

NEWS

OF THE

LEPIDOPTERISTS' SOCIETY

Volume 59, Number 4

Winter 2017



Inside:

Amethyst Hairstreaks in abundance, Big Pine Key

***Lepidoptarphius perornatella* and *Paracorsia repandalis* in the U.S.**

Butterflies from Pond Inlet, Baffin Island, Nunavut, Canada

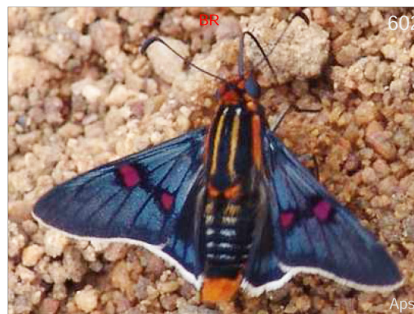
Online Andean butterfly catalogs

Hawaiian Lepidoptera -- diversity disappearing before discovery

Fluctuations of big moths in the early 21st century in New Jersey

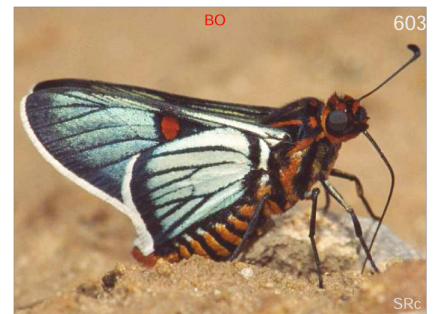
Marketplace, Book Review, Announcements, Membership Updates

... and more!



Amenis pionia pionia

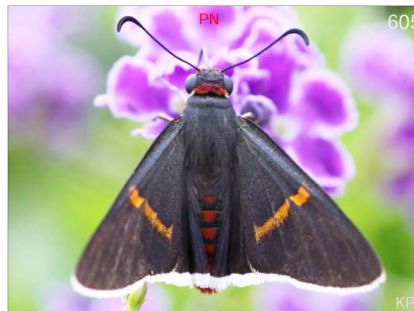
CO-BO



Amenis pionia pionia

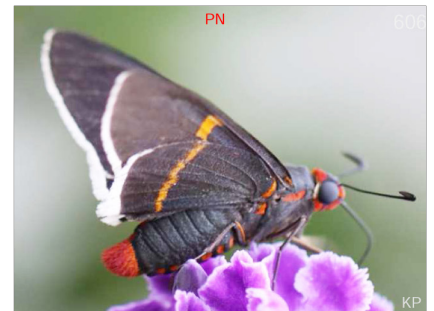
CO-BO

2000 m



Amysoria galgala

MX-VZ



Amysoria galgala

MX-VZ



Aspitha agenoria agenoria

CO-BO



Aspitha aspitha

CO-BO

800 m

NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 59, Number 4
Winter 2017



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www.lepsoc.org

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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Front Cover:

Part of one of the Hesperidae pages from Catalogs of Butterflies of the Andes (see article next page), online at <http://www.butterflycatalogs.com/families.html>, produced by Kim Garwood and Juan Guillermo Jaramillo Velasquez.

Digital Collecting:**Catalogs for butterflies of the Andes**

Kim Garwood

721 N Bentsen Palm Dr. #40, Mission, TX 78572 kimgrwd@sbcglobal.net

My friend Juan Guillermo Jaramillo Velasquez and I have been collecting butterfly photos from the Andean countries for quite a while, and Juan, who lives in Medellin, Colombia, has built a database of our photos. We are producing PDFs of the six families of butterflies, and have posted them online for anyone to download at <http://www.butterflycatalogs.com/families.html>. You can go to [butterflycatalogs.com](http://www.butterflycatalogs.com), then hover your mouse over PDFs, and you will see several choices. Families is the top choice. Click on that and you will get to the six family PDFs for downloading. You can also download Juan's PDFs by Localities, for many locations in Colombia, from the same site.

We have all six families of PDFs on this site, but the one we have done a lot of work on is HesperIIDae (see front cover), with over 260 pages of skipper photos. A huge thank you to Bernard Hermier, who has been my secret weapon for working on skipper id's. Without his countless hours and thousands of emails back and forth, and his infinite patience, we would have a lot more unknowns. All errors are of course my fault, not his. The other five PDFs are very incomplete. So far Juan has been concentrating on adding Colombian photos, but I want to include Ecuador, Peru and even some of our Bolivian photos.

People have asked me when I'm going to print a book on butterflies of the Andes, and the answer is I'm not. Instead, we're making these digital PDFs that can be updated, added to, corrected and shared for free. If we printed a book, or a series of books which is what it would be, not only would it be too expensive (not just the printing costs but the shipping, especially internationally), but once they were printed they would be set in stone and immediately be out of date or include errors. Every trip we are finding new species for our files, new photos to add, or improved photos of species we already have. It will probably take the rest of my life to make all the corrections, sort of a never ending project.

Juan has set up the database so we can add photos to it, then push a button and re-create the PDF, sorted in taxonomic order automatically. Sounds easy, but it is surprising how much time it takes. The time consuming part is processing the photos, and coming up with id's, so it is going much slower than we wish. But poco a poco, bit by bit we are working on it. This is much easier than adding photos to a book, where you have to wrap the pages one by one to insert additional photos.

We are always looking for photographers to add good, in-focus photos of any species that we don't have. So if you're

interested in contributing to our database, or if you're willing to help with id's, especially on difficult groups like Lycaenidae, Riodinidae or Ithomiinae, please contact me at kimgrwd@sbcglobal.net. We'll take all the help we can get.

I'm also building a spreadsheet of species which shows ranges, some of my notes, and elevations from two excellent Ecuadorian sites, butterflies of Sangay National Park and butterflies of Cotacachi, by Jean-Claude Petit: <http://www.sangay.eu/en/les-papillons> and <http://www.cotacachi.eu/en/les-papillons>, and from the Manu Road/Cosnipata Valley in southeast Peru (my favorite butterfly road in the world), from our many trips there and unpublished data. I'm slowly working through each genus, listing how many species in each genus that we have photos of, and how many we're still missing.

This spreadsheet is a compilation of my many trips to Colombia, Ecuador, Peru and Bolivia, the many many photos other photographers have sent me over the years, and collections that I have photographed (thanks to the many collectors and museums who have allowed me access to their collections), plus any information I've run into. Using www.butterfliesofamerica.com as a basic starting point, based on Lamas's Atlas of Neotropical Butterflies 2004, has enabled me to build this spreadsheet with species and subspecies within each genera. I'm sure there are many errors on my part, as this is very much a work in progress, and it is incomplete in places. I have been combining my old spreadsheets for each country into one Andean spreadsheet.

For skippers we have almost 1,600 species on the spreadsheet, a little less than 1,300 of them for which we have photos, or about 80%. Including subspecies, there are more than 2,200 lines in the spreadsheet. As we have most of the more common, widespread species, it is getting more difficult to add new species. But we're still adding new species, or subspecies, all the time, and we can always use great photos. With butterflies you're always looking for the fresh, untouched individual who wants to pose and become famous. The following pages are some of the examples of the plates for the HesperIIDae.

We will be continuing to work on the family PDFs, and every now and then will post updated ones to the [butterflycatalogs.com](http://www.butterflycatalogs.com) site, available to download for free. We are now slowly working on the Riodinidae, then we will move on to the other families.

Hesperiidae de Colombia y del neotrópico



Astraptes chiriquensis chiriquensis MX-EC

Reserva Las Tangaras El Carmen de Atrato Chocó - CocE



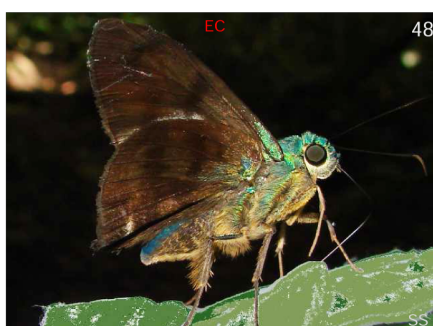
Astraptes chiriquensis chiriquensis MX-EC

Carretera Montezuma - PNN Tatamá 1400 m
Pueblo Rico Risaralda - CocE



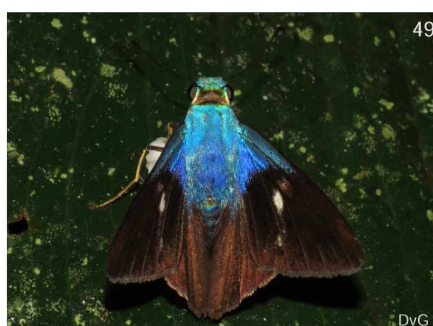
Astraptes cretatus cretatus NI-BO

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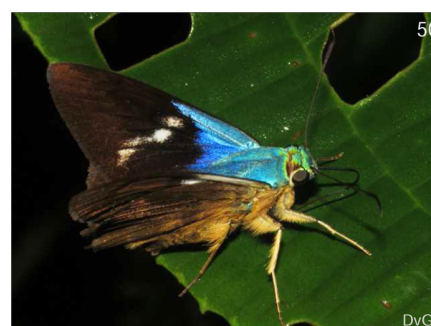
Astraptes cretatus cretatus NI-BO

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Astraptes creteus crilla CO-EC

Carretera Montezuma - PNN Tatamá 1250 m
Pueblo Rico Risaralda - CocE



Astraptes creteus crilla CO-EC

Carretera Montezuma - PNN Tatamá 1400 m
Pueblo Rico Risaralda - CocE



Astraptes creteus crilla CO-EC

Carretera Montezuma - PNN Tatamá 1250 m
Pueblo Rico Risaralda - CocE



Astraptes creteus crilla CO-EC

Carretera Montezuma - PNN Tatamá 1400 m
Pueblo Rico Risaralda - CocE



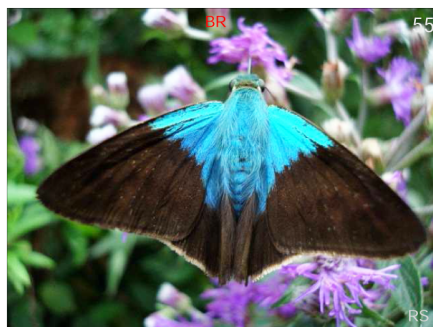
Astraptes egregius egregius TX-CO

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Astraptes egregius egregius TX-CO

Vereda Paso Nivel - Finca Zanzibar 1450 m
Amagá Antioquia - Cce



Astraptes elorus CO-BR

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Astraptes elorus CO-BR

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Hesperiidae de Colombia y del neotrópico



Entheus bombus CO-BR

P.N.N. Amacayacu Leticia Amazonas - Amz



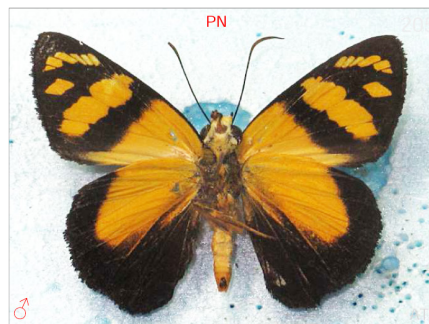
Entheus gentius CO?-SU



Entheus gentius CO?-SU



Entheus huertasae PN-CO



Entheus huertasae PN-CO



Entheus matho aequatorius CR-EC



Entheus matho latifascius CO

Carretera Montezuma - PNN Tatamá
Pueblo Rico Risaralda - CocE



Entheus matho latifascius CO

Carretera Montezuma - PNN Tatamá
Pueblo Rico Risaralda - CocE



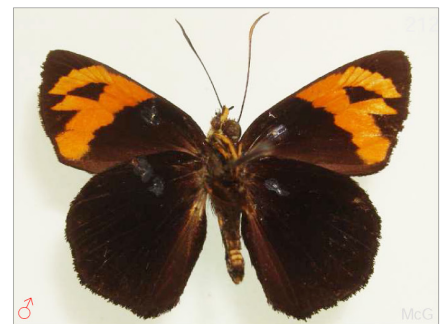
Entheus priassus CO



Entheus priassus CO

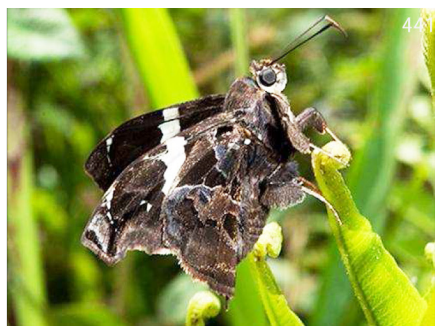


Entheus telemus CO-BR



Entheus telemus CO-BR

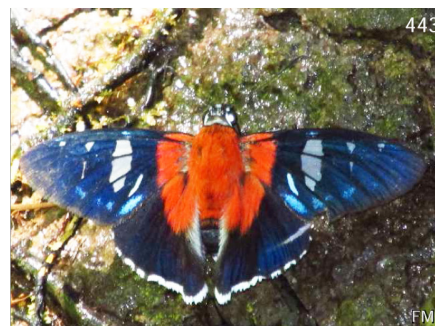
Hesperiidae de Colombia y del neotrópico



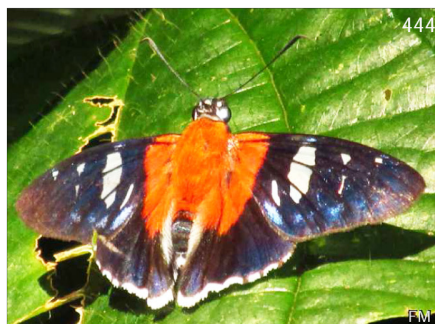
Spathilepia clonius Tx-AR



Tarsoctenus corytus corba CO?-PE,BR

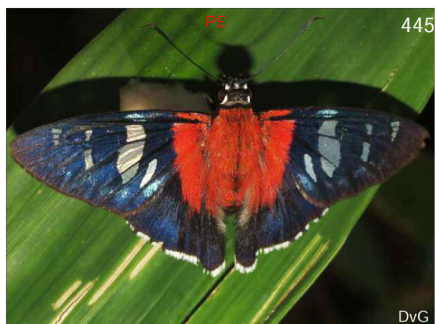


Tarsoctenus corytus corba CO?-PE,BR



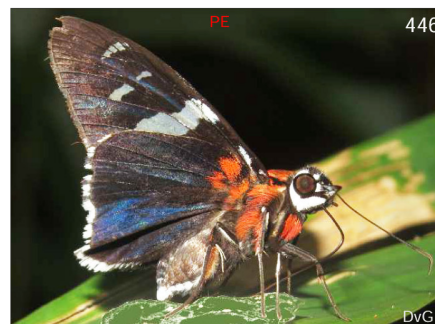
Tarsoctenus corytus corba CO?-PE,BR

Río Pepino Mocoa Putumayo - CorE 560 m



Tarsoctenus corytus corba CO?-PE,BR

650 m



Tarsoctenus corytus corba CO?-PE,BR

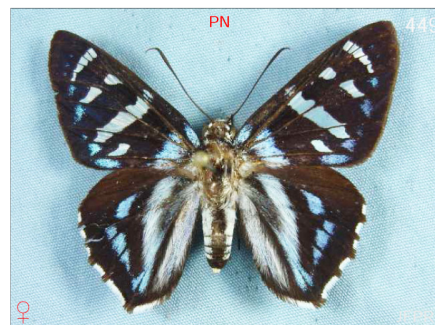
650 m



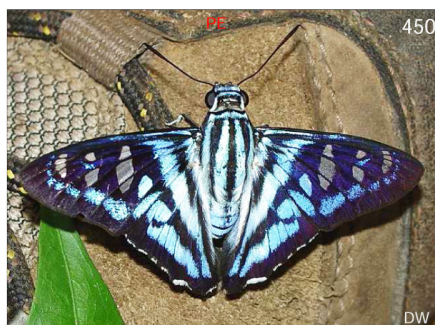
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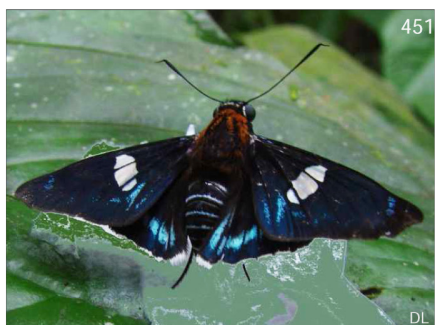
Tarsoctenus corytus gaudialis NI-CO



