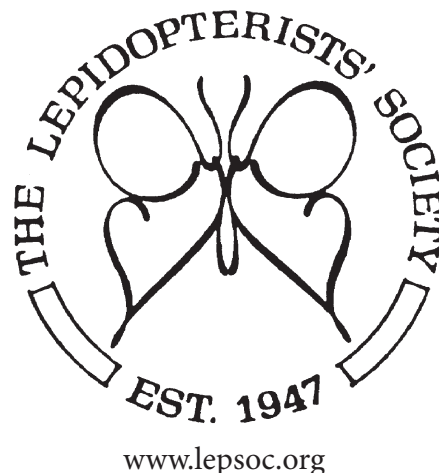


NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 61, Number 1

Spring 2019



Inside:

***Plume moths from
Guantanamo Bay, Cuba***

***Protambulyx strigilis --
new county and host
records in Florida***

***New host plant record
for Celastrina neglecta
in Florida, and thoughts
on Florida Celastrina***

Ecuadorian butterflies

***Conservation of British
butterflies***

***Magnificent color pattern
in the Taiwanese ghost
moth Endoclyta atayala***

***Election Results,
Marketplace,
Announcements,
Metamorphosis,
Membership Updates***

... and more!



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The Lepidopterists' Society is a non-profit educational and scientific organization. The object of the Society, which was formed in May 1947 and formally constituted in December 1950, is "to promote internationally the science of lepidopterology in all its branches; to further the scientifically sound and progressive study of Lepidoptera, to issue periodicals and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to compile and distribute information to other organizations and individuals for purposes of education and conservation and appreciation of Lepidoptera; and to secure cooperation in all measures" directed towards these aims. (Article II, Constitution of The Lepidopterists' Society.)

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Contents

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Conservation Matters – Conserving British butterflies: progress against the odds <i>Martin Warren.</i>	3
New host plant record for <i>Celastrina neglecta</i> (W. H. Edwards) (Lepidoptera: Lycaenidae: Polyommatainae) in Okaloosa County, Florida <i>Mary Ann Friedman, David M. Wright and Marc C. Minno.</i>	6
A strange <i>Colias</i> (Pieridae) among John Abbot's illustrations of Georgia Lepidoptera <i>John V. Calhoun.</i>	8
Announcements:	12
Southern Lep Soc; Soc of Kentucky Leps; Assoc for Tropical Leps; The 2017 Season Summary; Pay Pal; Lep Soc statement on diversity inclusion, harrassment, and safety; New MONA fascicles coming; Eagle Hill field seminars; The Lep Course (Arizona)	
Plume moths recorded from the United States naval base, Guantanamo Bay, Cuba <i>Deborah L. Matthews, Terry A. Lott, Jacqueline Y. Milller, James K. Toomey and Roger W. Portell.</i>	14
2019 Lepidopterists' Society Election Results.	19
Sphingidae of the United States – a new informational website <i>Teá Kesting-Handly and Stephen Kloiber.</i>	20
2019 Lepidopterists' Society Annual Meeting announcement.	23
Magnificent color pattern of <i>Endoclita atayala</i> Buchsbaum and Hsu 2018 (Lepidoptera: Hepialidae) from Taiwan <i>John R. Grehan, Yu-Chen Yang and Ulf Buchsbaum.</i>	24
New thoughts on <i>Celastrina</i> in Florida <i>David M. Wright, Mary Ann Friedman, Marc C. Minno, John V. Calhoun, Harry Pavulaan and James L. Monroe.</i>	26
Tom Emmel remembered <i>Gary Noel Ross.</i>	30
The Marketplace.	34
New host and county records, with a breeding range extension for <i>Protambulyx strigilis</i> (Lepidoptera: Sphingidae) <i>Teá Kesting-Handly and Stephen Kloiber.</i>	38
Digital Collecting – Ecuador: Eastern slope to Amazonas <i>Bill Berthet.</i>	44
Metamorphosis <i>Chris Grinter.</i>	52
Membership Updates. <i>Chris Grinter.</i>	53
Membership, Dues Rates, Change of Address, Mailing List, Missed or Defective Issues, Submission Guidelines and Deadlines.	50
Executive Council/Season Summary Zone Coordinators.	51
Issue Date: February 8, 2019	
ISSN 0091-1348	
Editor: James K. Adams	

Front Cover:

African Peach Moth (*Egybolis vaillantina*), 25 October, 2018, 11:33am, 29°31'15.03"S 31°13'29.73"E, Ocean Drive, Salt Rock, Ballito, Kwazulu Natal, South Africa, photo by Andréa Myburgh

Conservation Matters: Contributions from the Conservation Committee

Conserving British butterflies: progress against the odds

Martin Warren

martinswarren@btinternet.com

Britain has a relatively limited butterfly fauna, being isolated from mainland Europe for millennia, but we are fortunate that this small group of insects have attracted the attention of naturalists since the 17th century. Thanks to their painstaking efforts, and more recent ecological studies, our butterflies are probably the best studied in the world. During the 1960s, effort switched from collecting to conservation, galvanised by the formation of the charity Butterfly Conservation. Formed originally as the British Butterfly Conservation Society in 1968, its founders were strongly influenced by the publication in 1963 of *Silent Spring* by Rachel Carson. Having seen the dreadful destruction of wildlife caused by DDT and other chemicals, the founders believed that something should be done about the drastic decline of butterflies and moths in the UK. Following a stint with the UK government conservation agency, I had the privilege of working for Butterfly Conservation for 23 years, and have seen first-hand the problems and the immense amount of effort being made to conserve them. I hope to do them justice in this short account.

If we include a few regular migrants, Britain is currently blessed with just 60 species of butterfly. Before the industrial and agricultural revolutions, many species were widespread across our landscape, living in flower-rich meadows and pastures, hedgerows, heaths and woodlands. These habitats were all created or modified by humans, but before the 20th century such activities actually helped most species to thrive by creating open sunny habitats, full of wild flowers. It may also have influenced the type of species that could survive the extensive habitat modifications. But during the last 100 years, many grasslands were ploughed up, field fertilised and sprayed with herbicide, while woodlands were either abandoned or planted with non-native conifer species. These changes had devastating effects on wildlife but especially butterflies. Because of their short life cycles, and reliance on specific food-plants, they were especially sensitive to change. And change they did.

Our knowledge of the status of butterflies comes from two main sources: the Butterflies for the New Millennium distribution scheme, which has gathered over 10 million records of butterflies going back to the 1780s; and the UK Butterfly Monitoring Scheme, which has gathered data on butterfly abundance since 1976. Details on the history of these schemes can be found in *The Millennium Atlas of Butterflies of Britain and Ireland* by Jim Asher et al., 2001. Since then, we have produced updates on the sta-

tus of UK Butterflies every five years to put together a detailed picture of how our butterfly fauna is changing (the five-year reports can be downloaded from the BC website <https://butterfly-conservation.org/sites/default/files/soukb-2015.pdf>).

The first cause for concern is that five resident species have become extinct in Britain over the last 150 years: The Large Copper (*Lycaena dispar*; Fig. 1) in the 1860s, the Mazarine Blue (*Polyommatus semiargus*) in 1905, Black-veined White (*Aporia crataegi*) in the 1920s, Large Tortoiseshell (*Nymphalis polychloros*) in the 1980s, and the Large Blue (*Maculinea arion*; Fig. 2) in 1979. Even



Fig. 1. The Large Copper (*Lycaena dispar*) was the first documented butterfly extinction in Britain. It breeds in damp fenland habitats and declined due to the drainage of the fens during the 18th and early 19th centuries, finally becoming extinct in the 1860s.



Fig. 2. The Large Blue (*Maculinea arion*) is an icon of successful conservation having been restored to over 30 sites since its extinction in 1979.



Fig. 3. The High Brown Fritillary (*Argynnis adippe*) is Britain's most endangered butterfly, having declined in range by over 96%.

worse, of the remaining species, over 70% are declining and 45% are officially categorised as threatened, based on either their rarity or rapid rate of decline. Some declines are truly shocking: the High Brown Fritillary (*Argynnis adippe*; Fig. 3), which was once widespread across southern Britain, has declined in distribution by over 96%. It is now our most endangered species. Against this backdrop of decline, around 15 species are spreading, almost certainly the result of climate change. Some are moving incredibly quickly, such as the Comma (*Polygonia c-album*) which is heading north at 10km per year. It is a complex picture and we even have species like the White Admiral (*Ladoga camilla*) that are expanding their range while declining in numbers in existing areas!

To help explain what is going on, we divide butterflies into Habitat Specialists and Wider Countryside Species. The former are restricted to specific semi-natural habitats and tend to live in discrete colonies, while the latter breed around the countryside and tend to be more mobile. Of course, nature is more complex than that and the reality is a spectrum with each species occurring somewhere along it, but it has been a useful construct to help understand the changes as well as design protected areas and recovery plans.

By and large, the Habitat Specialists have fared worse, with a shocking 77% decline in overall numbers since 1976 (Fig. 4a). The explanations are relatively easy to see. The UK has experienced a massive loss of butterfly habitats, with flower-rich meadows down by 97% since the 1940s, fenland down by 90%, chalk and limestone grassland down by 80%, and native woodland down by 50%. Fortunately, many remaining areas of habitat have been protected and managed as either nature reserves or statutory Sites of Special Scientific Interest. Sadly, many of them are quite small and scattered around the countryside, which brings us to another problem, namely habitat fragmentation. To give an idea of the seriousness of the problem, we can look at data for damp grassland, habitat of the threatened

Marsh Fritillary (*Euphydryas aurinia*). In a survey in the 1980s, we found that almost half of known colonies occurred in habitats that were less than 2ha in size, and over 80% were in habitats less than 10ha. Given that we think that the species needs around 70ha to survive in the long term, you can see the problem.

Numerous studies have shown that small and isolated populations do not survive well, even if the habitat is suitable. Stochastic processes cause populations to fluctuate and, in their low points, small populations can easily become extirpated. Others may suffer from inbreeding depression. In the case of the Marsh Fritillary, it has a specific parasite that can cause over 99% mortality in the larvae, causing huge fluctuations in numbers from year to year. Small colonies rarely survive for long and rely on recolonization from nearby colonies. So in the UK, most of these habitat specialists usually survive as metapopulations, that is a population of neighbouring populations within which there is some movement, local extinctions, and natural recolonisations. So a lot of our focus has been on conserving these butterflies at a landscape scale, trying to expand each population as far as possible and reconnecting them by improving intervening habitat.

The other major problem facing specialist butterflies is changing habitat management. As mentioned earlier, most have survived for millennia under traditional farming and forestry and rely on specific types of management. In grasslands, grazing is critical to the survival of most species. Too much grazing is often bad, but too little or no grazing is disastrous in the long term as flower-rich grassland changes to rank grassland and then to scrub and woodland. Abandonment of grassland is a big problem, especially in parts of Britain where grasslands are too small to make livestock grazing economic. But getting the appropriate grazing (stocking density) is also a problem as some butterflies are very particular about the type of sward in which they breed. In the case of the Marsh Fritillary, females tend to lay their eggs on larger host-plants of Devil's-bit Scabious (*Succissa pratensis*) and thus lay into swards of intermediate height, typically 8-20cm tall. Other species need shorter swards and heavier grazing, while others need tall swards and even lighter grazing. In most regions, we do not have the luxury of large areas where we could create a mosaic of habitats, so getting the balance right on small nature reserves is a tricky balancing act.

In woodlands, many species formerly benefited from the widespread tradition of coppicing, whereby patches of trees were cut down on a regular cycle and the subsequent regrowth used to produce a crop of small poles for building houses and weaving fences. During the 20th century, this practice virtually ceased, leading to a rapid decline in woodland butterflies, notably the fritillaries. Many of these are our now our most highly threatened butterflies, including the High Brown, Pearl-bordered (*Boloria euphrosyne*) and Small Pearl-bordered Fritillaries (*Boloria*

sylene). Many woods were also converted to fast growing, non-native conifer plantations, which also had a devastating impact.

Wider Countryside species were less affected by these habitat losses, as they continued to breed in hedgerows, road verges, field margins, and even domestic gardens. They fared relatively well during the 1970s and 80s, but then something curious happened, they started declining quite rapidly during the 1990s and 2000s. Their overall decline over the last 42 years has been 46% (Fig. 4b). The causes are not well known and could be more intensive hedge and verge management, eutrophication, increased pesticide use, or as yet unidentified stressor. Fingers have been pointed to neonicotinoid pesticides, which were introduced in the 1990s and are linked to declines in wild bees. However, the evidence so far is circumstantial and it is an active area for research.

Butterfly Conservation in Britain has a huge uphill struggle to counter these threats and reverse the decline

of butterflies. It has four main tactics. Firstly, we are trying to increase our research capacity and collaborations with universities to pinpoint some of the underlying problems and solutions. Secondly, we are working with other conservation bodies to try to improve landuse policies for wildlife. Improved urban and countryside planning, and better road verge management can help, but the biggest issues revolve around agricultural policy. Currently, subsidies are paid to farmers for growing food and relatively little is paid for sympathetic wildlife management. The latest scheme to promote biodiversity and the environment in England is called Countryside Stewardship, with counterparts in other UK countries, Scotland, Wales, and Northern Ireland. We have worked to improve these schemes, which pay farmers in a specific way to help wildlife, such as arranging the right grazing regime for rare butterflies. Our advisers train and enthuse the farmers and then help them apply for grants.

Thirdly, we are targeting efforts in specific landscapes where threatened butterflies and moths live, and where

they stand the best chances of long-term survival. So far 76 areas have been identified and we have successfully raised funds for several project officers to work with local landowners to help improve habitat quality and connectivity on a landscape level. The results have been very promising and our monitoring shows that several species are increasing after decades of decline. For example, the Duke of Burgundy (*Hamearis lucina*) was on the brink of extinction in many regions but has responded well to habitat restoration and its UK population has increased significantly in recent decades. Other regional successes have been with the Pearl-bordered and Marsh Fritillaries, and Wood White (*Leptidea sinapis*). Our greatest success has been the restoration of the Large Blue. Thanks to the pioneering research of Jeremy Thomas we

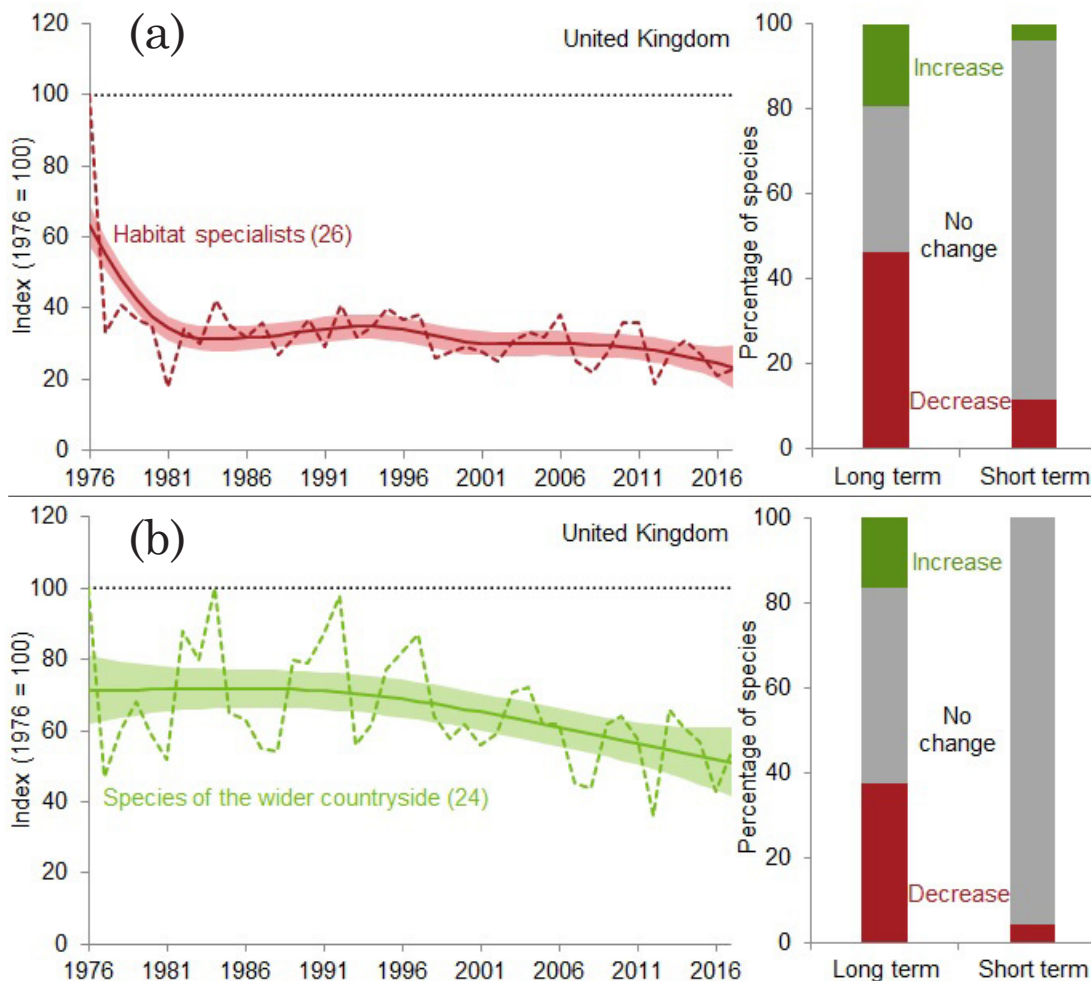


Fig. 4. Trends in butterfly abundance in the UK, from the UK butterfly monitoring scheme. Data are collected by volunteers from systematic weekly counts at over 1000 sites. Trends 1976 to 2017. (a) Habitat Specialists, decline 77%; and b) Wider Countryside Species, decline 46%. Source: Butterfly Conservation/Centre for Ecology and Hydrology <http://jncc.defra.gov.uk/page-4236>



Fig. 5. Sir David Attenborough promoting the Big Butterfly Count.

Fourthly, we are trying to raise awareness amongst the public through citizen science projects like the Big Butterfly Count. This is promoted each year by our President, Sir David Attenborough (Fig. 5), and has now become the biggest project of its kind on insects anywhere in the world. Since the scheme started in 2010, over a quarter of a million people have been involved and in 2018 alone over 90,000 people took part. This not only gives us a huge amount of publicity for the issues, but it also gathers invaluable data on the trends of some of our most widespread and familiar species.

Success breeds success and Butterfly Conservation has grown enormously in recent decades. It now has over 35,000 members, 80 staff, and a huge following on social media. We will need to maintain and increase their effort in the future if we are to conserve British butterflies, but we have made a good start.

know how to manage grasslands for the correct host ant of this myrmecophilous butterfly and have restored thriving populations on over 30 sites (see Fig. 2).

huge following on social media. We will need to maintain and increase their effort in the future if we are to conserve British butterflies, but we have made a good start.

New host plant record for *Celastrina neglecta* (W. H. Edwards) (Lepidoptera: Lycaenidae: Polyommatainae) in Okaloosa County, Florida

Mary Ann Friedman¹, David M. Wright² and Marc C. Minno³

¹1625 Oak Hills Dr., Colorado Springs, CO 80919

marsabones@hotmail.com

²100 Medical Campus Dr., Lansdale, PA 19446

david.wright@jefferson.edu

³600 NW 35th Terrace Gainesville, FL 32607, and Research Associate, McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, FL

marc.minno@gmail.com

Friedman (2016) recently provided an inventory of host preferences of *Celastrina neglecta* (W. H. Edwards) in the Panhandle Region of Florida. These included the floral buds of Laurel Cherry (*Prunus caroliniana*), Black Cherry (*Prunus serotina*), Devil's Walking Stick (*Aralia spinosa*), and Sourwood (*Oxydendrum arboreum*), as well as the exotic invasive mint, *Perilla frutescens*. In an earlier note, Harvey and Webb (1980) reported White Crownbeard (*Verbesina virginica*) as a host at Florida Caverns State Park in Jackson County. This report introduces another host for *C. neglecta* in the Panhandle Region.

On 11 April 2018, several *Celastrina* females were observed ovipositing repeatedly on the floral buds of Black Tupelo, *Nyssa sylvatica*, on private property in Okaloosa County, Florida (Figs. 1, 2). *N. sylvatica* is found in mesic woodlands throughout the Florida Panhandle (Wunderlin et al. 2018). It grows singly, rather than in communities like other *Nyssa* species (Nelson 1994), and becomes more

obvious when blossoming in May, and when its leaves turn red and speckled in the fall. The genus *Nyssa* is closely related to *Cornus*, a well-known host genus for *Celastrina* species throughout their range.

Celastrina neglecta females continued to oviposit on unopened floral buds of *Nyssa sylvatica* for several days and males were frequently observed in close proximity. Three eggs were collected on 11 April for rearing (Fig. 3). Two of the eggs hatched four days later on 15 April. The first instar larvae immediately began eating the unopened floral buds (Fig. 4.) Unfortunately, the third egg was lost while separating the buds out of concern for larval cannibalism. A fourth egg (already hatched) and a second instar larva were found on fresh buds collected for food stock on 23 April.

The first two larvae pupated on 30 April. The third larva, found on new food stock, pupated on 3 May. All four larval

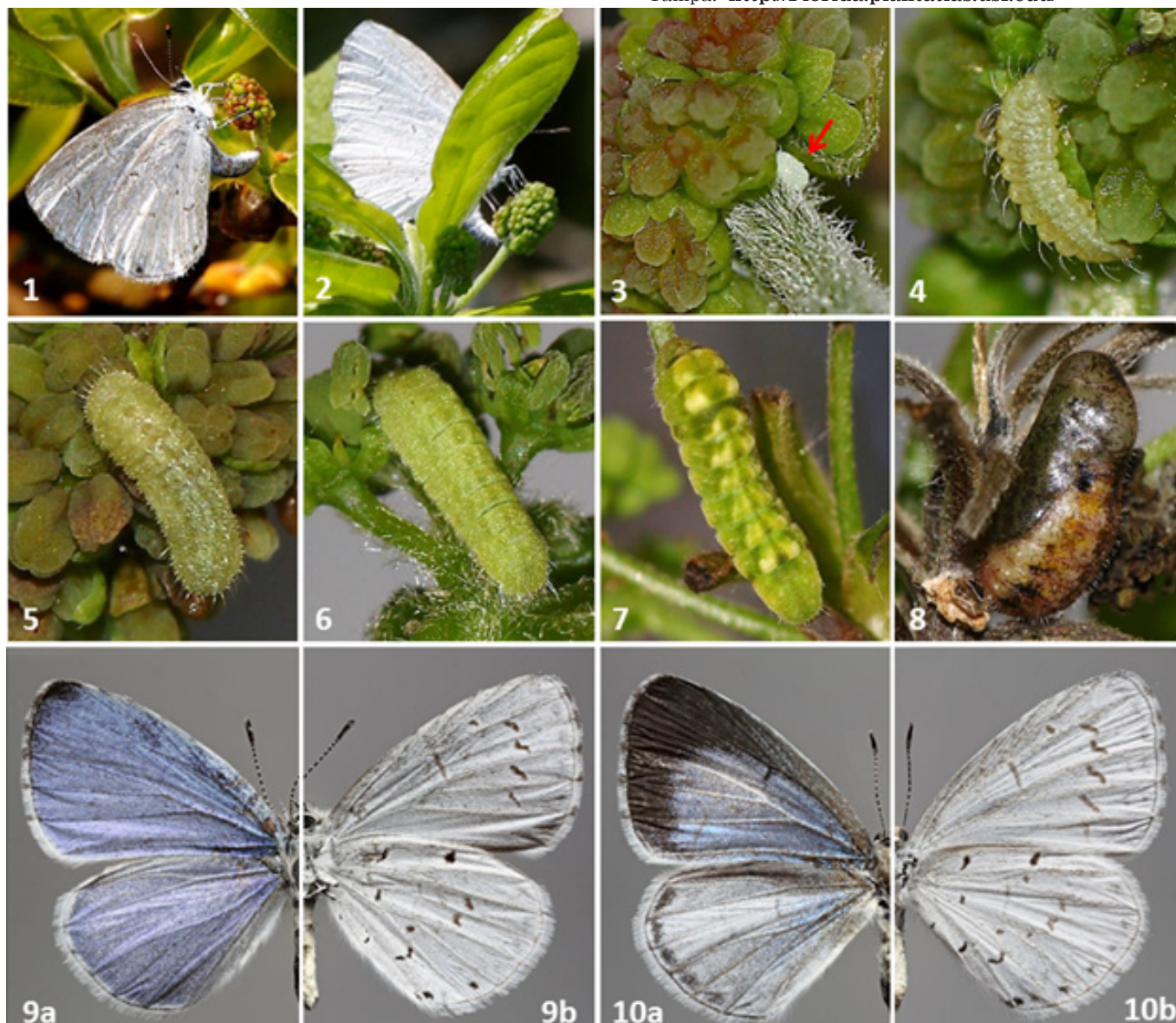
instars and pupae were successfully photographed (Figs 4-8). Throughout the rearing period, no signs of larval toxicity or disinterest in the *Nyssa* host were observed. All three pupae eclosed between 6 May and 16 May yielding one male and two females. The exact dates of eclosion were not recorded; observations ceased during this interval due to other obligations.

Acknowledgements

The authors would like to express their deep appreciation to John V. Calhoun for review of the manuscript, including many helpful suggestions, and to James L. Monroe who generously provided photos of the adult specimens (Figs. 9, 10).

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Figs. 1-10. *C. neglecta* early stages and adults. **1)** *Celastrina neglecta* female ovipositing on *Nyssa sylvatica*, 11 April. **2)** Different *C. neglecta* female ovipositing on same host, 11 April. **3)** Egg on floral buds of *N. sylvatica*, 11 April. **4)** First instar feeding on floral buds, 17 April. **5)** Second instar, 20 April. **6)** Third instar, 25 April. **7)** Fourth instar, 26 April. **8)** Pupa, 30 April. **9a)** Dorsal male *C. neglecta* reared ex *N. sylvatica*, eclosed 6-16 May. **9b)** same, ventral. **10a)** Dorsal female *C. neglecta* reared ex *N. sylvatica*, eclosed between 6-16 May. **10b)** same, ventral.

