone Wall Rd. (SGR)

***Phryxus caicus* (Cramer, 1777)**

Not recorded by Jordan (1940) or Askew (1980).

## New records

**Grand Cayman**

iii.1990 North Side (Mrs Stevens, NTCI)

21.ii.1993 2.3 km west of Colliers at black light in cut-over forest near ponds (W.E. Steiner & J.W. Swearingen, NTCI)

xi.1994 unlocalised (Peter Davey, NTCI)

ii.1998 in *Macrotus waterhousii* roost (NTCI)

05.ix.2009 Valley Gardens 18:50 dusk, single individual nectaring at cultivated white *Ixora* at same time as *Erinnyis oenotrus* (Rose-Smyth, P)

24.viii.2015 Valley Gardens 21:00-21:49, uv light (Rose-Smyth, P), Fig. 4.

27.i.2017 Valley Gardens 20:30-22:00, during new moon, many moths and bats at flowering silk cotton tree (*Ceiba pentandra*); uv light under mango 10 meters from the cotton tree (Rose-Smyth, P, MCR)

27.vi.2017 East End, Compass Point (SGR)

29.xii.2019 North Side (iNaturalist 37207669, P)

19.i.2020 East End, Compass Point, 18:00 (Ian Mailer, P)

**Cayman Brac**

30.viii.2013 nectaring at *Tecoma stans* (Alan Markoff, P)

**Little Cayman**

24.vi.2017 Pirates Point (SGR)

***Pachylia ficus* (Linnaeus, 1758)**

Not recorded by Jordan (1940) or Askew (1980).

## Prior record

**Grand Cayman** specimens in the Natural History Museum London, accessioned 1911, collected by T.M. Savage English (Askew 1994). These specimens were probably collected in George Town (Savage English 1916).

## Later records

**Grand Cayman**

viii.1968 George Town (Wayne Klopp, MPM)

29.vi.1970 unlocalised (F.D. Bennett, UWIZM)

vii.1982 1♂ George Town (D.R. Askew, RRA)

1985 1♂ George Town MRCU light trap (RRA)

Pre-1989 unlocalised (Richard Ground, P) (Ground 1989, p. 15)

vii.1992 1♂ George Town (Askew, RRA)

28.i.2005 George Town sunset, nectaring flowers of *Tecoma stans* (shamrock) (Stafford, P)

30.vi.2005 unlocalised, reared on fig (S. Frederick, DAGC)

11.ii.2006 Mastic Trail south end at rest on tree trunk (Askew)

26.viii.2007 George Town (Stafford)

15.i.2008 Bodden Town at rest in porch (Askew)

- 25.ii.2009 Lower Valley at rest in Agricultural Pavilion (Askew)  
 7.iii.2009 Bodden Town at rest in porch (Askew)  
 19.vii.2011 Valley Gardens 20:15, on porch wall, examined and released (Rose-Smyth)  
 27.viii.2011 Agriculture Grounds 08:42 larvae on *Maclura tinctoria* (L.) D. Don ex Steud (fustic tree) (Rose-Smyth, P)  
 19.xii.2011 George Town, Mary St., early evening, larva on undercroft pillar of office building (Rose-Smyth)  
 10.i.2012 Valley Gardens 18:25 at ornamental *Ixora* dusk (Rose-Smyth, P)  
 29.xii.2012 Agriculture Grounds 11:59, larva being eaten by *Coccyzus minor* Gmelin (Cuculidae) (mangrove cuckoo) (Yves-Jacques Rey-Millet, P) Fig. 5.  
 23.ii.2013 Valley Gardens 7:02, in flowering *Broughtonia* R. Br. hybrid orchid, shifted to nearby stems when watered and remained all day, departure at dusk not observed (Rose-Smyth, P)  
 9.iii.2013 George Town emerged from pupa found 22.ii.2013 at base of *M. tinctoria* (Stafford)  
 28.vi.2015 1♀ Valley Gardens 22:10, on porch wall (Rose-Smyth, P).  
 09.viii.2015 1♀ Valley Gardens dusk, at yellow *Allamanda* spp (Rose-Smyth)  
 24.viii.2015 1♀ Valley Gardens 18:57-21:46 at wet *Ixora* and at uv light (Rose-Smyth, P)  
 16.iii.2016 1♀ Valley Gardens 8:15, ragged margins forewing (Rose-Smyth, P)  
 08.iv.2016 1♀ Valley Gardens 07:17, in west orchid house, worn individual hanging on cultivated orchid (Rose-Smyth, P)  
 16.iv.2016 Valley Gardens 8:00 in orchid house, fresh bright individual hanging on same plant as the prior (Rose-Smyth, P)  
 01 & 02.i.2017 Valley Gardens, dusk, at white *Ixora* (Rose-Smyth)  
 23.i.2017 Valley Gardens 20:50, on wall (Rose-Smyth, P)  
 17.vi.2017 Valley Gardens 19:03, at white *Ixora* (Rose-Smyth, P)  
 25.vi.2017 Colliers (SGR) 11:00 appearing to be searching for oviposition sites.  
 10.ii.2018 1♀ Valley Gardens 19:59, on wall (Rose-Smyth, P)  
 13.ii.2018 Valley Gardens 21:26, at uv light; worn forewing (Rose-Smyth, P)  
 15.ii.2018 1♀ Valley Gardens 20:00, at uv light (Rose-Smyth, MCR).  
 01.iv.2018 Valley Gardens 19:27, uv light, left forewing tip torn (Rose-Smyth, P)  
 05.iv.2018 1♂ Valley Gardens 21:46, at uv light (Rose-Smyth, P, MCR) Fig. 6.  
 07.v.2018 2 Valley Gardens 21:09, at uv light (Rose-Smyth, P)