Tarsoctenus corytus gaudialis NI-CO



Tarsoctenus papias CO-BR



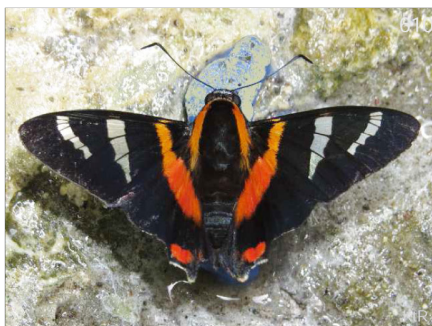
Tarsoctenus praecia plutia CO?-PE,BR

Municipio de Villavicencio Villavicencio Meta - Orq



Tarsoctenus praecia rufibasis CO?-FG,BR

Hesperiidae de Colombia y del neotrópico



Aspitha leander MX-CO

Cañón río Claro - Reserva el Refugio San Luis Antioquia - CceE 320 m



Azonax typhaon MX-GU



Azonax typhaon MX-GU



Chalypyge zereda hygieia CO EC

Carretera Montezuma - PNN Tatamá Pueblo Rico Risaralda - CocE 1450 m



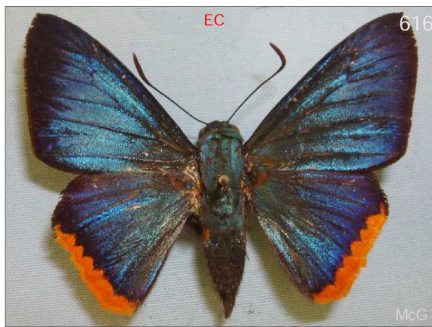
Chalypyge zereda rufipectus CO EC

Carretera Montezuma - PNN Tatamá Pueblo Rico Risaralda - CocE



Chalypyge zereda rufipectus CO EC

Carretera Montezuma - PNN Tatamá Pueblo Rico Risaralda - CocE 1400 m



Chalypyge zereda rufipectus CO EC



Chalypyge zereda rufipectus CO EC

Carretera Montezuma - PNN Tatamá Pueblo Rico Risaralda - CocE 1400 m



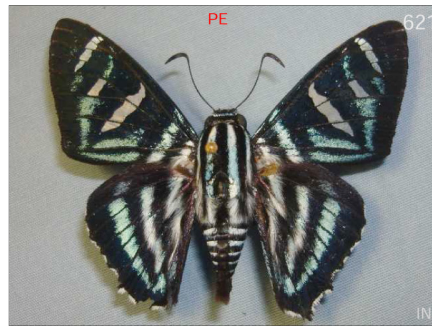
Chalypyge zereda rufipectus CO EC



Elbella azeta azeta VZ-BR

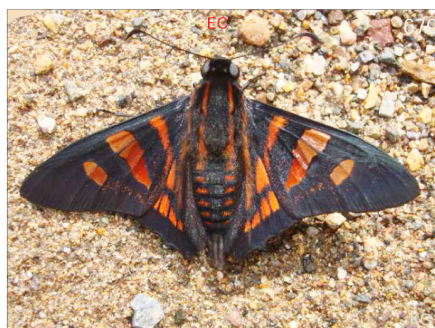


Elbella azeta azeta VZ-BR



Elbella blanda CO-BR

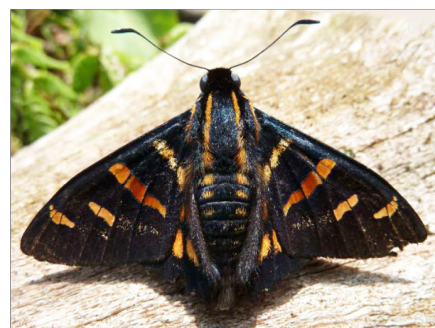
Hesperiidae de Colombia y del neotrópico



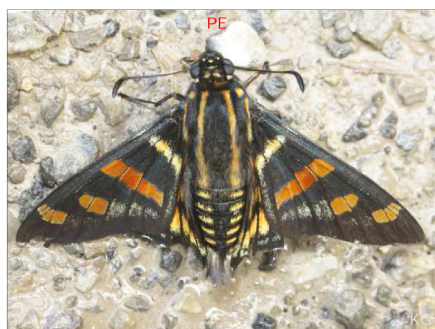
Mimardaris minthe CO-PE



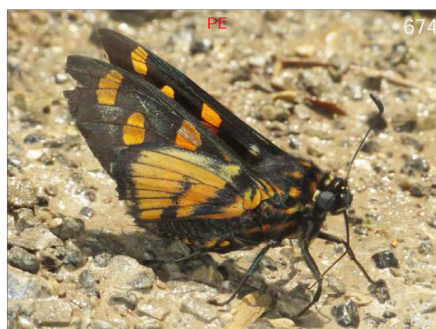
Mimardaris minthe CO-PE



Mimardaris porus porus CO



Mimardaris sela sela CO



Mimardaris sela sela CO



Mimoniades nurscia nurscia CO-PE



Mimoniades nurscia nurscia CO-PE



Mimoniades nurscia nurscia CO-PE



Mysarbia sejanus stollii CR-BR

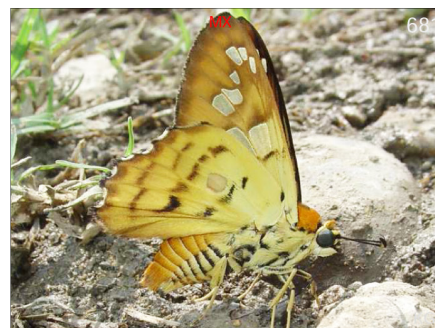


Myscelus amystis amystis CO-VZ,TR

Cañón río Claro - Reserva el Refugio San Luis Antioquia - CceE



Myscelus amystis hages MX-CO?



Myscelus amystis hages MX-CO?

Hesperiidae de Colombia y del neotrópico



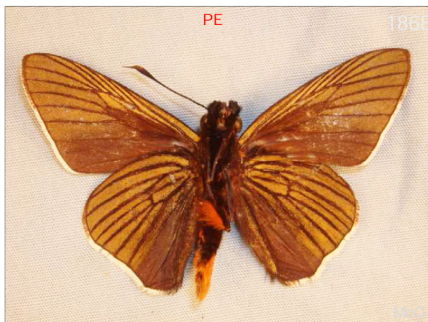
Perichares seneca PN-BR 1865



Pyrrhopygopsis agaricon agaricon CR-CO 1866



Pyrrhopygopsis agaricon agaricon CR-CO 1867



Pyrrhopygopsis romula romula CO 1868



Pyrrhopygopsis romula romula CO 1869



Pyrrhopygopsis socrates socrates CO-BR 1870

Municipio de Mitú Mitú Vaupés - Amz 200 m



Pyrrhopygopsis socrates socrates CO-BR 1871

Municipio de Mitú Mitú Vaupés - Amz 200 m



Pyrrhopygopsis socrates socrates CO-BR 1872



Pyrrhopygopsis socrates socrates CO-BR 1873



Pyrrhopygopsis socrates socrates CO-BR 1874



Pyrrhopygopsis socrates socrates CO-BR 1875

**www.lepsoc.org and
https://www.facebook.com/lepsoc**

About biodiversity websites, citizen scientists, and scientist citizens: a North Carolina example

Steve Hall¹, Bo Sullivan², Tom Howard³, and Parker Backstrom⁴

¹105 Braswell Place, Chapel Hill, NC 27516 stephenphall@outlook.com

²200 Craven Street, Beaufort, NC 28516 sullivan14@earthlink.net

³NC Division of Parks & Recreation, 121W. Jones Street, Mail Service Ctr. 1615, Raleigh, NC 27699
tom.howard@ncparks.gov

⁴P.O. Box 31, Bear Creek, NC 27207 dpbackstrom@embarqmail.com

The members of the North Carolina Biodiversity Project and NC Division of Parks and Recreation would like to announce the creation of the Moths of North Carolina Website, which along with the Butterflies of North Carolina and four other taxon-focused websites are part of the North Carolina Biodiversity Project. The Moth website can be reached directly at <http://www.dpr.ncparks.gov/moths/index.php> or through the NCBP portal website at <http://nc-biodiversity.com/>. Although we had originally contemplated describing the North Carolina moth fauna in the form of a traditional book or monograph, we ultimately decided on creating an electronic version instead, the advantages of which we would like to discuss here. These include advantages to the scientific and conservation communities as well as the interested public, all of which can gain from the greater exchange of information in the forum provided by the website.

For the general public, biodiversity (or taxon-focused) websites offer freely available identification guides and an opportunity – in some cases, including the Moths of NC – to display their photos. Without the space limitations, marketing constraints, or the prohibitive costs of color printing that limit the scope of traditional field guides, websites can cover more species, provide more illustrations, and go into greater detail about species' identifying features. More information can also be provided on the distribution, phenology, ecological associations, conservation status, and management needs of individual species. Attention can also be focused on much more restricted geographic areas than is usually possible with published field guides, and can focus as much – or more – on the rarer species as the common ones that the public is most likely to encounter. With such a close focus, an attempt can be made to actually cover the entire range of species within even as a large a fauna as the moths, which in North Carolina are estimated to include between 3,000 and 4,000 species.

Another critical factor governing our decision, was the fact that an electronic publication can be a work in continual progress, subject to revision at any time new information becomes available. With all of the taxonomic changes that are occurring, both as the result of surveys being conducted in areas not previously studied as well as the massive changes being wrought in taxonomy by genetic

analyses, any work published at a particular point in time becomes obsolete almost as soon as it goes out the door.

Monetary profits have not been the main motivation in our devoting large amounts of time and effort in constructing this project. While our individual motives vary, we all share a fascination with moths, and with biodiversity and the natural world more generally. In some of our cases, we have conducted surveys of moths over the past several decades, for either taxonomic or conservation-oriented purposes; one of our main goals in this website involves sharing that hard-won scientific knowledge we have acquired, which might otherwise be easily lost. In other cases, we simply want to share the excitement of discovery of the vast array of colors, patterns, sizes, shapes, and adaptations that are presented by moths. One motive that is true for all of us is our concern about the fate of nature -- moths, birds, grasshoppers, other organisms, and humanity, all inter-related and sharing intertwined fates on a single planet.

Biodiversity conservation is a hard sell, however. It has proven hard enough to convince people that we are responsible for changes in the earth's climate, let alone that we are responsible for a sixth great extinction event, rivaling the demise of the dinosaurs. Just getting people aware that extinctions and extirpations are occurring all around us is difficult enough. Within North Carolina alone, we believe that four species of Lepidoptera have vanished from the state since the 1990s (when conservation-oriented surveys began to be done): Regal Fritillary, Loammi Skipper (the inland savanna species, not *Atryonopsis quinteri*), Arogos Skipper, and the Rattlesnake Master Borer Moth. Several others hover on the brink, most notably the Venus Flytrap Moth, which is almost entirely confined to North Carolina.

The demise of these species has largely gone under the radar here in our state, even among the scientific and conservation communities. We ourselves have to admit to a certain amount of skepticism – how do you prove a negative? Although the loss of individual populations can be well documented, there is always the possibility that the species is still lurking somewhere out there that hasn't yet been surveyed, hiding out with the Ivory-billed Woodpecker and Sasquatch. All we can suggest as

an answer is to make the probability of making such a discovery as small as possible, relying on large amounts of survey data and good habitat models and other theories that explain why a species has vanished.

In that context, websites that accept data from a broad segment of the public can play a key role, not just raising an awareness of the issue but also by providing a larger set of eyes and covering more territory than formal biological surveys can ever hope to do. This is especially important in an era when academic and government interest in conducting such surveys has itself largely gone the way of the Arogos Skipper. In just the first few weeks since we announced the opening of the Moths of North Carolina website, we have, in fact, received a record for *Hemaris gracilis*, a species that we have not recorded since 1971; a record for *Lytrosis pergmagnia*, the fourth site for this species recorded in the eastern Piedmont, now becoming a global hotspot for this rare Geometrid; and the first state record for *Samia cynthia*, an introduced species but still a noteworthy find, given the spottiness of records for this species elsewhere. All of these records are now incorporated into our website, demonstrating (for now at least) that we can keep pace with the rate of new discoveries.

We rest great hopes in the ability of our websites to draw in still more public participation, which is needed both to increase the amount of raw data to make a case for conservation, but also to increase the public awareness of the problems confronting the conservation of biodiversity. At the same time, we are not neglecting scientific standards of evidence. We take vetting these new records very seriously. We do most of our vetting in-house, relying on decades of experience identifying moths to the species level based on collected specimens. The vast majority of the records included in the website, in fact, come from field surveys that we ourselves have conducted. A significant number also come from previous surveys conducted throughout the state, especially those collected beginning around 1900 by the North Carolina Insect Survey (summarized by Brimley, 1938, and Wray, 1967). Many of those specimens still exist and were transferred from the original NC Department of Agriculture Insect Collection to the NC State Insect Museum in 2000. Vetting of specimens from that era is one of our on-going projects, providing a strong historical context for interpreting our current fauna.

Despite the continued importance of specimens for accurate species identification, the success of the website depends on our acceptance and reliable vetting of photographs. Fortunately – at least in the case of the macro moths – key characters used in the original descriptions or later reviews usually include wing markings and/or other external features that can be seen in good quality photos of unworn specimens. These published characters (but also including our own observations) form our standards for accepting a photographic record and are described in our species accounts, along with citations of the sources we use.

Writing these standards, however, is still a work in progress and we have currently completed them for only 507 species, primarily macro-moths – completion for the nearly 3,000 or more species of moths believed to occur in North Carolina is still years away. As a stop-gap measure, we are in the process of placing all species into three identification categories: 1) identifiable based on good quality photographs of the forewing patterns of unworn specimens; 2) identifiable based on good quality photos that include key diagnostic features in addition to forewing pattern, or where supplementary information – e.g., forewing length, presence of known host plants, etc. – is included that help make the diagnosis; and 3) identifiable only by close inspection or dissection or DNA analysis of specimens. To date, we have completed this task for all but a couple of hundred micros, providing this information as Adult ID Requirements on our species accounts. In addition to scouring the literature ourselves, we are indebted to a number of taxonomists (acknowledged on the About Us page on the Moth Website) for input, particularly for the micros.

For species falling in the first category, we encourage the submitter to do an initial match of their photos to those in the field guides or online sites such as the Moth Photographers Group website, BugGuide, or BAMONA (which we list and describe on an Identification Guide page). In fact, we require that an initial identification be made in order to submit a record, helping us conduct the vetting process more speedily. Currently, we display all photographs for a species that meet our standards. In some cases, where the photo allows the specimen to be identified to genus but not species, we display them in a separate genus-level account. That allows us to preserve at least some information. Many of the species falling in our third ID category are given this treatment, with the hope that new information will eventually become available that might result in suitable characters for identification.

For records that are submitted that represent new additions to the state's list, we prefer that specimens be submitted -- either to us or other taxonomic experts -- for identification. Photos are allowed for this purpose only where they can be unequivocally identified by an expert. The same is true for species recorded for the first time in a given region of the state, particularly from habitats with which the species has not been previously been associated. We also accept specimens – only with permission of the website authors – where the authors have a particular taxonomic, ecological, or conservation interest in a particular species.

In addition to the images themselves, records submitted to the website must include information on the observer(s), location and date of the observation, habitat, and number seen. Additional comments on behavior or ecological factors are welcomed. The photos are automatically displayed, with their authors given credit. The locational data is also automatically displayed on a county-level

map and the dates – for adult moths only – are shown in flight charts divided into four separate regions of the state. Additional data for early stages, parasites and habitat preferences where known are included as well as genitalic photographs and DNA analyses.

We are not just passive recipients and transmitters of these data, however. The authors take an active role, based on our years of experience – in some cases professional – not only in vetting the incoming records, but in synthesizing the information they provide. In particular, we make use of our broad but detailed knowledge of the state's natural features and ecosystems to interpret the habitat associations of the individual species. We also utilize our understanding of the changes that are occurring in the state's environmental conditions to estimate a species' conservation status and needs, following conventions established by the Natural Heritage Program Network and NatureServe.

Over 400 species accounts have now been written that include these analyses, focusing especially on the species of greatest conservation concern. Examples include the Venus Flytrap Moth, *Hemipachnobia subporphyrea*, a species for which we have written an extensive account in the website, based on over 45 years of our investigations of this species in North Carolina. At the other extreme is the Nutmeg Underwing, *Catocala myristica*, a species described in 2015 (by Kons and Borth) and discovered in North Carolina just last year (thanks to Larry Gall). In the case of this species,

as well as a number of other recently described species, we are just beginning the assessment of their status in North Carolina, with the website serving an important role in flagging them as in need of more information.

The fact that we can focus so closely on some of the most rarely seen species, as well as provide state-specific information on Luna Moths and other well-known species, is a strong testimony to what we can accomplish through this website. The Moths of North Carolina website – as well as biodiversity websites more generally – can be viewed as a forum where both Citizen-Scientists and Scientist-Citizens can have a dialogue about the how and why to conserve our native species and ecosystems. This must involve creating a solid basis of empirical data that clearly show how our biodiversity is changing, particularly that a large portion of it is becoming irretrievably lost. But conservation requires more than just dispassionate science, i.e., cold facts. It also requires that as many people as possible place a value on the natural world, on its great breadth and depths, and on our own place as a biological species within its unity. Not only do taxonomists, ecologists, and conservationists need to take part in this dialogue, but so must all citizens of the planet. We hope that Moths of North Carolina website, along with the larger website project of the NCBP, can help promote this vitally needed interaction.