A strange *Colias* (Pieridae) among John Abbot's illustrations of Georgia Lepidoptera

John V. Calhoun

977 Wicks Drive, Palm Harbor, FL 34684 bretcall@verizon.net

Research Associate, McGuire Ctr. for Lep Research and Biodiversity, FL Museum of Natural History, Gainesville, FL

Citing a drawing dated "ca. 1800," Scudder (1888-1889) claimed that John Abbot (1751-c.1840) found the orange sulphur, *Colias eurytheme* Boisduval, in Georgia. This illustration is included in a collection of 177 watercolors of insects that was once in the possession of the London painter and engraver William Raddon (?-1848), who may not have been the original owner. Around 1869, these drawings were acquired by John E. Gray (1800-1875), Keeper of Zoology at the British Museum. Gray possibly purchased them from Raddon's family, as there is no evidence that they were auctioned with Raddon's insect collection after his death (Stevens 1848). A few years later, Gray sent this set of drawings to the American botanist Asa Gray (1810-1888) (no relation) at Harvard University, who transferred them in early 1874 to the Boston Society of Natural

History (BSNH) to "complete the series of Abbott's [sic] drawings now in their possession." The society already owned two sets of Abbot's insect watercolors, purchased in 1859 and 1873. All three of these collections were transferred in 1946 to Harvard University, where they are now preserved at the Houghton Library. The drawings in the set owned by Raddon were completed around 1800-1815. The Lepidoptera compositions are mostly life histories, with figures of adults, early stages, and food plants (Fig. 1). Others portray only adult specimens, with one to three figures per sheet (Fig. 2). This set originally incorporated nineteen drawings of butterflies. Two additional butterfly life history drawings, as well as that of a moth, are tipped into the rear of the volume. On the verso of each is written "May 19/97," indicating that they were acquired by BSNH in 1897. These three drawings were completed by Abbot at a later date, about 1820-1825.



Fig. 1. Life history of *Eurytides marcellus* (Cramer) by J. Abbot (MS Typ 426.2, Houghton Library, Harvard University).



Fig. 2. Male *Megathymus yuccae* (Boisduval & Le Conte) by J. Abbot; dorsal (top) and ventral (MS Typ 426.2, Houghton Library, Harvard University).

In 1839, the English lepidopterist Edward Doubleday (1811-1849) borrowed Abbot's drawings from Raddon and discussed many of the depicted species in letters to the American entomologist Thaddeus W. Harris (1795-1856). In a letter dated 28 August 1839, Doubleday mentioned that one of the drawings pictured "a *Colias* very near to but smaller than our *Edusa*." The name *Colias edusa* (F.) was once applied to a highly variable European butterfly that is now recognized as *Colias croceus* (Geoffroy), commonly known as the clouded yellow. Doubleday described the figured butterfly as "Upper wings deep orange with a broad black border in which is one small round pale yellow spot near the lower angle, a central black dot as usual. Under wings greyish clouded within. Externally with incomplete blackish margins, a bright central orange spot. Below up[er] wings yellowish, disc orange central & 4 marginal black dots, lower wings greenish with a central white spot surrounded with pale ring" (Harris correspondence, Ernst Mayr Library, Harvard University). This drawing portrays two specimens without early stages or food plant (Fig. 3). I initially assumed that the figures represented dorsal and ventral aspects of the same specimen, but their antennae and wing shapes differ. Moreover, the dorsal figure is a female, while the ventral figure appears to be a male.

Because Doubleday believed the *Colias* drawing was by Abbot, he assumed that it illustrated a North American butterfly. Abbot lived and studied natural history exclusively in Georgia from 1776 until his death, over 60 years later. When Scudder (1869) transcribed and edited the

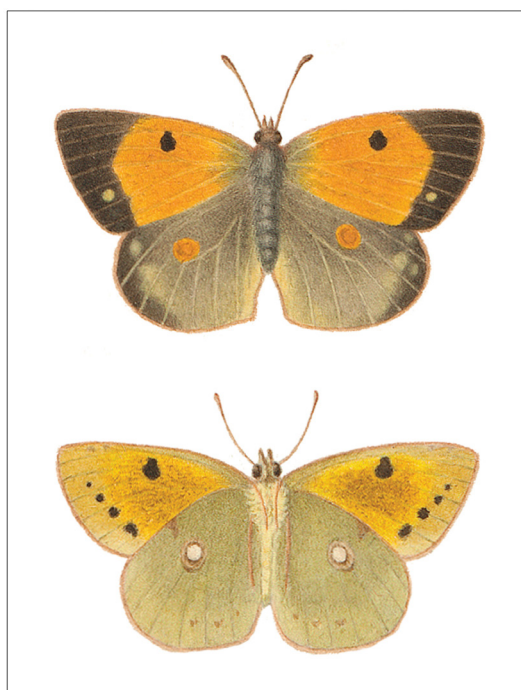
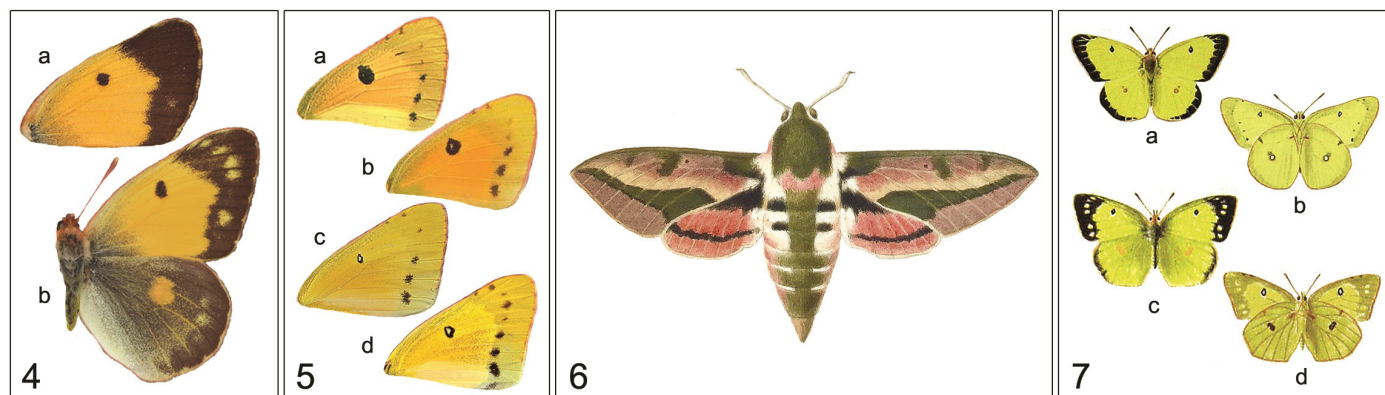


Fig. 3. *Colias* figures from set of J. Abbot's drawings; dorsal female (top) and ventral male (MS Typ 426.2, Houghton Library, Harvard University).

correspondence of T. W. Harris, he examined Doubleday's letter and probably wondered what species of *Colias* Abbot could have illustrated. A few years later, Scudder had the opportunity to examine this drawing in the library of the Boston Society of Natural History, where he had previously served as librarian. Of course, he identified the figured butterflies as *C. eurytheme*, the only similar species known to occur in eastern North America.

A closer examination of the odd *Colias* figures reveals that Doubleday's comments held a clue to their true identity. The dorsal female (Fig. 3, top) has orange forewings and dark, greenish-gray hindwings, similar to the aberration of *C. croceus* called *electra* by Frohawk (1938) (Fig. 4b). The black border of the forewing contains only a single pale spot in cell Cu1, which is an anomaly found in some females of *C. croceus* (Fig. 4a). The ventral male in the drawing (Fig. 3, bottom) bears a well-developed, solid black discal spot on the forewing. *Colias croceus* typically has a large, rounded, black discal spot (Fig. 5a), which sometimes has a trace of a white pupil (Fig. 5b). This spot often has a square-shaped anterior bulge (Figs. 5a, 5b), which is also visible on the specimen figured in the drawing (Fig. 3). In *C. eurytheme*, this spot tends to be smaller, narrower or more angular, and virtually always has a distinct white pupil (Figs. 5c, 5d). Furthermore, the artistic style of the drawing is not consistent with that of Abbot, who left England many years before he completed the other drawings in this collection. Based on this evidence, the specimens portrayed on the drawing represent *C. croceus*, not *C. eurytheme*.



Figs. 4-7. Specimens and drawings. 4) Female *C. croceus*: a, dorsal forewing with single rudimentary spot in cell Cu1 of black border; b, aberration *electra*. 5) Ventral forewing discal spot comparison: a, b, *C. croceus*; c, d, *C. eurytheme*. 6) Dorsal female *H. euphorbiae* by W. Raddon (© British Museum). 7) *C. philodice* by Abbot: a, dorsal male; b, ventral male; c, dorsal female; d, ventral female (© Natural History Museum, London).

William Raddon was a talented artist and some of his insect watercolors are preserved at the British Museum, London. His technique incorporates a denser application of paint than Abbot (Fig. 6). After examining an image of the *Colias* drawing, Olivia Ghosh of the Department of Prints and Drawings at the museum was inclined to agree: "Raddon does not allow the natural translucency of the medium or the colour/texture of the paper to play a role in his works in the way that Abbot appears to" Raddon was particularly interested in rare Lepidoptera of Britain and his surviving watercolors at the British Museum portray several such species, including the moth *Hyles euphorbiae* (L.) (Fig. 6). His well-publicized discoveries of this sporadic immigrant in Britain are generally regarded as dubious (Allan 1943), though there may be some truth to his claims (Brown 1962). Raddon's original drawings of *H. euphorbiae*, which contributed to illustrations of this species by Curtis (1824) and Newman (1834), are among those at the British Museum. In addition, there were a number of "Edusa years" during the early nineteenth century, when massive invasions of *C. croceus* arrived in Britain from Continental Europe (Salmon 2000). Morris (1853) referred to this species as "one of the favorite Butterflies of every Entomologist" in Britain. To Raddon, aberrations of this butterfly would have been worthy subjects for illustration. The drawing of *C. croceus* among Abbot's watercolors was almost certainly rendered by Raddon, probably before 1830.

Colias eurytheme is thought to be a western North American species that spread eastward during the mid-1800s in the wake of agricultural practices that offered suitable habitat and food plants (Gerould 1943, Klots 1951). It possibly strayed to the East Coast much earlier, as suggested by pre-1840 reports of "*Colias edusa*" and "*Colias chrysotheme*" from New York and Philadelphia, Pennsylvania (Boisduval & Le Conte 1829-[1837], Boisduval 1836). These specimens reportedly had a minute amount of orange-yellow or tawny coloration, which "scarcely appears except towards the disk of the upper wings" (translated from French). Boisduval (1836) claimed to have possessed at least one such specimen from New York, but none were found in the collection of the National Museum of Natural History (Smithsonian Institution, Washington, D.C.), where many of his North American butterflies are deposited. Whether these individuals truly were *C. eurytheme* or variants of the common eastern *Colias philodice* (Godart) is a mystery. Some females of "true" *C. philodice* display

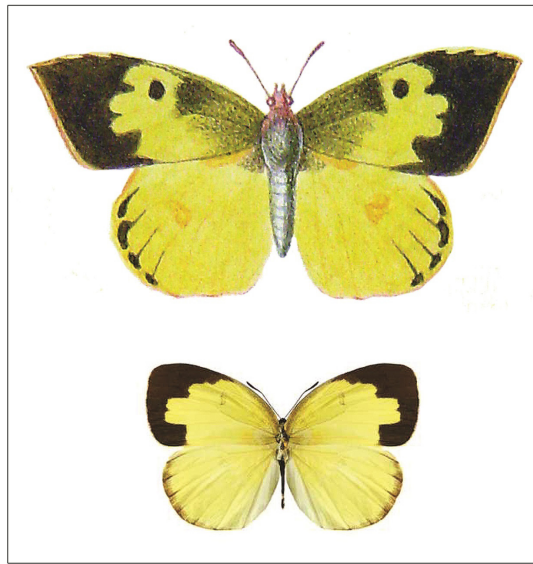


Fig. 8. Male *Zerene cesonia* by J. Abbot, 1828* (top) and female *Eurema hecabe*, which Megerle (1803) compared against Abbot's specimens of "*Papilio notatus*" (= *Z. cesonia*) (*Kenan Research Center, Atlanta History Center)

a hint of tawny scaling in the disc of the ventral forewing. *Colias eurytheme* is not believed to have become established in New York until 1929-1933 (Shapiro 1974) and this species is not represented among the surviving specimens of the Philadelphia naturalist Titian R. Peale (1799-1885) (Academy of Natural Sciences, Philadelphia), which date back at least to 1831 (Gelhaus et al. 2004, Calhoun & Wright 2016). However, at least one of Peale's female *C. philodice*, taken in Philadelphia in 1833, shows a slight amount of tawny scaling within the ventral forewing disc. The first confirmed *Colias eurytheme* record in Pennsylvania was in 1869 (Monroe & Wright (2017). A single specimen was also reportedly taken in Delaware around that time (Edwards 1869). Southward along the coast, this species was reportedly common in the vicinity of Charleston, South Carolina, during the 1870s (Smyth 1890, Clark & Clark 1951), but earlier records are lacking.

There are no known ancient records of *C. eurytheme* from Georgia. The American lepidopterist William H. Edwards, who maintained an immense correspondence with collectors across North America, did not receive any specimens of this species from Georgia, despite having acquired "large miscellaneous collections" of butterflies from that state (Edwards 1869). The only Georgia record of *C. eurytheme* mentioned by Scudder (1888-1889) was the drawing that he erroneously attributed to Abbot. Having examined all of Abbot's known butterfly drawings, and many of his surviving specimens, I have found no evidence that he ever encountered *C. eurytheme* in Georgia. A century later, it was common in the state (Harris 1931).

Although Abbot did not find *C. eurytheme*, he definitely recorded *C. philodice*, albeit very rarely. He is known to have illustrated *C. philodice* only twice, portraying male and female specimens on two separate sheets within the same volume of drawings, which were completed during the 1790s (Natural History Museum, London) (Fig. 7). The figured males (Figs. 7a, 7b) were collected on 10 May "in a Rice Field on Briar Creek" and the figured female (Figs. 7c, 7d) was taken on 12 March "in an old field near Ogeechee [Ogeechee] Swamp." He was unsure if they represented the same species, calling the male "Rare" and the female "very Rare." In 1835, Abbot related to T. W. Harris, "Some years ago I met with a plenty (then only) in a small Swamp field . . . since which I have not seen one any where" (Dow 1914). *Colias philodice* is still infrequent to rare in Georgia, especially southward (Harris 1972, Daniels 2004).

In an old auction catalog, Megerle (1803) listed six Georgia specimens of a butterfly using the name "*Papilio notatus*," which Clark and Clark (1941) ascribed to *C. philodice* from John Abbot. Megerle compared them to the Old World species *Eurema hecabe* (L.) (Fig. 8, bottom), but noted that they were larger. He described the specimens in Latin, stating that the forewing was black with a yellow band containing a black spot (hence the name "*notatus*"). The hindwing was yellow with a black margin, and the ventral hindwing was yellow with a silvery ocellus. Although Clark and Clark (1941) argued that *C. philodice* is the only species in Georgia that matches this description, *Zerene cesonia* is surely the species involved (Fig. 8, top). It is significant that Megerle (1803) described the forewing as black with a yellow band (as in *cesonia*), not yellow with a black margin (as in *philodice*). In addition, the forewing of *E. hecabe* suggests a "dog's head" outline similar to *Z. cesonia* (Fig. 8), explaining why Megerle used that species for comparison. No other specimens listed in Megerle's auction catalogs (1801-1805) could apply to *Z. cesonia*. While Abbot encountered *C. philodice* only once or twice, he considered *Z. cesonia* to be common and illustrated it at least nine times (Fig. 8, top).

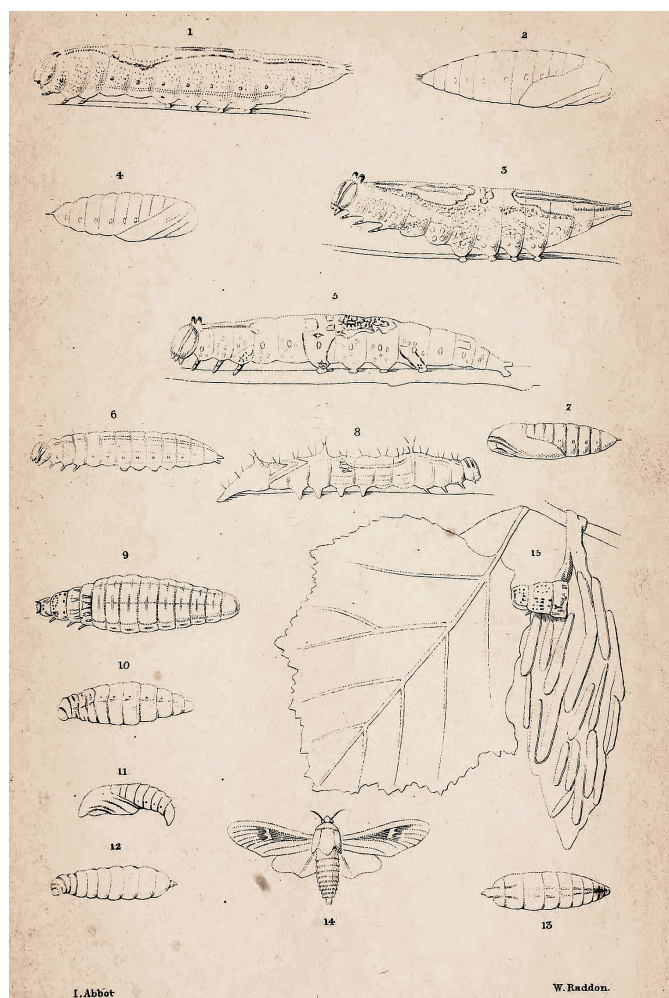


Fig. 9. William Raddon's plate of moth early stages copied from J. Abbot's drawings for Doubleday (1841a, 1841b).

Finally, it is not widely known that William Raddon published some of Abbot's figures. He created an uncolored plate for Doubleday (1841a, 1841b), which illustrated the early stages of five species of moths (Fig. 9). Doubleday (1841a) explained: "The drawings from which the accompanying plate was taken, form part of a large series executed by that indefatigable artist John Abbot, and now in the possession of Mr. Raddon, to whom I am indebted for their loan for some months, and also for the plate – the better half of this paper . . ." Although Raddon's uncolored plate is very detailed, it does not convey the magnificence of Abbot's original colored figures (Fig. 10). Grote (1880) later described one of the moths that was figured by Raddon (adult and early stages, bottom half of Fig. 9) as *Oiketicus abbotii* in Abbot's honor.

Acknowledgments

I thank Mary C. Haegart (Houghton Library) and Olivia Ghosh (British Museum) for kindly providing images and information. Suzanne A. Smailes (Wittenberg University, Springfield, Ohio) helped with literature. Brian Harris (National Museum of Natural History) searched for specimens.

(Literature Cited is on page 37)

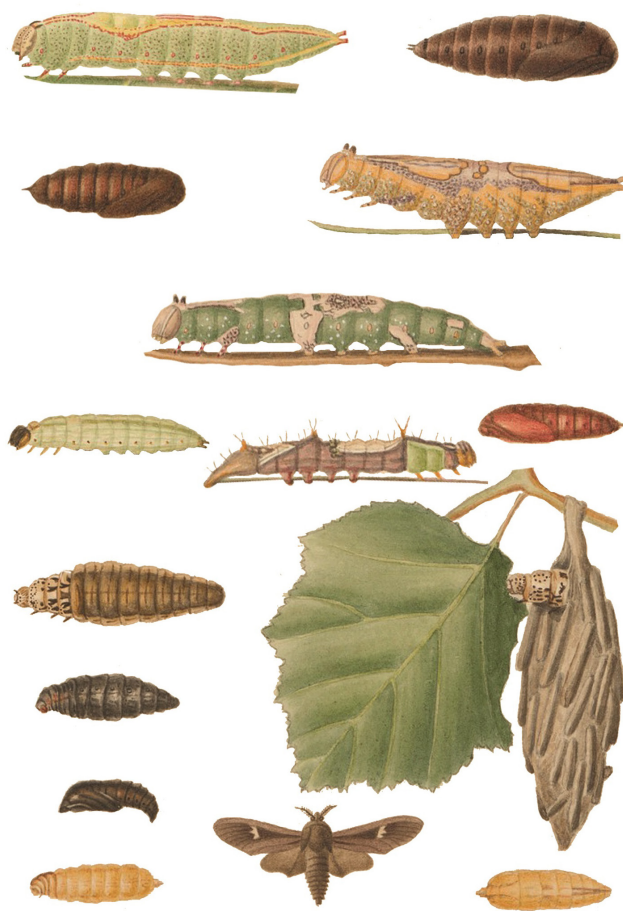


Fig. 10. Abbot's original figures in place of Raddon's engraved copies (see Fig. 9) (MS Typ 426.2, Houghton Library, Harvard University).

Announcements:

The Southern Lepidopterists' Society invites you to join

The Southern Lepidopterists' Society (SLS) was established in 1978 to promote the enjoyment and understanding of butterflies and moths in the southeastern United States. As always, we are seeking to broaden our membership. Regular membership is \$30.00. Student and other membership categories are also available. With membership you will receive four issues of the SLS NEWS. Our editor J. Barry Lombardini packs each issue with beautiful color photos and must-read articles. SLS will hold its annual meeting this year April 5-7 at Georgia Southern University in Statesboro, GA. The SLS web page (<http://southernlepsoc.org/>) has more information about our group, how to become a member, archives of SLS NEWS issues, meetings and more.

Please write to me, Marc C. Minno, Membership Coordinator, at marc.minno@gmail.com if you have any questions. Dues may be sent to Jeffrey R. Slotten, Treasurer, 5421 NW 68th Lane, Gainesville, FL 32653.

Society of Kentucky Lepidopterists

The Society of Kentucky Lepidopterists is open to anyone with an interest in the Lepidoptera of the great state of Kentucky. Annual dues are \$15.00 for the hard copy of the News; \$12.00 for electronic copies only.

The annual meeting is held each year in November, at the University of Kentucky, Lexington. This year's meeting featured Brian Scholtens speaking on Lepidoptera in your own backyard.

To join the Society of Kentucky Lepidopterists, send dues to: Les Ferge, 7119 Hubbard Ave., Middleton, WI 53562.

The Association for Tropical Lepidoptera

Please consider joining the ATL, which was founded in 1989 to promote the study and conservation of Lepidoptera worldwide, with focus on tropical fauna. Anyone may join. We publish a color-illustrated scientific journal, *Tropical Lepidoptera Research*, twice yearly (along with a newsletter), and convene for an annual meeting usually in September. Recent meetings have been joint gatherings with the Southern Lepidopterists Society at the McGuire Center for Lepidoptera & Biodiversity in Gainesville, FL. Dues are \$95 per year for regular members in the USA (\$80 for new members), and \$50 for students. Regular memberships outside the USA are \$125 yearly. See the troplep.org website for further information and a sample journal. Send dues to ATL Secretary-Treasurer, PO Box 141210, Gainesville, FL 32614-1210 USA. We hope you will join us in sharing studies on the fascinating world of tropical butterflies and moths.

The 2017 Season Summary

Leroy Koehn has assured me (the editor) that there WILL be a 2017 Season Summary. He has completed part of the work, and is not certain as to when the rest will be compiled. But he indicated he is committed to getting it out sometime early to mid 2019. So stay tuned.

PayPal -- the easy way to send \$ to the Society

For those wishing to send/donate money to the Society; purchase Society publications, t-shirts, and back issues; or to pay late fees, PayPal is a convenient way to do so. Sign on to www.PayPal.com, and navigate to "Send Money", and use this recipient e-mail address: kerichers@wuesd.org; follow the instructions to complete the transaction, and be sure to enter information in the box provided to explain why the money is being sent to the Society. Thanks!

Lep Soc Statement on Diversity, Inclusion, Harassment, and Safety

This is available at any time, should you need to know at: <https://www.lepsoc.org/content/statement-diversity>

New MONA Fascicles coming!

The Wedge Entomological Foundation is dedicated to producing volumes in the series "The Moths of North America". Volumes are produced as authors complete them on an anticipated schedule (due to budgetary constraints) of one volume per year, if manuscripts are available.

The governing board members of the Wedge are pleased to announce that there are at least three volumes "in the pipeline" of the Moths of North America series at the present time. The first of these is the Notodontidae Part 1 (see Marketplace), which should be in print by now. Immediately following this is the Acronictinae volume, and following that is the second volume of the Notodontidae. Thus, 2018, 2019 and 2020 volumes are in the process of production at the present time.

2019 Eagle Hill Natural History Science Field Seminars, Steuben, Maine 2019

Leaf and Stem Mining Insects: July 28 – Aug 3

Leaf and stem miners are insect larvae that feed within the tissues of plants for at least part of their development, forming externally visible feeding patterns (mines). In North America, they include well over 2000 species of moths, flies, beetles, and sawflies. They tend to be highly host-specific, feeding on one or a few closely related plant genera, and each miner leaves a species-specific pattern as it feeds. It is therefore generally possible to identify these insects by noting the host plant and studying the mine characteristics. This course will introduce students to the identification and biology of leaf and stem miners. On field

trips, we will visit a variety of habitats to observe and collect mines from as many different plant species as possible. In the lab, we will use the hostplant-based keys in Leafminers of North America to identify what we have found. Slide-show presentations will give overviews of the many groups of leaf and stem mining insects and their natural history. We will also discuss how to rear leaf and stem miners to adults, with a brief introduction to the various types of parasitoid wasps that inevitably emerge in the process.