### ***Madoryx pseudothyreus* (Grote, 1865)**

Askew (1980) **Little Cayman** 4 unsexed 10–30.vii.1975 Pirates Point in mv light trap (present location unknown), 1♂ 28.vii.1975 central forest south of Sparrowhawk Hill in mv light trap (RRA).

Later records

None found.

The five specimens of *M. pseudothyreus* collected by Askew (1980) in Little Cayman remain the only known examples of the species in the Cayman Islands. The species is of limited distribution in Cuba, South Florida and nearby islands (Tuttle 2007) and recently confirmed to comprise three allopatric subspecies: *pseudothyreus*, *floridensis*, and *bahamensis* (Melichar and Řezáč 2013). With only one individual now remaining available for comparison it is not possible to assign a subspecies designation to the Little Cayman specimen. The larval food plant is, unusually for the genus, *Avicennia germinans* (black mangrove), and the larvae pupate in cocoons attached to branches of the host plant above the salt water in which they grow (Minno and Emmel 1990). Careful searching for larvae might result in this species being recorded from Grand Cayman. The larval food plant does not occur in Cayman Brac (Proctor 2012).

### ***Aellopos tantalus zonata* (Drury, 1773)**

Jordan (1940) **Grand Cayman** attributed to *Sesia tantalus zonata* (Drury 1773), 1♀ 10.vii.1938 Hut Road. Askew (1980) **Little Cayman** 2 28.vii.1975 central forest south of Sparrowhawk Hill flying at dusk of which 1♂ in collection (RRA).

## Later records

**Grand Cayman**

- 13.viii.1968 George Town, specimen of *Aellopos*, identified to genus only, Wayne Klopp (MPM)  
 summer 1997 Newlands (F.J. Burton, NTCI)  
 27.xi.2004 George Town nectaring at *Bauhinia divaricata* L. (bull-hoof) (Stafford)  
 13.xii.2004 at cultivated *Vitex agnus-castus* L. (Carla Reid, P)  
 31.i.2006 High Rock (RRA)  
 8.ii.2006 Botanic Park (Askew)  
 14.vi.2008 Lords Way, Prospect, George Town (Tracy Galvin, DEGC)  
 23.ii.2009 Bodden Town (Askew)  
 22.xii.2010 Valley Gardens 07:00, at white *Ixora* (Rose-Smyth)  
 02.vii.2011 Valley Gardens 07:00, trapped in orchid gazebo, captured, inspected and released, the same or another individual seen in afternoon (Rose-Smyth)  
 10.vii.2011 North Side, Mastic Trail 10:07 (Stuart Mailer, P)  
 26.viii.2011 Valley Gardens, in orchid gazebo, flew into adjacent cultivated pink *Bouganvillea* Comm. ex Juss. (Rose-Smyth)  
 28.xi.2011 at cultivated red *Ixora* (Michael Austin, P)  
 07.i.2012 Valley Gardens (Rose-Smyth) 07:00–7:30, nectaring on pink *Bouganvillea* (Rose-Smyth)  
 23 & 24.ii.2013 Valley Gardens, early morning each time, in west shrubs and white *Ixora* (Rose-Smyth)  
 07.i.2015 Valley Gardens, morning (Rose-Smyth)  
 28.vi.2015 Lower Valley, Lottery Rd. (Rose-Smyth, MCR)  
 5.xi.2015 Colliers Wilderness Road at yellow Asteraceae flowers (Askew)  
 26.vi.2017 Colliers (SGR)  
 25.iii.2018 Valley Gardens 18:00, released from ceiling of orchid gazebo (Rose-Smyth)  
 06.vi.2018 Lower Valley, Lottery Rd. (near Agricultural Grounds) 16:30–17:30 in mixed secondary growth (Rose-Smyth)  
 03.ix.2019 Lower Valley, Lottery Rd. (near Agricultural Grounds) 09:05 nectaring at *Croton linearis* Jacq. (Rosemary) (Rose-Smyth)