*North Carolina Biodiversity Project (<http://nc-biodiversity.com/>)

A successful search for *Callophrys irus* pupae

Dave McElveen¹ and Virginia Dell Craig²

¹3806 Leane Dr., Tall Timbers Research Station, Tallahassee, FL 32309

d.mcelveen@comcast.net

²1833 Halstead Blvd. #702, Tallahassee, FL 32309

vdellcraig@centurylink.net

Though uncommon for a butterfly, the Frosted Elfin (*Callophrys irus*) pupates at or below the soil surface with mature larvae wandering several meters from their host plant in search of a pupation site (Schweitzer et al. 2011; Thom, 2013). As part of a larger study of the Frosted Elfin in north Florida, we sought to observe elfin pupae in their natural habitat.

In April 2017, we located seven late-instar elfin larvae (12-16mm in length) on sundial lupine (*Lupinus perennis*), their host plant. Following procedures described by Thom 2013, we placed five screen-topped metal sleeves over larvae and plants (Figure 1). Sleeves were designed to confine the area of larvae pupation so we could more easily find them later. Two sleeves contained two larvae each, and three contained one larva each. Sleeves were standard 12"-diameter metal ducting cut to 12" lengths. We set each about 1" in the soil to prevent lateral larval escape and duct-taped plastic screen over the tops as protection from predators.



Figure 1: Typical sleeve used to confine *Callophrys irus* larvae for subsequent pupal search. (Photo by Sally Jue)

In June 2017, we revisited the sleeves, removed them and searched for pupae. We carefully removed successive layers of leaf litter, duff and soil until we found pupa(e) or encountered packed soil judged to be a barrier to larvae downward movement (Figure 2). A total of four pupae were found (Figures 3, 4 and 5). Two were 10mm in length and two were between 11 and 12mm in length. All were found lying horizontally on the soil surface just under the leaf litter. We found pupae in three of the five sleeves (60%). In one sleeve, in which we had observed only one late-instar larva, we found 2 pupae. Assuming we actually sleeved 8 larvae, we found four of eight (50%). After being studied and photographed, each pupa was returned to its original location and position, and the removed soil and leaf litter were carefully replaced. At each of the two sleeve locations where no pupae were found, the sleeve enclosure contained a small burrow with an exit hole going directly into the enclosed area. The small diameter (ca. 2.5cm) of the burrows and exit holes is consistent with the presence of a small mammal such as a shrew.

Our findings compared to those of Thom 2013, who found 12 pupae, eight of which were on the soil surface and four of which were 0.5cm to 3.0cm below the surface.

Acknowledgements

We wish to thank Dean Jue, Sally Jue and Wilson Baker for their gracious assistance in excavating and finding pupae. Also, thanks to Matt Thom for sharing his methods and experiences searching for *Callophrys irus* pupae. And a special thanks to Jean McElveen for her unwavering support and assistance in all aspects of our Frosted Elfin work.



Figure 2: Searching for pupae. Pupae, leaf litter and soil were replaced after pupae were found. (Photo by Virginia Craig)



Figure 3: *Callophrys irus* pupa. Scale is in millimeters. (Photo by Dean Jue)



Figure 4: *Callophrys irus* pupa *in situ*. (Photo by Dean Jue)



Figure 5: *Callophrys irus* pupa. (Photo by Dave McElveen)

Literature Cited

Schweitzer, D.F., M.C. Minno, and D.L. Wagner, 2011. Rare, declining, and poorly known butterflies and moths (Lepidoptera) of forests and woodlands in the eastern United States. US Forest Service, Forest Health Technology Enterprise Team, FHTET-2011-01. Morgantown, WV. 517pp.

Thom, Matthew D., 2013. The ecology and conservation of *Callophrys irus* Godart: the role of fire and microhabitat. Univ. of Florida PhD dissert. 189pp.

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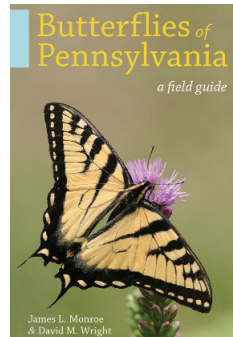
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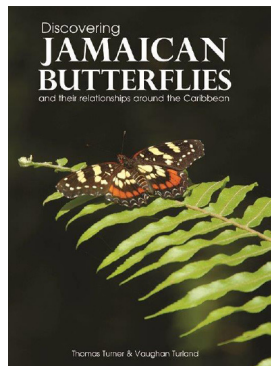
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Research

Wanted: Observations, photos, specimens of larvae and adults of *Lophocampa roseata* and the Spotted Tussock Moth, *Lophocampa maculata* from all areas of North America, recent or old data. Records from Alaska and northern Canada, the desert SW, southern Appalachians and Pacific Coast are especially needed to define range. Records of early or late season observations are particularly valuable. All larval and adult photographs are useful, especially if they show unusual patterns of coloration. Specimens are desired for future genetic analysis. Contact Ken Strothkamp, Portland State University (kstrot2@pdx.edu) for more information on the project. 594



From the Editor's Desk

James K. Adams

This issue will be my 26th since taking over the editorship in mid-2011. I truly enjoy putting the News together and hope that you find it worth your while to peruse. This issue has some articles with common themes, such as biodiversity websites (the Andes and North Carolina) and recent or new species for North America (*Paracorsia repandalis* and *Lepidotarphius perornatella*). For your enjoyment and keeping with the "new or recent" species theme, here is Georgia's second record for *Sideridis congermana*, taken on Rocky Face Ridgeline, just west of Dalton, GA on July 16 of this year. (Okay, so it's ALMOST new . . .)



Paracorsia repandalis (Lepidoptera: Crambidae) in North America

Paul Denehy

14 West Lawn Street, Danville, PA 17821 dennej10@gmail.com

The crambid moth *Paracorsia repandalis* (Denis & Schiffermuller, 1775), first reported in North America in 2015 on the basis of two specimens collected by Jim Vargo in Indiana and identified by James Hayden (Scholtens & Solis, 2015), has become widely established in the northeastern United States and southeastern Canada. Specimens have now been collected at two locations in Pennsylvania, and photographic records exist from Ontario.

P. repandalis is native to Europe and central Asia, where its hosts are various species of mullein (*Verbascum* spp.) (Emmet, 1979). While I am unaware of any observations of the immature stages of this species in North America, the widespread presence of the non-native common mullein (*Verbascum thapsus*) in disturbed habitats throughout the United States and Canada makes it a likely candidate for the species' host here. The two specimens collected in Pennsylvania were both found in open, disturbed habitats, one in a powerline cut and one in an old field, and *V. thapsus* was present in both locations. Stephanie Hill also reports that both *V. thapsus* and *V. blattaria* are common in the park in Ontario where her photographic records were obtained (personal communication). If *V. thapsus* is the moth's preferred host in North America, then *P. repandalis* has the potential to continue expanding its range, as *V. thapsus* occurs in every U.S. state and Canadian province (USDA Plants Database).

P. repandalis (Figure 1) has likely been overlooked by most observers in North America due to its superficial similarity to several common North American Crambidae. The wing expanses of the two Pennsylvania specimens of *P. repandalis* are 21 mm (male) and 26 mm (female).

Photographic records of this species online have been confused with the larger *Ostrinia nubilalis* (Hübner, 1796) and with various similarly-sized species of *Hahncappsia* Munroe 1976. With specimens in hand, the species can be separated from these relatives by examining the ventral wing surface, and one of the Ontario photographic records included a ventral photograph of the moth, allowing for easy identification. The ventral surface of *P. repandalis* (Figure 2) is white, suffused with gray scaling throughout, with the pattern on the dorsal surface of the wings mirrored on the ventral surface in dark gray. This bold ventral pattern separates this species from any superficially similar species in eastern North America. On the dorsal surface, the smoothly curving PM line distinguishes this species from similar northeastern *Ostrinia* spp. (*O. nubilalis* (Hübner, 1796), *O. penitalis* (Grote, 1876), and *O. obumbratalis* (Lederer, 1863)), all of which have jagged PM lines. The ground color of the forewings of *P. repandalis* is pale dull yellow to gray, and the ground color of the hindwings is white, which distinguishes it from *H. neomarculeta* (Capps, 1967), *H. neoblitalis* (Capps, 1967), and *H. marculeta* (Grote & Robinson, 1867), all of which have a brighter yellow ground color throughout. Specimens of *H. pergivalis* (Hulst, 1886) and *H. mancalis* (Lederer, 1863) from the Northeast also tend to be yellower in color and have the PM line greatly reduced on the hindwing compared to *P. repandalis*. In addition to these features, the ST line on the forewing of *P. repandalis* is complete, similar in thickness to the PM line, and curves inward at the costa, while the ST lines of the five northeastern *Hahncappsia* spp., when complete, are straight and tend to be more diffuse than the PM lines. The male genitalia (Figure 3) are amply distinct from those of *Hahncappsia* and *Ostrinia*, bearing a closer resemblance to *Sitochroa*.



Figures 1 & 2. Female *Paracorsia repandalis*, dorsal aspect (left); ventral aspect (right)



Figure 3. *Paracorsia repandalis*, male genitalia

The valves are broad, the uncus narrow and rounded, and the claspers large and strongly arched.

In addition to Jim Vargo's two specimen records from St. Joseph County, Indiana, collected on 11 Aug 2010 and 14 Aug 2012 and reported by Scholtens & Solis, I have collected two specimens of the species in Pennsylvania with the following data: one female, "Pennsylvania: Montour County, Hess Field property: wetland along Mahoning Creek 40.9738°N 76.6208°W, 17 May 2017, Paul Dennehy leg.", and one male, "Pennsylvania: Huntingdon County, Juniata College Peace Chapel, 1 mile NE of Huntingdon 40.5044°N 77.99846°W, 15 September 2017, Paul Dennehy leg." Both these specimens were taken at 175 W mercury vapor lights and are deposited in my personal research collection. Jim Vargo has not encountered the species again in Indiana since collecting the first two specimens (personal communication). In addition to these four specimens, five photographic records from Ontario were located on BugGuide.net with the following data: "Scarborough, Ontario, Canada; 14 Jun 2009; photo by John Lee", "Scarborough, Ontario, Canada; 2 Aug 2015; photo by John Lee", "Riverwood Park, Mississauga, Peel Region, Ontario, Canada; 24 Aug 2016; photo by Stephanie Hill", "Riverwood Park, Mississauga, Peel Region, Ontario, Canada; 17 Aug 2016; photo by Stephanie Hill", and "Toronto, High Park, Ontario, Canada; 31 Aug 2016; photo by Ken Sproule". All records for which method of collection was given indicate that the moth was attracted to lights nocturnally. The date range of these nine records collectively suggests the species is double-brooded, with dates of sightings ranging from 17 May to 15 September.

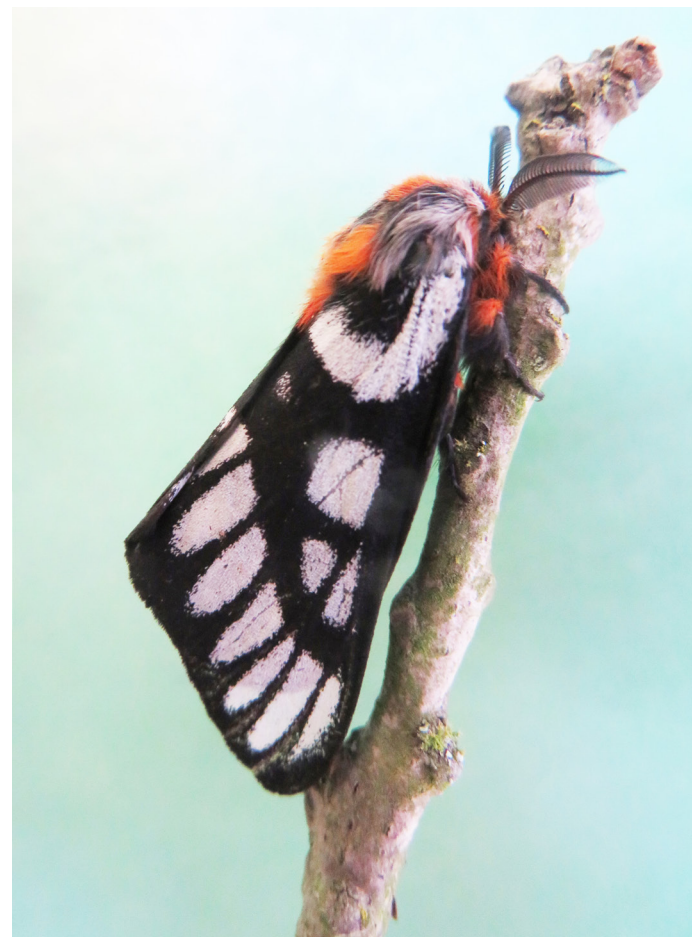
This species should be sought out in additional states in the northeastern United States to better understand its distribution. It certainly already occurs in more states than those reported here, and has the potential to expand its range even further. Searches for larvae should also be conducted on *V. thapsus* and other *Verbascum* spp. established in the United States and Canada to clarify the specific host or hosts that *P. repandalis* is using in North America.

Acknowledgements

I would like to thank James Hayden for identifying my first Pennsylvania specimen of *P. repandalis* and suggesting that I write this article. I would also like to thank Jim Vargo for sharing his experience with the species in Indiana. Also, thanks to Stephanie Hill for her insight on the habitat where her photographic records were obtained, and to John Lee and Ken Sproule for sharing their photographic records on BugGuide. Further, I would like to thank the Montour Area Recreation Commission for giving permission to collect on their properties. And finally, thanks to Juniata College in Huntingdon, PA, for hosting the BioBlitz during which the Huntingdon Co. specimen was collected.

Literature Cited

- Scholtens, B.G., Solis, A.M. 2015. Annotated check list of the Pyraloidea (Lepidoptera) of America North of Mexico. *ZooKeys* 535: 1–136. doi: 10.3897/zookeys.535.6086.
- Emmet, A.M. 1979. *A field guide to the smaller British Lepidoptera*. British Entomological and Natural History Society, London. 1-271:206.
- "Plants Profile for *Verbascum thapsus* (common mullein)." USDA PLANTS Database. Accessed October 16, 2017. <https://plants.usda.gov/core/profile?symbol=VETH>.



Hemileuca chinatiensis. Fort Davis, Texas, larva collected on *Condalia ericoides* in March 2016, moth emerged in August 2017 (they normally fly in October). Collected and photographed by Ric Peigler.

Lepidotarphius perornatella (Walker, 1864) (Lepidoptera: Glyphipterigidae) new to North America

Kyhl Austin¹, Vazrick Nazari², Jean-François Landry², Stephen R. Johnson³

¹Davidson College, 209 Ridge Road, PO Box 6418, Davidson, North Carolina 28035 kyaustin@davidson.edu

²Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa Research and Development Centre, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada
vazrick.nazari@agr.gc.ca; jean-francois.landry@agr.gc.ca

³Independent ecologist; 103 Independence Street, Pella, Iowa musquaspenne@gmail.com

On 18 August 2017, SRJ uploaded to BugGuide.net (<http://bugguide.net/node/view/1427183>) two images of an unknown moth which he photographed around a small pond on his property in Pella, Marion County, Iowa (Figs. 1–2). The ponds were put into the yard 16 or 17 years ago and stocked with *Acorus americanus* and several species of *Carex* about 15 years ago. These images immediately caught the attention of the first author (KA) who suspected that the distinctive moth belonged to either Heliodinidae or Glyphipterigidae. Initial examination of reference material (Heppner 1985; Hsu & Powell 2004) did not yield a satisfactory match among the described North American species. An image on the Barcode of Life Data Systems (http://v4.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=396400) of a pair of wings of *Lepidotarphius perornatella* (Walker) from South Korea provided a clue. After examining Walker's original description and subsequent authors' figures, KA relayed his identification to SRJ, who then proceeded to collect and send five specimens to VN and JFL at the Canadian

National Collection (CNC) for genitalia dissection, imaging, and confirmation of the suggested identification. SRJ observed and photographed several more individuals between September 3–25, including a mating pair on September 25 (Fig 3). SRJ also observed this behavior: individuals when disturbed rose from near ground level and landed at mid-level leaf to begin rapid (1 s to 0.5 sec) leg waving. This “eye-catching” display would continue for 5 or more minutes. Individuals performing this display were highly noticeable to the eye. It evoked a deceiving behavior to elicit confusion in a potential predator, or alternatively to attract a mate. Both males and females performed this behavior.