About the instructor

Charley Eiseman (ceiseman@gmail.com) is a freelance naturalist based in western Massachusetts. He has been conducting plant and wildlife surveys and natural resource inventories throughout New England for the past twenty years. He holds an MS in Botany (Field Naturalist) from the University of Vermont and a BS in Wildlife and Fisheries Conservation and Management from the University of Massachusetts. Charley is the lead author of *Tracks & Sign of Insects and Other Invertebrates* and has published over thirty scientific papers describing new insect species or documenting new natural history information for known species. He also writes an insect-themed blog, "BugTracks," and is currently self-publishing *Leafminers of North America*, a serial e-book with the final monthly installment scheduled for June 2019.

Microlepidoptera: Collection, Preparation, Dissection, Identification, and Natural History: Aug. 4 - 10

This lab-intensive course will systematically cover all of the families of the microlepidoptera from Micropterigidae to Mimallonidae in the United States and Canada. The focus will be on identification characters for each family and most of the major subfamilies and tribes through talks rich in photos and examination of specimens. Overall natural history will be covered with special focus on ecologically and economically important species. There will be practical training on collecting methods, pinning techniques, and genitalic dissection along with a discussion of larval rearing techniques.

About the instructors

Jason Dombroskie (jld278@cornell.edu) has had a lifelong interest in nature and started seriously collecting moths at the age of 12. Over ten years of collecting moths in his childhood backyard in rural Renfrew County, Ontario, he collected over 1000 species of moths and began networking with the larger lepidopterist community. From 1996 to 2005 he worked as a naturalist in Algonquin Provincial Park where he delivered popular educational programs as well as document the moth diversity culminating in nearly 1000 confirmed species. He obtained a BSc. Hon. in Biological Sciences from the University of Guelph and his PhD was on aspects of archipine [Tortricidae] evolution at the University of Alberta. Since 2012 he has worked as the manager for the Cornell University Insect Collection and the coordinator for the Insect Diagnostic Lab. Jason has published 18 scientific papers in entomology including a

matrix-based key to the Lepidoptera of Canada. Current research in his lab focuses on systematics of the tribe Archipini (Tortricidae) in the New World, but some of his students work or have worked on other Tortricidae, Argresthiidae, and Mimallonidae. Jason regularly hosts public moth events across NY and gives richly-illustrated, popular talks and workshops on moth natural history, basic entomology, beneficial insects, and other topics.

Kyhl Austin (kaa226@cornell.edu) is a graduate student at Cornell University revising the Archipini (Tortricidae) of the Caribbean. He has experience collecting and photographing moths in the southeastern US. He worked for two summers as a curatorial assistant at the Mississippi Entomological Museum and for four years as the sole curator for the Davidson College Insect Collection. He is interested in the systematics and biogeography of microlepidoptera and broadly interested in insect systematics as a whole.

Eagle Hill Institute, PO Box 9, 59 Eagle Hill Rd, Steuben, ME 04680. www.eaglehill.us. 207-546-2821 Ext 4. office@eaglehill.us

2019 Lepidoptera Course: August 1-10

The 2019 Lep course will be held August 1-10 at the Southwestern Research Station (SWRS) in the Chiricahua Mountains of Southeastern Arizona (a 2 1/2 hour drive from Tucson). With its extensive series of sky-island mountain ranges, SE Arizona is a hot spot for the highest Lepidoptera diversity in North America. With low desert scrub oak and mixed oak-pine woodland, lush riparian, juniper, Douglas fir, and mountain meadow habitats all within a 40 minute drive from the station, the SWRS is an ideal location from which to sample this diversity of both habitats and species.

The emphasis of the Lep Course is to train graduate students, post-docs, faculty, and serious citizen-scientists in the classification and identification of adult Lepidoptera and their larvae. The course includes lectures, field trips and labs. Topics to be covered include an extensive introduction into adult and larval morphology with a focus on taxonomically important traits, extensive field work on both adults and larvae, collecting and curatorial techniques, genitalic dissection, larval classification, and general issues in Lepidoptera systematics, ecology, and evolution.

Instructors will include Chris Grinter, Sangmi Lee, Richard Brown, Ray Nagle, Jennifer Bundy, Bruce Walsh, Ron Rutowski, John Brown, and James Fordyce.

Updates and further information is available online at www.lepcourse.com

Applications to the Lep Course can be made in the future at the following site: <https://www.amnh.org/our-research/southwestern-research-station/education/lepidoptera-course>

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

Deborah L. Matthews¹, Terry A. Lott², Jacqueline Y. Miller¹, James K. Toomey³ and Roger W. Portell³

¹McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, P.O. Box 112710, Gainesville, FL 32611-2710 dlott@flmnh.ufl.edu

²Paleobotany Division and University of Florida Herbarium, Florida Museum of Natural History, P.O. Box 110575, University of Florida, Gainesville, FL 32611-0575

³Invertebrate Paleontology Division, Florida Museum of Natural History, University of Florida, P.O. Box 117800, Gainesville, FL 32611-7800

INTRODUCTION

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

MATERIALS AND METHODS

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

RESULTS

Stenoptilodes brevipennis (Zeller, 1874)

(Fig. 1)

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

scalloped. Hindwing third lobe with scattered dark spatulate scales along anal margin and distinct dark scale patch at apex.

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

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

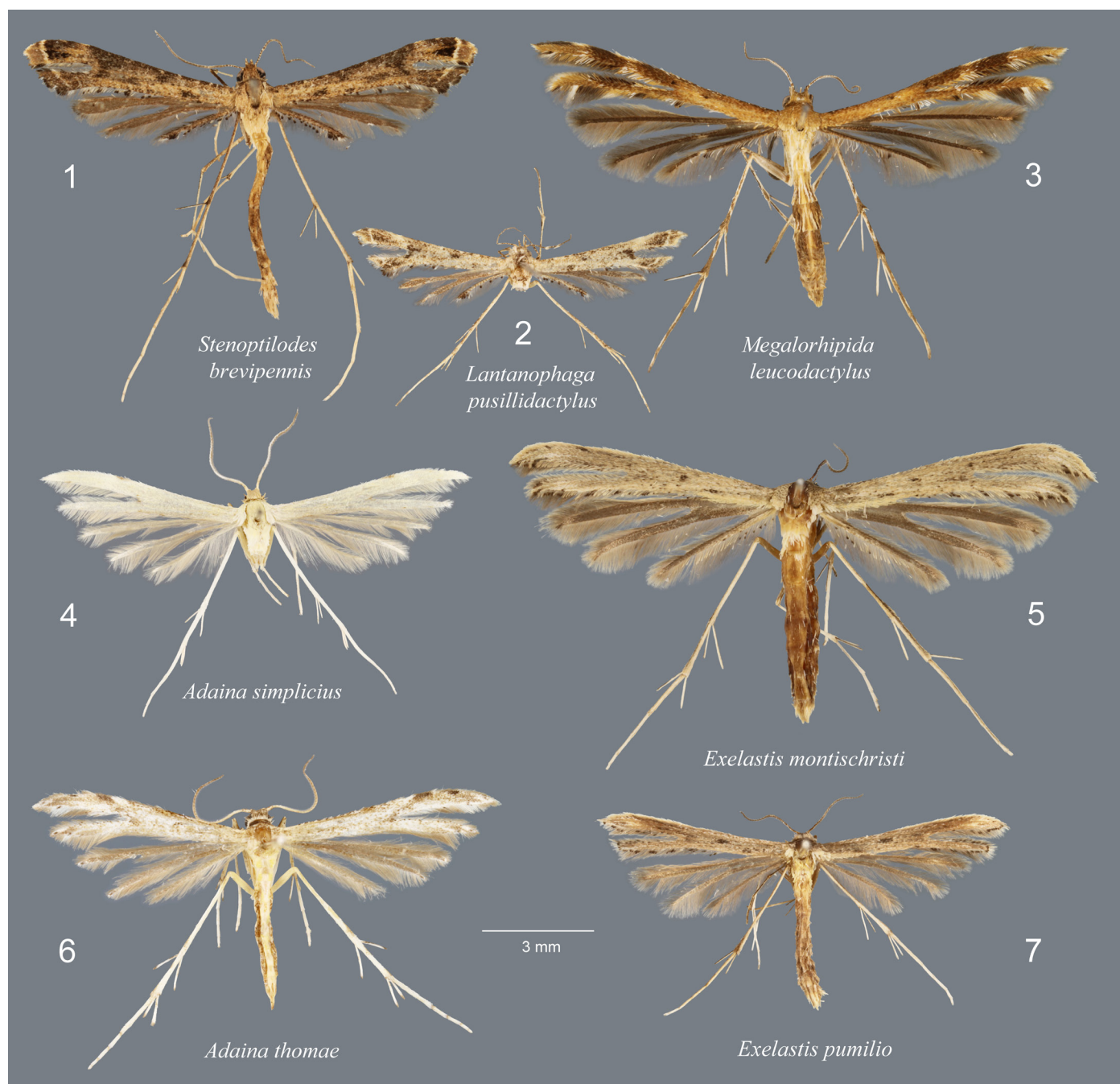
This species is difficult to distinguish from *Stenoptilodes taprobanes* which has not yet been recorded from Cuba. Females of *S. brevipennis* bear conspicuous lateral scale tufts ventrally on the abdomen which flank the ostium. Males must be dissected for positive identification. All four males collected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

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

Lantanophaga pusillidactylus (Walker, 1864)

(Fig. 2)

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



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

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

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

dissected in order to confirm the identification.

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

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

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

Pinned Material – CUBA: Guantanamo: GTMO Naval Base, Site 2, vic. Sherman Ave., 19.91978°, -75.1362° (datum WGS 84), 5.x. 2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession 2013-31 (1f), MGCL 230772; Site 4, XRAY 02, 19.9347°, -75.0972° (datum

WGS 84), 20.i.2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2, (1 m), MGCL 172051, (5 f), MGCL 172046, 172048, 172052, 172053, 172062; Site 7, vic. Stephens Ave., 19.92296°, -75.1289° (datum WGS 84), 23.i. 2012, D. Matthews, R. Portell, J. Toomey, T. Lott, MGCL Accession # 2012-2, (3 f), MGCL 172055, 172057; Site 7b, vic. Stephens Ave., 19.92206°, -75.1297° (datum WGS 84), 7.x. 2013, D. Matthews, J.Y. Miller, R. Portell & J. Toomey, MGCL Accession # 2013-31 (1 m), MGCL 230779, (2 f), MGCL 230777, 230780; Site 11, E of Sherman Ave., vic. Library, 19.91368°, -75.1399° (datum WGS 84), 19.i.2012, D. Matthews & T.A. Lott, ex. *Boerhavia*, MGCL Accession # 2012-2 (2 m) MGCL 172058, 172061, (2 f) MGCL 172031, 172059; same data except 20.i.2012, (2 m) MGCL 172047, 172060, (5 f) MGCL 172032, 172033, 172045, 172049, 172050; same data except 22.i.2012, (1 m), MGCL 172054.



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

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

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

Distribution – pantropical, extending into southern temperate areas.

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

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

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

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



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

GTMO, a pupa found attached to one of the leaves emerged during our stay.

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

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

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

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

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

Distribution – This species occurs throughout the new and old world tropics and subtropics. In the West Indies it is known from the Bahamas, Cuba, Guadeloupe, Jamaica, Puerto Rico, and the Virgin Islands.

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

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

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

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

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

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



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

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

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

Adaina thomae (Zeller, 1877)

(Fig. 6)

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

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

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

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

DISCUSSION

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

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

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

ACKNOWLEDGEMENTS

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

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2019 Lepidopterists' Society Election Results

Total ballots returned: **327**

President:

Maria Alma Solis 303

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

Vice-Presidents:

Andrew V. Z. Brower (USA) 253 (1st VP)

André V. L. Freitas (Brazil) 225

James E. Hayden (USA) 211

Jeffrey M. Marcus (Canada) 231

Members-at-Large:

Charles E. Harp 259

Elizabeth Long 246

Christopher E. Looney 149

Deborah L. Matthews 274

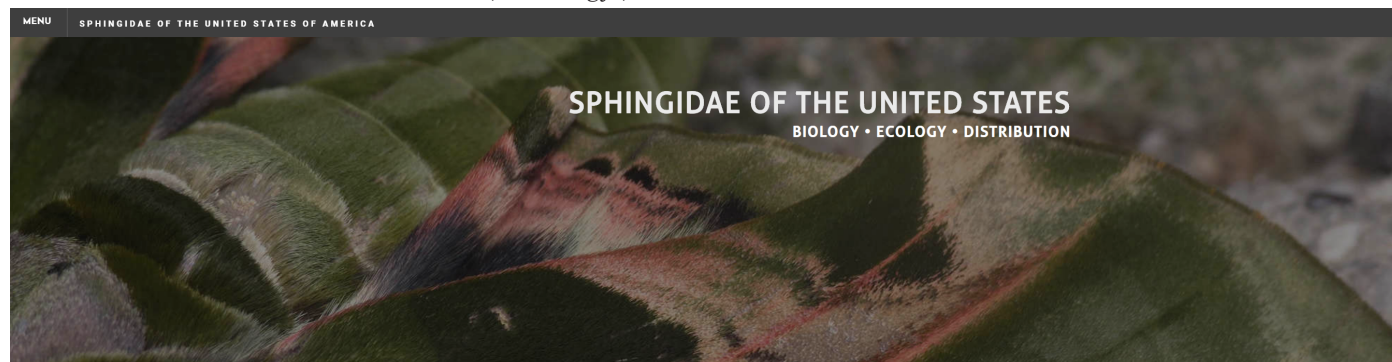


Elymnias vasudeva burmana (Painted Jezebel), Nymphalidae, Satyrinae, Chiang Dao (Chiang Mai, Thailand), 17 November 2018, photo by Antonio Giudici.

Sphingidae of the United States -- A new informational website

Teá Kesting-Handly¹ and Steven Kloiber²

¹Sphingidae of the United States, 26 Arborway, Boston, MA 02130 sphingidaeusa@gmail.com
²657 Sandt Rd., Pen Argyl, PA 18072 skloiber@frontier.com



WELCOME

Welcome to Sphingidae of the United States. This website is an in-depth look at the family Sphingidae. Colloquially these moths are known as Hawk Moths or Sphinx Moths. This charismatic group is found on all continents (except Antarctica) and are generally fairly large. This website is a collection of information of every sphingid found in the United States of America. Currently, this website only encompasses the Eastern USA. If you wish to see exactly which species are represented on this site, please click to the "Sphingidae Index" button below. In the coming years, it will be expanded. There are several keys to help you begin identifying both caterpillars and adult moths in this family. There are species pages full of photos, range maps, flight-times, and rearing information. Thank you for using this website; if you have any questions or comments, please click the contact link at the bottom of this page.



SPHINGIDAE INDEX



GENERAL INFORMATION



FINAL INSTAR LARVAL ID

Abstract:

Sphingidae of the United States (Sphingidae USA; www.sphingidae.us) is a new educational and informative website that launched in May 2018. This website aims to be an accessible repository for information and life histories for every species of Sphingidae found in the USA. As of December 2018, 70 of the 130 Sphingidae species found in the US (excluding Hawaii, Puerto Rico, Guam, and other US territories) are represented on the website, each with a full species page including images and life cycle information. A comprehensive Hostplant Index on the website allows users to search and browse sphingids by their host plant, and vice-versa. While still in progress, this website also contains: final instar larvae identification keys, adult sphingid identification keys, as well as range maps to browse species by state. New features and species are set to be rolling out to the website continually through 2020.

Keywords: life history, lepidoptera, rearing, hostplants, database, ecology, taxonomy, website, education, citizen science

Introduction

Sphingidae USA was originally conceived as a coffee table book outlining life history, habitat requirements, and rich images of every Sphingidae species found in Massachusetts. As research was conducted and data compiled, it became clear that a more dynamic medium was essential to convey the information. Soon afterwards, the region of interest was extended beyond Massachusetts, today encompassing the entirety of the continental United States and Alaska.

While the Sphingidae are often considered over studied or well understood, closer examination of the field shows great potential for further development. Worldwide, there are still many undiscovered species and, even in the United States, there are many species that need their life histories described, hostplants identified, and rearing conducted. This website hopes to serve as a place where not only the authors can share their findings, but also to gather findings and information from many other sources and create a large, robust compilation of knowledge. Amateur and

professional entomologists are encouraged to submit their findings to the website for inclusion.

There is a fair amount of information out there in the world about Sphingidae. However, all too often, books and papers tend to get lost when information transitions to an electronic platform. Most of these books and papers are also not necessarily accessible to non-expert amateurs or hobbyists. This website hopes to not only add new information to the Sphingidae, but to comb the literature, add in citations, references, and notes from previous sources, and present this information in an easily accessible way to professional entomologists, non-expert amateurs, and hobbyists alike. Eventually, the hope is that this website could also serve as a repository for all papers related to Sphingidae in the USA.

Previous work on the US sphingid-fauna has been remarkable. The *Sphingoidea Fascicle* produced by Hodges in 1971 was the first major publication on these moths in the US (Hodges, 1971). Following him, a book called *Hawk-moths of North America* produced by Jim Tuttle in 2007 was the next most comprehensive publication on these moths including detailed ecology, life history, and field notes (Tuttle and Rutledge, 2007). Several other authors have written works including the Sphingidae and their life histories, such as David Wagner's book *Caterpillars of Eastern North America* (Wagner, 2010). There are many guidebooks that include adult sphingids for identification and some may include limited information on life history and ecology. Sphingidae USA was made with all of this in mind with the goal of taking all the previous knowledge, including it, and expanding on it to account for new information, thus creating a new sphingid-centric work about the fauna in the USA. This website is not intended to replace or make-obsolete any previous work, and in fact celebrates this work and hopes to expand upon it. As a dynamic medium, the website can be continuously updated to reflect emerging sphingid-fauna data.

Currently the website is in its first iteration with about 70 species represented and a goal of 100 species represented by May 2019, and all continental US sphingid species available by January 2020. Once every species of sphingid found in the continental US is included on the website, we will begin to expand to Hawaii and US territories. Hawaii functionality is expected by the end of 2020 or early 2021, and the territories will be follow on an approximately annual basis. Current features of the site are detailed below.

Features

Sphingidae Index

The Sphingidae Index is the main taxonomic page for the website. Navigation to this page is accessible both through the menu at the top of the website, or through the button on the home page. Once on this page, you can find

a list of all the species currently on the website with direct links to the respective species pages. Below the Sphingidae Index is the living plate system. This is a gallery of almost every species on the website so far. People looking for a quick ID may find their moth in this gallery and can select it to navigate to the species page. Underneath the living plate system are the specimen plate galleries. These galleries display specimens of the majority of species represented on the website with descriptions of their respective subfamilies. This allows users to learn the Subfamily of the moth they are trying to identify. Navigation to the species pages will reveal links to subfamily pages and genus pages as well. These pages give a little bit of information on the higher level of taxonomy within the Sphingidae family. The Sphingidae Index can be accessed at any time from any page with the help of a button located in the footer of the website. Pressing this button brings up a popup list of every species of Sphingidae found on the website and you can use this list to navigate to a different species page. While one of the goals of this website is accessibility to a wide user base with varying levels of expertise, the use of common names was avoided to encourage accurate and consistent identification. This choice was made based on observations of the authors and their audiences' reactions at speaking engagements.

Hostplant Index

The Hostplant Index is a large database that allows users to search for relationships between sphingid larvae and their hostplants. You can navigate to this page by the dropdown menu at the top of the website, or by clicking the button on the lower half of the front page. This database is a compilation of records from personal observations, papers, and other databases. The database features multi-level searchability with links to the relevant species pages currently on the website. Containing all 130 species of sphingid in the continental USA, the database can be searched by querying any level of hostplant or sphingid taxonomy below family. Through this database, tables have been added to species pages that automatically present the information in the index relevant to the species you are looking at. This index is updated monthly and will hopefully continue to grow.

Final Instar Larva Keys

The Final Instar Larva Keys are found by clicking the button on the homepage. Once you navigate to the page for the key, you will be presented with a regional map. To make the keys more efficient and concise, the continental US was split into 6 ecoregions based on their breeding sphingid fauna. The regions are: East, Gulf Coast, Texas, Southwest, Midwest, and West. Currently only 2 keys, East and Gulf Coast, are available on the website, with the rest being added soon. As the website expands to encompass other regions, more ecoregions will be added. While the keys are preliminary and have not been peer-reviewed, they are quite accurate, and feedback is encouraged. The keys will be published for peer-review at a later date. The

keys represent every species of sphingid in the US in the ecoregion regardless of whether they are on the website or not. The keys are photo-illustrated and are accessible to all. While these keys are currently only for final instar larvae, there is a useful guide on distinguishing earlier instars on the General Information page. In the future, a key for younger larvae will be created.

Adult Keys by Genera

On each Genus page, there is a key to species. To navigate to the Genus pages, simply use the menu at the top of the website. Genera can be found once you navigate past the subfamily in the dropdown menu. Monotypic genera do not have keys. The keys found on the genus pages are representative of all species found in the continental US in that genus, regardless if they are on the website, you can find links to the species underneath the key. There is no key to ID a moth to genus-level, this functionality will be coming soon.

General Information

This page can be navigated to by clicking the button on the home page, or by navigating there using the menu at the top of the website. This page has 4 main sections and is intended to help the non-expert amateurs and hobbyists gain a basic understanding of the Sphingidae and better use the website. The first section "Is It a Sphingid" helps explain easy and quick ways to identify members of this family. This is also where you can learn some basic tips to identifying if you have a final instar larva to use with the key. The next section is "Life Cycle" and outlines a basic Sphingidae life cycle. The third section is "Anatomy". This section has 2 images of adult sphingids and one larval image, all labeled with important anatomical parts that are used in identification. The last section is the "Glossary" which contains lots of important terms that will help familiarize users with some of the terminology on the website. This page is updated frequently, and the glossary is expanded often.

Range

The range page can be accessed by the main menu bar at the top of the website. This page is a fairly new addition to the website and has two different ways of looking at Sphingidae range. The first is a database where a state (or multiple states) can be selected and then will display a checklist of all the species recorded in that state. This allows users to develop lists and compare their data to the existing data. While the databases are quite complete, there may be species missing and feedback is welcomed. The second way to view data is by clicking on your state in the interactive map on the bottom of the page. This will generate a list of all the species in that state. While the information is the same, the database is superior for generating a checklist and the map is useful for exploring what species are in various states quickly without needing a checklist.

Upcoming Features

Parasitoid & Predator Indexes

This page is accessible via the main menu at the top of the website. Currently there is some information on this page and some gallery images up. Eventually this page will host two databases. One detailing the relationships of parasitoids and sphingids, and the other detailing general predators. While these databases will take a long time to complete, a first draft of these databases are planned for April 2019.

Ultraviolet Light Larval Glowing

This page will be accessible via the main menu at the top of the website. While it is not currently on the website, a first version is expected in February 2019. This page will have lots of images of sphingid larvae that fluoresce under ultraviolet light (UV) as well as a proposed system of ranking UV fluorescence. This will eventually allow comparisons and studies to be done on the possible causes of this phenomenon. The main attraction to this page will be another database that features which species of sphingid glow and how strongly. Eventually, other findings from the collected data will also be presented here.

Paper Repository

The paper repository will be a unique part of the website. This area will be accessible from the main menu. This will be a searchable library of papers relating to Sphingidae from the United States. Ideally this will become a larger and larger library as users submit papers or allow their papers to be displayed. The papers will all be tagged by keywords and the library will allow this to be searchable.

Sources

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Links

Home Page: www.sphingidae.us
 Sphingidae Index: <http://www.sphingidae.us/sphingidae-index>
 Hostplant Index: <http://www.sphingidae.us/hostplant-index.html>
 Final Instar Larval Key: <http://www.sphingidae.us/final-instar-larva-key.html>
 General Information: <http://www.sphingidae.us/general-information.html>
 Range: <http://www.sphingidae.us/range.html>



The Lepidopterists' Society annual meeting

Davis, California – July 9-12, 2019

The 68th annual meeting of the Lepidopterists' Society will be from Tuesday, July 9 – Friday July 12, 2019 at the Odd Fellows Hall in Davis, California – 415 2nd St. between C and D. The meeting will be hosted by the Bohart Museum at University of California at Davis (<http://bohart.ucdavis.edu/>). The Bohart Museum has the 7th largest insect collection in North America with more than 7 million specimens and is the home of the California Insect Survey.

We encourage contributed papers and posters and will have a special symposium on Lepidoptera and environmental change. The Bohart Museum will be open, and those interested in visiting or working in the collection are encouraged to contact Collections Manager Dr. Steve Heydon – slheydon@ucdavis.edu. Because of the travel distance to good field locations during the summer in Davis, we will not be officially sponsoring field trips, but information will be provided about locations for both collecting and observing field trips in the area, and we encourage groups of members to coordinate on field trips. A welcome reception will occur at the Bohart Museum Tuesday evening. Main sessions and the Friday banquet will take place at the Odd Fellows Hall in downtown Davis, a short distance from the campus. The Thursday BBQ will be at a local park within walking distance of the Odd Fellows Hall and the downtown hotels.

Online registration and abstract submission are open on the Lepidopterists' Society website (<https://www.lepsoc.org/content/annual-meeting>). Registration includes facility fees, snacks, and the BBQ. Banquet tickets are available separately. Additional tickets for both the BBQ and banquet are available for purchase on the registration site. A meeting T-shirt is available for purchase and can be ordered separately on the registration site.

Davis is located right on Interstate 80 (I-80) about 15 miles west of Interstate 5. Sacramento (20 miles) and San Francisco (85 miles) airports are the closest major airports, and shuttles are available from both to Davis, about \$21 from Sacramento and \$70 from San Francisco. The Sacramento airport (SMF) is an international airport and is the more convenient. Private shuttles will be \$21 - \$35 or more each way, taxis will be over \$100 each way, Uber is \$26 to \$35 one way. YoloBus – 530-666-2877 – www.yolobus.com is only \$2 and makes the round trip hourly, but their drop-off in Davis is about 2 miles from meeting location.