**Little Cayman**

- 2008 Nature Trail (Frank Roulstone III)  
 ii.2009 nectaring at *Suriana maritima* L. (jennifer/bay cedar) flowers (Frank Roulstone III)  
 21.vi.2017 Coppice Rd., east (SGR)

***Enyo lugubris lugubris* (Linnaeus, 1771)**

Not recorded by Jordan (1940) or Askew (1980)

## New records

**Grand Cayman**

- 5, 3–16.viii.1968 George Town (Wayne Klopp, MPM)  
 21.ii.1993 3km west of Colliers at black light (W.E. Steiner & J.W. Swearingen, NTCI)  
 1.xii.1994 Prospect, Ocean Club, indoors (Peter Davey, NTCI)  
 2.i.2008 no locality (DE)  
 18.xii.2009 Queen Elizabeth II Botanic Park (Kristan Godbeer, DEGC)  
 2017 1♂1♀ Valley Gardens (Rose-Smyth)  
 16.xii.2012 Valley Gardens, worn (Rose-Smyth, P)  
 26.xii.2012 Valley Gardens, fresh (Rose-Smyth, P)  
 06.vii.2015 Valley Gardens 21:11, fresh, on wall (Rose-Smyth, P)  
 05.viii.2015 Valley Gardens 20:18, fresh, at uv light (Rose-Smyth, P)  
 13.ix.2015 Valley Gardens 20:28 fresh, at uv light (Rose-Smyth, P)  
 10.v.2016 Valley Gardens 04:03, fresh, on wall (Rose-Smyth, P)  
 09.i.2017 Valley Gardens 18:54, fresh, on porch ceiling (Rose-Smyth, P)  
 13.i.2017 Valley Gardens 19:35, at uv light, worn (Rose-Smyth, P)

- 22.i.2017 Valley Gardens 20:02, at uv light, some wear (Rose-Smyth, P)  
 27.i.2017 Valley Gardens 20:42, at uv light, fresh (Rose-Smyth, P)  
 26.vi.2017 Colliers (SGR)  
 11.ii.2018 Valley Gardens 20:21, at uv light, fresh (Rose-Smyth, P)  
 13.ii.2018 3 Valley Gardens 19:56-21:36, at uv light (Rose-Smyth, P) Fig. 7.  
 14.ii.2018 Valley Gardens 20:41, on wall in porch; fresh (Rose-Smyth, P)  
 15.ii.2018 Valley Gardens 21:21, at uv light, on floor of porch, fresh (Rose-Smyth, P)  
 23.ii.2018 Valley Gardens 22:25, at uv light, on wall of porch, fresh (Rose-Smyth, P)  
 01.vi.2018 Valley Gardens 21:42, at uv light, fresh (Rose-Smyth, P)

### ***Cautethia grotei apira* (Jordan, 1940)**

Jordan (1940) **Grand Cayman** described as a new subspecies *C. g. apira* Jordan: syntypes: 1♂ 19.iv.1938 west end of Georgetown, 1♂ 17.vii.1938 West Bay, both collected in light trap.

Later records

#### **Grand Cayman**

- 24.ix.1991 South Sound (NTCI)  
 26.vi.2017 Colliers (SGR)

### ***Cautethia grotei hilaris* (Jordan, 1940)**

Jordan (1940) **Cayman Brac** described as new subspecies *C. g. hilaris* Jordan: syntypes: 3♂♂ 23 & 24.v.1938 Bluff near east end of Spot Bay, 2♂♂ 24.v.1938 north coast, Earthquake Hole; 1♂ 28.v.1938 Stakes Bay, all in light traps. Askew (1980) attributed to *C. g. hilaris*, **Little Cayman** 5 individuals 10–30.vii.1975 Pirate's Point at mv light, 20 on 28.vii.1975 central forest south of Sparrowhawk Hill at mv light of which 1♂ in collection (RRA).