Dissection and slide mounting of genitalia were performed by JFL following standard methods (Landry 2007). Images of the live moths were taken with a Cannon EOS Rebel T6i camera and 90 mm Tamron Macro lens. Slide-mounted genitalia were photographed with a Nikon DS-Fi1 digital camera mounted on a Nikon Eclipse 800 microscope at

100x magnification, and subsequent assembly of multiple photos of different focal planes into single deep-focus images using Nikon's NIS 2.3 Elements. The specimens are deposited in the CNC. Unfortunately when received, the unpinned specimens had become partly covered in mold, which hindered attempts at DNA barcoding as well as caused some of the abdomens and genitalia to break up upon dissection. Photos of set specimens are shown in Heppner (1992).



Figs. 1–2. First images of *Lepidotarphius perornatella* (Walker) from Pella, Marion County, Iowa. Photos by Stephen R. Johnson, taken 1.IX.2017 and 5.IX.2017.

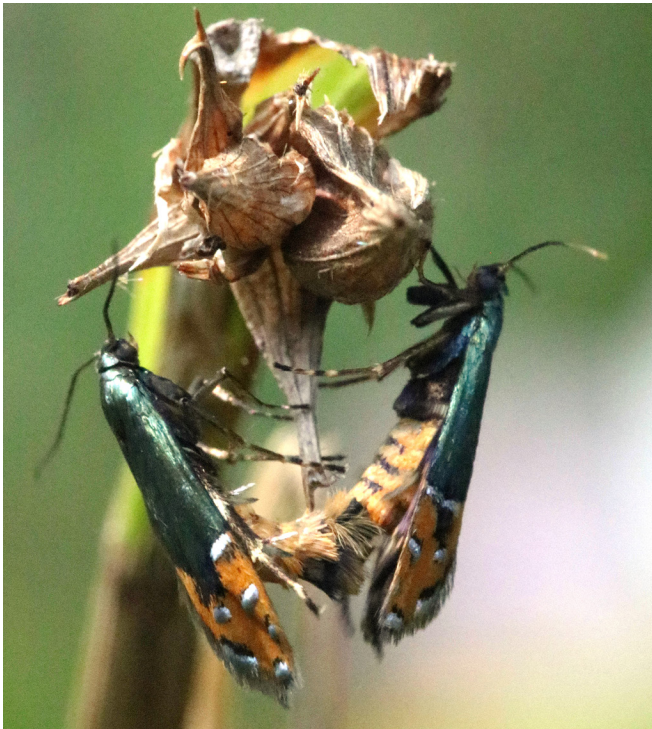


Fig 3. Mating pair, photo by Stephen R. Johnson, 25.IX.2017.

The family Glyphipterigidae was recently expanded to include three subfamilies, Glyphipteriginae, Acrolepiinae, and Orthoteliinae (Nieukerken *et al.* 2011). Glyphipteriginae are a subfamily of small, often iridescent or strikingly marked, primarily day-flying moths with a cosmopolitan distribution. Little is known about the biology of most species, but those whose host plants are known feed primarily on sedges, rushes, and various other monocots. Worldwide, there are about 345 described species (Heppner 1985). In North America the Glyphipteriginae are represented by five genera and 40 species (Heppner 1985; Heppner 1997a, b; Pohl *et al.* 2015). The North American fauna was revised by Heppner (1985).

Lepidotarphius Pryer currently includes a single, strikingly colored species, *Glyphipteryx perornatella* Walker, native to East Asia. Arita & Heppner (1992) reported it feeding on *Acorus calamus* (Acoraceae) and always being found in close proximity to its host. This echoes Pryer (1877), who reported that this species is “occasionally taken amongst reeds [and] not uncommon at ponds on the Shanghai race-course.”

***Lepidotarphius perornatella* (Walker, 1864) (Figs. 1–5)**

Glyphipteryx perornatella Walker, 1864: 840, 1040.
Lepidotarphius splendens Pryer, 1877: 235, pl. 4, f. 13.
Staintonia fulgens Erschoff, 1877: 347.

Material examined. 5 specimens. 4 ♂, 1 ♀, USA: IA: Marion Co., Pella, 41.402395, -92.906659, August 2017, Stephen R. Johnson. Slides MIC7942 ♂, MIC8013 ♂, MIC8014 ♀.

Known distribution. East Asia (Far East Russia, China, Japan, Taiwan [expected], South Korea) (Arita & Heppner, 1992; Korea Biodiversity Information System). This is a new record for the United States, known only from one location in Marion Co., Iowa.

Description. (Figs. 1-3). Forewing length: 13–18 mm (Arita & Heppner 1992). Head, thorax and tegulae brilliant metallic blue-green. Abdomen mostly bright orange dorsally and ventrally. Basal three-fifths of forewing of same color as head and thorax, distal two-fifths bright orange. The forewing two contrasting colors are divided by an incomplete silver line running from the costa to near the inner margin. The blue-green metallic scales sometimes bleed through this line towards the apex. Inside the orange portion are five silver spots; two positioned along the costa, one on either side of the apex, and one centrally. **Male genitalia.** (Fig. 4). Tegumen reduced to thin V-shaped band. Uncus and gnathos absent. Subscaphium developed, elongate. Vinculum transversely pentagonal with anterior margin V-shaped and markedly elongate, rod-like saccus. Valva heavy and constituting nearly the entire genitalia, divided into an elongate dorsal and ventral lobes with the inner surface densely covered with spiniform setae.



Fig. 4. Male genitalia (preparation MIC 8013, specimen CNCLEP00174811), dorsal and lateral views.



Fig. 5. Female genitalia (preparation MIC 8014, specimen CNCLEP00174813).

Phallus slender, thin, cornuti absent. *Female genitalia*. (Fig. 5). Relatively simple. Sternum 8 subdivided into two lateral, weakly sclerotized parts, caudal margin setose. Ostium bursae situated on membrane between S7 and S8, antrum short, cylindrical, weakly sclerotized. Ductus bursae straight, with small weakly sclerotized ring at inception with corpus bursae. Signum absent. Anterior apophysis with base divided two arms. Posterior apophysis with slight jog in caudal fourth. Ovipositor about twice as long as S8. Papillae anales slightly thickened.

Lepidotarphius perornatellus can be easily distinguished from any other described species of North American micromoth by the metallic blue-green coloration of the head, thorax and basal three-fifths of the forewings, and the bright orange distal two-fifths of the forewing. Its coloration is distinct from that of all the known North American Glyphipterigidae. Superficially, it is reminiscent of Heliodinidae, almost all of which have forewings with areas of bright orange and spots of raised silver scales. However, in heliodinids, the orange area extends over most of the forewing surface including the basal half, whereas in *L. perornatellus* the orange is restricted to the distal portion of the forewing. Likewise, the dots of raised silver scales are distributed over most of the forewing surface in heliodinids whereas they are restricted to the distal area in *L. perornatellus*. The genitalia are also highly distinctive.

We suggest that this species was likely introduced through shipment of its host plant, *Acorus calamus* L., a semi-aquatic monocot imported for medicinal & horticultural purposes.

The taxonomic status of *Acorus* in North America has been a historically contentious issue. Some confusion exists in the literature about whether *Acorus* is native or introduced, but at present, the consensus seems to be that there are two species present in North America: *A. calamus* L., a non-native sterile triploid of Asian origin brought over by European settlers for medicinal uses, and recorded from most of the eastern United States and Canada (Nova Scotia east to Manitoba and south to Colorado, Texas, and Georgia) as well as along the west coast (Washington south to northern California); the second species, *A. americanus* Raf., is a native fertile diploid congener with a more northern

distribution (Nova Scotia south to northern Virginia and west along the northern Great Plains to Idaho, Alaska, and the Northwest Territories) (Thompson 2000).

Literature cited

- Arita, Y., Heppner, J.B. 1992. Sedge Moths of Taiwan (Lepidoptera: Glyphipterigidae). *Tropical Lepidoptera*, 3(2): 1–40.
- Erschoff, N. 1877. Neuer Lepidopteren aus den verschiedenen Provinzen des Russischen Reiches. *Horae Societatis Entomologicae Rossicae*, 12: 347.
- Gaedike, R. 1997. Yponomeutoidea: Acrolepiidae. *Lepidopterorum Catalogus (new series)*, 5 (55), i–viii, 1–20.
- Heppner, J.B. 1997a. New *Glyphipterix* sedge moths from the Southeastern United States (Lepidoptera: Glyphipterigidae). *Holarctic Lepidoptera*, 4: 67–69.
- Heppner, J.B. 1997b. New *Diploschizia* sedge moths from Florida (Lepidoptera: Glyphipterigidae). *Holarctic Lepidoptera*, 4: 70–72.
- Heppner, J.B. 1985. The sedge moths of North America (Lepidoptera: Glyphipterigidae). Fauna and Flora Publications, Gainesville, FL. 254 pp.
- Korea Biodiversity Information System. 2017. Online resource, accessed September 2017 (KA).
- Landry, J.-F. 2007. Taxonomic review of the Leek Moth genus *Acrolepiopsis* (Lepidoptera: Acrolepiidae) in North America. *The Canadian Entomologist*, 139: 319–353.
- Pohl, G.R., Cannings, R.A., Landry, J.-F., Holden, D.G., Scudder, G.G.E. 2015. *Checklist of the Lepidoptera of British Columbia, Canada*. Entomological Society of British Columbia Occasional paper no. 3. 308 pp.
- Pryer, W.B. 1877. Descriptions of new species of Lepidoptera from North China. *Cistula Entomologica*, 2: 231–235.
- Nieukerken, E.J. Kaila, L., Kitching, I.J., Kristensen, N.P., Lees, D.C., Minet, J., Mitter, C., Mutanen, M., Regier, J.C., Simonsen, T.J., Wahlberg, N., Yen, S.-H., Zahiri, R., Adamski, D., Baixeras, J., Bartsch, D., Bengtsson, B.Å., Brown, J.W., Bucheli, S.R., Davis, D.R., De Prins, J., De Prins, W., Epstein, M.E., Gentili-Poole, P., Gielis, C., Hättenschwiler, P., Hausmann, A., Holloway, J.D., Kallies, A., Karsholt, O., Kawahara, A., Koster, J.C., Kozlov, M., Lafontaine, J.D., Lamas, G., Landry, J.-F., Lee, S., Nuss, M., Penz, C., Rota, J., Schmidt, B.C., Schintlmeister, A., Sohn, J.C., Solis, M.A., Tarmann, G.M., Warren, A.D., Weller, S., Yakovlev, R., Zolotuhin, V., Zwick, A. (2011) Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness: Order Lepidoptera Linnaeus, 1758. *Zootaxa*, 3148: 212–221.
- Thompson, S.A. 2000. Acoraceae. In *Flora of North America North of Mexico*, vol. 22, Oxford University Press, pp. 124–127.
- Walker, F. 1864. List of the Specimens of Lepidopterous Insects in the Collection of the British Museum, 30: 840, 1040.

Parasitic mite larva (Acari) on an adult *Atrytonopsis quinteri* (Hesperiidae)

Mark H. Salvato¹, Holly L. Salvato¹, and Allison K. Leidner²

¹1765 17th Ave. SW, Vero Beach, FL 32962 anaea_99@yahoo.com

²Washington, DC aleidner@gmail.com

The Crystal Skipper, *Atrytonopsis quinteri* (Hesperiidae), is endemic to Bogue Banks, Bear Island, and a few small dredge-spoil islands within a 50-km stretch of barrier islands in North Carolina (Leidner and Haddad 2010, 2011; Burns 2015). The skipper occurs on coastal sand-dune habitats that maintain its larval hostplant, seaside little bluestem (*Schizachyrium littorale*). Leidner and Haddad (2010; 2011) and Burns (2015) described many aspects of *A. quinteri* natural history, status, distribution, and conservation needs. Spiders and birds have been observed to prey on *A. quinteri* (AKL, pers. observations). However, little is known regarding parasitism of *A. quinteri*.

On 19 April 2017 MHS and HLS observed and photographed a larval mite attached to the hindwing of an adult *A. quinteri* (Fig. 1) at Fort Macon State Park, Bogue Banks, North Carolina (Carteret County). We were unable to capture the butterfly to obtain the mite specimen. However, after examining the photos, it appears to be a parasitic mite larva most likely in the Family Erythraeidae (possibly *Leptus* sp. or *Callidosoma* sp.), a group known to frequently attach to the wings of butterflies (Welbourn, pers. comm.).

Treat (1975) reported parasitic mite larvae from several butterfly species in the United States; however, few mites have been documented as ectoparasites on hesperiids. AKL has observed these mites on *A. quinteri* several times over the course of her long-term monitoring (2006 to 2009) on this species. To our knowledge these are the first observations of mite association with *A. quinteri*. Further studies are required to verify which mite species are involved in the natural history of *A. quinteri*.

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Literature Cited

- Burns, J. M. 2015. Speciation in an insular sand dune habitat: *Atrytonopsis* (Hesperiidae: Hesperinae) - mainly from the southwestern United States and Mexico - off the Carolina coast. *Journal of the Lepidopterists' Society* 69(4):275-292.
- Leidner, A. K. & N. M. Haddad. 2010. Natural, not urban, barriers define population structure for a coastal endemic butterfly. *Conservation Genetics* 11:2311-2320.
- Leidner, A. K. & N. M. Haddad. 2011. Combining Measures of Dispersal to Identify Conservation Strategies in Fragmented Landscapes. *Conservation Biology*, Volume 25, No. 5, 1022-1031.
- Treat, A. E. 1975. *Mites of Moths and Butterflies*. Cornell University Press. London. 362 pp.



Fig. 1. A parasitic mite larva (likely Erythraeidae) on the outer hindwing of an adult *Atrytonopsis quinteri* at Fort Macon State Park, Bogue Banks, North Carolina on 19 May 2017 (Photo Credit: H.L. Salvato).

Fluctuations of moths with big summer caterpillars (Saturniidae, Sphingidae, *Datana*) in early 21st century northwestern New Jersey, USA

Dale F. Schweitzer¹ and Joseph R. Garris²

¹NatureServe (retired), 1761 Main St., Port Norris, NJ 08349 dfstnc@aol.com

²1001 Mt Benevolence Rd., Newton, NJ 07860 jrgarris.sr@att.net

Schweitzer et al. (2014), and Schweitzer (2017) report that, in contrast to observations and data from slightly farther east (e.g. Wagner, 2012, Young et al., 2017) and globally (reviewed by Haddad and Wagner, 2017), as of 2015 there was no obvious scarcity of large moths in northwestern New Jersey and adjacent eastern Pennsylvania, approximately 39.8-41.2° N and 75-76°W, during the early 21st century. To the contrary, Schweitzer (2017) found that catch rates for Saturniidae, Sphingidae, and *Datana* (Notodontidae) were generally about an order of magnitude higher, with nearly all species found, at two sites in 2000-2015 compared to three from 1967-1977, when many species were not found at all. He presented other observations indicating such change is widespread.

Here we examine JRG's catch rates for Saturniidae, Sphingidae, and *Datana* from 2011, and a few from 2010 or earlier, through 2017 at the Stillwater, Sussex County, New Jersey site previously included by Schweitzer et al. (2014) and Schweitzer (2017) based on virtually nightly observations with 30-40 Watt blacklights. Although sampling is expected to continue for about another three years when a more detailed statistical analysis might be warranted, we present seven years worth of data now because they seem useful in the context of recent discussions of moth statuses (especially Wagner, 2012, Schweitzer, 2017, Young et al., 2017). This report and Schweitzer (2017) also provide substantial baseline data for four ash-feeding Sphinginae a few years prior to the expected annihilation of their primary or exclusive foodplants by Emerald Ash Borer (*Agilus planipennis*, Buprestidae).

Methods

All expected (Schweitzer et al., 2014) nocturnal Saturniidae and Sphingidae are listed in Table 1, except for *Anisota senatoria*, which is questionable from the 19th century. The mostly crepuscular *Lintneria eremitus*¹, which is frequent at flowers and as larvae (JRG and Anthony McBride), and the common diurnal *Amphion floridensis* are omitted although both came to the blacklights once. Catch per unit effort (CPUE) is the total number of observations for the season divided by the number of blacklights, three through 2011, and two subsequently. Most discussion of

Sphingidae is confined to those 16 operational taxonomic units (=OTUs) that were encountered at Stillwater in at least four of the five years starting in 2011. Information from nearby Hardwick, Warren County is attributable to Anthony McBride (pers. comm., 2016-2017) and mostly summarized by Schweitzer (2017).

Field, and sometimes even photographic, identification of adult *Datana* to species is difficult so these are reported only to generic level. About half were *D. drexeli*, e.g. 57% in 2017, but photos and actual specimens also include *D. ministra*, *D. angusi*, and *D. integerrima*. Some *Sphinx gordius* and *S. poecila* also proved impractical to reliably separate. Positive identifications now include three of each collected in 2007 and one *S. gordius* in 2006 from specimen photos, and a *S. poecila* in 2017 from a live image. Stillwater is virtually at the southern limit for *S. poecila* (Tuttle, 2007).

Results and Discussion

Sampling began at Stillwater in July 2005 and all Saturniidae (except *Eacles imperialis*) and regularly occurring Sphingidae had been vouchered by 2007.