Housing reservations are available at several downtown hotels (see list below). Call directly for reservations, and

indicate you are attending the Lepidopterists' Society Annual Meeting for special rates. All of these hotels offer free parking for guests and are a short walk from the meeting location.

Best Western University Lodge - 530-756-7890 – 1 block to Odd Fellows Hall

Queen rooms - 119.99 + tax

Queen doubles - 129.99 + tax

Includes breakfast, Wi-Fi, fitness, free self-parking on-site

Best Western Plus Palm Court - 530-753-7100 – 1 block to Odd Fellows Hall

King rooms - 159.00 + tax

Queen doubles - 165.00 + tax

Includes Wi-Fi, fitness, free self-parking on-site – no free breakfast

Aggie Inn - 530-756-0352 – 2 blocks to Odd Fellows Hall

Double Queens 149.00 + tax

Includes breakfast, Wi-Fi, fitness, free self-parking on-site

Davis information

Located in Yolo County, in the Central Valley of northern California, Davis, a city of about 65,000 people, is situated 11 miles west of Sacramento (the State Capital), 385 miles north of Los Angeles, and 72 miles northeast of San Francisco. Davis sits in the Pacific Flyway, a major migration route for waterfowl and other North American birds. Several wildlife preserves, offering a natural environment, dot the landscape. The Odd Fellows Hall is in the middle of downtown, where there are many options for dining within a close walk. If you stay away from the downtown area, parking is available for about \$9-10 per day at lots close to the meeting location. Those staying at downtown hotels are offered free parking. Parking on campus during weekdays is \$9 per day. A map will be provided.

If you would like to become a member of the Lepidopterists' Society, please visit <https://www.lepsoc.org/content/new-membership>. Membership gives you access to current and past issues of the Journal of the Lepidopterists' Society and the News of the Lepidopterists' Society. Members are also eligible for various awards including travel awards to help defray costs of meeting attendance (for those giving papers or posters) (<https://www.lepsoc.org/content/awards>). Our real strength is people! We are a supportive group of amateurs and professionals, collectors and photographers, students and retirees, all united around our mutual love for butterflies and moths.

Local hosts of the meeting are Jeff Smith and Dr. Lynn Kimsey of the Bohart Museum and Dr. Michael Collins of Nevada City, CA. Please contact Jeff Smith at 916-624-9401 or bugman@starstream.net for questions or concerns. Hope to see you in Davis this July!

Magnificent color pattern of *Endoclita atayala* Buchsbaum & Hsu 2018 (Lepidoptera: Hepialidae) from Taiwan

John R. Grehan¹, Yu-Chen Yang² and Ulf Buchsbaum³

¹Associate Researcher, Museum Witt, Munich, Germany calabar.john@gmail.com

²Citizen scientist; Taiwan yyc2015096@gmail.com

³Zoologische Staatssammlung München, Münchhausenstraße 21, D – 81247 München, Germany
UlfBuchsbaum.Lepidoptera@zsm.mwn.de

Museum specimens can be of critical importance for the identification and description of new species. But for ghost moths they can also be deficient in terms of color due to fading which can sometimes take place quite rapidly and more so over time. Where fresh material is also available this problem can be rectified, but otherwise color tones cannot be assumed to be definitive for species. A recent case example that came to light (pun intended) was the new species *Endoclita atayala* Buchsbaum & Hsu 2018 that was named for a single unique specimen from Taiwan that was found at a light trap in Meiyun Village, Miaoli County at 2,360 m on July 24, 2008 (Buchsbaum *et al.*

2018). This specimen was partially worn and many of the finer markings were indistinct. The overall color tone was pale yellowish brown with darker brown to black markings (Fig. 1a). This overall appearance was suggestive of a rather drab looking moth that lacked any prominent and striking markings that would easily catch the attention of an observer or collector, particularly as the insect is quite large with a wingspan reaching 150 mm.

Almost immediately after publication of *E. atayala* as a new species, Li-Cheng Shih (pers. comm.) drew attention to the similarity between the holotype forewing pattern and a photograph of a live moth posted by Yu-Cheng Yang on the Taiwan Moth Information Center website (<http://twmoth.tesri.gov.tw/peo/FBMothInfo/175245>). This specimen was observed at Dalu Lindau, Wufeng Township, Hsinchu County at 1098m on July 15, 2017. The locality of the type and the photographed specimen are in very close proximity (Fig. 2), but there is a startling contrast in between the bright colors of the habitus specimen and the holotype. About half

the wing surface of the habitus specimen, particularly between CuA2 to the dorsum, and between the cross veins and termen, was dominated by a bright whitish green (Fig. 1b). In detail, the wing pattern and markings of the two specimens match or correspond very closely to fall within expectations of variation within the same species. Both specimens have a transverse marginal band between Rs2 and Rs3 (Fig. 3, blue dotted circle) but the longitudinal curved line on the anterior discal cell takes the shape of a shepherd's crook (Fig. 3, blue dotted outline).

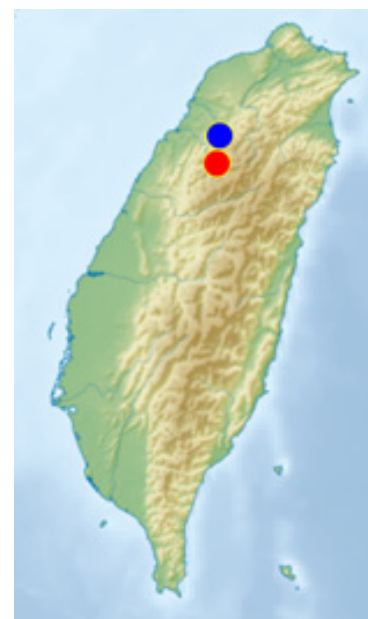


Fig. 2. Taiwan locality records for *Endoclita atayala*: holotype, red circle; habitus specimen, blue circle.

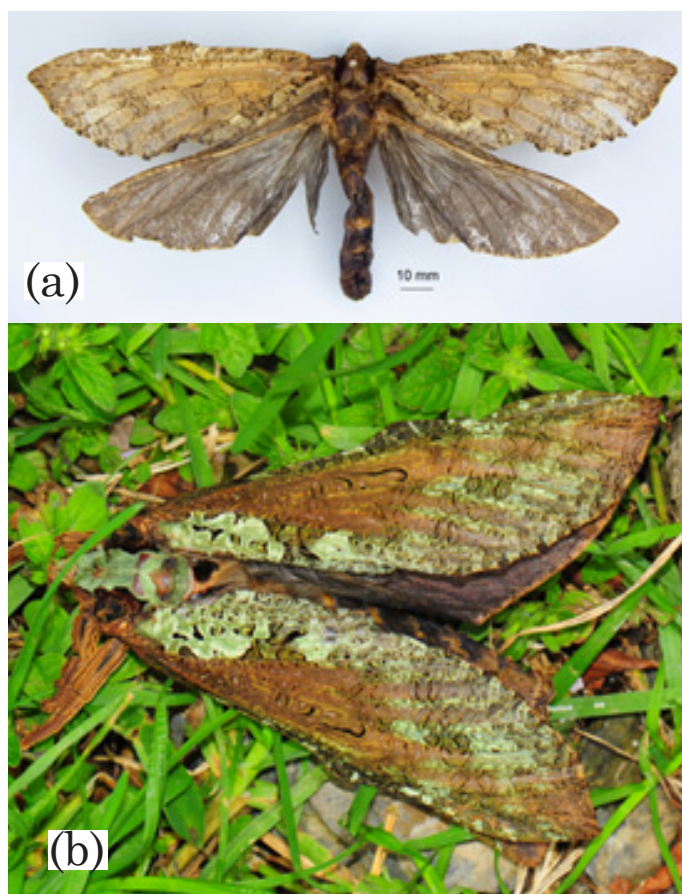


Fig. 1. Comparison of *Endoclita atayala* specimens: (a) holotype, (b) specimen from Dalu Lindau, Wufeng Township, Taiwan. Habitus photo by Mrs. Yu-Cheng Yangat.

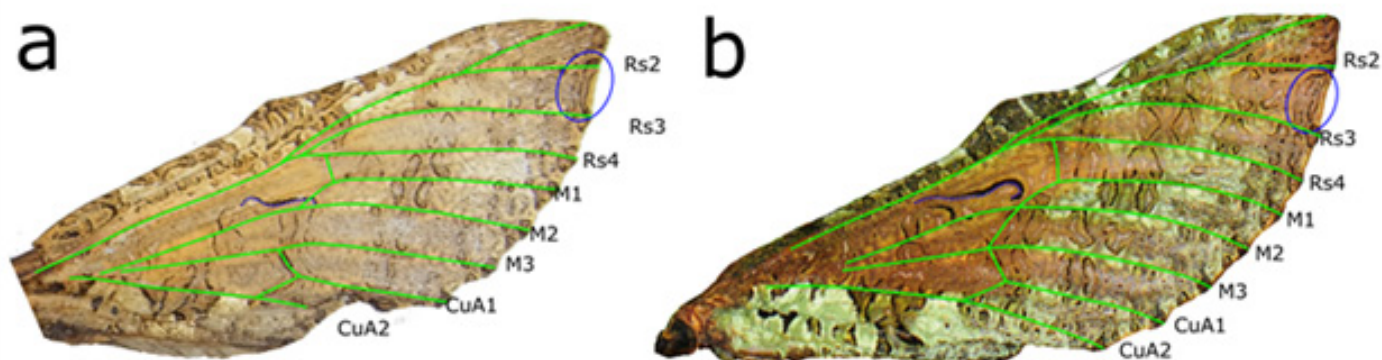


Fig. 3. Comparison of forewing pattern in specimens of *Endoclita atayala*: (a) holotype, (b) habitus specimen from Dalu Lindau, Wufeng Township, Taiwan.

The ghost moth fauna of Taiwan comprises three genera and 12 described species, including two *Endoclita* species currently treated as conspecific with mainland Asian populations, but this classification has yet to be confirmed by comparative study. The presence of *E. atayala* in Taiwan is of general biogeographic interest as the species appears to belong in a monophyletic sub clade of *Endoclita* that also includes two species in China. Buchsbaum et al (2018) have suggested that the distribution of the three species is the result of vicariance of a formerly widespread ancestral distribution where the part of the ancestral range was separated by tectonic rifting resulting in an island arc that became amalgamated with the main accretionary block

that now comprises modern Taiwan (Fig. 4). This tectonic origin may have also contributed to the origin of many other taxa endemic to Taiwan (Buchsbaum *et al.* 2018).

Acknowledgements

We are grateful to Li-Cheng Shih (Taiwan) for his assistance.

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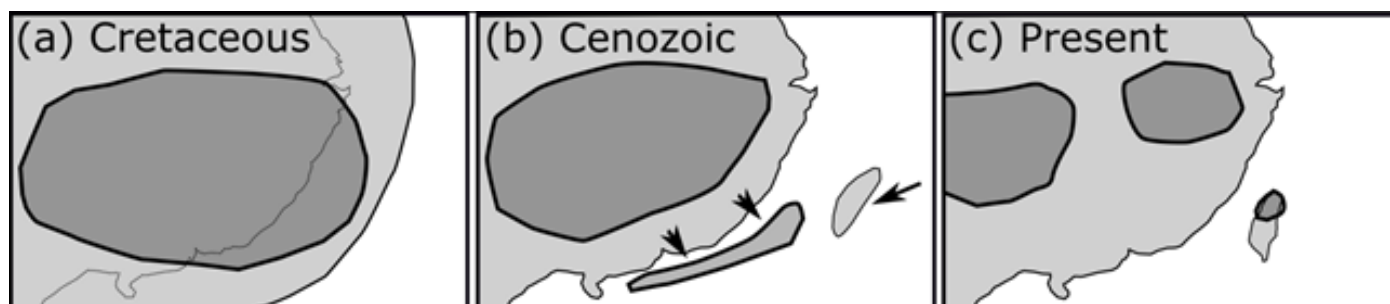


Fig. 4. Geological vicariance origin of *Endoclita atayala* and related mainland relatives. See Buchsbaum *et al.* 2018 for details.



Hasora salanga (Black-tailed Awl), Hesperidae, Coeliadinae, Kaeng Krachan (Phetchaburi-Thailand), 20 November 2018, photo by Antonio Giudici



Hypochrysops polycletus (Royal Jewel), Lycaenidae, Theclinae, Fakfak Regency, West Papua, 8 December 2018 during a Thai Butterflies.com trip, photo by Antonio Giudici

New thoughts on *Celastrina* in Florida

David M. Wright¹, Mary Ann Friedman², Marc C. Minno³, John V. Calhoun⁴, Harry Pavulaan⁵, and James L. Monroe⁶

¹100 Medical Campus Dr., Lansdale, PA 19446

²1625 Oak Hills Dr., Colorado Springs, CO 80919

³600 NW 35th Terrace Gainesville, FL 32607

⁴977 Wicks Drive, Palm Harbor, FL 34684

⁵606 Hunton Place, NE, Leesburg, VA 20176

⁶295 Market Street, Beaver, PA 15009

david.wright@jefferson.edu

marsabones@hotmail.com

marc.minno@gmail.com

bretcall@verizon.net

Harrypav@hotmail.com

jim5@psu.edu

^{3,4,6}Research Associate, McGuire Ctr. for Lepidoptera and Biodiversity, FL Museum of Natural History, Gainesville, FL

The report of a new larval host for *Celastrina neglecta* (W. H. Edwards) in the Panhandle Region of Florida (Friedman et al. 2019) is a welcome addition to the variety of hosts previously documented for this butterfly in that region (Friedman 2016).

Naturalists and scientists have studied Florida's butterfly fauna for over 200 years, yet the taxonomy and life history of the state's *Celastrina* have received limited attention. Kimball (1965) implied that multivoltine *Celastrina neglecta* flew exclusively in the state. More recently, Calhoun (1997) and Glassberg et al. (2000) recognized both univoltine *Celastrina ladon* (Cramer) and multivoltine *C. neglecta* occurring in the state. The distinction between these two

forewing androconia and lack the elongated, overlapping scale seen in *ladon* males. What's more, it is normally multivoltine throughout its wide range.

Celastrina ladon is presently understood to be a springtime denizen of mesic Appalachian forests with some spill-over into adjacent lowlands. The species-rich Appalachian forest community has largely remained stable since the early Tertiary, excluding periods of glaciation. So far, the precise range of *C. ladon* has not been carefully inspected. The presence of the unusual forewing scale (the "*ladon* scale") gives the dorsum of *ladon* males a matte-like, slightly hoary appearance. The presence of this overlapping scale is best seen in pinned specimens using

species is based on differences in voltinism and in morphology of the male forewing (see Appendix). Research by Pratt et al. (1994) discovered that adult *ladon* males possess unique, elongated transparent scales that overlay blue scales, and that *ladon* pupae diapause in spring after one adult flight. Males of *ladon* also lack androconia (sex scales). The uniqueness of the *ladon* forewing scales was discussed in several of our studies (Wright 1995; Wright 1998; Wright & Pavulaan 1999) and later confirmed by others (Belth 2013; Omura et al. 2015; Schmidt & Layberry 2016). In contrast, male *neglecta* possess

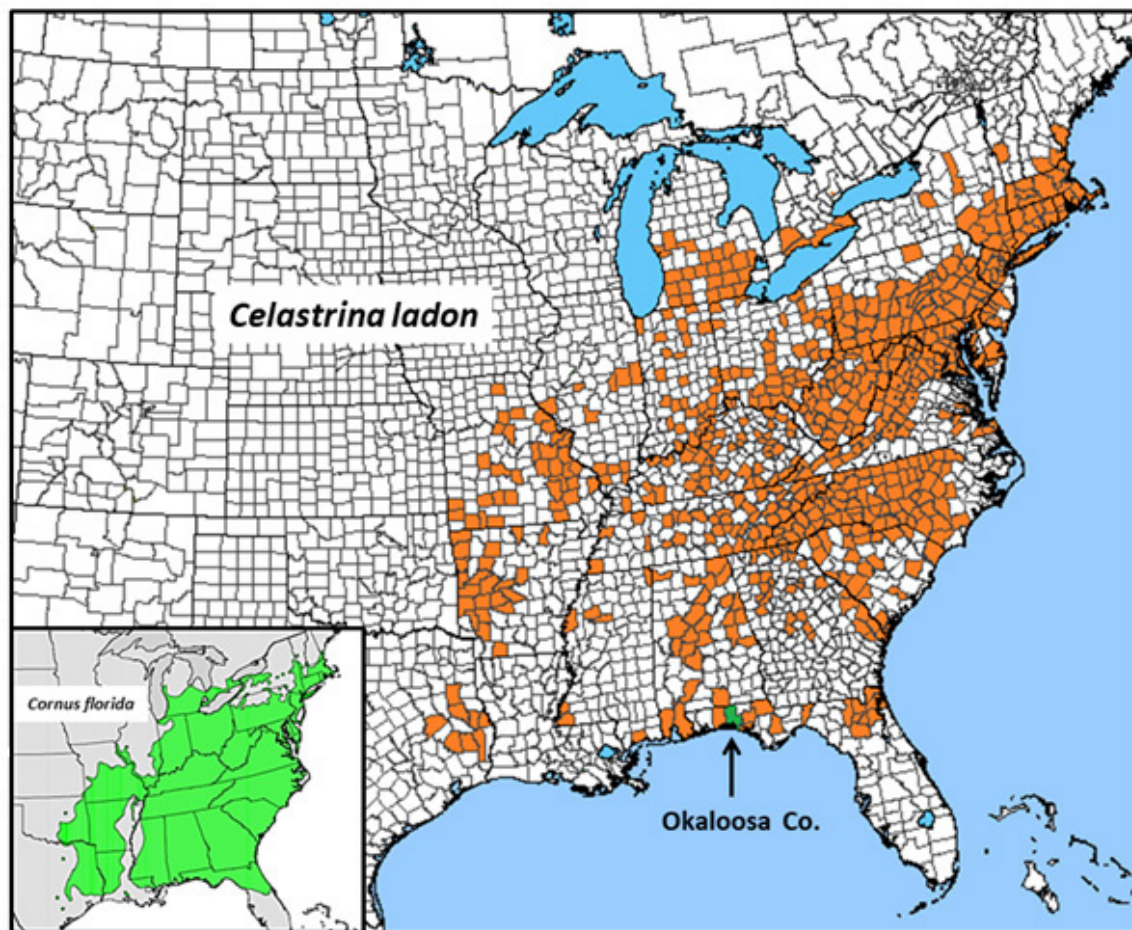


Fig. 1. Distribution map for *Celastrina ladon*. (Inset: natural distribution of *Cornus florida*.)

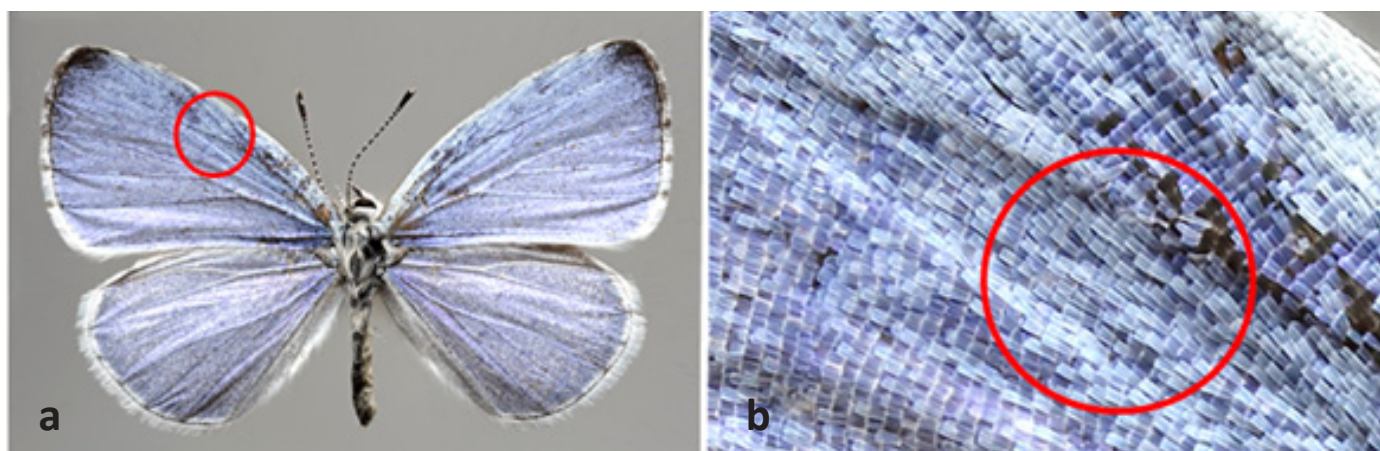


Fig. 2a,b. *Celastrina neglecta* ♂ with “ladon scales”, reared on *Nyssa sylvatica*, Okaloosa Co., Florida, eclosed 6-16 May 2018. Red circles indicate areas where overlapping scales can be found.

simple magnifying equipment such as a hand lens, dissecting scope, or camera with macro lens. From surveys of *Celastrina* found in 50+ museums and private collections, county records of spring-time males with the unusual scale character were compiled and mapped by DMW (Fig. 1). Though gaps remain to be filled, the range of *C. ladon* appears to closely align with the range of flowering dogwood, *Cornus florida*, its most common larval host in eastern North America. The inset in Figure 1 displays the natural distribution of *C. florida* by Little (1971).

Some new observations challenge what we thought we knew about the *Celastrina* of Florida.

(1). The “ladon scale” appears in *Celastrina neglecta* males in the Florida Panhandle.

We were completely surprised when a male *neglecta* that was reared on *Nyssa sylvatica* in Okaloosa County by MAF in 2018 was found to possess the “ladon scale.” A photo of this specimen (Fig. 2a) shows where to look for the “ladon scales” and the accompanying macrophotograph (Fig. 2b) demonstrates the standard appearance of these scales under magnification. This discovery necessitated a reexamination of other adults that MAF provided. Three additional *neglecta* males were found to have the “ladon scale”; two were reared ex *Prunus caroliniana* (emerged 26 February and 5 March 2012) and another was plucked out of a cobweb on 27 March 2012.

During the 1990s, DMW made a similar observation while examining Florida *Celastrina* males in the

Florida State Collection of Arthropods (FSCA) and the Allyn Museum of Entomology (AME) (both of these collections are now deposited at the McGuire Center for Lepidoptera and Biodiversity, Gainesville, Florida: MGCL). Distinctly light phenotype males (Fig. 3), flying from March to June, had the “ladon scale.” The conclusion at that time was *ladon* must have an extra brood in the Deep South, particularly in Florida. An additional *ladon* brood would naturally have a lighter phenotype due to increasing spring-time temperatures. However, *Celastrina* flights lasting into June suggested this represented much more than one extra brood. Now, thanks largely to MAF’s 15-year effort to record local *Celastrina* flights in the Florida Panhandle, we have a better understanding about the timing and number of broods. Photos of wild and reared adults

in Okaloosa County agree with a succession of multiple broods of a single species (*C. neglecta*), beginning in January and flying again in late February, March, April, and May. Some males from each of these broods have the “ladon scale”. Males from summer and fall broods have not yet been examined, but it is possible that all populations of *neglecta* in Florida produce the “ladon scale”.

(2). How did *Celastrina neglecta* in Florida acquire the “ladon scale”?

This exceptional character apparently introgressed from univoltine *ladon* into multivoltine *neglecta* at some time in the past. During the last Wisconsin glacial maxima (25,000 to 20,000 yrs BP), deciduous forests of the southern Appalachian Mountains were displaced southward into Florida. Florida’s full-glacial shoreline lay



Fig. 3. Light phenotype *Celastrina* ♂♂ resembling *C. neglecta* with “ladon scales,” Allyn Museum (MGCL). Top: Liberty Co., Florida, Torreya State Park, 3 June 1983, leg. H.D. Baggett. Bottom: Clay Co., Florida, Gold Head Branch State Park, 3 April 1975, leg. H.D. Baggett.

considerably further out on the continental shelf compared to the present-day shoreline (Whitehead 1973). Even so, populations of *ladon* and *neglecta* in this peninsular refuge had their backs to the wall (Gulf of Mexico, Atlantic Ocean). As their flights overlapped significantly, widespread hybridization likely occurred with selective character introgression of the “*ladon* scale” and loss of androconia. Meanwhile an array of suitable hosts guaranteed survival, especially for *neglecta*. Strangely, it looks as if pheromone-bearing androconia are not required for mate acceptance.

Another instance of this character introgression occurred at the northern extreme of the *ladon* range, specifically in New England. There, males of *Celastrina lucia* acquired the “*ladon* scale” during a warm and dry post-glacial period (Xerothermic, 8,000 to 5,000 yrs BP) when Appalachian forests with *Cornus florida* advanced northward as far as the southern tip of Maine (Wright, 1971; Pavulaan & Wright 2005). During this interval, climatic temperatures in eastern North America were notably warmer than those of today.

(3). Does “true” *Celastrina ladon* occur in Florida?

The most common *Celastrina* in Florida is *neglecta*. The vast majority of specimens in collections and those seen in the field are *neglecta*. Today, what we currently recognize as *ladon* appears to persist in the Florida Panhandle where a small violet-blue phenotype flies predominantly in February, between the first two *neglecta* broods (Fig. 4a). William H. Edwards described this “deep glossy violet-blue” phenotype as a distinct species, *Lycaena violacea* (Fig. 4b), from Coalburgh, West Virginia, in the Appalachian Mountains (Edwards 1866). (*L. violacea* is now treated as a junior synonym of *Papilio ladon* Cramer 1780.) On the map (Fig. 1), one can imagine a tongue of the Appalachian *ladon* population extending southward into the Florida Panhandle. It is fascinating to note that another Appalachian lycaenid, *Callophrys augustinus* (Westwood), was recently discovered in the same area of the Florida Panhandle (Calhoun et al. 2009a, 2009b; Friedman 2009). Flowering dogwood, *Cornus florida*, is likely the *ladon* host in the Florida Panhandle. However, the current decline of *C. florida* trees

due to fungal disease (anthracnose) may necessitate host shifts by egg-laying females to *Prunus* or *Ilex* species. To firmly document an extant population of *ladon* in Florida, it is essential that its host plant(s) be determined. Rearing immatures to diapausing pupae would be the clincher.