Later records

#### **Little Cayman**

- 3 22.vi.2017 Stone Wall Rd. (SGR)

Additional individuals of each subspecies, dating from the Oxford Expedition, are held at NHMUK (I.J. Kitching pers. comm. 2021) including specimens illustrated in the Sphingidae Taxonomic Inventory, as follows:

- C. g. apira* 1♂ 18.vi.1938, catalogue number BMNH(E)273058 (Kitching 2022b.)  
*C. g. hilaris* 1♂ 22.v.1938, behind Stakes Bay, catalogue number BMNH(E)273059 (Kitching 2022c).  
*Cautethia grotei* is the smallest of the Cayman Islands sphingids.

### ***Eumorpha vitis vitis* (Linnaeus, 1758)**

Jordan (1940) **Cayman Brac** attributed to *E. vitis vitis* 1♂ 2♀♀ 18.v.1938 and 1♀ 26.v.1938 Stakes Bay at ♂ paw-paw [*Carica papaya*] flowers, 1 21.v.1938 Stakes Bay in light trap, 4♀♀ 27.v.1938 at Court House light, 1♂ 24.v.1938 bluff near Spot Bay in light trap. Askew (1980) **Little Cayman** 5 10-30.vii.1975 Pirates Point at mv light of which 1♂ 18.vii.1975 (RRA)

Later records

#### **Grand Cayman**

- 12.v.2010 North Side, Mastic Trail 10:37 (Stuart Mailer, P) Fig. 8.

#### **Cayman Brac**

- 08.vii.2019 Arlin Reid Drive, north, late instar larva feeding on *Cissus verticillata* (James Vascik, P)

The Grand Cayman adult specimen is also attributable to *E. vitis vitis*.

***Eumorpha fasciatus fasciatus* (Sulzer, 1776)**

Jordan (1940) **Grand Cayman** 1♀ 1938 Georgetown west end.

Later records

**Grand Cayman**

10.ii.2018 Savannah 18:34 (Norma and Peter Davey, P), Fig. 9.

***Eumorpha labruscae* (Linnaeus, 1758)**

Jordan (1940) **Grand Cayman** 1♀ 6.viii.1938 Georgetown in light trap.

Later records

**Grand Cayman**

22.ii.1994 George Town, off Crewe Road, in porch of house (Penny Clifford, NTCI)

2.v.1996 North Side reared from larva on *Cissus trifoliata* pupated 14.iv.1996 (M. Van Liefde, NTCI with pupal case)

2, 2008 no locality (DEGC)

1.i.2008 no locality (Carla Reid)

14.i.2008 no locality (John Paruch, P)

6.ii.2008 Bodden Town, dead in porch (RRA)

8.ii.2008 Lower Valley, Agricultural Pavilion dead (Askew)

22.ii.2010 George Town, larva (Stafford)

25.xii.2011 Valley Gardens 20:43, west porch (Rose-Smyth, P)

05.i.2012 Valley Gardens 22:20, west porch (Rose-Smyth, P)

09.ii.2012 Valley Gardens 22:00, west porch (Rose-Smyth, P)

13.vii.2015 Valley Gardens 01:45, west porch on wall (Rose-Smyth, P)

06.ii.2017 Valley Gardens 06:10, west porch, at uv light (Christine Rose-Smyth, P)

26.vi.2017 Colliers (SGR)

13.i.2019 Valley Gardens 20:34, west porch, at uv light (Christine Rose-Smyth, P)

***Eumorpha satellitia posticatus* (Grote, 1865)**

Not recorded by Jordan (1940) or Askew (1980).

New record

**Grand Cayman**

26.vi.2017 Colliers (SGR) Fig. 10.

**Tribe Macroglossini Harris, 1839*****Xylophanes pluto* (Fabricius, 1777)**

Jordan (1940) **Grand Cayman** 3♀♀ 17.iv, 12.vi & 14.vi.1938 Georgetown in light trap.