Saturniidae. One expected species, *Citheronia regalis*, which currently occurs at Hardwick and elsewhere in adjacent Warren County, was not encountered at Stillwater. Ten of 12 Saturniidae known to have ever occurred in Sussex or Warren County, including *Hemileuca maia* larvae, were encountered in 2017 (Table 1, JRG, Anthony McBride) and the other two, the fen or Great Lakes buckmoth (*Hemileuca* sp.) and *Anisota virginienis*, were observed in 2016 (both McBride). Six Saturniidae were encountered at the Stillwater blacklights in all seven years. Among those that were not, males of *Callosamia promethea* and *Anisota virginienis* are diurnal and *Eacles i. imperialis*, which was historically mostly coastal at this latitude, became established during the observation period (Schweitzer et al., 2014 supplemental materials; Schweitzer, 2017). None were encountered at Stillwater in 2006-2011, or at nearby Hardwick in 2000-2011, but some have been documented at both places every year since (see Table 1), with at least 37 at Stillwater in 2017².

¹ Females also come to Mercury vapor light at Hardwick later at night.

² Counting multiple erratically flying moths that sometimes apparently either left or settled far from the sheet was difficult some nights.

Table 1. Joseph Garris's observations of nocturnal Sphingidae, Saturniidae, and *Datana* at blacklights north of Stillwater, NJ. There were three blacklights in 2011, two subsequently. Expected species are based on Schweitzer et al. (2014, supplemental materials). Species in **boldface** are those considered regularly encountered in the text.

Expected species	CPUE 2011	CPUE 2012	CPUE 2013	CPUE 2014	CPUE 2015	CPUE 2016	CPUE 2017
SPHINGIDAE, MACROGLOSSINAE							
<i>Sphecodina abbotti</i>	4.7	2.0	2.0	9.5	3.0	0.5	0.5
<i>Deidamia inscripta</i>	3.0	1.0	0.0	1.5	0.5	19.0	8.5
<i>Darapsa myron</i>	17.3	18.5	10.5	15.5	5.0	3.0	26.0
<i>Darapsa choerilus</i>	21.7	22.5	19.0	20.5	9.0	5.5	18.0
<i>Darapsa versicolor</i>	0.33	0.0	0.0	0.5	0.5	0.0	2.0
<i>Eumorpha pandorus</i>	2.3	1.0	2.0	0.5	1.0	0.5	4.5
<i>Hyles gallii</i> ³	0.67	0.0	0.5	0.0	0.0	0.0	1.0
<i>Hyles lineata</i>	0.0	0.0	0.5	0.0	0.0	0.0	0.0
SMERINTHINAE							
<i>Amorpha juglandis</i>	0.67	1.0	0.5	0	1.0	0.5	0
<i>Pachysphinx modesta</i>	2.0	1.5	0.5	1.5	1.0	0.5	0
<i>Paonias excaecatus</i>	9.3	5.0	12	6.0	2.0	0.5	6.5
<i>Paonias myops</i>	10.7	2.5	11	14.5	2.0	1.0	12.0
<i>Paonias astyalus</i>	3.0	2.0	2.0	2.5	1.0	1.0	5.5
<i>Smerinthus jamaicensis</i>	1.7	0.5	0.5	0.0	0.0	0.0	0.0
SPHINGINAE, short tongued							
<i>Ceratomia amyntor</i>	1.3	0.0	2.5	0.0	2.5	0.5	4.5
<i>Ceratomia undulosa</i>	14.0	12.0	16.5	17.5	11.5	13.0	18.0
<i>Lapara bombycoides</i>	5.0	8.0	1.5	5.5	5.5	1.5	8.5
<i>Lapara coniferarum</i>	2.5	3.0	0.5	2.5	1.5	0.5	0.5
SPHINGINAE, long-tongued⁴							
<i>Sphinx chersis</i>	0.0	0.0	2.0	0.0	0.0	0.0	1.0
<i>Sphinx kalmiae</i>	0.33	1.0	4.0	1.0	0.0	0.0	0.5
<i>Sphinx gordius/poecila</i>	3.0	0.5	0.5	3.0	0.5	1.0	0.5
<i>Sphinx drupiferarum</i>	0	0	0	0	0	0	0
<i>Dolba hyloeus</i>	3.7	1.0	0.0	0.0	0.0	0.0	0.0
<i>Manduca jasminearum</i>	3.3	0.5	3.0	2.5	1.0	0.0	2.0
<i>Manduca quinquemaculata</i>	0.67	0.0	1.0	0.0	0.5	0.0	0.5
<i>Manduca sexta</i>	1.0	0.5	1.5	0.0	0.0	0.0	1.5
SATURNIIDAE							
<i>Citheronia regalis</i>	0	0	0	0	0	0	0
<i>Eacles imperialis</i>	0.0	0.5	2.0	2.5	0.5	2.5	>18.5
<i>Anisota virginiensis</i>	0.33	0.0	0.0	0.5	0.5	0.0	0.0
<i>Dryocampa rubicunda</i>	≈21.7	92.5+	204.0	87.5	46.5	17.0	26.0
<i>Automeris io</i>	3.3	11.3	22.5	31.0	25.0	2.5	5.5
<i>Callosamia angulifera</i>	4.7	3.0	1.0	0.5	1.5	1.0	2.5
<i>Callosamia promethea</i>	0.67	0.5	0.0	0.0	0.0	0.5	0.5
<i>Hyalophora cecropia</i>	4.0	16.5	4.5	8.0	12.0	1.5	2.5
<i>Antheraea polyphemus</i>	3.3	4.0	4.0	5.0	1.5	2.0	6.5
<i>Actias luna</i>	24.3	12	11.5	18.5	14.5	10.0	7.5
<i>Datana</i>	<7	3.5	5.5	9.0	5.5	3.0	47.0

3 Adults are fairly regular at flowers at dusk at Stillwater and Hardwick.

4 That is potential or known pollinators, as are all Macroglossinae.

Four of the seven regularly encountered Saturniidae had their lowest CPUE to date in 2016 but three were higher in 2017. The seven maxima were distributed among five different years. After a steady decline of *Callosamia angulifera* from its extremely high CPUE of 23 in 2010 to 0.5 in 2014, CPUE was 2.5 in 2017. If 2010 is included this species had a 46-fold fluctuation over five seasons and five of seven regularly encountered Saturniidae, including *E. imperialis*, fluctuated an order of magnitude in only seven or eight years, with one minimum and two maxima in 2017.

Five of six blacklight samples and one of three faunal lists spanning about 1984-2006 reviewed by Schweitzer (2017) did not produce *Hyalophora cecropia* at all, so with CPUEs of 1.5 to 16.5 this species seems unusually common at blacklights at Stillwater. The flight period there is much more compressed than it was in most of New Jersey and eastern Pennsylvania in and before the 1970s when adults occurred mostly about 30 May to 10 July (Smith, 1910, Tietz, 1952, Schweitzer, 2017, my collection, pers. obs.). At Stillwater, which is farther north and colder, 80 of 90 males in 2011-2017 were from 14 to 31 May, with only ten in June, latest on the 12th. In 2012 and 2015 observations were concentrated on the first night, with ten of 33 on 14 May, and twelve of 24 on 22 May respectively.

Sphingidae. All of four diurnal Macroglossinae, including three *Hemaris*, and the crepuscular *Lintneria eremita* (Sphinginae) were encountered in Sussex or Warren County as recently as 2017 (JRG, McBride) and 23 of 25 sphingid OTUs in Table 1 were encountered at Stillwater or Hardwick as recently as 2016-2017⁵. *Sphinx drupiferarum* was undetected in Sussex and Warren Counties during 2000-2017. *Hyles lineata* was taken only once in 2005-2017 at Stillwater and not since 2006 at Hardwick. *Smerinthus jamaicensis* and *Dolba hyloeus* were encountered during the first two or three years in Table 1 and some prior years (2006-2010) but have been undetected there since, but the former is encountered every year at Hardwick.

Many sphingids had mean CPUEs less than 2.0 with 15 of 26 OTUs missed at least once in 2011-2017, but some uncommon species were encountered every year, e.g. *Lapara coniferarum* (CPUEs 0.5 [three times] to 3.0) and *Eumorpha pandorus* (0.5-4.5). Both spring macroglossines, *Deidamia inscripta* (e.g. medians 9 May 2016, 4 May 2017) and *Sphecodina abbotti* (91% of dates 12-30 May), were especially unstable, and the former was very out of synchrony with other species in Table 1. The most stable common sphingid was *Ceratonia undulosa*.

Among the 16 regularly occurring sphingid OTUs, the highest number of maxima was five in 2017, four of which had or tied their lowest CPUE the previous year, followed by four (1 tie) in 2014, with one to three, including ties, in other years. Four of the nine less regularly encountered ⁵ *Dolba hyloeus* and *Hyles lineata* were last encountered in 2013-2015.

Sphingidae also had maxima in 2017. Eleven of these 16 had minima to date, including four ties, in 2016, but only *Pachysphinx modesta* was lower (none vs. one) in 2017. No regularly encountered Sphingidae had minima in 2011 or 2012. Seven of these 16 regularly encountered sphingid OTUs, including the five most common summer species and a congeneric *Paonias*, had their two lowest CPUEs in 2015 and 2016, as did one saturniid. Both spring sphingids, but only 3⁶ of 14 regularly encountered summer OTUs, fluctuated through an order of magnitude in 2011-2017, compared to five of seven regularly encountered Saturniidae. However, sphingids rebounded quicker after 2016 minima with six of eleven OTUs being 5.5 to over twelve-fold higher in 2017. The three rebounding Saturniidae were up by 3.3-fold or less.

Summary. Seven⁷ of 16 regularly encountered sphingid OTUs and four of seven regular Saturniidae had higher CPUEs in 2017 than in 2011, very nearly as expected by chance. Joseph A. M. Smith performed several regression analyses (CPUE vs year) for the 16 regularly encountered Sphingidae that show no significant trends in the 2011-2017 data. However some analyses would have shown a significant decline had observations ceased after 2016. *Datana* were about seven times higher in 2017 than in 2011 and over 15 times their 2016 minimum.

We note that among the two detected tree-feeding *Sphinx*, *S. chersis* and *S. kalmiae*, nine of our 14 CPUEs in 2011-2017 were 0.0-0.5. Only time will tell if *S. kalmiae* is really declining at Stillwater, but three of its four lowest CPUEs were in 2015-2017. However, the scarcer *S. chersis* shows no hint of an on-going negative trend, with none encountered at Stillwater in 2005-2009, one in 2010, then, with decreased effort, four in 2013 and two in 2017. Notably 2013 was also the only recent year (Table 1) in which CPUE for *S. kalmiae* exceeded 1.0. At nearby Hardwick, Anthony McBride had only one *S. chersis* (in 2003) at a mercury vapor light in 2000-2017, but does see *S. kalmiae* every year.

Conclusions

We conclude 1) that there is no evidence of multi-species declines of Saturniidae, Smerinthinae, Macroglossinae, short-tongued Sphinginae, or *Datana* during 2011-2017, 2) that order of magnitude fluctuations over less than a decade occurred in most Saturniidae, some Sphingidae, the genus *Datana*, and 3) that *Eacles imperialis* has become established in Sussex County, as it did in adjacent Warren County a few years earlier, and was still increasing in 2017.

Most long-tongued Sphinginae remain scarce, but additional sampling will be needed to determine possible

⁶ This includes *Sphinx kalmiae* (CPUEs 0.0 [twice] and 0.5 (once) to 4.0).

⁷ Although *Sphinx kalmiae* was essentially a tie.

trends. Excluding the two crop pests, three of five detected long-tongued Sphinginae had their highest CPUEs (only 3.0-3.7) in the first of seven years, including the smallest one which has not been seen for five consecutive years. None had maxima in 2017.

Statuses of Saturniidae, Smerinthinae, and Macroglossinae, mostly seem consistent with Smith (1910). However, *Callosamia angulifera* and *Lapara* spp. are no longer considered "rare" with the advent of blacklights in the 1950s. *Sphinx drupiferarum*, which apparently was uncommon in Smith's time, has disappeared and the "common" *Hyles lineata* nearly has.

Pollinator decline? Most small pollinating Sphingidae, i.e. those with forewing lengths 37 mm or less based on Tuttle (2007), are widely common in northwestern New Jersey. This includes three diurnal Macroglossinae: *Amphion floridensis*, *Hemaris thysbe*, *H. diffinis*, and the somewhat more local *Lintneria eremitus* (Sphinginae), which are not in Table 1, plus four nocturnal Macroglossinae with mean CPUEs from 3.17 to 16.6, including two of the three highest for Sphingidae. *Darapsa versicolor* occurs less commonly (CPUE 0.48) and *Hemaris gracilis* is very local-neither a change of status since Smith (1910). The somewhat larger *Hyles gallii* (0.31) is more common at Hardwick than at Stillwater, as are its primary foodplants, *Galium* spp. Among these eleven species, Young et al. (2017) report a significant 20th century decline in relative detection probability only for *Darapsa myron*, ironically the third most common nocturnal sphingid (mean CPUE 13.9) at Stillwater.

The two largest local pollinating Sphingidae are *Manduca sexta* and *M. quinquemaculata*. Both are primarily pests on solanaceous crops, and would have depended heavily on cultivated tobacco prior to European settlement, if they were present at all. *Hyles lineata*, also relatively large (often >40mm), was common over 100 years ago (Smith, 1910). None of these could have been common on the mostly forested pre-settlement landscape, and *M. quinquemaculata* and *H. lineata* show the largest 20th century declines among pollinating Sphingidae in New England (Young et al., 2017).

The original guild of large, long-tongued, pollinators (forewing lengths 40-55 mm, proboscis length usually >30 mm) would have included three tree-feeding *Sphinx* (mean CPUEs zero, 0.43, 0.98), *Manduca jaminearum* (assuming it visits flowers) (CPUE 1.76), and *Eumorpha pandorus* (CPUE 1.69). Only the last was encountered in all seven years at Stillwater, or at all in 1967-1977 samples (Schweitzer, 2017). Smith (1910) refers to *S. chersis* as "nowhere common", but does not comment on status of the others. Young et al. (in 2017) report significant 20th century declines in relative detection probability for four of these five species, but had insufficient data for *M. jaminearum*. Observations at Stillwater from 2011-2017 are inconclusive regarding possible on-going declines.

However, three of the four survivors have bleak prospects as Emerald Ash Borer annihilates their primary foodplants over the next decade or two--which will probably leave *E. pandorus* and the ruby-throated hummingbird as the only reliably available large pollinators in most places. The slightly smaller (32-43 mm) shrub-feeding *S. gordius* and *S. poecila* should persist on acid soils.

References

- Haddad, N., D. Wagner. 2017. Persistent decline in the abundance and diversity of Lepidoptera. *News of the Lepidopterists' Society* 59(2):94-95, 101.
- Schweitzer, D.F., J. R. Garris, A. E. McBride, J. A. M. Smith. 2014. The current status of forest Macrolepidoptera in northern New Jersey: evidence for the decline of understory specialists. *Journal of Insect Conservation* 18: 561-571.
- Schweitzer, D. F. 2017. Current versus mid 20th century statuses of moths with big summer caterpillars (Saturniidae, Sphingidae, *Datana*) in northern New Jersey and eastern Pennsylvania. *News of the Lepidopterists Society* 59 (3):134-141.
- Smith, J.B. 1910. *Insects of New Jersey*. New Jersey State Museum, Trenton NJ.
- Tietz, H. M. 1952. *The Lepidoptera of Pennsylvania, a manual*. Pennsylvania State University, Agricultural Experiment Station, State college, PA.
- Tuttle, J.P. 2007. *The Hawkmoths of North America*. The Wedge Entomological Research Foundation, Washington, D.C., 253 pp.
- Wagner, D.L., 2012. Moth decline in the northeastern United States. *News of the Lepidopterists' Society* 54: 52-56.
- Young, B.E., S. Auer, M. Ormes, G. Rapacciuolo, D. Schweitzer, N. Sears. 2017 (October). Are pollinating hawk moths declining in the northeastern United States? An analysis of collection records. *PLOS ONE*. PONE-D-17-15058R1.



Phrygionis polita, Geometridae; Panama; photo by C.V. Covell, Jr. This lovely tropical moth image is to entice you to join the Association for Tropical Lepidoptera (see announcement next page).

www.lepsoc.org and
<https://www.facebook.com/lepsoc>

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 the 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 conveniently holds its annual meeting, in Sept. or Oct., almost always with the Association for Tropical Lepidoptera. 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. We are a very active organization. Annual dues are \$15.00 for the hard copy of the news; \$12.00 for electronic copies only. The society typically schedules three+ field trips yearly. Contact Loran Gibson, 859-384-0083 or 1stkymothman@gmail.com, to learn more. The annual meeting, which is held each year in November, just occurred at the University of Kentucky, Lexington.

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.