Acknowledgements

We thank the many curators and others who granted access to collections over the years, including John B. Heppner, Jacqueline Y. Miller and the late Lee D. Miller, and Andrew D. Warren. For a list of collections visited by DMW consult pp. 295-296 in Monroe & Wright (2017).

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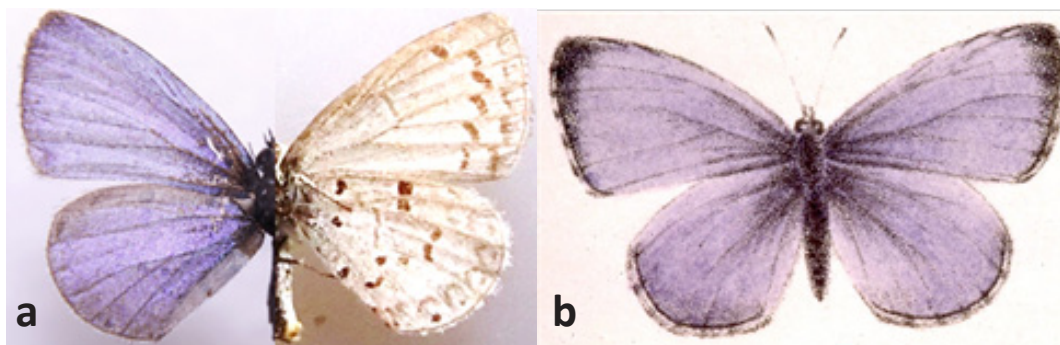
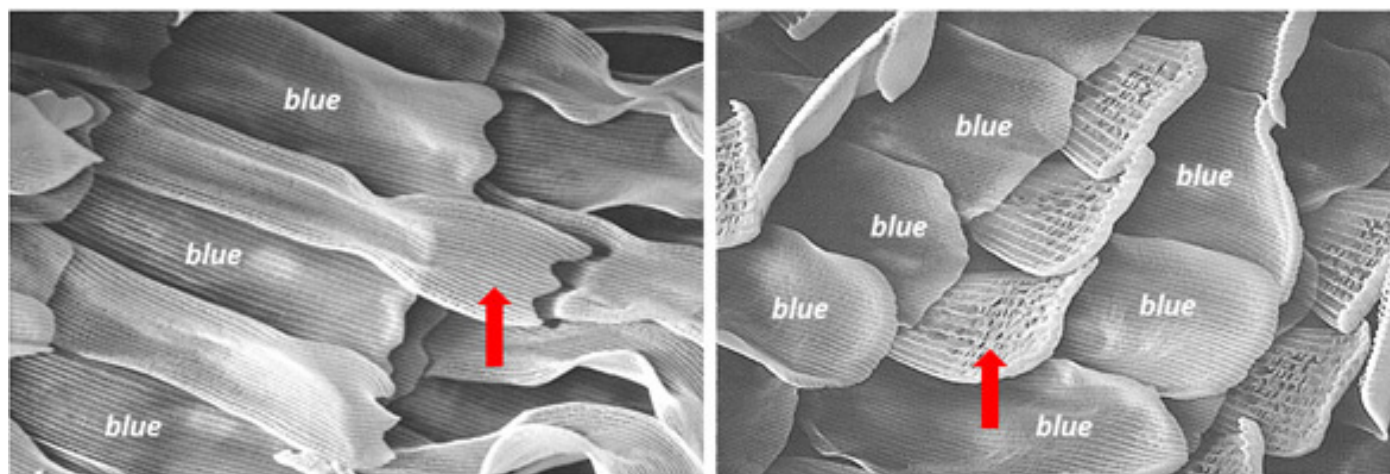


Fig. 4a,b. Violet-blue phenotype of *Celastrina ladon* ♂ in eastern North America. (a) Putative *C. ladon*, Okaloosa Co., Florida, Baker, 29 January 2006, leg. M.A. Friedman. (b) *Lycaena violacea* as it appears on Plate Lycaena II in Edwards (1884).

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Appendix



Male dorsal forewings of *Celastrina* (SEM, 640x). Left: *C. ladon* with elongated overlapping transparent scale (red arrow) covering blue scales. No androconial scales are present (Maryland: Allegany County, Green Ridge State Forest, 23 April 1992, leg. D.M. Wright). Right: *C. neglecta* with androconial scales (red arrow) inserted between rows of blue scales. No elongated overlapping, transparent scales are present (Pennsylvania: Montgomery Co., Harleysville, 17 Sep 1987, leg. D.M. Wright).



Images from the Atlas of Butterflies and Diurnal Moths in the Monsoon Tropics of Northern Australia (pg. 36):
 above -- mating Scarlet Jezebels, *Delias argenthona* (Fabricius, 1793), Mt Burrell, NT;
 right -- Pale Triangle, *Graphium eurypylus* (Linnaeus, 1758), Wanguri, Darwin, NT (photos by M. F. Braby)



Tom Emmel Remembered

Gary Noel Ross

6095 Stratford Avenue, Baton Rouge, LA 70808

GNRoss40@yahoo.com

I first met Tom C. Emmel in June 1967. We both were involved with the new Organization for Tropical Studies program in Costa Rica. Tom (along with Roy McDiarmid) was directing a summer course in Tropical Biology, I was one of a dozen or so participants. Following the summer, Tom and I lost contact with each other. That changed in November 1985 when I published my first commercial nature story ("The Case of the Vanishing Caterpillar" in *Natural History* magazine). In response, Tom wrote a very complimentary "Letter to the Editor" that was forwarded to me. From that point on, Tom and I remained the best of friends. I often participated in his Expedition Travel tours to exotic places (in several tours to Brazil, Honduras, Madagascar, and Mexico, I was co-director with Tom). Then in 2000, Tom asked me to become involved with the newly developing McGuire Center for Lepidoptera and Biodiversity associated with the Florida Museum of Natural History (FLMNH), University of Florida. That I did. During subsequent years, I developed two exhibits ("Zapotec Butterfly Tapestries from Mexico" and "Butterflies and Moths in Contemporary Zuni Art" for the new Hall of Culture and Science. In addition, for the decade or so before Tom passed, I was involved with the

development of a future exhibit of multi-cultural quilts from Guatemala. Because of my interest in education, approximately every two years, Tom and one or more of his colleagues from FLMNH visited with me in my home in Baton Rouge in order to discuss future projects of mutual interest; Tom's last visit was with Marie Emerson (Senior Director of Development, FLMNH) on February 6, 2018, shortly before he traveled to Brazil where he met his untimely death.

In reflection, I am fortunate to have saved some slide-film photographs from some of my experiences with Tom. A few of those are presented below. All photographs are by yours truly unless otherwise stated.

Fig. 1 shows Tom at the Monarch overwintering site at El Rosario. In years after this picture (1988), Tom usually led annual tours to visit one or more of the Monarch colonies.



Figure 1. January 1988. Tom in newly discovered (1975) overwintering colony of Monarch butterflies in what has become known as "El Rosario" in the state of Michoacán, Mexico.

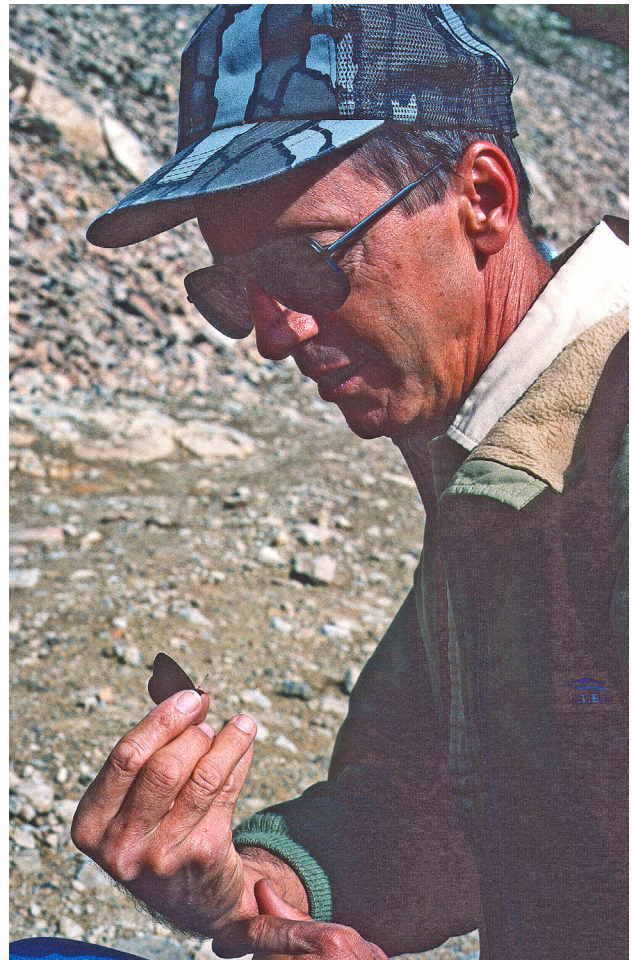


Figure 2. July 1990. Tom examining a Magdalena Alpine (*Erebia magdalena*), netted at Horseshoe Mountain, Colorado.

Tours were under the auspices of Holbrook Travel, Inc. and Tom's company, Expedition Travel, both headquartered in Gainesville, Florida. I accompanied Tom on three excursions to the Monarch colonies. These experiences resulted in me publishing: "The Monarch butterfly." *Louisiana Wildlife Federation*, special issue-- Monarch magic, 2001, November-December (Vol. 29:4), pages 4, 13-40, front cover (inside, outside), back cover (inside, outside). [This special issue was the recipient of the "2001 Conservation Communicator of the Year Award" issued by The Louisiana Wildlife Federation and The National Wildlife Federation for "Outstanding Contributions to the Wildlife and Management of Louisiana's Natural Resources."]

Fig. 2 shows Tom examining a Magdalena Alpine (*Erebia magdalena*), a prized strictly alpine tundra species in Colorado. For many years, Tom would teach a summer course in butterfly biology at The Nature Place—a National Environmental Study Area of the National Park Service, and located in the highlands of Colorado near the community of Florissant. A one-day field trip to Horseshoe Mountain for alpine butterflies was usually on the agenda. (Incidentally, Tom requested that after his death, his ashes would be scattered on the grounds of The Nature Place; that wish was honored.) My experiences resulted in me publishing two stories: (1) "Flying High: An Adventure in the Alpine Tundra of Colorado" in *News of the Lepidopterists' Society*, 2010, Autumn (Vol. 52:3), pages 90-92, 104; (2) "Highland Fling: Butterfly Wrangling on Colorado's Horseshoe Mountain" in *Naturalist at Large*, in *Natural History* magazine, 2011, February (Vol. 119:4), pages 12-15.

Fig. 3 shows Tom in the rain forest of Papua or West Papua. This is the eastern most province of the nation of Indonesia, and the western half of the island of New

Guinea (the eastern end is independent nation of Papua New Guinea). This first-of-a-kind collecting trip was organized by Giovanna Holbrook of Holbrook Travel, Inc. and Tom of Expedition Travel. The trip was a collecting/photographing trip targeting birdwing butterflies (*Ornithoptera*) and primitive indigenous peoples such as the Dani. My experiences resulted in me publishing two stories: (1) "My Wallace Moment: On the Trail of Birdwing Butterflies" in *Natural History* magazine, 2015, "Special Issue: Honoring Alfred Russel Wallace," September (Vol. 123:7), pages 24-29; (2) "On Alfred Russell (sic) Wallace, Birdwing Butterflies, and My Experiences in New Guinea" in *News of the Lepidopterists' Society*, 2016, Spring (Vol. 58:1), pages 9-15.

Fig. 4. shows Tom with the family of Harold and Barbara Schmitz, Fazenda Ranch Grande, Rondônia, Brazil. The family (originally from Germany by way of Venezuela)



Figure 4. December 1990. Family of Harold and Barbara Schmitz, Fazenda Ranch Grande, Rondônia, Brazil. (Tom on right)



Figure 3. November 1990. Tom (left) in the rain forest of Papua or West Papua (formerly Irian Jaya).

owned a 750 hectare (1,853 acres) tract of land in Brazil's northwestern state of Rondônia. The family grew cacao (chocolate beans) and raised cattle. But thanks to Tom (and others), the family reserved a sizable portion of the land in virgin and secondary rain forest. Tom was closely involved in the establishment of FAUTRON-Rondônia Fauna and Flora Foundation, the organization that is responsible for preserving the Schmidt's undeveloped land. In addition, Tom spearheaded the SOS Rain Forest Project, BARC (Biological Analysis & Research Center, Inc.) headquartered at the University of Florida in Gainesville. The organization was designed to raise funds to purchase forested land near Fazenda Rancho Grande. During the late 1980s through the mid 1990s, Tom led collecting/research expeditions to the ranch, sponsored through Holbrook Travel, Inc. Nearly 1,800 species

of butterflies or approximately 10% of the Earth's known species are found here -- making Rondônia the butterfly capital of Planet Earth. (Unfortunately, Rondônia now has the highest rate of deforestation for the entire country.) Collecting trips were discontinued when the Brazilian government banned collecting by foreigners. Fig. 5 shows Tom discussing the trip out from the Fazenda Rancho Grande with the bus driver in mid December. The isolated ranch could be accessed by bus only during the dry season. Otherwise, the final 37-mile leg of the journey had to be negotiated in vans and open-back trucks.



Figure 5. December 1990. Tom discussing schedule with bus driver for the groups' exodus from Fazenda Rancho Grande.

The virgin rain forest around the Fazenda Rancho Grande was truly incredible (see Fig. 6). Unfortunately, I do not have a photograph of Tom in the forest, but this one of me taken with my camera on a tripod using a timer gives a good idea of the magnificence of the Amazonian rain forest. My experiences during my three-months (December 5, 1990-February 23, 1991) at the Fazenda resulted in me publishing five stories: "One Butterfly's Poison is Another's Feast: Ithomiines on Droppings (Lepidoptera:Nymphalidae)." *Tropical Lepidoptera*, 1995, NOTE, Vol. 6:1, page 10; "Pollen Gathering: Heliconiines Collecting Pollen (Lepidoptera: Nymphalidae)." *Tropical Lepidoptera*, 1995, NOTE, Vol. 6:1, page 52; "A Butterfly Roundtable: Ithomiines on Fruit (Lepidoptera:Nymphalidae)." *Tropical Lepidoptera*, 1995, NOTE, Vol. 6(2), page 94; "Butterfly Carnivale." *Wildlife Conservation* magazine, May-June (Vol. 101:3), pages 46-55; "An Adventure in the Amazon and a Mother's Final Blessing." *News of the Lepidopterists' Society*, Winter (Vol. 51:4), pages 140-145, 148.



Figure 6. January 1991. Yours truly in rain gear beside a huge Ficus tree in the virgin rain forest within Fazenda Rancho Grande, Rondônia, Brazil.

The remaining figures (7 - 11) include three of myself and Tom, with or discussing various projects, and two more of Tom at the El Rosario Monarch preserve. I hope that you enjoy this remembrance of Tom. I will miss him.

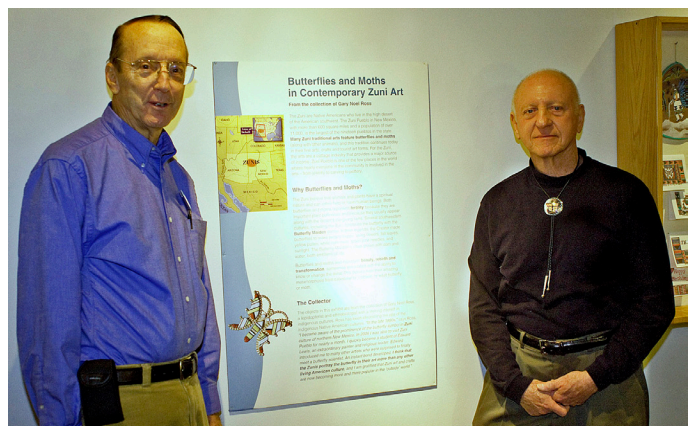


Figure 7. February 2010. Tom (left) and yours truly in front of one of the panels for my exhibit "Butterflies and Moths in Contemporary Zuni Art" at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History. The exhibit ran from 2008 to 2010. I produced one story based on the exhibit: "Exhibit of Zuni Butterfly Art at McGuire Center Extended through 2009." *Association for Tropical Lepidoptera*, NOTES, June 2009, two pages. Photograph (digital) by Jeff Cage of FLMNH.

Figure 8. 2010. Tom (left) and yours truly (right) viewing a new large quilt designed by Priscilla Bianchi, a Guatemala textile quilter renowned as the master quilter in Central America. The quilt combines textiles by four cultures: embroidered patches by the Otomi Indians of central Mexico, panels from indigenous cultures in Guatemala, panels of contemporary textiles by Ms. Bianchi, and final pattern stitching by Laura Lee Fritz, a California based quilter. The quilt, along with a second design by Ms. Bianchi, was being considered for a future exhibit at the McGuire Cen-ter for Lepidoptera and Biodiversity. Photograph (digital) by Jeff Cage of FLMNH.



Figure 9. September 2012. Tom (left) and yours truly (right) in my home during one of Tom's visits to discuss projects of mutual interest. Photograph (digital) by Ian Segebarth of FLMNH.

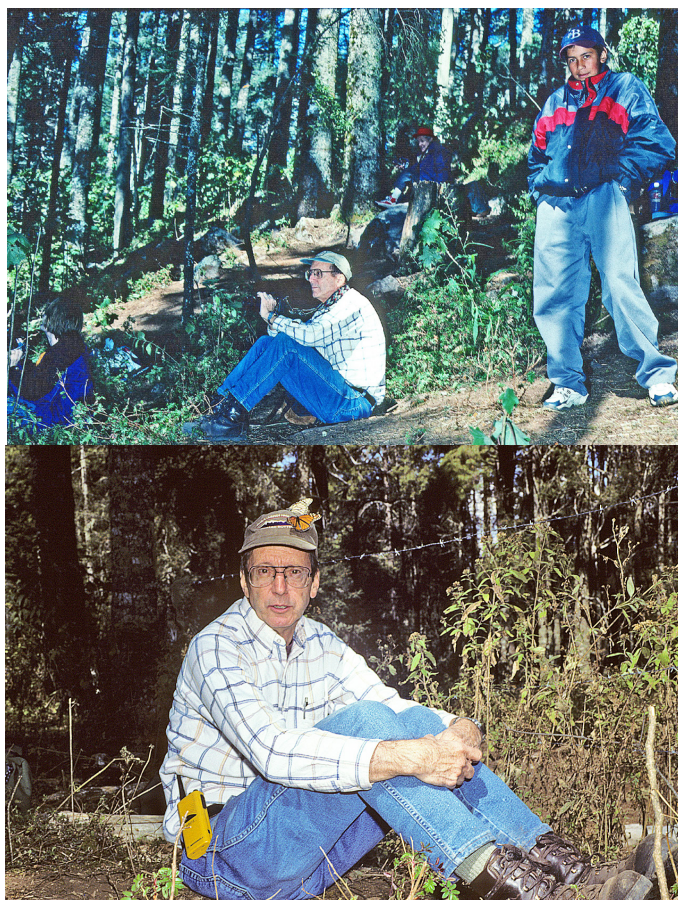


Figure 10 (top). February 2001. Tom (seated) in the El Rosario colony of overwintering Monarchs in Michoacán, Mexico. A local young guide is in the right of the photograph. Figure 11 (bottom). February 2002. Tom in the overwintering monarch colony of El Rosario surrounded by some of his closest "friends."

The Marketplace

IMPORTANT NOTICE to ADVERTISERS: If the number following your ad is "611" then you must renew your ad before the next issue if you wish to keep it in the Marketplace!

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The aim of the Marketplace in the **News of the Lepidopterists' Society** is to be consistent with the goals of the Society: "to promote the science of lepidopterology...to facilitate the exchange of specimens and ideas by both the professional and the amateur in the field..." Therefore, the Editor will print notices which are deemed to meet the above criteria, without quoting prices, except for those of publications or lists.

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Buyers, sellers, and traders are advised to contact state department of agriculture and/or ppqaphis, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting the possession, collection, import, and export of some insect and plant species. Plant Traders: Check with USDA and local agencies for permits to transport plants. Shipping of agricultural weeds across borders is often restricted.

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Publications

Butterflies of Colorado - HesperIIDae - Part 6 The Skippers, by Michael Fisher; \$50.00 paperback.



THE
BUTTERFLIES OF COLORADO



HESPERIIDAE - PART 6
THE SKIPPERS

Lepidoptera of North America 7.6
Contributions of the C.P. Gillette Museum of
Arthropod Diversity, Colorado State University

Michael S. Fisher

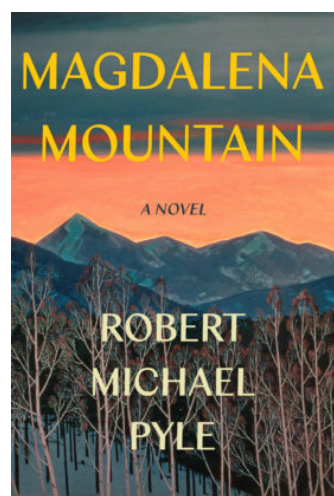
The final part published as the sectional series, Lepidoptera of North America 7.6, Contributions of the C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Ft. Collins, Colorado (ISSN 1084-8819). 223 pages covers the 76 recorded/reported species, most of which are resident and includes all applicable subspecies; 382 color photographs with clear detail and current Colorado county

distribution maps for all among the text pages. In most instances, behavioral and host plant information is included.

For ordering information email the author: butterfliesofcolorado@hotmail.com 611

Magdalena Mountain: A Novel

by Robert Michael Pyle. Counterpoint Press, 2018. Paperback, 400 pp. (ISBN: 9781640090774) List Price: \$16.95. May be ordered from any bookstore or online service, including Powells.com and Indiebound. More info at <https://www.counterpointpress.com/dd-product/magdalena-mountain/>



In *Magdalena Mountain*, Robert Michael Pyle's first and long-awaited novel, the award-winning naturalist proves he is as at home in an imagined landscape as he is in the natural one. At the center of this story of majesty and high mountain magic are three Magdalenas -- Mary, a woman whose uncertain journey opens the book; Magdalena Mountain, shrouded in mystery and menace; and the all-black Magdalena alpine butterfly, the most elusive of several rare and beautiful species found on the mountain.

And high in the Colorado Rocky Mountain wilderness, sharing the remote territory of *Erebia magdalena*, lives the enigmatic Oberon, a reluctant de facto leader

of the Grove, a diverse community of monks who share a devotion to nature. Converging in the same wilderness are October Carson, a beachcomber-wanderer in pursuit of the alpine butterflies he collects for museums; James Mead, a young graduate student intent upon learning the ecology of this seductive creature and the whereabouts of Carson; and Mary Glanville, who also seeks the butterfly but can't remember why. While the mystery surrounding Mary takes a sinister turn, their shared quest pulls them deeper into the high mountain wilderness, culminating in a harrowing encounter on the stony slopes of Magdalena Mountain.

Lepidopterist-readers will take special pleasure in this story, as they recognize many of their ilk, by their actual names or not, populating the pages of this delicious and taut butterfly caper. 612

Ctenuchina de Guyane française, Lepidoptera, Erebidæ, Arctiinae, Arctiini (partie 1)

by Jean-Aimé Cerda. In French and English.



\$90.00 softcover. 2017. 181 p., 20 full-page color plates with 149 photos of adult moths & 1 map of collecting zones; 115 figs. in text (photos of male genitalia). [Mémor. No. 7, Société Linnéenne de Lyon] Treats 119 species currently known from French Guiana: 43 species added & 15 species removed from the fauna of French Guiana. Describes 2 new genera & 18 new species; 16 new combinations, 10 species with revised status,

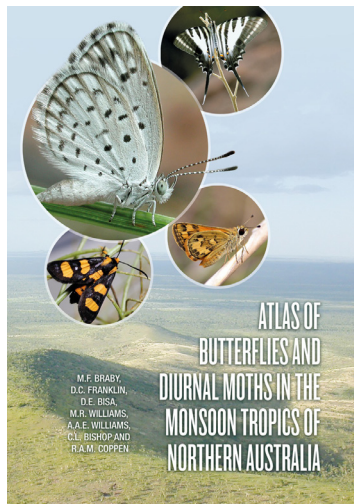
11 new synonyms. Companion volume (*Euchromiini de Guyane Française*, 2008, softcover with 2 CDs of photos of adults & male genitalia) also available for \$105.95. Entomological Reprint Specialists, 2985 E. Manzanita Ridge Pl., Tucson, AZ 85718-7342. Free U.S. shipping if you order direct (bugbooks@aol.com), or order online (no free shipping) at <https://tinyurl.com/yaeeoy84> or on Amazon.com. 611



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Atlas of Butterflies and Diurnal Moths in the Monsoon Tropics of Northern Australia

by M.F. Braby, D.C. Franklin, D.E. Bisa, M.R. Williams, A.A.E. Williams, C.L. Bishop, R.A.M. Coppen. The Australian National University Press, Acton, Australian Capital Territory, Australia 2601; \$135.00 print.



Northern Australia is one of few tropical places left on Earth in which biodiversity—and the ecological processes underpinning that biodiversity—is still relatively intact. However, scientific knowledge of that biodiversity is still in its infancy and the region remains a frontier for biological discovery. The butterfly and diurnal moth assemblages of the area, and their intimate associations with vascular plants (and sometimes ants), exemplify these points.