Later records

**Grand Cayman**

4, 4–14.viii.1968 George Town (Wayne Klopp, MPM)

01.vii.1970 unlocalised (F.D. Bennett, UWIZM)

1♀, 1985 George Town light trap (Askew 1994) (RRA)

18.ii.1993 3♂♂ 1.5 km south of Hutland in forest near mangroves at black light (W.E. Steiner, J.W. Swearingen & F.J. Burton, NTCI)

ii.1998 1♀ North Side reared from larva (M. Van Liefde, NTCI)

4.vii.2007 George Town, Mosquito Research Control Unit airport hangar (DEGC)

31.i.2014 QEIIBP 11:53, nursery potting shed (Rose-Smyth, P)

05.vi.2015 Valley Gardens, inside house (Rose-Smyth)

18.vii.2015 Valley Gardens 20:28 (Rose-Smyth, P)

- 24.viii.2015 Valley Gardens 21:05 (Rose-Smyth, P)  
 08.v.2016 Lower Valley, Lottery Rd. (near Agricultural Grounds) (Rose-Smyth & V.R. Block, MCR)  
 28.iii.2017 Valley Gardens 19:54, at uv light (Rose-Smyth, P)  
 23.iv.2017 2 Valley Gardens 19:57 & 21:36, at uv light (Rose-Smyth, P)  
 26.vi.2017 Colliers (SGR)  
 11.ii.2018 2 Valley Gardens 9:10-20:23, at uv light (Rose-Smyth, P, MCR)  
 12.ii.2018 Valley Gardens 20:00, at uv light (Rose-Smyth, P, MCR)  
 2, 13.ii.2018 Valley Gardens 19:55-20:06, at uv light (Rose-Smyth, P, MCR)  
 2, 14.ii.2018. Valley Gardens 19:57-20:31, at uv light (Rose-Smyth, P)  
 15.ii.2018 Valley Gardens 21:16, at uv light, worn (Rose-Smyth, P)  
 21.ii.2018 Valley Gardens 21:15, at uv light (Rose-Smyth, P)  
 24.iii.2018 Valley Gardens 19:57-20:31, at uv light (Rose-Smyth, P)  
 01.iv.2018 4 Valley Gardens 19:37, at uv light (Rose-Smyth, P)  
 06.iv.2018 Valley Gardens 22:10, at uv light (Rose-Smyth, P)  
 07.v.2018 Valley Gardens 21:12, at uv light (Rose-Smyth, P)  
 12.v.2018 2 Valley Gardens 19:56, at uv light, one fresh, one very worn (Rose-Smyth, P)  
 14.v.2018 Valley Gardens 21:26, at uv light, very worn (Rose-Smyth, P)  
 09.xii.2018 Valley Gardens 19:25, at uv light (Rose-Smyth, P)  
 30.i.2019 2 Valley Gardens 20:10, at incandescent light, fresh (Rose-Smyth, P).

#### Little Cayman

- 21.vi.2017 2008 Coppice Rd., east (SGR)

Adult *X. pluto* appear as two colour variants in Grand Cayman, one greenish and the other a golden brown. Of specimens observed at Valley Gardens, 17 were recorded as being of the green form and 10 as of the golden form. The difference occurs in both fresh and worn specimens. No temporal pattern in occurrence of these two forms was noted. D'Abbrera (1986) mentions the existence of two colour forms of the larvae.

#### *Xylophanes tersa* (Drury, 1770)

Jordan (1940) **Little Cayman** 2♂♂ 30.v.1938, 4♂♂ 31.v.1938, 3♂♂ 2.vi.1938 & 1♂ 3.vi.1938 all east coast at South Town in light trap. Askew (1980) **Little Cayman** 19 10-30.vii.1975 Pirates Point of which 1, 16.vii.1975 (Askew, NTCI, Fig. 11), 1♀ 10.vii and 1♀ 12.vii.1975 at house light (RRA), 1♂ 14.vii.1975, 1♂ 17.vii.1975 and 1♂ 30.vii.1975 at mv light (RRA), 1 16.vii.1975 central forest south of Sparrowhawk Hill in mv light trap (Askew, NTCI).

Later records

#### Grand Cayman

- 21.ii.1993 3 km west of Colliers at black light (W.E. Steiner & J.W. Swearingen, NTCI)  
 5.ii.2006 Bodden Town (RRA)  
 26.vi.2017 Colliers (SGR)

#### Little Cayman

- 21.vi.2017 Coppice Rd., east (SGR)

#### *Hyles lineata* (Fabricius, 1775)

Jordan (1940) **Cayman Brac** 1♂ 20.v.1938 West End, Cotton-tree Land in light trap; **Little Cayman** 1♀ 5.vi.1938 East end, 1♀ 8.vi.1938 south coast, South Town in light trap. Askew (1980) **Little Cayman** 1♂ 24.vii.1975 Pirates Point in mv light trap (RRA)

Later records

- 1 without data (DAGC)