Lepidopterists' Society Statement on Diversity, Inclusion, Harassment, and Safety¹

The following statement was approved by the EC on 13 November 2016. This is important to help our members feel safe during Society events, and provide the necessary means to resolve situations should they occur.

“The Lepidopterists' Society values diversity among our membership, just as we value diversity within the biological communities we study. We welcome into our Society and encourage the participation of all individuals who are interested in Lepidoptera regardless of age; gender; gender identity; sexual orientation; race; ethnicity; cultural background; nationality; religion; physical or mental ability; professional status; opinions on collecting, observing, and photographing; and all other characteristics and activities that make our members unique.

“The Lepidopterists' Society is dedicated to providing a safe, hospitable, and productive environment for everyone attending our events. We therefore prohibit any and all intimidating, threatening, or harassing conduct during these events. Harassment includes, but is not limited to: offensive gestures or verbal comments; the sending or sharing of offensive images, videos, emails, texts, or voicemails; deliberate intimidation; stalking, following, harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact; and unwelcome attention. Participants asked to stop any harassing behavior are expected to comply immediately. This policy applies to all event speakers, staff, volunteers, exhibitors, and attendees.

“The Society may take any action it deems appropriate in dealing with an event participant who engages in harassing behavior, ranging from a simple warning to expulsion from any Society sponsored events to loss of membership in the Society.

“If you are being harassed, if you notice that someone else is being harassed, or if you have any other concerns, please do not hesitate to contact the Society's designated ombudsperson, who will work with the appropriate Society leadership to resolve the situation. The designated ombudsperson will always be identified by name in the event's program book, along with their contact information. If needed, the Society will also help participants get in touch with convention center/hotel/venue security or local law enforcement, and otherwise assist those experiencing harassment, to enable them to feel safe for the duration of our events.”

¹Based in part on the Entomological Society of America's Statement on Diversity & Inclusion and Code of Conduct

-- John V. Calhoun, Immediate Past President

Call for Season Summary Records

It is once again the time of year to prepare your submissions for the annual Season Summary report. The annual report is sent as a hardcopy to members each year, and each year's data is also incorporated into the on-line database. Take the time to access the Season Summary database through The Lepidopterists' Society home page (<http://www.flmnh.ufl.edu/lepsoc/>) and do a few searches. The value of the on-line database increases as your data gets added each year. Please take the time to consider your field season and report range extensions, seasonal flight shifts, and life history observations to the appropriate Zone Coordinator. Zone Coordinators, their contact information, and the scope of their zone appears on the inside back cover of every issue of the "News".

There are a number of factors that make it necessary for the Zone Coordinators to meet a reporting deadline each year. As a result, you should have your data to the Zone Coordinator(s) no later than **December 1, 2017**. If you haven't yet sent in your records, then obviously you need to **DO SO IMMEDIATELY**.

All records are important. Reporting the same species from the same location provides a history for future researchers to use. Report migratory species, especially the direction of flight and an estimated number of individuals. Again, all of these records may be useful in the future.

Season Summary Spread Sheet and Spread Sheet Instructions

The Season Summary Spread Sheet and Spread Sheet Instructions are available on the Lepidopterists Society Web Site at http://www.lepsoc.org/season_summary.php. The Zone Coordinators use the Season Summary Spread Sheet to compile their zone reports. Please follow the instructions carefully and provide as much detail as possible. Send your completed Season Summary Spread Sheet to the Zone Coordinator for each state, province or territory where you collected or photographed the species contained in your report.

Important reminder to contributors using MAC computers to submit records

PC operating systems save dates based upon a 1900 format, whereas MAC operating systems save dates based upon a 1904 *default* format. The Lepidopterists' Society master database is maintained in PC format. As a result, if you submit your Excel spreadsheet season summary records generated on a MAC to a Zone Coordinator who operates a PC system, without disabling the default date setting, the dates will be off by 4 years and 1 day. If you submit your records generated on a MAC to a Zone Coordinator who operates a MAC system, without disabling the default date setting, the dates will appear proper to the Zone Coordinator but the dates will be off by 4 years and 1 day

when they are incorporated into the master data base. In some cases, MAC system dates sent to a Zone Coordinator operating a MAC system are off 8 years and 2 days (we haven't figured that one out). The following are instructions so that this problem will never rear its ugly head again.

Instructions

When a MAC user sits down to enter the very first record of the season, he/she must create a new Excel file. **Before typing in any data**, go to "Tools", then "Options" or "Preferences" depending upon your version of Excel, "Calculations", and **uncheck** the 1904 box. Once the data is entered, save this file, and close. If supplemental data is entered directly into this file by keypunching it in, there will not be any problems. However, do NOT paste in MAC data from another file into your file without first ensuring that the 1904 box was *unchecked* in their file PRIOR to entering any of data. Unfortunately, once data has been entered in a file, it does NOT do any good to retroactively *uncheck* the date box!!!

By following these few steps, it is a simple matter to accommodate MAC records. However, you, as the original contributor, must ensure that those steps are taken. Improperly dated records will be rejected and your important records will not get into the database.

Photographs for Front and Back Covers

Please submit photos for the front or back covers of the Season Summary to the editor of the News, James K. Adams (jadams@daltonstate.edu). Photos can be of live or spread specimens, but **MUST** be of a species that will actually be reported in the Season Summary for this year.

Leroy C. Koehn, Season Summary Editor, 3000 Fairway Court, Georgetown, KY 40324-9454, Leptraps@aol.com

PayPal is the easy way to send money 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. The process is simple: 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!

Correction to News of the Lep Soc 59:3

The lower left hand image on page 158 is labelled "Mike and Weiss Walker". Having labelled the image myself and having known Mark for many years, I have no idea why "Mike" came from my brain. I apologize profusely to Mark -- James Adams, editor.



Societas Europaea Lepidopterologica

Combined Annual Meeting of The Lepidopterists' Society and Societas Europaea Lepidopterologica

Carleton University
Ottawa, Ontario, Canada
11-15 July 2018

Preliminary Announcement: Mark Your Calendars!

The 67th Annual Meeting of The Lepidopterists' Society will take place **July 11-14, 2018** as a combined meeting with Societas Europaea lepidopterologica (SEL) at Carleton University in Ottawa. The meeting will be followed by excursions on July 15. The venue is within a 30 minute walk from the Canadian National Collection (CNC), the largest insect and Lepidoptera collection in Canada.

The 2018 meeting will follow the **Third North American Microlepidopterists' meeting**, to be held on **July 10, 2018**, at the K.W. Neatby Building in Ottawa which houses the CNC. Registration for both meetings will open by **March 2018**. Deadlines for abstract submission for oral or poster presentations will be announced at that time.

International travel support is available for LepSoc and SEL members upon application (Bryant Mather Award; <https://www.lepsoc.org/content/awards>).

For additional information or inquiries please contact the organizers at lepsoc2018@gmail.com.

Réunion annuelle combinée de la Société des Lépidoptéristes et de la Societas Europaea Lepidopterologica

Université Carleton
Ottawa, Ontario, Canada
11-15 juillet 2018

Annonce préliminaire: marquez vos calendriers!

La 67e réunion annuelle de la Société des Lépidoptéristes aura lieu du **11 au 14 juillet 2018**, en tant que réunion combinée avec la Societas Europaea Lepidopterologica à l'Université Carleton à Ottawa.

La réunion sera suivie d'excursions le 15 juillet. Le site se trouve à 30 minutes à pied de la Collection nationale canadienne (CNC), la plus grande collection d'insectes et de lépidoptères au Canada.

La réunion de 2018 suivra la **troisième réunion de Microlépidoptéristes en Amérique du Nord**, qui se tiendra le **10 juillet 2018**, à l'édifice K.W. Neatby à Ottawa qui abrite la CNC. L'inscription pour les deux réunions débutera en **mars 2018**.

Les dates limites pour la soumission des présentations orales ou par affiche seront annoncées à ce moment-là.

Le soutien pour les déplacements internationaux sera disponible pour les membres de LepSoc et SEL sur demande (Prix Bryant Mather; <https://www.lepsoc.org/content/awards>).

Pour toute question ou demande d'information, veuillez contacter les organisateurs à lepsoc2018@gmail.com.

The Joan Mosenthal DeWind Award

The Xerces Society is now accepting applications for two \$3,750 awards for research into Lepidoptera conservation.

SUBMISSION REQUIREMENTS

The DeWind Awards are given to students who are engaged in research leading to a university degree related to Lepidoptera conservation and who intend to continue to work in this field. All proposals must be written by the student researcher. Proposed research should have a clear connection to Lepidoptera conservation and must be completed within one year from receiving funds. Applicants may be graduate or undergraduate students; however, please note that all but one awardee, to date, have been pursuing graduate research. Applications from countries outside the United States will be considered but must be written in English and international applicant work cannot involve work in the United States.

The submission deadline is Sunday, December 31, 2017, at 11:59 PM PST. Award winners will be announced by March 31, 2018, with the awards given by May 2018.

Instructions for Submitting the Proposal

All proposals must be submitted by email to dewind@xerces.org. The proposal should be attached as a single file in PDF format. The subject line of the email should read "DeWind Award Proposal 2018."

Proposal Format (12 pt font and one inch margins)

1. Cover page (1 page)
 - a. Title. List the title in Bold.
 - b. Contact information. Provide the name and contact information for the applicant and his or her major advisor. Include institutional affiliations, complete mailing address, and country. Also provide an email address and telephone number (include country code if outside the U.S.).
 - c. Abstract. Include a project summary immediately following the title and contact information. The summary should be limited to 100 words and should not exceed one paragraph.
2. Proposal body (2 pages). Begin with a clear statement of the problem or objectives, follow with a clear methods section, and end with a substantial conclusion. The proposal should include a discussion of potential conservation applications and results, and what products, if any, will result from this work.
3. Additional information. On separate pages, please include all of the following information: cited literature, detailed project budget, project timeline, and a short (2 pages or less) CV. It is the goal of the DeWind Award that the funds be used for direct research-related expenses; overhead and/or administrative fees are considered ineligible.

4. Please include all of the materials as a single attachment. No other attachments or supporting materials should be included.

For more information, to download a PDF of the submission guidelines, and to read summaries of previous award winning projects, please visit <http://www.xerces.org/joan-dewind-award/>.

Bryant Mather [Travel] Award

The Awards Committee is now accepting applications from Society Members for the 2018 Bryant Mather Award(s) for travel to the Lepidopterists' Society meeting at Carleton University, Ottawa, Ontario, Canada, July 11-15, 2018. **We would like to award two or three stipends to partially cover meeting-related expenses.** Applicants are to be judged on need for the award (i.e., lack of sufficient resources to travel to the meeting without the award) and acceptance of their proposed presentations. Applicants can include any member wanting to attend and present at the meeting (the award is not limited to students).

Please submit a brief (500 words maximum) application summarizing your need for the award, together with a detailed budget and proposed title of your presentation/poster to president Brian Scholtens at scholtensb@cofc.edu by April 30, 2018. Winners will be selected by the Awards Committee and notified by May 15, 2018. Recipients will be reimbursed by the Treasurer after the meeting.



Ashley Wick, Megan McCarty, and David McCarty



Mike Toliver, Brian Scholtens, and Ranger Steve Mueller
(both photos: James Adams at Lep Soc 2017)

200 Amethyst Hairstreaks: mesmerized by the sparkle of gems in the gloaming

Leigh Williams¹, Amy Grimm¹, and Bill Beck²

¹2072 Palm Beach Road, Big Pine Key, FL Mleighwilliams@msn.com; Grimma01@yahoo.com

²15660 N. Roadrunner Ridge Lane, Tucson, AZ 85739 billbeck001@gmail.com



© Amy Grimm

Photo 1: Amethyst Hairstreak on flowers of Jamaica Dogwood – 5/24/14

Introduction

Chlorostymon maesites, the Amethyst hairstreak, is exotically named the *Verde Azul* nymph of the Antilles Islands in the Caribbean. Seemingly infrequent Florida sightings create excitement; traffic spikes on the web-serves and Facebook chimes (check your mail!) for the tortured souls hypnotized by hairstreaks!

Maybe it's the mystery. Sightings have been fleeting; and even if seen, the sprite quickly vanishes. A quest and a sighting expectation may be quite out of context for unlucky folk like me! But what if.....wouldn't that be EXTRAORDINARY! Just close your eyes and imagine, the lush green of a tropical isle, and the tiniest gemmed butterfly, "gossamer-winged" as it were. An adult's finery? Its' colors make for a blink...and a startled "What is THAT?" The colors you see may vary with light conditions, so imagine bright lemon-yellow or chartreuse green, with a white and black lined maroon splash on the hind-wing underneath, and flashing brilliant violet (male) or blue (female) uppersides . . . and seemingly fragile wings and with "hairstreak" tails so thin as to be translucent.

Once in your mind's eye, well, how can you not flash-dream a butterfly so exquisite? Mother Nature is not shy! Why wouldn't there be a *Verde Azul* in the real world of hairstreaks? Open your eyes widely, 'cause this is not just an imagination. The real gossamer-winged gems have recently appeared regularly to invite our amazed observation. THERE ARE two ladies who, not long ago,

crafted a doorway with a KEY for going upstairs into an unseen place, a place where these shimmering sprites fly free, spiral and dance, make love and metamorphose.



Photo 2: Amy Grimm, Leigh Williams

Amy and Leigh have lived on Big Pine Key for 33 years. They have seen changes in this time, its certain. Amy continues as a nurse in the Keys' medical community, while Leigh enjoys the semi-retired life after a career in outdoor education and administration of Seacamp Association's residential marine science field center programs (both the summertime Seacamp program and the school-year Newfound Harbor Marine Institute program).

They live at the far end of a sparsely-settled subdivision, their yard just on the edge of the Key Deer National Wildlife Refuge. They are truly "naturalists", with a keen interest and inquiry into many forms of life in nature; not just butterflies but plants, birds, fish, reptiles, insects - you name it! They study it all and they don't miss much!

"In the news" for Amethyst hairstreak sightings in 2014, Amy and Leigh have since been active with butterfly surveys and helping to monitor imperiled tropical

butterflies. They participate in NABA butterfly counts in several localities in South Florida, and you can see Amy's occasional posts on the NABA Sightings website. Their yard is managed with native plants and wildlife in mind.

Several conjoining factors jostled them into a position to see what is unseen by others. These factors include A) 365 day-a-year living on the Key, B) living adjacent to protected wildlife habitat, C) having a keen interest in nature, D) owning a yard with important natural habitat, and most catalyzing, E) recent (2013) construction of a second - story full-surrounding 12-ft. high deck that allows for unobstructed observation into a tropical hammock tree canopy.

Once they had access to the tree canopy and up-close viewing opportunities, they started looking and soon discovered an Amethyst hairstreak! They subsequently saw more, frequently, and continuously in April/May through August/early September. Oh My! **Amethysts live in the tropical hammock tree canopy!**

The perimeter trees around the Big Pine Key yard are about the tallest in the visual area and must have a natural attraction. Nearby is somewhat open island scrub habitat. In Amy and Leigh's yard there are at least four adjacent "taller" trees within the transitional pine rockland to hardwood hammock zone, including pine trees, a Jamaica dogwood, a West Indies mahogany, and several buttonwoods. These trees are estimated to be 50-60 feet in height.

But lets read their interesting story, from the Ladies themselves!



Photo 3: Amethyst Male, Dorsal View, On Mahogany Leaves – 6/18/14

“Florida Keys Treasure Hunting”

In 2013, a birding friend in Key West encouraged Amy and me to join him on “butterfly walks”. Until then, it had not occurred to us that enthusiasts across the country actually focus upon searching for butterflies “in the wild”. (Nor

did we know that, in recent years, scientists and wildlife managers began to solicit the involvement of “citizen-scientists” to help survey and monitor butterflies).

After 35 years of learning about Florida Keys reef and ocean ecosystems, native flora, Key deer, and indigenous and migratory birds, we decided to consider this a new challenge and to study imperiled butterflies of South Florida.

In February 2014 our Key West friend told us that his teenage son, Eric, had recently photographed a rarely seen butterfly - an Amethyst hairstreak (AHS)- near home. We enjoyed the photo he posted on the NABA website and then sought references to learn more about this butterfly. We learned that even prior to 1980 the AHS status was “Rare” and was reported in the USA only in extreme southeast Florida and the Keys; and that from the late 1970's until 2004 there were only three AHS reported in the USA (all in 2004 - two in Broward Co., FL and one in neighboring Miami-Dade Co., FL).

One afternoon later that Spring (on 5/11/14) Amy was photographing a white-eyed vireo from the upper deck of our home, located just along the edge of the Key Deer National Wildlife Refuge. She noticed a few butterflies nectaring on a native *Pisonia* tree (*Pisonia rotundata*) growing close to the deck. She happily photographed as many butterflies as would perch long enough for a shot. Upon reviewing the photos, she was able to identify Cassius Blues, Florida Duskywings, Southern Broken-Dash skippers, and . . . lo and behold, an Amethyst hairstreak! Later, an hour before dusk, she observed another AHS basking amongst the new leaves and flowers of a very large Jamaica Dogwood tree (*Piscidia piscipula*).