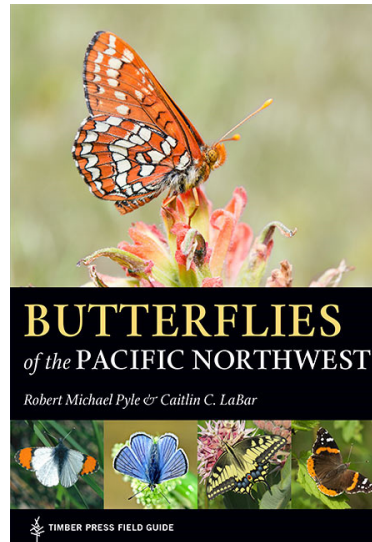
However, the opportunity to fill knowledge gaps is quickly closing: proposals for substantial development and exploitation of Australia's north will inevitably repeat the ecological devastation that has occurred in temperate southern Australia—loss of species, loss of ecological communities, fragmentation of populations, disruption of healthy ecosystem function and so on—all of which will diminish the value of the natural heritage of the region before it is fully understood and appreciated. Written by several experts in the field, the main purpose of this atlas is to compile a comprehensive inventory of the butterflies and diurnal moths of northern Australia to form the scientific baseline against which the extent and direction of change can be assessed in the future. Such information will also assist in identifying the region's biological assets, to inform policy and management agencies and to set priorities for biodiversity conservation.

You can download the whole Northern Australian Atlas or individual chapters free of charge at this link: <http://doi.org/10.22459/ABDM.12.2018>. 612

Butterflies of the Pacific Northwest

by Robert Michael Pyle and Caitlin C. LaBar. Timber Press, 2018. Flexibind, 464 pp., 612 color photos, 198 maps, 20 illustrations. (ISBN-10: 1604696931) List price \$27.95. Maybe ordered from any bookstore or on-line service, including Powells.com and Indiebound. More info at http://www.timberpress.com/books/butterflies_pacific_northwest/pyle/9781604696936.

Winner of the 2018 National Outdoor Book Award for Nature Guides.



Easy to use and beautifully illustrated with more than 600 color photographs and nearly 200 maps, *Butterflies of the Pacific Northwest* is a definitive field guide to all species known from Washington, Oregon, western Idaho, northern California, and British Columbia. The profiles include accepted names for genus and species, type locality, conservation status, distinguishing traits and variation of every species, the preferred foodplants

and nectar plants, habitat and range, as well as personal, lyrical, and familiar accounts of each butterfly. 17 illustrative plates are included to help users compare and identify species. Additional information includes a brief introduction to how butterflies work and details on ecology, biogeography, and conservation. *Butterflies of the PNW* updates and expands upon *The Butterflies of Cascadia*, with new images superbly curated by Caitlin LaBar. The text, taxonomy, and maps are all entirely up-to-date. 612

About the Authors

Robert Michael Pyle

Lepidopterist and writer Robert Michael Pyle is the founder of the Xerces Society for Invertebrate Conservation, the founding chairman of the IUCN/SSC's Lepidoptera Specialist Group, a sixty-year member of the Lepidopterists' Society, and an Honorary Fellow of the Royal Entomological Society. A Yale-trained ecologist and a Guggenheim Fellow, he is a full-time biologist and the author of 22 books, including *Wintergreen*, which won the John Burroughs Medal, *The Butterflies of Cascadia*, and the *Audubon Society Field Guide to the Butterflies of North America*. He recently co-revised the species *Lycaena mariposa*, describing nine new taxa.

Caitlin C. LaBar

Pacific Northwest native Caitlin C. LaBar was born with a fascination for insects, which has developed into an interest in studying the habitats and life histories of butterflies. A geographer and GIS analyst by training and a conservationist by nature, she enjoys photographing and collecting local butterflies and working on various butterfly mapping projects. She is the author of *Pocket Guide to the Butterflies of Washington* and *Butterflies of the Sinlahekin Valley Wildlife Area*. LaBar is a former Member of the Executive Council of the Lepidopterists' Society.

Research

WANTED: spread, high-quality (i.e., scaled, undenuded) specimens of *Halysidota tessellaris*, *H. harrisii*, and *H. cinctipes* for a study testing the efficacy of new methods of species delimitation. +50 individuals of each sex needed for each species. Specimens will be imaged, have their DNA sequenced, and have their genitalia dissected to confirm IDs. Recently collected specimens (<5-10 years old) preferred. Live specimens greatly appreciated, though not necessary. Donators will be acknowledged in any publications using data derived from specimens, unless they prefer to remain anonymous. For more information please contact Dr. Nick Dowdy of the Milwaukee Public Museum (njdowdy@gmail.com). indefinite

Wanted, spring/summer 2019: Live specimens, any stage, of *Leptotes marina*. I prefer populations using *Plumbago* as a hostplant. Contact Raymond White (rrweditha@yahoo.com) to discuss numbers, timing, delivery, & payment.

Collections

WANTED: Large private collections or individual specimens of native or exotic species of Lepidoptera, Coleoptera, Hymenoptera, Diptera, etc. Experienced in dealing, thoughtfully, with family members who desire to sell the collection of a loved one who passed on and also those who have loads of stored specimens wanting to unload some to make room. No matter how common or rare, do not hesitate to contact me. Willing to travel. Only purchasing specimens/collections already in the United States; I am not interested in importing. Thank you for considering me and trusting my hands to see to it that your collection gets appreciated for many years to come. Please email Jay Timberlake at crossmoth777@aol.com or text me at (812)267-4319. Thank you! 612

A strange *Colias* in John Abbot's Georgia butterfly illustrations

Continued from p. 11

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New host and county records, with a breeding range extension for *Protambulyx strigilis* (Lepidoptera: Sphingidae)

Teá Kesting-Handly¹ and Steven Kloiber²

¹Sphingidae of the United States, 26 Arborway, Boston, MA 02130 sphingidaeusa@gmail.com

²657 Sandt Rd., Pen Argyl, PA 18072 skloiber@frontier.com

Abstract:

Protambulyx strigilis (Sphingidae: Smerinthinae) is a hawkmoth distributed throughout the Neotropics and Florida. The larvae are known to feed on many plants in the Anacardiaceae and several in the Simaroubaceae. We discuss and summarize the breeding range for this species in Florida, adding an expansion and a county record, review the hostplants used in southern Florida, and provide a new hostplant record: *Rhus copallinum* (Anacardiaceae). We photographically illustrate several larval color morphs of this species, including previously unrecognized forms, as well as introduce hypotheses as to why these forms exist in the Smerinthinae and in other Sphingidae.

Keywords: Lepidoptera, Sphingidae, Hostplant, Breeding, Range expansion, *Protambulyx strigilis*, Color forms

Introduction:

Protambulyx strigilis is a hawk moth distributed throughout the Neotropics, from South America to southern Florida and the Caribbean, straying occasionally into South Texas. For a full, detailed account of the distribution of this species, please see Haxaire, 1988 and Haxaire & Rasplus, 1986. In the continental United States, this moth has been primarily recorded from Southern and Central Florida with a few records from the southeastern coast of Texas (BugGuide). At the time of writing this paper, there are no online or literature records of *P. strigilis* breeding north of Orlando, Florida (Fig. 1b). A breeding record in this case is considered to be a larva found in nature. Records of adults are sparse in northern Florida, with the northernmost record from near St. Augustine, Florida, on the Atlantic Coast (Fig. 1a).

It has been noted that this species takes advantage of the introduced Brazilian Pepper tree *Schinus terebinthifolius* (Raddi) (Anacardiaceae) and thus the northern expansion of *P. strigilis* may be explained by the spread of this plant (Tuttle, 2007). *Schinus terebinthifolius* is an invasive plant native to Brazil, Paraguay,

and Argentina which was introduced into Florida in the 1800s (MacDonald, et al. 2008). Although the plant has spread over most of Florida, it is intolerant of extended periods of cold or hard frosts and thus has not spread beyond Levy and St. Johns counties or farther west than Santa Rosa County in the state (MacDonald, et al. 2008) (Fig. 2). It should be noted that this plant exists outside of Florida in Mobile Co., Alabama which is the farthest North and West this plant is found in the USA (Fig. 2).

New Hostplant Record and Larval Color Forms:

On Nov. 27th, 2017, we visited the University of Florida's Natural Area Teaching Laboratory (NATL) in Gainesville, Florida. *Rhus copallinum* (Linnaeus) (Anacardiaceae), known as Winged Sumac, grows in the sandy soil of NATL. The nighttime temperatures at NATL during our visit there reached 14°C (US Climate Data) and *Rhus* was

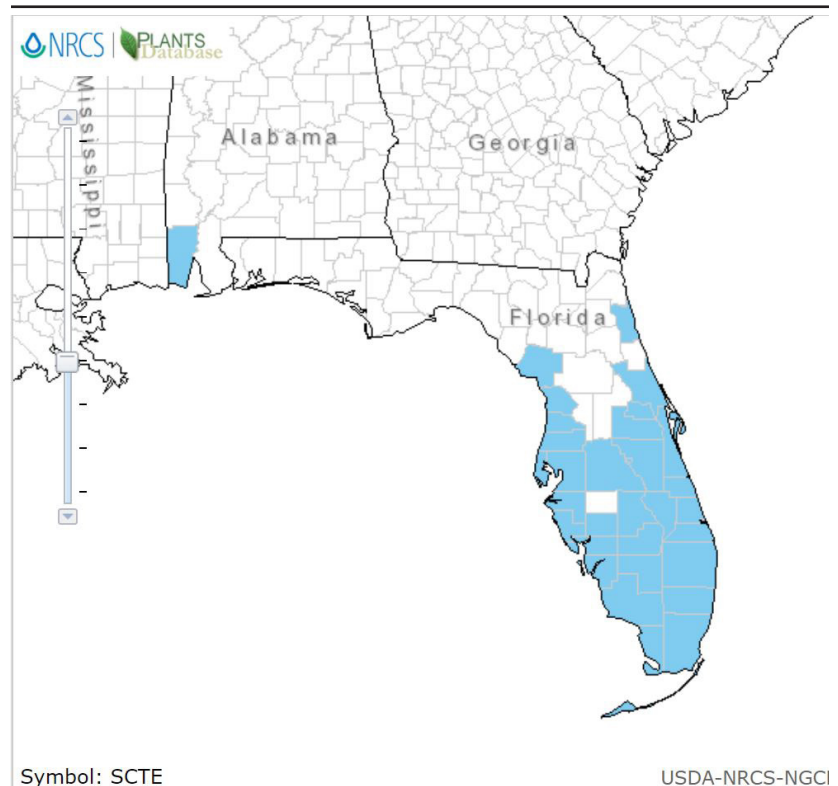


Figure 2: USDA-NRCS Plants Database distribution map for *Schinus terebinthifolius* (Anacardiaceae)

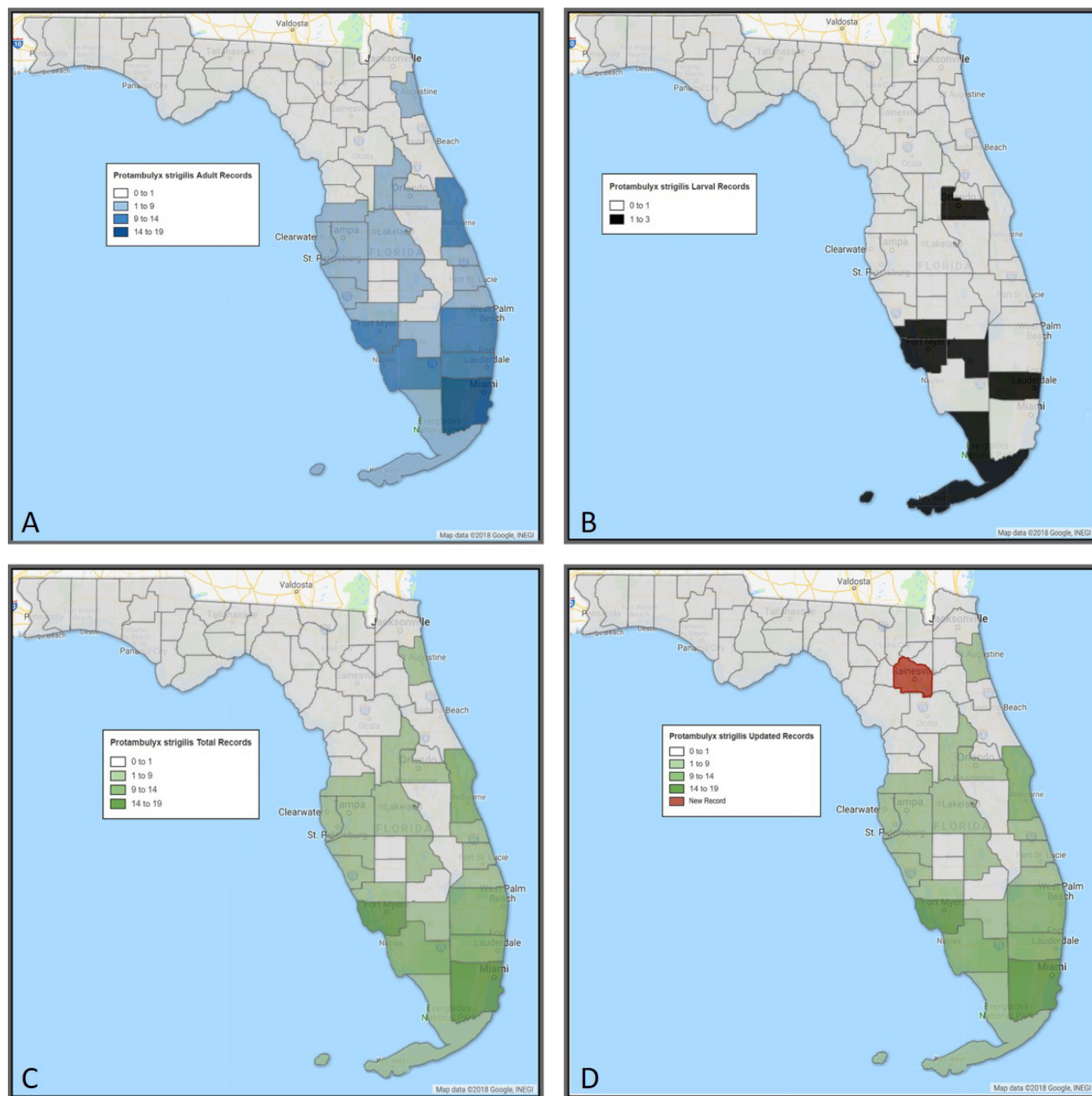


Figure 1: Records and Distributions of *Protambulyx strigilis* in Florida. Data collected from online citizen science projects (BugGuide, iNaturalist, BAMONA), published literature (Tuttle, 2007; Hodges, 1971) and the author's personal collection (n=140). **Fig. 1A:** Records of Adult *P. strigilis* found in Florida. The highest concentration of records is in deep blue and the lowest in lighter blue. The southern tier counties tend to have the highest concentration of adult records. The northernmost record displayed on this map is St. Augustine, Florida. **Fig. 1B:** Records of larval *P. strigilis* found in Florida prior to this paper. Each county colored is represented only by a few records. The northernmost record is Orange County (Orlando, Florida). **Fig. 1C:** Total records of *P. strigilis* compiled from the sources listed above. The darkest shade of green represents the highest concentration of records, once again, focused primarily around the southern tier counties. **Fig. 1D:** Total records of *P. strigilis* as well as the new record (in red). The new record is the northernmost record for larvae and is roughly of the same latitude as the northernmost adult record.

sporting its deep red fall colors, though there were several plants that were still green. We began searching the habitat for any larvae using several 18W ultraviolet flashlights. Large sphingid larvae were soon observed on many

of the *R. copallinum*. In one small area of NATL, ten larvae were recovered. The first author identified the larvae as *Protambulyx strigilis*. Out of all the collected larvae, one was fourth instar and the remainder in their final instar.

Coloration variation in the larvae was noted; some were the typical plain green, while others were orange in color with purple markings (Fig. 3A-G). Among the collected larvae, three distinct color forms, described here, were

observed: green form, maculated form, and orange form. Larvae were all characterized in their final instar for consistency. The number in parentheses represents the percentage of larvae recovered per color form. It is important



Figure 3: Larval images of *Protambulyx strigilis* from Alachua Co., Florida on hostplant *Rhus copallinum*. Images A-D,F are of unique individuals, whereas the same individual is represented in E,G. The images are assigned one of three color forms for easier identification. **Fig. 3A:** Non-bicolored maculated form of *P. strigilis* with large purple-brown blotches around the spiracles and a distinctly yellow last abdominal stripe. **Fig. 3B:** A characteristic green form larva. In this form, the larva is entirely green with a bright and distinctly white last abdominal segment leading to a green horn. **Fig. 3C:** Green form larva exhibiting some minor purple splotching above the abdominal streaks. **Fig. 3D:** A bicolored maculated form of *P. strigilis*. The dorsal coloration is orange-yellow with deep purple blotching, the larva becomes greener ventrally. The normally white last abdominal stripe is tinted yellow. This form is nearly an intermediate between the green and orange forms. **Fig. 3E:** An orange form *P. strigilis*. The entire larva is orange including the caudal horn (usually a green-yellow color often with some blue coloration on the dorsal portion) and head capsule. There is some purple splotching above the now distinctly yellow abdominal streaking. The last bold abdominal streak is distinctly yellow. **Fig. 3F:** A green form larva with some yellow and purple maculation above a few abdominal streaks. The thick bold streak before the caudal horn shows hints of yellow coloration before turning distinctly white as you approach the prolegs. **Fig. 3G:** Another view of the orange form larva showing the orange-brown head capsule with yellow-orange line. The horn is orange and the abdominal streaking more yellow in color.

to note that none of the pictured larvae are prepupal. The photographs in Fig. 3 were taken two days after collecting the larvae, and pupation did not occur until several days later. The larvae were collected and reared on *Rhus* until they pupated. All larvae pupated successfully and the resulting pupae kept in captivity. Due to rapid temperature fluctuation, the adults did not expand their wings properly; pupae began eclosing roughly three to four weeks after pupation, and may have undergone diapause if exposed to natural temperatures as opposed to the relatively high temperature and humidity of the indoors enclosure.

The most abundant and common form seems to be the green form (60%). This form is green in color, occasionally with some small amount of purple splotching above or below the abdominal streaking and has a green head capsule. The characteristic large bold abdominal streak that runs from the anal prolegs to the base of the green (or green-yellow, occasionally with some blue on the dorsal portion) caudal horn, is distinctly and primarily white (Fig. 3B, 3C, 3F).

The maculated form is variable, from almost bicolored in appearance to green with splotches, but is easily characterized by the last abdominal streak being yellow or cream but not white (30%). In the bicolored-maculated form, the dorsal region of the larva tends to have extensive amounts of purple, orange, and yellow coloration. The purple tends to exist in the form of splotches, whereas the orange and yellow colorations composes the ground color. The coloration of the bicolored morph progresses from orange-yellow to green along a dorsal-ventral gradient. The change to the green color becomes quite distinct around the spiracles. In other morphs, the larva is primarily green but has large purple-brown splotches along the sides, often surrounding the spiracles. The thick white streak that leads to the caudal horn is distinctly yellow in the heavily maculated larval form, the caudal horn itself tends to be more yellow than green, and the bluish coloration appears purple (Fig. 3A, 3D). Occasionally, prepupal green form larvae can take on an orange/yellow hue dorsally, but the white streaks generally remain white. Apart from coloration, prepupal larvae can be immediately recognized by the dark pulsating dorsal aorta which is visible through the thin cuticle.

The most unusual color form is the orange form (10%). In this form the ground color is entirely orange, with a rusty orange head capsule. There is a significant amount of yellow or purple maculation. The caudal horn is orange and the last abdominal streak leading to it is yellow (Fig. 3E, 3G).

Previously, there are several color forms of this species depicted. A blue form observed in the final instar by Ben Trott is pictured on Bill Oehlke's website (Oehlke). This form also appears in the database of Dan Janzen (Janzen). This form is akin to the green form, except that the larva's ground color has a bluer tint and the caudal horn tends to be darker in color, blue to nearly black. The thick white last abdominal stripe is the same as in the green form.

Moss first depicted the larval forms of this species from Brazil. In his work, he noted several color forms including a "red", "green", and "gray" form (Moss, 1920). The green form in his paper is akin to the green form here, the red form is most like the orange form, though perhaps slightly darker. The gray form is closest to the blue form shown on Dan Janzen's website (Janzen).

A simple key is introduced here to help identify the color forms proposed in this paper:

- 1: Last abdominal stripe distinctly white (2)
- 1': Last abdominal stripe yellow, beige, or otherwise not distinctly white (3)
- 2: Overall appearance of the larva is green, caudal horn is green in color... *green form*
- 2': Overall appearance of the larva is bluer, caudal horn is dark almost black... *blue form*
- 3: Larva is overall orange in color with no green and a distinctly orange horn and orange head capsule... *orange form*
- 3': Larva may be bicolored or green with splotches, the horn color may be orange or yellow-green and the head capsule is primarily green... *maculated form*

While this variability is striking, it is not unique among the Sphingidae, and in fact many other smerinthine sphingid larvae also have drastic variation in their maculation. For example, in the genus *Paonias* (Hubner, 1819), both *P. myops* (J.E. Smith, 1797) and *P. excaecata* (J.E. Smith, 1797) exhibit various amounts of red or purple splotching in the larval stage, with some larvae exhibiting heavy maculation and others exhibiting none (Tuttle, 2007). The orange coloration of *Protambulyx strigilis* may be in response to the autumnal coloration of the *Rhus* as we cannot find similarly colored larvae pictured elsewhere, nor has such variability been previously described for *P. strigilis*. Another smerinthine species, *Amorpha juglandis* (J.E. Smith, 1797) may rarely have a larval form similar to the orange form of *P. strigilis* (Kesting-Handly & Kloiber, 2018). It would be of interest to attempt to induce these color forms in captivity, and to determine if the coloration is indeed caused by seasonal changes in plant chlorophyll levels.

Though *Rhus copallinum* is a member of the Anacardiaceae, it has not been previously recorded as a hostplant for *Protambulyx strigilis* (Table 1). In fact, the genus *Rhus* appears quite infrequently in the literature, only being recorded for this species by Moss (Moss, 1920). In 2018, Alan Chin-Lee uploaded photos to BugGuide of a *P. strigilis* larva feeding on a plant he identified as "Sumac" (BugGuide record #1572640). The photos on BugGuide do show a green form larva on a *Rhus* species, and it is likely *Rhus copallinum*. This record, along with ours, suggests that *P. strigilis* is using *R. copallinum* as a host in Florida and the rest of its breeding range.

Table 1: Hostplant Records for *Protambulyx strigilis* with new record in red.

Family	Species	Source
Anacardiaceae		(Robinson, et al. 2010)
Anacardiaceae	<i>Anacardium</i>	(Hodges, 1971)
Anacardiaceae	<i>Anacardium giganteum</i>	(Moss, 1920)
Anacardiaceae	<i>Anacardium occidentale</i>	(Robinson, et al. 2010; Oehlke; Moss, 1920)
Anacardiaceae	<i>Astronium graveolens</i>	(Oehlke; Janzen)
Anacardiaceae	<i>Comocladia</i>	(Hodges, 1971)
Anacardiaceae	<i>Comocladia dentata</i>	(Robinson, et al. 2010)
Anacardiaceae	<i>Comocladia dodonea</i>	(Robinson, et al. 2010; Oehlke)
Anacardiaceae	<i>Rhus copallinum</i>	Teá Kesting-Handly & Stephen Kloiber
Anacardiaceae	<i>Rhus spp.</i>	(BugGuide, 2018; Moss, 1920)
Anacardiaceae	<i>Metopium toxiferum</i>	(Tuttle, 2007)
Anacardiaceae	<i>Schinus terebinthifolius</i>	(Robinson, et al. 2010; Oehlke; Tuttle, 2007)
Anacardiaceae	<i>Spondias</i>	(Hodges, 1971)
Anacardiaceae	<i>Spondias cytherea</i>	(Robinson, et al. 2010; Oehlke)
Anacardiaceae	<i>Spondias dulcis</i>	(Oehlke)
Anacardiaceae	<i>Spondias mombin</i>	(Robinson, et al. 2010; Oehlke; Janzen)
Anacardiaceae	<i>Spondias purpurea</i>	(Robinson, et al. 2010; Oehlke; Janzen)
Annonaceae	<i>Annona muricata</i>	(Robinson, et al. 2010; Oehlke)
Caprifoliaceae	<i>Sambucus australis</i>	(Robinson, et al. 2010; Oehlke)
Compositae	<i>Eupatorium villosum</i>	(Robinson, et al. 2010; Oehlke)
Erythroxylaceae		(Robinson, et al. 2010)
Erythroxylaceae	<i>Erythroxylon (=Erythroxylum)</i>	(Hodges, 1971)
Erythroxylaceae	<i>Erythroxylum havanense</i>	(Robinson, et al. 2010; Oehlke)
Leguminosae	<i>Cajanus cajan</i>	(Robinson, et al. 2010)
Simaroubaceae	<i>Simarouba amara</i>	(Oehlke; Janzen)
Simaroubaceae	<i>Simarouba glauca</i>	(Oehlke; Janzen)
Anacardiaceae	<i>Tapirica mexicana</i>	(Janzen)
Anacardiaceae	<i>Anacardium excelsum</i>	(Janzen)
Anacardiaceae	<i>Mosquitoxylum jamaicense</i>	(Janzen)
Solanaceae	<i>Lycopersicon</i>	(Oehlke)

Range Expansion:

Our discovery of *P. strigilis* in Gainesville, Florida (Alachua County) also presents a new breeding expansion and county record for this moth (Fig.1D). Currently, the nearest breeding records are all from south of Orlando, Florida (Orange County). This northward expansion is not entirely surprising, but it is interesting that it has taken so long to be documented. It is surprising that this *P. strigilis* had not yet been observed in NATL considering that it is a well-surveyed location. *Protambulyx strigilis* has not been encountered previously at the University of Florida despite extensive survey work (Kons, 2001). An additional northern record, albeit a coastal one, was also recently reported from southern St. Augustine, FL (R. St Laurent, pers. comm., January, 2017). This record is unsurprising as this moth is likely dispersing across Florida year-round as

temperatures allow. Despite the record possibly being slightly more north of Alachua County and Gainesville, St. Augustine is a coastal location, and thus the temperatures are still slightly warmer year-round than in Gainesville (NOAA).

It is unclear if *Protambulyx strigilis* can survive the winters in NATL as this area of Florida can experience frosts from early December to mid-March. However, other parts of the state including parts in the regular breeding range of this moth can also experience frosts (Florida Interactive Average First Frost Date Map, Florida Interactive Average Last Frost Date Map). It's unclear if this would induce a short diapause in the pupa or kill the pupa entirely. Since pupation can last for many weeks, it is possible this would not disrupt the lifecycle of the species. Tuttle indicates that larvae reared in captivity do not enter diapause and can emerge in as little as three weeks (Tuttle, 2007). It is also worth noting, that before the larvae were collected, Gainesville, Florida did experience cold temper-

atures, including several nights ranging between -1 and 2°C (US Climate Data). This did not seem to impact larval growth and development.

Future Work

Based on our observations, we suggest continued surveying for *P. strigilis* larvae in NATL, and to see if they can persist there year after year, particularly after cold winters. In captivity, it would be worthwhile to determine the degree of cold-tolerance of this species during its various immature life stages. It is worth searching throughout the state for additional larvae on *Rhus copallinum* as well as on other *Rhus spp.* It would be of interest to attempt to captive rear this species on various species of *Rhus*, including species found outside of Florida. Experimental rearing

using closely related plants in the Anacardiaceae including *Toxicodendron* and *Cotinus* would potentially yield more hostplant records as well as some interesting results.

A larger scale morphological study of the larvae of *P. strigilis* should be performed. It would be interesting to determine if the orange form can be found in areas where plants do not break down chlorophyll in the autumn. Previous work indicates that these forms can persist on evergreen plants, as Moss found a red/orange form larva on *Anacardium occidentale* (Moss, 1920). Another method would be to see if the orange form larva can be found on *Schinus terebinthifolius* as it is evergreen across its range. It would also be beneficial to try and induce the orange form of either *P. strigilis* or even *Amorpha juglandis* in captivity using light cycles and/or feeding them plants with fall colors. In a broader sense, continuing studies on why these color forms exist within species of Smerinthinae would be useful. Previous works indicate that some sphingid color forms can be dependent on foodplant preference or predation (Fink, 1995; Grayson & Edmunds, 1989, 1991). Continuing to examine these types of relationships could help shed light onto why so many different larval color morphs exist within species.

Acknowledgements

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Figure Citations

- Fig. 1) Maps provided by and created with Google Fusion Tables, 2018
- Fig. 2) "Plants Profile for *Schinus Terebinthifolius* (Brazilian Peppertree)." *PLANTS Database*, USDA - NRCS, plants.usda.gov/core/profile?symbol=SCTE



Digital Collecting:**Ecuador: Eastern slope to Amazonas**

Bill Berthet

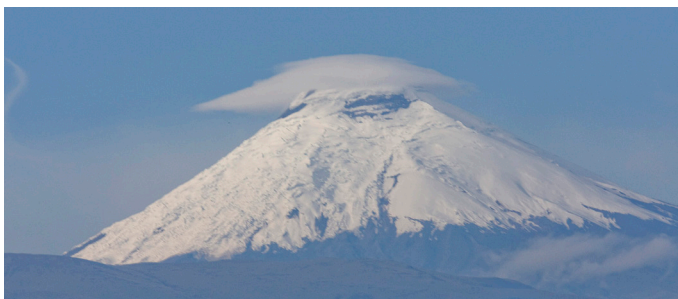
12885 Julington Road, Jacksonville, FL 32258

bergems@comcast.net

This article is based on two butterfly photography holidays to Ecuador. The first, from April 01 to April 27, 2011, was organized by Geodyssey out of London using Andean Travel Company as the ground agent, led by Andrew Neild. The second from November 11 to December 06, 2018 was with Mariposa Butterfly Tours as the ground agent, and led by David Geale.

I arrived in Quito the day before the first trip to visit the old colonial churches, Iglesia Santo Domingo, Iglesia San Francisco, and Casa de la Cultura, containing books made from lambskin, pigskin, and sheepskin, and some very heavy printing machinery manufactured in the US around the 1880s.

On a bright sunny morning our international group left Quito driving along the East slope of the Andes. Arriving at the Papallacta Pass around 4000m, admiring the partially snow covered 5897m high Cotopaxi volcano, we then found our first butterfly, *Altopedaliodes tena*. Eventually we headed towards Termas Papallacta, a lovely hotel with hot springs.



Volcan Cotopaxi

*Altopedaliodes tena*

Neopedaliodes j. jubilosa (above);
Lymanopoda huilana upperside and
underside (right)

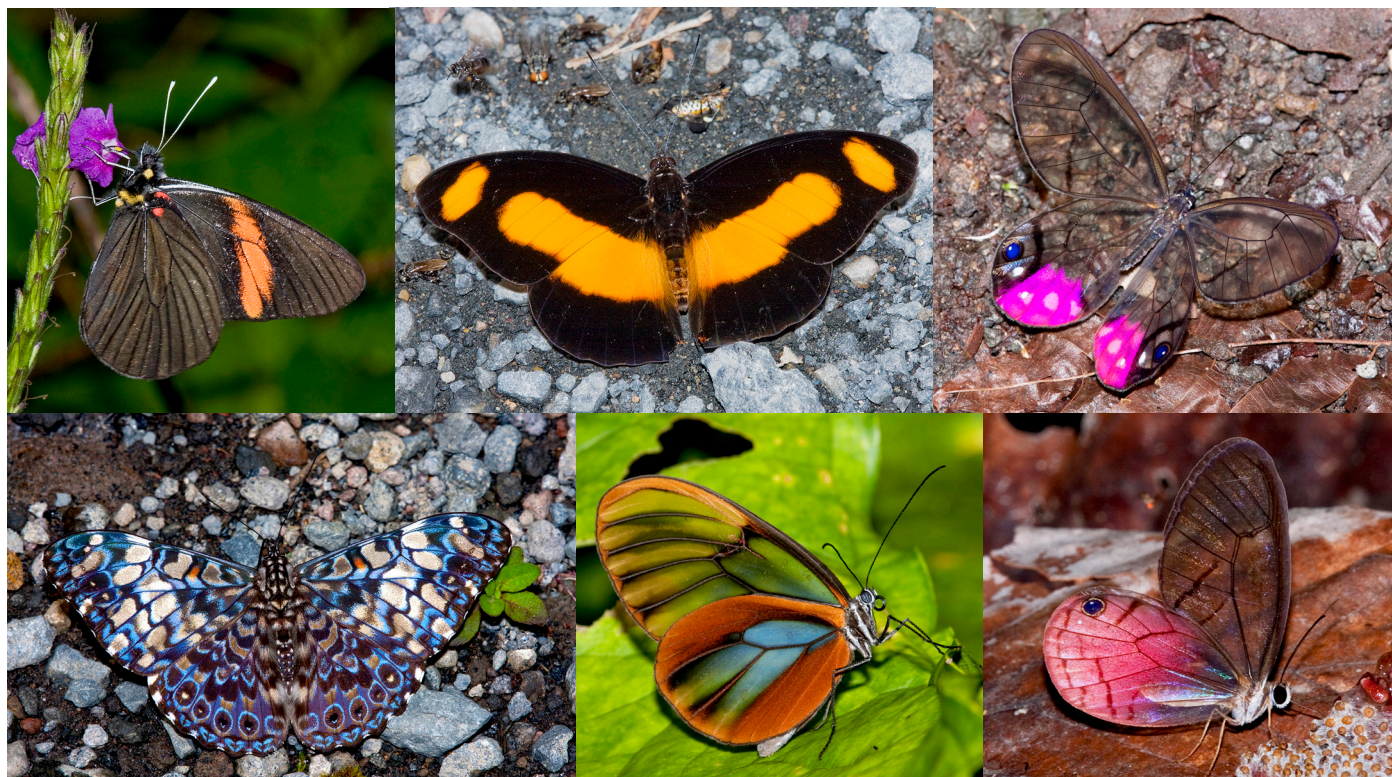


Working Cayambe-Coca Ecological Reserve above the hotel, in the rain, Andrew, using rotting fish bait lures in *Lymanopoda huilana*; then in a stealth like approach on my knees I got a click of *Neopedaliodes j. jubilosa*.

Later that afternoon all of us enjoyed a very relaxing visit to the hot springs. Some of the cabana floors are heated. If you can find a warm area you can plop down your bathing suit to dry.

Heading towards Cabanas San Isidro, our group stopped at the Rio Jatuntinagua bridge dodging traffic to photograph Satyrs, *Catastictas*, *Leptophobias*, *Orophila cardases*, and *Podotricha telesiphe*. We made it to San Isidro about 3:00. Using fish bait, Andrew attracted lots of butterflies-the best being the fancy multi-colored green, white, and black, hairy legged hairstreak, *Rhama familiaris*.

*Rhama familiaris*



Top row: *Pereute leucodrosime beryllina*, *Catonephele salambria* and *Cithaerias pyropina*.
Bottom row: A well camouflaged *Hamadryas fornax*, *Godyris duilla*, and *Citherias pireta*.

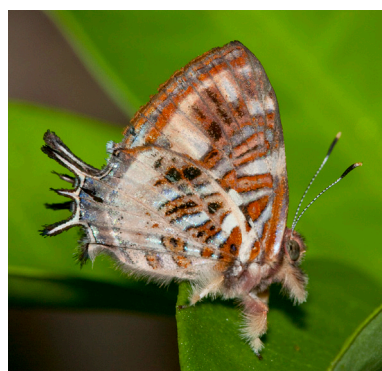
At just under 1500 m we drove to Wildsumaco Lodge where we were greeted by a number of blooming Blue Porterweed Trees over 10' high, loaded with nectaring butterflies, including *Pereute leucodrosime beryllina*. Along the road was able to get clicks of open winged *Catonephele salambria*, *Cithaerias pyropina*, the well camouflaged *Hamadryas fornax*, and a closed wing *Godyris duilla*. I cut off a pupa from a tree near the dining room, then mounted it on the wall next to the bar. When it hatched, Bonnie the owner, sent Kim Garwood a photo – it turned out to be a female *Pterourus menatius*.

Nine of us wedged ourselves into an undersized Toyota van, with luggage on top for a 40 minute ride to Rio Pinguillo, a great spot with lots of butterflies including *Cunizza hirlanda* which were attracted to our rotting fish bait.

In the afternoon we drove to Agua Santa, where a motorized long boat took us upstream on the Coca River to Yachana Lodge which is owned by a local indigenous tribe. The dining area has a spectacular porch providing beautiful sunset views overlooking the Coca River.

Exploring around Yachana, then trekking up the dark forested ridge above, we found *Sarota chrysus*, *Archaeoprepona demophoon*, *Antirrhea philoctetes*, *Caeruleptychia lobelia*, *Pierella lena*, with my favorite, the pink clearwing *Cithaerias pireta* feeding on fallen fruit.

After a 45 minute motorized long boat ride we visited the farm of our guide Abel's uncle. There we were entertained



Sarota chrysus

Yellow-bellied Puffing Snake



by a 7 ½' long Yellow-bellied Puffing Snake, that has two types of toxins. Sulmotoxin 1 is deadly to mammals but has no effect on birds and lizards. Sulditoxin is harmless to mammals but deadly to birds and lizards.



*Bia
actorion*

My most fist pumping, heart pounding, exciting moment of the entire trip was when after a stealth like approach, ending about 3 feet away, I observed then photographed an open wing *Bia actorion* basking in a light gap about 20 yards off the trail.

The next morning our group survived a two hour extremely wet motorized long boat ride to Coca, where we spent the night. Next morning, we were off on a three hour Napo River motorized long boat ride, followed by a two hour canoe trip to Napo Wildlife Center. This last part was a wonderful trip, going slowly through a small creek with amazing trees, giant river otters, wonderful birds, and an about a 6' Anaconda.

Everyone was excited to see the Metalmarks *Helicopis cupido* and *H. gnidus* perched on unfurled leaves along the way. Several passengers tried to stand up and take pictures, which was too risky, as these canoes can tip over easily.



Helicopis cupido (top) and *H. gnidus* (bottom); Helicopter Dameselfly (right)



Dragon
Mantis
*Stenophylla
lobivertex*

The lodge is basically in a swamp surrounded by Terra Firma Rain Forest. Highlights included *Panacea prola*, Helicopter Damselies, *Helicopis cupido* and *gnidus*, *Eunica concordia*, a mating pair of *Quadrus cerialis*, and a bizarre looking Dragon Mantis, *Stenophylla lobivertex*.

One night we had dinner in the beautiful high end dining area, with a well stocked bar. Next to us sat the president of Bolivia with six armed bodyguards, a beautiful woman and a man who was visiting to gather information on this very well run eco-lodge.

After a 5 hour boat trip back to Coca, including 3 hours in a very heavy rainstorm and getting stuck on a sand bank, we bid the Brits farewell. Kim Garwood, Kristine Wallstrom, and I waited to be picked up by Thierry Garcia, an energetic Frenchman, in his 1987 Ford Crown Victoria. Thierry owns Bigal River Biological Reserve near Loretto. After picking us up, he backed into a curb, jamming the muffler into the wheel well. With some of the locals staring at us, we limped along while scraping the muffler into the pavement as we headed for repairs. The mechanic while attempting the repair, decided to use a torch to weld something RIGHT NEXT TO THE GAS TANK, so Kim and I took a walk around the block, hoping not to hear an explosion. The car was fixed and we were on our way.

The next morning we hiked the three mile partially boot sucking trail, loaded with scads of butterflies along the way, while our provisions for the next five days were hauled in by horseback.

We stayed in an open two story structure with hammocks on the top floor. Butterfly photography at its best. Using rotting fish and my own pee, we baited the "front yard" about 35 feet away. While swinging in the hammock we would wait for a "goodie" to land, then would walk down the steps, take our pictures, walk back up the stairs and lay in the hammock, read a book, have a chat, all while enjoying a "cold" one, waiting for the next butterfly to land.



Mimardaris minthe (left: upperside; middle: underside), *Myscelus amystis*.

We were there to discover additional species of butterflies. Thierry has an existing list of around 430 species; over the next five days we added another 53 species during our visit. Some of the genera included *Sarota*, *Memphis*, *Prepona*, *Fountainea*, *Zaretis*, *Consul*, *Nisoniades*, and many others. We all had a great time and the crepes were sensational!

TRIP TWO: Southern Ecuador

In November 2018, David Geale sent members of our group an 11 page list of 1288 species of butterflies that we might encounter on a trip to Southern Ecuador. On November 18, 2018 David, the trip leader, and four others including myself departed Zaysant Eco Lodge in Quito at 3:30 a.m. for a 5:40 a.m. flight to Loja, delayed because of heavy fog. Finally we were met at the Loja airport by our driver for a 3 hour drive to Copalinga Lodge near the Bombuscaro entrance to Podocarpus National Park.

Along the way we stopped at Parque National Podocarpus San Francisco for lunch and our first butterflies of the trip. The best was my first *Melanis vidali*, a dark colored metal-mark with bright red on the wing margins.

We arrived at Copolinga Lodge in the late afternoon. This Lodge always has delicious food and gracious hosts. Grabbing the camera for a quick look around, I observed five or six *Historis acheronta* imbibing minerals from a moist area, along with *Doxocopa laura* and *D. cyane* that cooperated for very good dorsal shots. This is a very interesting location 950-1150m because it is at the high end of the low-land species and the bottom end of the higher elevation/cloud forest species.

While in bed that evening, a bat flew around the room and finally nestled up in the ceiling. In the morning I let management know, and it was gone when I got back that afternoon. I have had bats in my room on other trips. Several large ones even hung on the mosquito net around my bed while I was staying with the Vine tribe on the Las Piedras River in Peru. The bats were living in a hollowed out area between the walls about four feet away from my pillow. They can be quite noisy. I also had to deal with a family of noisy owls nestled between the walls at a Home Stay in Assam N.E. India.

The butterfly Gods provided good sunny to partly sunny weather with no wind for the next eight days!

After breakfast we descended a steep trail having a moist sandy area along the river margin. This place was hopping! I got dorsal and ventral of the local endemic *Mimardaris minthe*, along with *Myscelus amystis*, *Jemadia albescens*, *Phocides pigmalion hewitsonius*, *Pyrrhopyge sadia*, and a ventral click of a very nervous *Perrhybris lorena*.

The next morning David went into the park early to bait for butterflies. Last year the ranger had seen him doing this, was pretty pissed off, and kicked him out. So David went in early before the ranger got there about 8:45. This time he ran into a different ranger who was more forgiving. About an hour later the other ranger showed up and scolded each of us. The bait was already out, just no rebaiting was allowed later on. The fish bait was quite effective. "Goodies" included *Anteros chrysoprasta*, *Ancyluris f. formosissima*, *Caria trochilus*, *Erora caespes*, *Chorinea gratiosa*, and the small *Symmachia probetor* female, a butterfly I had been wanting to see for a long time. Those extra special first time lifers sure get the adrenalin flowing.



Anteros chrysoprasta

Symmachia probetor
female





Anteros bracteata, *Cyanophrys amyntor*, *Callicore excelsior*, and *Zera difficilis*

During breakfast the next day a monkey grabbed a banana from the feeding area then fell from a broken branch looking embarrassed. The feeding area also attracted several Agouties. The day was sunny with no wind. I walked across the road to the owner's house and scored my first *Baeotus baeotus* (back cover). As I walked the road and Orange trail, I got good clicks of *Anteros bracteata*, *Cyanophrys amyntor*, *Callicore excelsior*, a dorsal shot of *Consul fabius diffusus* that kept landing on my pants, *Zera difficilis*, and *Euselasia orfila*.

Situated at around 1010m, we had a 2 ½ hour drive to Cabanas Yankuam exploring the Reserva Natural Maycu in the Nanzaritza Valley.

We were greeted by Chocolate, a very friendly fairly large dog whose owner was out in the boat with a guest from

Germany. As we waited for them to get back, we started walking the dirt road, viewing *Theritas mavors*, and *Temenis pulchra*.

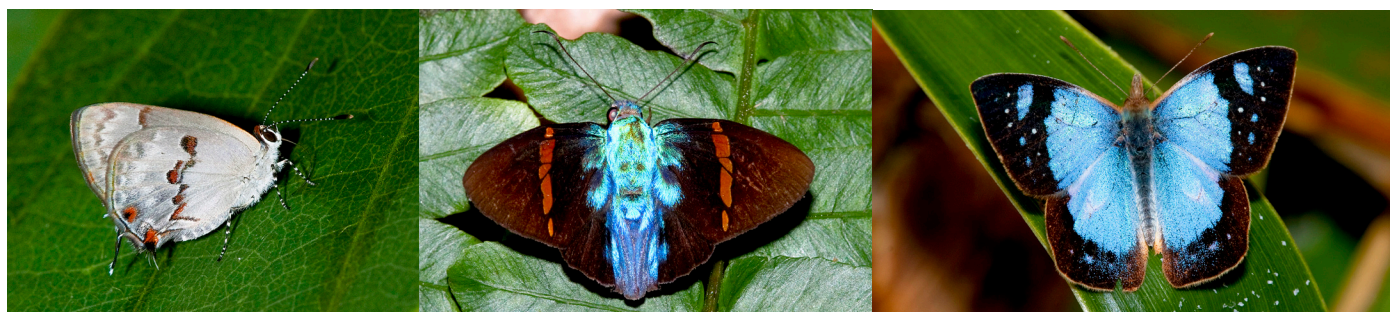
Finally getting settled in, our driver took us up to the reserve, while David baited along the way. Bugs started showing up right away. Joan found a small trail off the main dirt road that was fabulous. Clicks included *Adelotypa huebneri*, a striking aqua blue, black and white metalmark, *Anteros acheus*, *Chloreuptycha agatha*, a brilliant bright blue satyr that lights up the dark forest when in flight, *Epargyreus clavicornis*, a large skipper you can hear when it buzzes by you, *Erichthodes antonina*, *Iaspis verania*, a small boldly marked hairstreak, *Napaea belyiana*, and a number of memorable clicks of open winged *Napaea heteroea* and *Memphis glauce*. During dinner all of us enjoyed a beautiful sunset, the hand of God pulling the

Sun down from behind a mountain peak. One of the guests, a German woman with extra long lens on a tripod was feverishly taking pictures. Life is Great!

In the morning we were greeted by the ruby eyed crepuscular skipper *Thracides cleanthes*, buzzing around finding moist areas on the cement to imbibe. We all got dorsal and ventral clicks. We then all hopped in the van, drove down the road a bit to a hanging bridge. I putzed around while David crossed the bridge and baited the trail along side the river. This turned out to be a day to remember. I observed six *Haemactis sanguinalis*, the "Lip-stick Skipper", very striking bright red with



Top row: *Adelotypa huebneri*, *Anteros acheus*, *Chloreuptycha agatha*. Middle row: *Iaspis verania*, *Napaea heteroea*, *Memphis glauce*. Bottom row: *Thracides cleanthes* (left and middle), *Haemactis sanguinalis*.



Ministrymon cleon, *Porphyrogenes omphale*, and *Lymanopoda samius*.

contrasting black markings. Also picked up *Lyropteryx apollonia*, *Ministrymon cleon*, *Pierella lucia*, and *Jemadia hospita*, but the star of the day was an open wing *Porphyrogenes omphale*, a skipper with extremely bright blue hairy scales, displaying the image of a face on the back of its abdomen. I saw it buzzing around in the late afternoon on a pile of crap I had deposited earlier that day. I always make sure to put ferns on top, making for better pictures.

On the way to Vilcabamba we stopped and worked the old Loja-Zamora Road around 2800 m. The sun peaked in and out of the clouds along with windy conditions. David baited along the road margins, observing several high elevation species of *Corades* and *Pedaliodes*. Not much was happening; however the bait lured in a fresh *Lymanopoda samius* long enough to get a very nice open wing click.

We arrived at Vilcabamba, a pleasant well know tourist town. This is the famous "Valley of Longevity" where people live to be more than 100 years old, and the year round temperature is perfect.

All of us crashed at Madre Tierra Lodge owned by Peter

and Gail Gerentes from Washington State, boasting meticulously decorated rooms, located on a hillside with waterfall and gardens, facing the multi peaked "Sleeping Inca" "Cerro Mandago". The food is outstanding; they grow a number of organic herbs and vegetables in the nearby garden and have their own bakery. Yum.

If I ever wanted to move to another country, I would live in a lone cabana up the hillside here, (not two cabanas together, the sound proofing is not good, so you would hear too much nighttime frolicking) then chill out, hang with the expats, and use this as a base for future butterfly photography holidays.

After an excellent breakfast we took a 30 minute ride, stopping along a river. We crossed the bridge into a more forested habitat, loaded with hairstreaks, including fresh green *Cyanophrys pseudolongula*, *Erora carla*, *Chlorostyemon simaethis*, *Cyanophrys amyntor*, where I found a very fresh, beautifully marked *Ocaria ocrisia*, normally a fairly dull looking butterfly to photograph. Also we got good clicks of the endemic *Diaethria ceryx* and *Elzunia pavonii*. Water seeping down the trail next



Top row: *Cyanophrys pseudolongula*, *Erora carla*, *Chlorostyemon simaethis*, and *Ocaria ocrisia*.
Bottom row: *Diaethria ceryx*, *Elzunia pavonii* (middle and right).

to the river attracted hoards of butterflies. The trouble is, too many butterflies, along with the locals occasionally walking along the same trail, makes it a real challenge in butterfly photography.

Next we headed up to the higher elevation, around 2700-2900m in Podocarpus National Park, Cajanuma sector. This huge Park is a megadiverse zone and an area with a high level of endemic species because it is a meeting point for four ecological systems: Northern Andes, Southern Andes, Amazonian, and Pacific.

David baited about a two km area along the dirt road, including several spots that have gullies with water on the margins of the road.

After my first glimpse of *Junea dorinda*, I couldn't help standing in awe of the marvelous array of shapes, sizes, textures, and colors of butterflies created by Mother Nature. Walking along the road I spotted three very fresh *Perichares colenda* buzzing around looking for the right consistency of bird poop to feed on, allowing me to get very good clicks. Later on, next to the gully, I spotted *Junea doraete*, the other target species we had hoped to find. Several feet away, next to each other, both *Juneas* were lured to the bait. *Dorinda* liked *doraete*'s spot and pushed *doraete* out of the way to claim the better spot.