Thus began our new quest with a step out our door! We've always considered that finding any imperiled wildlife species is like finding long-lost treasure. The quandary was what should we do about the discovery of this amethyst treasure? We concluded that documenting



Photo 4: Ventral View, Top Of Mahogany Tree – 6/29/16

our observation and learnings, and sharing them with scientists, managers of public lands, teachers and students, gardeners (everyone!) might help lead to its conservation and subsequent dispersal throughout the Florida Keys. Amy posted a report with photo on the NABA website.

Just two weeks later an unfamiliar car pulled into our driveway. We cautiously greeted the two strangers, who then identified themselves as Paula Cannon (a local naturalist and nature photographer) and Marc C. Minno (a well known lepidopterist from Gainesville, FL; co-author of "Butterflies Through Binoculars-Florida" with Jeffrey Glassberg and John V. Calhoun as well as "Butterflies of the Florida Keys" with Thomas C. Emmel.)

During that afternoon visit, Marc and Paula discovered three tiny AHS caterpillars in a Jamaica Dogwood flower cluster that was dangling from a branch less than 10 feet from our upper deck. We were amazed that these tiny larvae were the same pinkish-purple color as the base of each floret in the cluster of flowers. We never would have noticed them! Amy was able to get a couple of photographs of the larvae.

From that day until the present we have monitored these same environs almost daily and have kept records of our AHS observations as well as those reported to us by others. Butterflies from around the state and around the country have visited us to witness for themselves the late-afternoon appearance and rituals of the AHS, which include mating and ovipositing. On rare occasions we have been lucky enough to observe AHS at other sites on Big Pine Key. After three years of surveying and observing, we have learned much about the habits and behavior of the AHS in the Lower Florida Keys, as well as the challenges they encounter.

At the location we monitor daily close to our home:

- Appear in the last two hours of daylight, approx. 30 minutes after the arrival of Fulvous Hairstreaks, all flying above the nearby mature canopy trees, then dropping suddenly onto a leaf or pine needle at or near the top of the tree to bask, display and/or mate:
- Often seen in the company of other butterflies, particularly Fulvous hairstreaks and Martial Scub-Hairstreaks that also perch, bask and display in the nearby high canopy;
- Seen nectaring in mid-day; with Florida Duskywings, Cassius Blues, Hammock Skippers, Monk Skippers, and other hairstreaks;
- Seen primarily in *P. rotundata* and Jamaica Dogwood in May - until all flowers have developed into seed pods. Seen primarily in Mahogany in June-until flowers are spent. Seen July and August zipping above any/all nearby canopy trees, occasionally basking or mating or ovipositing;
- Mating most often observed in the top of Mahogany tree.

At other Big Pine Key locations:

- Seen (once - February) nectaring on same shrub (Marsh Fleabane) in pine rocklands with fulvous hairstreak and Florida Duskywing during mid-day;
- Seen (once-June) nectaring on beachside trees and shrubs (Black Mangrove; Sea Lavendar; Jamaica Dogwood) with Martial and Mallow Scrub hairstreaks and Cassius Blues during mid-day;
- Seen twice (June) flying/spiraling above Jamaica Dogwoods along trails in the pine rocklands;

Mating:

The pairings that we have observed happen in the evening at the treetop where the butterflies gather. The perching males fly out at passing butterflies. Whether they identify females by sight or something else is not clear; but then they have some ability (pheromones/behavior) to convince the female of their intent and fitness. After some short flight they land on a leaf together. When a male and female land, the joining happens very quickly, but then it can last for some hours.



Photo 5: Pair Mating Sunset To Midnight In Jamaica Dogwood - 8/13/16

Ovipositing:

At any time of day a female could appear in the host tree, presumably seeking to oviposit. We have observed them alight and then proceed to walk slowly down and around a small branch or stem from one new-growth cluster of leaves or flowers down to the next, then down again to the next. *Gotta get your photo quick, before she walks around to the reverse side of the stem/leaf!!*

Caterpillars & Pupae:

As mentioned, three tiny caterpillars were observed on Big Pine Key on 5/24/14 - two weeks after sighting the first adult(s). They were found on *Piscidia piscipula* (Jamaica Dogwood) at the base of a cluster of flowers - two weeks after sighting the first adults. They were found on the base of a cluster of flowers. Their colors varied. The tiniest one

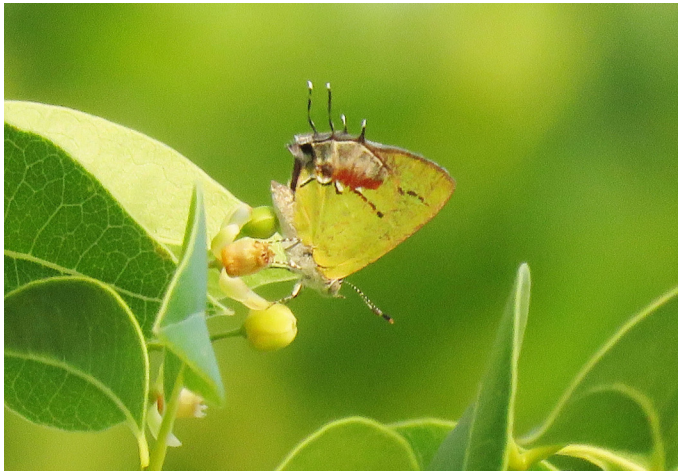


Photo 6: Female On Flower Buds Of Mahogany – 5/30/17



Photo 7: Amethyst Larva On Jamaica Dogwood Flower Stem – 5/24/14

was a pearly-green hue while the larger one was a “dirty-maroon” color - the same color as the base of the flower bud. Amy took a photo of the “dirty-maroon” larva.

Paula Cannon published photos of a “pearly-green” larva in her article. Paula documented that her captive-raised AHS caterpillar pupae attached to a leaf of this caterpillar’s host plant *Conocarpus erectus* (Buttonwood)- (so we no longer think that a caterpillar may drop from the canopy to the ground to pupate in leaf litter). The caterpillar pupated 22 days after it was found on its host plant by the author/photographer. A fresh adult emerged from this pupae in eleven days. (Cannon).

Habitat:

While the vast majority of our sightings are on the top of the taller mature native trees in our yard, of importance is also knowing the makeup of the whole environment that supports and shelters the islands wildlife. On Big Pine Key we have observed AHS in the transition zones of Pine Rock-lands to Hardwood Hammock and between the eastern-shore beach to the hardwood hammock along that beach berm, as well as along scarified firebreak trails in the

Pine Rock-lands in which native pines are companioned with Buttonwood (*Conocarpus erectus*), Jamaica Dogwoods (*Piscidia piscipula*) and understory native shrubs, grasses and wildflowers.

Other medium-to-large native trees in close proximity include Gumbo Limbo, Thatch Palm and Poisonwood, and understory native shrubs and small trees include locustberry, blackbead, wax myrtle, saw palmetto, Geiger tree, wild dilly and myrsine. Nearby, an exotic Madagascar Rubbervine climbs high into the buttonwood and poisonwood canopy, attracting Monk Skippers and Sulphurs.

(When we visited the Key West site of the “first” (Eric’s 2014) reported sighting, we noted that it was a site that had been scarified when the airport runways were constructed; but which had been restored to native wetland-to-upland habitat with mangroves, buttonwoods, Jamaican Dogwoods, Wild Sage, Poisonwood and other native trees, grasses and wildflowers.)

Host Plants:

Host plants reportedly include the naturalized *Albizia lebbek* (Woman’s Tongue) and possibly other legumes (Minno pers comm). We have seen that AHS eggs are deposited on Jamaica Dogwood (a legume) and Buttonwood. All of these trees are quite common in the Lower Florida Keys.

Nectar Plants:

The tiny AHS seems to prefer nectaring on tiny white flowers of trees and large shrubs. We have not found AHS using “low-growth-habitat” plants/wildflowers, the lowest being in a shrub 7-8’ above the ground. (However an AHS was photographed in 2004 at Castellow Hammock park in Homestead, FL on a low-growth *Bidens alba* wildflower – but which are rarely found in the Big Pine Key wilds due to the browsing of Key Deer.)

We (or others) have observed adults feeding upon flowers of the following trees/shrubs in the Lower Keys:

<u>Genus/Species:</u>	<u>Common Name(s):</u>	<u>Observed in Bloom:</u>
<i>Argusia gnaphalodes</i>	Sea Lavender	(May-June)
<i>Avicennia germinans</i>	Black Mangrove	(May-July)
<i>Conocarpus erectus</i>	Buttonwood/Button Mangrove	(June-August)
<i>Lantana involucrata</i>	Wild Lantana/Wild Sage	(Spr-Summer)
<i>Piscidia piscipula</i>	Jamaica Dogwood	(May-June)
<i>Pisonia rotundata</i>	Pisonia; Smooth Devil’s Claws	(May-June)
<i>Pluchea carolinensis</i>	Bushy Fleabane; Cure For All	(Feb-March)
<i>Swietenia mahogani</i>	West Indian Mahogany	(May-June)

Native nectar sources are quite sparse in the Lower Keys during the Fall and Winter months. Could this be why no AHS have been recently reported in October, November or December?

Predation:

As with many butterfly species, adult AHS could be preyed upon by lizards, tree frogs, dragonflies, praying mantis, birds, spiders and likely other predators. (Amy photographed a large assassin-type bug on the same leaf where an AHS was perched.) Larvae are preyed upon by parasitic wasps, and likely vireos and flycatchers (and other predators). Though hairstreak larvae often have symbiotic relationships with ants which may help protect from predators, curiously we have never seen ants on any of the host trees that we regularly observe. (The caterpillars have DNO organs for this symbiotic relationship to exist.)

Sighting Notes:

From April 2014 to June 2017 we documented 224 sightings.

Our sightings are mainly late afternoon observations at our home, with exception of a few others documented. Photos were taken of almost all of the hairstreaks observed from our nearby 15'-high deck - but, still quite a distance! Best tree-topping (EVE) times are between 5:30 PM and sundown.

Other experienced observers have also documented Amethyst hairstreaks in and around a yard in the Big Pine Key Koehn Subdivision, with larvae feeding upon Jamaica Dogwood and Buttonwood - from the end of April through August/early September as well.

Lastly, there have been reported sightings to us in late Spring/early Summer on Big Pine Keys' Long Beach - one Amethyst nectaring in a large Jamaica Dogwood on the beach berm and one nectaring in a large seaside black mangrove.

Discussion & Literature References:

The Amethyst is a tropical butterfly, with Broward County Florida being a northern extreme of its' range. As we know with all our North American butterflies, the dramatic North American climate changes even in the last 20,000 years (relatively "near term") reshuffles the butterflies in "our deck"! Henry Clench wrote that tropical butterflies in Florida (including Amethyst), were most likely extirpated from Florida latitudes by the last continental glaciation 11,000 years ago, due to temperature drop below the insect's tolerance levels. Cuba and Hispaniola were likely the refugia for these butterflies. Subsequently (lucky for us) they have island hopped and re-colonized, although colonization thru the Antilles is not always a given for different species (Clench).

Records show Amethysts have been found on the Lucayan Archipelago (Bahamas), and both Greater and Lesser Antilles from Cuba to Dominica. Its' type location is in Cuba (BAMONA; Scott).

Taxonomy:

Chlorostrymon maesites, a species name, was first described (recorded) some time ago (Herrich-Schaffer, 1865).

The *Chlorostrymon* genus, constructed by Henry Clench in 1961, had particulars more specifically described by S.S. Nicolay. The Telea hairstreak, *Chlorostrymon telea*, is the genus type species. The genus includes *C. maesites* and *C. simaethis* (Silver-banded hairstreak). *Chlorostrymon* is set apart from other genera by both external characteristics, and specific unique genitalia. In the shifting world of hairstreak taxonomy, *Chlorostrymon* seems quite stable in definition (Nicolay).

In taxonomic hierarchy the genus *Chlorostrymon* belongs in *Eumaeini*, a large tribe within the butterfly subfamily *Theclinae*. For this tribe, having well over 1000 genera, it seems it would be valuable to understand the evolution or relatedness of the genera too! However the phylogeny and evolutionary relationships in *Eumaeini* have not been easily elucidated nor completely defined as of yet.

With the 2004 "Atlas of Neotropical Lepidoptera", "Introduction To The Checklist Of Eumaeini (Lycaenidae)" Robbins discusses higher order characters as tools for classification (page xxvi). In this work he organized the 1200-1300 species of Eumaeini into 83 genera and these into 15 sections. His arrangement provided a strong basis for continuing study. His *Satyrium* section grouping includes genera *Satyrium*, *Phaeostrymon*, *Ocaria*, *Chlorostrymon*, and *Magnastigma* (Robbins).

Big Pine Key Sightings

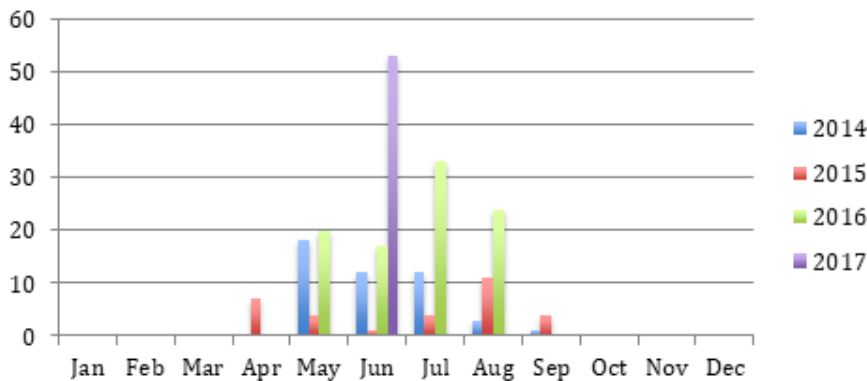


Figure 1: Monthly Sightings Summary

More work in this area was done in 2008 (Quental) with genetic work in the laboratory. His Chapter 2 lays out a DNA supported phylogeny with relationships for genera for the whole of the *Eumaeini* tribe. In this work *Erora* appears as a likely branch of *Chlorostrymon*'s evolutionary tree. Also very intriguing was a constructed chronogram of the *Eumaeini*, showing relative ages of evolutionary branches. This shows *Chlorostrymon* as a very old genus separating long-long ago when only perhaps 20% of the current "lineages" existed, at least 60% of the time(line) back to the first common ancestor (FCA) of all *Eumaeini* (Quental)! The FCA seems to have been around > 60 Mya (Heikkila).

Well, something to think about!

Conclusion:

Evidence shows that **Amethysts live in the tropical hammock tree canopy!** Essentially the complete life-cycle has been displayed on Amy and Leigh's balcony, and it is ALL up high!

Treetopping (In the canopy of course!):

Tree topping by the Amethyst is the most consistent, obvious, and repeated behavior seen. It is hardly possible to see these tree-top butterflies from the ground at all. (Tree topping, a similar behavior to hill topping, is a population concentrating maneuver that brings males and females together at a locus for reproductive benefit, which might otherwise be more problematic in local habitat (Shields).

(Note that Amethysts are NOT the only hairstreaks using this same exact location. Typically Fulvous Hairstreaks (*Electrostrymon angelia*) show up as the first "perchers" in the late afternoon. They are the most numerous, and they joust aggressively with each other and with any other hairstreaks there. Another hairstreak routinely seen in these treetops is the Martial Scrub-Hairstreak (*Strymon martialis*). Once in a great while a Mallow Scrub-Hairstreak (*Strymon istapa modesta*) or a Red-banded Hairstreak (*Calycopis cecrops*) will join in on the sunset fray. Uncommon on Big Pine Key, recently a Gray Ministreak (*Ministrymon azia*) was seen to "drop in" briefly in the mahogany tree. In the Columbian Andes it was shown that for an exceptionally good high point, MANY tropical hairstreak species show up (Prieto)!

The trees in the Amy and Leigh's yard are about the tallest in the visual area, and have a natural attraction. Nearby is somewhat open island scrub habitat. In Amy and Leigh's yard there are at least four adjacent "taller" trees (in the "tropical hammock" of quite a few trees around their house), including a pine tree, a dogwood, a mahogany, and a green buttonwood. These trees stand up probably 40-50 feet. The Amethyst usually prefer to perch on the larger, flatter leaves at the very top of the mahogany, but they are observed and will perch in any of the tall trees.

Propagation:

Reproduction is the priority task for adult hairstreaks. Amy's picture showed that mating happens right in the treetops, with "hooked up" couples together seen near the tree top perches. Females oviposit on early buds of flowers in host trees in the canopy as well. (Using the plant "reproductive parts" as caterpillar food seems typical in the *Chlorostrymon* genus.) Having need for budding flowers for their caterpillars may shift host plant oviposit selection during the AHS flight season, as Jamaica Dogwood flowers only in the months March-June (Hammer) - usually May-June in this location - while the buttonwoods may bloom throughout the year.