This area also had small amounts of running water on one side of the road that attracted *Catasticta poujadei*, *Catisticta scurra*, *Siseme aristoteles*, and the striking open

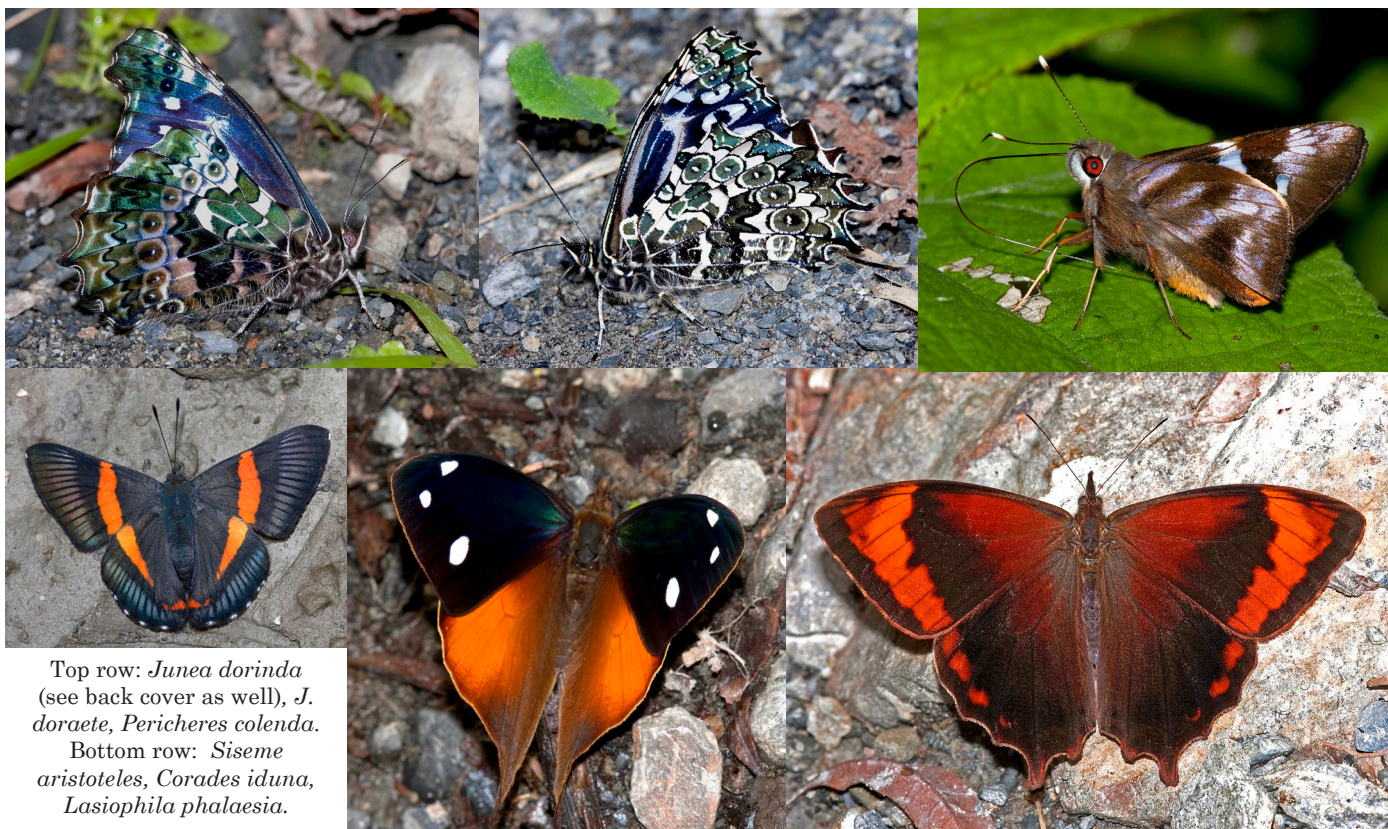
winged *Corades iduna* and *Lasiophila phalaesia*. Later that afternoon we enjoyed seeing *Oleria athalina*, a clearwing with orange edged wings, ovipositing in a shady area.

We also visited the Ranger Station at 2750m. Not many butterflies. While on one of the darker forested trails I tried to follow the rapid and erratic brilliant blue open wing flight of *Johnsonita pardoa*. Later Joan showed me where one had landed; I got great shots. It's good karma if you find a "goodie" then share it with someone else if they are close by. I later found *Dalla dimidiatus*, that I shared with P.Y. Thong.

Heading toward our last stop, on a bright sunny beautiful morning with light winds, we climbed to a 1865m very dry ridge above Loja. Listening to the constant humming of motors positioning the giant fan blades from the windmill farm, we got looks of *Ocaria aholiba*, *Thespies thona*, and *Noctuana brunneofusca*. We saw several other butterflies but not enough to stay very long.

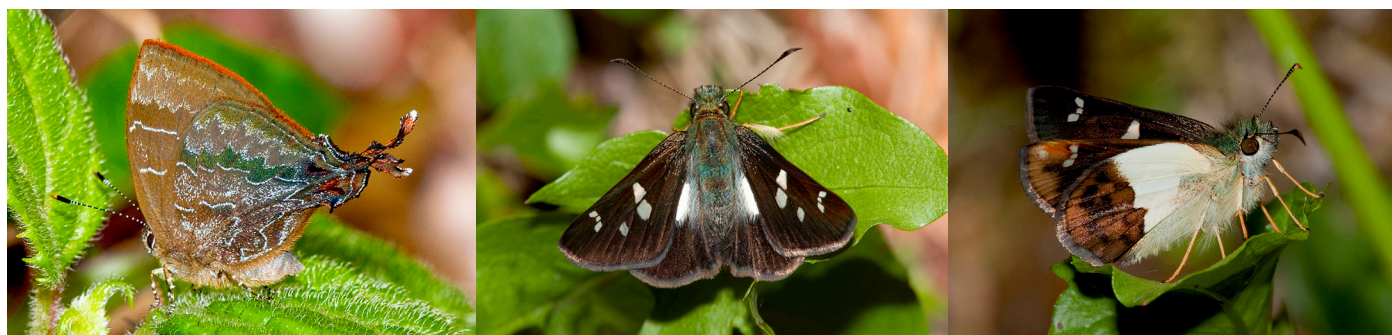
Driving west towards Buenaventura Nature Reserve I was amazed at the continuous change in scenery, lush green, then brown, back to brown and green, then lush green again. The rain patterns are quite variable in this region. We stopped along the way for a chocolate covered Magnum ice cream bar, arriving at the Umbrellabird Lodge in the late afternoon.

In the morning the three hummingbird feeders were alive with over 100 hummers rotating among the feeders. They



Top row: *Junea dorinda* (see back cover as well), *J. doraete*, *Perichares colenda*.

Bottom row: *Siseme aristoteles*, *Corades iduna*, *Lasiophila phalaesia*.



Johnsonita pardoa and *Dalla dimidiatus* (center and right).

allowed us to get within several feet for excellent viewing and photographic purposes. The next few days were rainy and overcast, overall not many butterflies, and bait was not working at all. But most of us got fabulous looks of the Umbrellabird displaying, leaning forward, swinging his long wattle, and blowing out his cheeks. He swings the wattle side to side and puffs it out, an impressive show. During dinner on our last night, David spotted the seldom seen *Caerois gerdrudtus* as it landed on a banana. We all grabbed our cameras and started clicking away. Later David caught the butterfly, for additional open wing shots and ID as a female.

On this 18 day Butterfly Photographing Holiday the combined observation of five participants totaled around 697 species of butterflies observed.

I want to personally thank David Geale for his time, baiting skills, including the infamous blue ribbon, marking a “goodie”, and expertise in identification of butterflies, and to Adrian Hoskins, Andrew Neild, and Kim Garwood for allowing me to be a participant on numerous butterfly trips around the world, providing a foundation to be a better in-the-field butterfly photographer, and providing a closer bond with nature.



Caerois gerdrudtus.



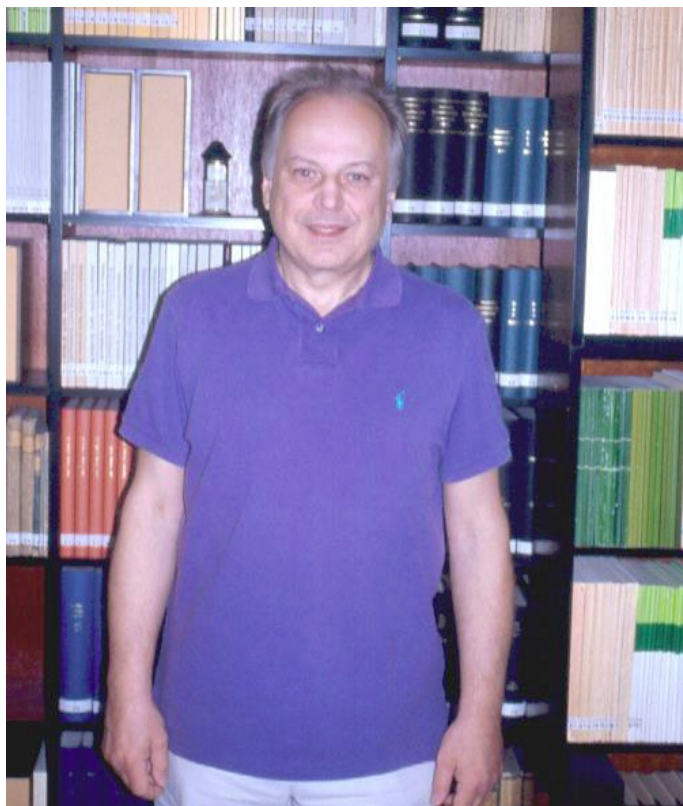
Penalincisalia loxurina, 1 Old Zamora-Loja Road, 2800m, Loja Province, Ecuador, 27-xi-18; *Sarota lasciva*, Loreto, Bigal River Biological Reserve, Ecuador, 935 to 1100m, 23-iv-11; *Euselasia toppini*, Nangaritza Valley, 875m, Zamora, Chinchipe, Ecuador 26-xi-18.

Metamorphosis

edited by Chris Grinter

Dr. Thomas J. Witt passed away Jan 27, 2019. This is really a shock to me, because apart of being acquainted for more than 30 years he was a wonderful Lepidoptera collector with a private Museum Witt (picture) of more than 3.5 million specimens in about 20,000 drawers! Thomas Witt collected moths (*Bombyces* et *Sphinges* sensu SEITZ) from all over the world and was interested in taxonomic and systematic research as well as their distribution. He was co-editor of the journal ENTOMOFAUNA and editor of PROCEEDINGS OF THE MUSEUM WITT (<http://www.insecta-web.org/MWM/>). (See also Lepidoptera Africana & Neotropica Projects at <http://www.insecta-web.org>). His collection will go to the Staatliches Museum in München. In 2007 I named a species after him: *Utetheisa witti* (Erebidae, Arctiinae). I will remember him as a fine colleague and friend.

-- Contributed by Rob de Vos



Dr. Thomas J. Witt, photo by Rob de Vos

Nate Gibson was born in Iowa and died (in his late 80s) in Portal, Arizona on 30 November, 2018. After graduating from high school he joined the Navy and served as a medical corpsman. Upon discharge he married and the couple moved to Casper, Wyoming where they opened Nate's

Flowers, which is still in business and owned by a former employee who was mentored by Nate. They raised 2 sons and 2 daughters. After many years of enduring Wyoming winters, they sold the business and moved to Gilbert, Arizona, where they opened another flower shop. Shortly thereafter, Nate's wife was diagnosed with terminal cancer and they sold the business. After his wife died, Nate bought a house in Patagonia, Arizona and planted a butterfly garden. Nate was an avid moth collector and enjoyed rearing the local silk moths and sphingids. During a collecting trip to the Chiricahua Mts., he met Zola Stoltz, a widow with a home outside of Portal. They married several years later in August, 2011. For several years, they maintained both homes and commuted between Portal and Patagonia. In 2016, Nate sold his Patagonia house and moved to Portal. During his years in Wyoming, Nate was an avid hunter and a skilled taxidermist, primarily of animals and large birds. Some of his mounts are at Casper College in Wyoming, and others are on display at The Geronimo Nature Center located just north of Rodeo, New Mexico. Nate was a generous and congenial host to collectors who visited the Patagonia area, and was much beloved by his widow and the Portal, Arizona community. His wry humor and outgoing personality will be missed by all who knew him.

-- Contributed by Cliff Ferris

Ed Knudson of Houston, Texas passed away the night of December 2-3, 2018 in Falfurrias, TX. He was on a mothing trip at the time. A more detailed obituary will appear in a future issue of the News.



Ed Knudson, at the 2013 Lepidopterists' Society meeting in Gainesville, Florida. Photo by James K. Adams



Membership Updates

Chris Grinter

Includes ALL CHANGES received by February 6, 2019. Direct corrections and additions to Chris Grinter, cgrinter@gmail.com.

New Members: *Members who have recently joined the Society, e-mail addresses in parentheses. All U.S.A. unless noted otherwise. (red. by req. = address redacted by request)*

Arturo Arellano: [red. by req.] (arellano.covarrubias@gmail.com)

Duncan Forrest Brown: 40 S. Prince St Apt 1, Lancaster, PA 17603 (dbrow@udel.edu)

Cody Beavers: 4266 Troy Lane SE, Dalton, GA 30721 (cbeavers@daltonstate.edu)

Jutta C. Burger: [red. by req.] (jburger04@gmail.com)

Alan Melgoza Calderon: 607 E 2nd St., Rialto, CA 92376 (amelgoza@cpp.edu)

Ryan Chew: 2211 Wesley Ave., Evanston, IL 60201 (ryanwc@sbcglobal.net)

Anne Cure: [red. by req.] (aecure@syr.edu)

Michael De Jesus: Calle 32A 3L16 Terrazas del Toa, Toa Alta, Puerto Rico 00953 (michael.dejesus1@upr.edu)

Charles DeRoller: PO Box 374, Victor, NY 14564 (exoticimports@hotmail.com)

Nick Engelfried: [red. by req.] (nicke.activism@gmail.com)

Felipe Espitia: 2985 Old Grade Rd., Dalton, GA 30721 (fespitia1@daltonstate.edu)

Bryan Finegan: Catie, Turrialba, Cartago, 93-7170 COSTA RICA (bryan_fcr@yahoo.com.mx)

Cindy Lang: 51 Gleason Street, Thomaston, ME 04861 (cindy78lang@gmail.com)

Theo Leger: Senckenberg Museum für Tierkunde Dresden, Königsbrücker, Landstr. 759, 01109, Dresden, GERMANY (theo.leger@outlook.com)

Cole Lowery: 5626 Poplar Springs Rd., Ringgold, GA 30736 (colelowery99@gmail.com)

Marcie Oconnor: [red. by req.] (marcie@haven2.com)

Melody Palmer: 112 Gillespie Drive, Dalton, GA 30720 (melody.palmer@hotmail.com)

Kerry Randles: 2441 Alberta Drive, Knoxville, TN 37920 (tnhiker73@yahoo.com)

Bruce D. Shephard: 14516 Nettle Creek Rd., Tampa, FL 33624 (shephardmd@verizon.net)

Annick Wadsworth: PO Box 50, Litchfield, CT 06759 (Awadsworth@whiteflowerfarm.com)

Scott R. Wehrly: 15727 Acorn Circle, Tavares, FL (sr-wehrly@msn.com)

Sarah Taylor Workman: [red. by req.] (workman.32@wright.edu)

Su'ad Yoon: PO Box 9343, Reno, NV 89507 (suady@nevada.unr.edu)

Address Changes: *All U.S.A. unless otherwise noted.*

Susan S. Borkin: 13848 Posada St., Venice, FL 34293 (borkinsu@gmail.com)

Deane Bowers: Dept. Ecology & Evolutionary Biology, 334 UCB, University of Colorado, Boulder, CO 80309 (deane.bowers@colorado.edu)

Andrew Brower: Assistant Director, National Identification Services (NIS), USDA APHIS PPQ Plant Health Programs, 4700 River Rd., Unit 52, Riverdale, MD 20737. (Andrew.V.Brower@APHIS.USDA.GOV)

Janet Chu: 964 Ravenwood Rd., Boulder, CO 80303 (2chuhouse2@gmail.com)

Carlos Rafael Cordero: Instituto de Ecología, UNAM, Ciudad Universitaria, Circuito exterior, Mexico City 04510 MEXICO (cordero@ecologia.unam.mx)

Logan Crees: 1750 Tennessee St., New Orleans, LA 70117 (crees.logan@gmail.com)

Mary Ann Friedman: 1625 Oak Hills Drive, Colorado Springs, CO 80919 (marsabones@hotmail.com)

Michio Imafuku: 619-15 Shizuichi-ichihara, Sakyo, Kyoto 601-1123 JAPAN (imafuku@dream.jp)

Santiago Abril Lombana: Calle 128B #19-55, Interior 1, Apartamento 90, Bogota, COLOMBIA (santiabrilcampestre@gmail.com)

Deborah L. Matthews: PO Box 141034, Gainesville, FL 32614 (dlott@flmnh.ufl.edu)

Bryan Pfeiffer: 138 Main St., Montpelier, VT 05602 (bryan@bryanpfeiffer.com)

Emily Shelby: 625 S. Montgomery St., Starkville, MS 39759 (eas483@msstate.edu)

Richard D. Ullrich: 7252 East Tasman St., Mesa, AZ 85207 (rdullrich62950@aol.com)

Corrections:

Jack N. Levy: PO Box 70670, Pasadena, CA 91117 (jnlevy@earthlink.net) [directory incorrectly listed PO Box as 0670]



Taenaris schoenbergi, Nymphalidae, Morphinae, Arfak mountains, West Papua, about 1600m, 4 December 2018 during a Thai Butterflies.com trip, photo by Antonio Giudici

Membership

The Lepidopterists' Society is open to membership from anyone interested in any aspect of lepidopterology. The only criterion for membership is that you appreciate butterflies and/or moths! To become a member, please send full dues for the current year, together with your current mailing address and a note about your particular areas of interest in Lepidoptera, to:

Kelly Richers, Treasurer
The Lepidopterists' Society
9417 Carvalho Court
Bakersfield, CA 93311

Dues Rate

Active (regular)	\$ 45.00
Affiliate (same address)	10.00
Student	20.00
Sustaining	60.00
(outside U.S., for above add 5\$ for Mexico/Canada, and 10\$ elsewhere)	
Life	1800.00
Institutional Subscription	60.00
Air Mail Postage, News	15.00
(\$30.00 outside North America)	

Students must send proof of enrollment. Please add \$5.00 to your dues if you live in Canada/Mexico, \$10.00 for any other country outside the U.S. to cover additional mailing costs. Remittances must be in U.S. dollars, payable to "The Lepidopterists' Society". All members receive the **Journal** and the **News** (each published quarterly). Supplements included in the **News** are the Membership Directory, published in even-numbered years, and the Season Summary, published annually. Additional information on membership and other aspects of the Society can be obtained from the Secretary (see address inside back cover).

Change of Address?

Please send permanent changes of address, telephone numbers, areas of interest, or e-mail addresses to:

Chris Grinter, Assistant Secretary
The California Academy of Sciences
55 Music Concourse Drive,
San Francisco, CA 94118
cell: 847-767-9688
cgrinter@gmail.com

Our Mailing List?

Contact Chris Grinter for information on mailing list rental.

Missed or Defective Issue?

Requests for missed or defective issues should be directed to Chris Grinter. Please be certain that you've really missed an issue by waiting for a subsequent issue to arrive.

Memoirs

Requests for Memoirs of the Society should be sent to the Publications Manager, Ken Bliss (address opposite).

Submissions of potential new Memoirs should be sent to:

Kelly M. Richers
9417 Carvalho Court
Bakersfield, CA 93311
(661) 665-1993 (home)
kerichers@wuesd.org

Journal of The Lepidopterists' Society

Send inquiries to:

Keith Summerville
(see address opposite)
ksummerville@drake.edu

Book Reviews

Send book reviews or new book release announcements to either of the following (do NOT send new books; authors will be put in contact with reviewers):

James K. Adams
(see address opposite)
jadams@daltonstate.edu

Carol A. Butler
60 West 13th Street
New York, NY 10011
cabutler1@outlook.com

WebMaster

Todd Gilligan, Colorado State University, Bioagricultural Sciences and Pest Management, 1177 Campus Delivery, Fort Collins, CO 80523-1177, (970)490-4478
tgilliga@gmail.com

Submission Guidelines for the News

Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgeable audience, illustrated and succinct (under 1,000 words, but will take larger). Please submit in one of the following formats (in order of preference):

1. Electronically transmitted file and graphics — in some acceptable format — via e-mail. Graphics/figures should be at least 1200 x 1500 pixels/inch² for interior use, 1800 x 2100 for covers.
2. Article (and graphics) on disk or thumb drive in any of the popular formats/platforms. Indicate what format(s) your disk/article/graphics are in, and call or email if in doubt. The InDesign software can handle most common word processing software and numerous photo/graphics software. Media will be returned on request.
3. Color and B+W graphics; should be high quality images suitable for scanning. Original artwork/maps should be line drawings in pen and ink or good, clean photocopies. Color originals are preferred.
4. Typed copy, double-spaced suitable for scanning and optical character recognition.

Submission Deadlines

Material for Vol. 59 and 60 must reach the Editor by the following dates:

Issue	Date Due
61 2 Summer	May 12, 2019
3 Fall	August 15, 2019
4 Winter	November 15, 2019
62 1 Spring	February 15, 2020

Be aware that issues may ALREADY BE FULL by the deadlines, and so articles received by a deadline may have to go into a future issue.

Reports for Supplement S1, the Season Summary, must reach the respective Zone Coordinator (see most recent Season Summary for your Zone) by Dec. 15. See inside back cover (facing page) for Zone Coordinator information.

Executive Council

President

Brian Scholtens
Biology Dept., College of
Charleston, 66 College St.
Charleston, SC 29424-0011
(843)953-8081
scholtensb@cofc.edu

Past President

John Calhoun
977 Wicks Drive, Palm
Harbor, FL 34684-4656
(727)785-0715
bretcal1@verizon.net

Vice Presidents

Richard S. Peigler (1st VP)
Dept. of Biology, University
of the Incarnate Word
4301 Broadway, San
Antonio, TX 78209
(210)829-3832
peigler@uiwtx.edu

Vazrick Nazari
Agriculture and Agri-Food
Canada, 3058-C KW Neatby
Bldg., 960 Carling Avenue
Ottawa, Ontario K1A 0C6,
CANADA, (613)715-5009
Vazrick.Nazari@agr.gc.ca

Michael Braby
Division of Evolution,
Ecology and Genetics
Research School of Biology
The Australian Nat'l Univ.
Canberra, ACT 200
AUSTRALIA, 61 8 8995-
5015, michael.braby@anu.edu.au

Secretary

Todd Gilligan
(see Webmaster, opposite)
tgilliga@gmail.com

Treasurer

Kelly M. Richers
9417 Carvalho Court
Bakersfield, CA 93311
(661) 665-1993 (home)
kerichers@wuesd.org

Assistant Secretary & Assistant Treasurer

Chris Grinter
The California Academy of
Sciences, 55 Music Concourse
Drive, San Francisco, CA
94118; 847-767-9688
cgrinter@gmail.com

Publications Manager

Kenneth R. Bliss
1321 Huntington Trail
Round Rock, TX 78664
(512)850-1700
krbliss@gmail.com

Editor, News of The Lepidopterists' Society

James K. Adams
School of Sciences and Math
Dalton State College
650 College Drive
Dalton, Georgia 30720
(706)272-4427
jadams@daltonstate.edu

Editor, Journal of The Lepidopterists' Society

Keith Summerville
Dept. of Environmental
Science and Policy, 131 Olin
Hall, Drake University
Des Moines, IA 50311-4505
(515)271-2498
ksummerville@drake.edu

Editor, Memoirs of The Lepidopterists' Society

Kelly Richers
(see Treasurer, above)

WebMaster

Todd Gilligan
(see WebMaster opposite)

Members-At-Large

Jason Dombroskie, Todd
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Bettman, Shannon Murphy,
Brigette Zacharczenko

Season Summary Zone Coordinators

Refer to Season Summary for Zone coverage details.

Chief Season Summary Coordinators/Editors

Brian G. Scholtens
Biology Department
College of Charleston
66 College Street
Charleston SC 29424-0001
(843) 637-6224
scholtensb@cofc.edu

AND

Jeff Pippen
101 Forest Oaks Dr.
Durham, NC 27705
jeffpippen9@gmail.com

Zone 1, The Far North:

Crispin Guppy
5 Boss Road, Whitehorse,
Yukon Y1A 5S9, Canada
(778) 256-1251
csguppy@gmail.com

Zone 2, The Pacific Northwest:

Jon H. Shepard
4925 SW Dakota Ave.
Corvallis, OR 97333
(541) 207-3450
shep.lep@netidea.com

Zone 3, The Southwest:

Ken Davenport
8417 Rosewood Avenue
Bakersfield, CA 93306
(661) 366-3074
kdavenport93306@yahoo.com
with help on moths from
Kelly Richers (see Treasurer,
this page)

Zone 4, The Rocky Mountains:

Chuck Harp
8834 W. Quarto Ave.
Littleton, CO 80128-4269
(720) 981-5946
cehmoth@aol.com

Zone 5, The Plains:

Michael M. Ellsbury
70855 Highway 8
Fairbury, NE 68352-5565
(402) 300-1969
bugsnrails@gmail.com

Zone 6, Texas:

Mike A. Rickard
411 Virgo Street
Mission, TX 78572
(956) 519-0132
Cell: (281) 734-1110
folksinger4@yahoo.com

Zone 7, Ontario and Quebec:

Jessica E. Linton
245 Rodney Street
Waterloo, ON, Canada
N2J 1G7, (519) 489-2568
Cell: (519) 502-3773
jessicalinton86@gmail.com

Zone 8, The Midwest:

Thomas Jantscher
2800 Rustic Pl. Apt. 206
Little Canada, MN 55117-
1389, (612) 875-1710
tjantscher@gmail.com

Zone 9, The Southeast:

Brian G. Scholtens
Biology Department
College of Charleston
66 College Street
Charleston SC 29424-0001
(843) 637-6224
scholtensb@cofc.edu

Zone 10, The Northeast:

Mark J. Mello
c/o Lloyd Center,
430 Potomska Rd
Dartmouth, MA 02748
markmello@lloydcenter.org

Zone 11, Mexico & the Caribbean:

Isabel Vargas Fernandez
Museo de Zoologia,
Facultad de Ciencias,
Univ. Nacional Autonoma
Mexico, Apartado Postal 70-
399, D.F., Mexico 04510
ivf@ciencias.unam.mx



Left: *Junea dorinda*, Parque Nacional Podocarpus, 29-xi-18, 2700m, Loja Province, Ecuador; right: *Baeotus baeotus* (Graphic Beauty), Copolinga Lodge near Podocarpus National Park, 22-xi-18, 950m, Zamora, Chinchipe, Ecuador (see associated article pg. 44; photos by Bill Berthet)



Your Executive Council members at the Ottawa Lep Soc/SEL meetings. Front row, left to right: Charlie Covell, Jr., archivist; Christ Jaeger, member-at-large; Kelly Richers, treasurer; Jean-François Landry, vice president; Annette Aiello, vice president; Carol Butler, ombudsperson. Back row, left to right: Vazrick Nazari, meeting organizer; Jeff Pippen, member-at-large; Keith Summerville, editor of the Journal; James Adams, editor of the News; Brian Scholtens, president; Jason Dombroskie, incoming member-at-large; Michael Collins, vice president. This meeting was a bit historic because it is the first time I (James Adams) can remember all three vice presidents being present.