Note that, after hatching and starting to eat flower buds some caterpillar species take on different colors depending upon instar stage or diet, and this must be the case for Amethyst caterpillars). Study was done with *Rekoa marius* and *R. palegon* larvae showing these larvae would be pink, green-brown, or even yellow, depending upon the host plant color being eaten. (Monteiro).

Unfortunately Amy and Leigh have not seen pupae YET, although I bet it transforms in pupation to adult in the treetops, too.

Adult Food Source:

The adult Amethysts are observed to prefer to nectar up high, if it is available. They can be seen routinely when "tasty" trees are flowering. They use many different flowering plants for their nectaring, switching to new availability as sources mature to seed.

During the morning and early afternoon Amethysts are not often seen from the balcony. Being an unobserved time, I can only speculate that they must be resting elsewhere, or perhaps out shopping for new nectar locations?

Bottom Line:

For the many years that people have been looking at these butterflies, the records are not "voluminous"! A search on the Lepidopterists' Society website collections search lists eighteen specimens from Florida, back to 1934. (SCAN). Other searches on the Internet (ButterfliesandMoths.org) and on the NABA Sightings (NABA.org) brought up another twelve documented sightings since 2004.

That is only about thirty records over 82 years! Of these, there have been upwards of 10 sighting records just since 2012, which has upped the sighting frequency tremendously (to a couple per year)!

This **PALES IN COMPARISON** to the incredible fact that Amy and Leigh have documented well over 200 sightings themselves since 2014! (So are these butterflies as rare as we think they are, or does their "life style" keep them well out of sight for normal observation?)

This means go see one NOW if you have plans to!

So go ahead! Get out there! And if you go to the Keys, LOOK UP! Its all good to know the most reliable (if there is such) place to see one, but the butterfly is probably at the top of the tallest tree you can find! See what you can see, discover what you can and tell others! Amy and Leigh have!

Acknowledgements:

Gratitude for help and insight goes to Marc C. Minno, Mark and Holly Salvato, Bart Jones, and Roger L. Hammer. Thanks also to Jim Brock, Fred Heath and Robert K Robbins for valuable thoughts and help.

Literature Cited:

- ANDERSON R.A. 1973. Three New United States records (*Lycaenidae* and *Nymphalidae*) and other unusual captures from the lower Florida Keys. *J. Lepid. Soc.* v. 28-29 1974-75, Page(s): 354-357.
- BAMONA. <https://www.butterfliesandmoths.org/species/Chlorostrymon-maesites>.
- CANNON P. 2014. Jewel of the isle, mysteries of the Amethyst hairstreak revealed. *Amer. Butterflies*. Page(s) 4-10.
- CLENCH H.K. 1963. A synopsis of the West Indian *Lycaenidae*, with remarks on their zoogeography. *J. Res. Lepid.* 2(4): 247-270.
- HEIKKILA M. *et.al.* 2012. Cretaceous origin and repeated tertiary diversification of the redefined butterflies. *Proc. Royal Soc. B.* 279, 1093–1099.
- MONTEIRO R.F. 1990. Cryptic larval polychromatism in *Rekoa marius* Lucas and *R. pulegon* Cramer (*Lycaenidae: Theclinae*). *J. Res. Lepid.* 29(1-2): 77-84.

- NICOLAY S.S. 1980. The genus *Chlorostrymon* and a new subspecies of *C. simaethis*. *J. Lepid. Soc.* 34(2), 1980 253-256.
- PRIETO C. & H.W. DAHNERS. 2009. Resource utilization and environmental and spatio-temporal overlap of a hilltopping *Lycaenid* butterfly community in the Columbian Andes. *J. Ins. Sci.* Vol. 9/ Art. 16.
- QUENTAL T.B. 2008. Systematics, sexual selection and evolution of secondary sexual characters in Neotropical *Eumaeini* butterflies (*Lepidoptera: Lycaenidae*). Chapter 2
- ROBBINS R.K. 2004. Introduction to the checklist of *Eumaeini* (*Lycaenidae*), Lamas, G. (Ed.), Checklist: Part 4A. *Hesperioidea - Papilionoidea*. In: Heppner, J. B. (Ed.), Atlas of Neotropical *Lepidoptera*. Volume 5A. Gainesville. Ass. for Trop. Lepid. Scientific Publishers.
- SCAN. Symbiota Collections of Arthropods Network [symbiota4.acis.ufl.edu]
- SCOTT J.A. 1986. The butterflies of North American. A natural history and field guide. Stanford University Press. Stanford California.
- SHIELDS O. 1967. Hilltopping: An Ecological Study of Summit Congregation Behavior of Butterflies on an Southern California Hill. *J. Res. Lepid.* 6(2): 69-178.

Other References:

- *Butterflies of the Florida Keys* - Marc C. Minno and Thomas C. Emmel (1993)
- *Butterflies Through Binoculars: A Field, Finding, and Gardening Guide to Butterflies in Florida* - Jeffrey Glassberg, Marc C. Minno, John V. Calhoun (2000)
- *Butterflies of the East Coast: An Observer's Guide* - Rick Cech and Guy Tudor (2005)
- *Florida Keys Wildflowers* - Roger L. Hammer (2004)



The Lepidoptera-themed tie contingent at the 2017 Annual Meeting of the Lepidopterists' Society, Tucson, AZ (photo: James Adams)

The Buckeye, *Junonia coenia*, uses the garden ornamental *Russelia equisetiformis* (Plantaginaceae) (“Firecracker Plant”) as a larval host in California

Arthur M. Shapiro¹ and Ria de Grassi²

¹Center for Population Biology, University of California, Davis, CA 95616 amshapiro@ucdavis.edu

²de Grassi Consulting, Davis, CA 95616 ria_de_grassi@hotmail.com

The common Buckeye, *Junonia coenia* (Nymphalidae), like many species of the very distantly-related Nymphalid genus *Euphydryas*, oviposits and feeds on a variety of plants that produce iridoid glycosides (Bowers and Puttick, 1986; Gardner and Sternitz, 1988; Bowers, 1984). The pattern of usage suggests that iridoids are necessary stimulants to oviposition and larval feeding but can be overridden by the presence of other chemicals that act as deterrents. It should not be surprising to find these butterflies using novel hosts that produce iridoids. Shapiro and Hertfelder (2009) reported the Variable Checkerspot, *Euphydryas chalcedona*, breeding spontaneously and repeatedly on Butterfly Bush (*Buddleia*) in the Sierra Nevada foothill county of Mariposa and the same phenomenon has now been reported in Mendocino County, in the North Coast Range (K. Hall, *in litt.*). In 2010 Shapiro and Biggs reported the Buckeye breeding spontaneously on the emergent aquatic plant *Hippuris vulgaris* (Hippuridaceae, an iridoid-producing member of the “Scroph clade”). On 10 July 2017 one of us (RdG) discovered four Buckeye larvae feeding on the ornamental terrestrial shrub *Russelia equisetiformis* in her garden in Davis, Yolo County, in the California Central Valley. *Russelia equisetiformis* is named for a superficial vegetative resemblance to a Horsetail (*Equisetum*), but it is a flowering plant (cultivated for its abundant red, tubular, hummingbird-pollinated flowers) formerly placed in Scrophulariaceae and, in the wake of DNA-based reclassification of the “scroph clade,” now in Plantaginaceae. It in fact produces a variety of iridoid glycosides, one of them entirely novel (Ochi et al., 2012). We have been unable to find any previous records of the Buckeye on this plant, which is native to Mexico and Guatemala but very widely planted as an ornamental (occasionally as a container plant) in California and the Southwestern United States. It is occasionally cited in horticultural sources as vulnerable to damage by unidentified caterpillars.

Literature Cited

- BOWERS, M.D. 1984. Iridoid glycosides and host-plant specificity in larvae of the buckeye butterfly, *Junonia coenia* (Nymphalidae). *J. Chem. Ecol.* 10: 1567-1577.
- BOWERS, M.D. & G.M. PUTTICK. 1986. Fate of ingested iridoid glycosides in Lepidopteran herbivores. *J. Chem. Ecol.* 12: 169-178.
- GARDNER, D.R. & F.R. STERNITZ. 1988. Hostplant utilization and iridoid-glycoside sequestration by *Euphydryas* (Lepidoptera: Nymphalidae). *J. Chem. Ecol.* 14: 147-168.
- OCHI, M., K. MATSUNAMI, H. OTSUKA & Y. TAKEDA. 2012. A new iridoid glycoside and NO production inhibitory activity of compounds isolated from *Russelia equisetiformis*. *J. Nat. Med.* 66: 227-232.
- SHAPIRO, A.M. & K. BIGGS. 2010. Use of *Hippuris*, an emergent aquatic plant, as a larval host by the buckeye, *Junonia coenia*, in Northern California. *J. Res. Lepid.* 42: 79-83.
- SHAPIRO, A.M. & K. HERTFELDER. 2009. Use of *Buddleia* as host plant by *Euphydryas chalcedona* in the Sierra Nevada foothills, California. *News Lep. Soc.* 51: 27, 39.



Fig.1. Larva of the Buckeye, *Junonia coenia*, on garden *Russelia equisetiformis* in Davis, CA.



Fig.2. Habit of *Russelia equisetiformis* in flower.

Conservation Matters: Contributions from the Conservation Committee**Hawaiian Lepidoptera represent remarkable diversity that is disappearing before it can be discovered**

Daniel Rubinoff

310 Gilmore Hall, Dept. of PEPS, Univ. of Hawaii, 3050 Maile Way, Honolulu, HI 96822 rubinoff@hawaii.edu

Hawaii is the most isolated landmass on Earth. The closest point on any continent is the City of San Francisco, a little over 2,300 miles away. There are probably over 1,500 species of Lepidoptera endemic to the archipelago, but the diversity is disharmonic relative to continental biotas. Some groups never got there (like Saturniidae and Lasiocampidae, neither of which feed as adults and as a consequence are ill-equipped to disperse long distance; no arctiines and only two butterfly families exemplify the glaring absences) but others are surprisingly diverse. For example, Cosmopterigidae is a minor microlepidopteran family in most continental systems, comprising maybe 2-5% of overall lepidopteran diversity; in Hawaii one out of every three species of native lepidopterans belongs to the family!

Sadly, as is typical for just about every other group of native terrestrial life in Hawaii, extinction has ravaged the Lepidoptera. It's likely that even our first peeks at their diversity in the 1800's were already looking at a severely depleted fauna due to European and Polynesian land use changes and introduced species like pigs and rats. Most native Hawaiian plants now occur in a fraction of their former ranges, while others occur only as a handful of individuals—some only in botanical gardens—and entire genera are extinct. These plants were eliminated by a combination of introduced mammals (rats, goats and pigs being the worst) introduced insects, and pathogens. The genus *Flueggea* contained a dominant lowland rainforest species. Due to alien bark beetles and the fungal pathogens they vector, the species is essentially extinct. The bark is very rot resistant, leaving trunks of long dead giants scattered in what is now a forest made up of exclusively invasive tree species from around the world. The remnants of the massive trunks are the only evidence that the tree ever existed (very similar to the fate of American chestnut in eastern North America). The case of *Flueggea* is far from unusual, and it's safe to say that there were species of Lepidoptera dependent on this botanical diversity which have followed their hostplants into oblivion, most without ever being collected.

Patterns of diversity vary tremendously among groups: there appears to be only a single species of native *Vanessa* across all the islands, yet the microlepidopteran *Hyposmocoma* (Cosmopterigidae) has diversified on volcanoes *within* each island and consists of 99% single-island endemic species. Some genera of noctuids diversified into multiple species, while others—at least now—appear



Aumakua omaomao, is an endemic, monotypic genus found only in rainforest areas of Kauai and Maui. (photo: Will Haines)

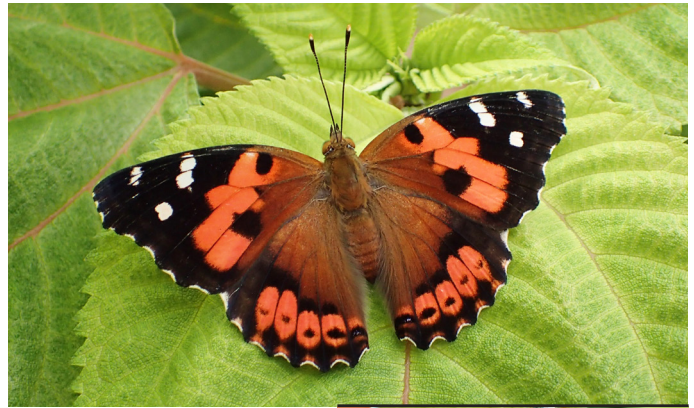
to be monotypic in the islands. Of course, everything we examine has to be considered through the filter of extinction. Groups that appear depauperate now may have told a different story 100 years ago, and 1,000 years ago, before Polynesians arrived, Hawaii would have been a very different place! But, without a time machine, we're left to piece together what's left and make our best guess as to the structure and patterns of the original diversity.

Hawaii is the only state that requires a permit to collect any native invertebrate anywhere in the state. This law is intended to help preserve what's left, but this policy only seems relevant in the case of a few commercially lucrative species, like *Vanessa tameamea*, that end up being sold on the black market. Overwhelmingly, evidence suggests that it is invasive species and habitat destruction which have done the vast majority of the damage to Hawaii's native insects, and control of invasives represents our best hope of conserving what is left. The extermination of their hostplants notwithstanding, native caterpillars are parasitized by introduced wasps and flies, ravaged by over 60 species of ants (all introduced), and preyed upon by introduced hornets and birds. Initial research seems to suggest that these are some of the main causes for native insect disappearance, but there are very little data available.

The problem with the dearth of data is changing now as an increasing number of research projects are dedicated to understanding not just what's left of native Hawaiian Lepidoptera, but also how to preserve them. Recent work has rediscovered *Omiodes* crambids that were thought to be extinct. It is generally believed that ants, not habitat destruction, have contributed most to their present rarity.

Other research is exploring reasons for the decline of *Vanessa tameamea*, the official State Insect of Hawaii, which has been slowly disappearing from spots where it was common only 20 years ago. By gathering data on species before they've disappeared, we hope to be able to effectively identify the causes for their declines and, at least in part, mitigate the damage. For many species it may already be too late.

The Kauai Green Sphinx, *Tinestoma smargaditis*, is in its own genus. When it was first discovered in the late 1800's, it was so rarely collected that the initial specimens were thought to be mislabeled material from Southeast Asia. Decades pass between sightings of the moth and one hasn't been seen in over 15 years. We still have no idea what the caterpillar looks like or what it eats. Or really, where the moth occurs. With only 18 ever collected, the data points are too sparse. This large green sphinx moth is charismatic



Above: (Female) *Vanessa tameamea* is the largest species in the genus and used to be more widespread than it is now. Right: *V. tameamea* pupa. This butterfly is the official State Insect of Hawaii. (photos: Will Haines)



Top: *Omiodes anastrepta*, once thought to be extinct, has been rediscovered and represents a lineage with cryptic species diversity. Bottom: *Omiodes continuatalis*, also thought to be extinct until recently, has been rediscovered in parts of its original range, giving hope that other species that have disappeared might be found again. (photos: Will Haines)

enough to attract attention and there are active efforts to rediscover it, but there is little doubt that it represents legions of other native species also hovering on the brink of extinction. Most likely, many extant native species are surviving in remnant pockets of habitat that are slowly being overwhelmed by invasive ginger, strawberry guava, and dozens of other aggressive weeds brought to Hawaii as part of misguided reforestation or commercial enterprises.

In almost every group of moths we examine, we find that up to 50% of the species are new to science. In some cases this is because what was thought to be one species across the archipelago is actually multiple species, each restricted to one or a few islands, as has happened in *Omiodes* and *Haliophyle* (Noctuidae). But we also have situations where



Haliophyle ignita is perhaps the most striking member of this endemic genus, thought to feed mostly on ferns. It is endemic to the Big Island. (photo: Will Haines)

there are new species and lineages that more than double the known diversity in a group, like the micromoths in *Hyposmocoma*. In the case of the latter, we have discovered the unexpected: the world's only snail-eating caterpillars, and other species that are the world's only truly amphibious caterpillars, dispersed amongst over 600 species in this single adaptive radiation. *Hyposmocoma* exemplify the incredible ecological diversity of insects in Hawaii. For example, while carnivory is extremely rare in Lepidoptera as a whole (less than .13% of all species), in Hawaii, at least three different families have evolved flesh-eating caterpillars. The truth is, we really don't have a good handle on the levels of Hawaiian Lepidopteran diversity, and if we factor in the specter of past extinction, it's quite possible we're missing significant diversity across the order that will never be known.

In an effort to facilitate research on Hawaiian insects and disseminate the information held in the University of Hawaii Insect Museum, we have begun to digitize the specimens and their data. The public has been a great help in this regard; volunteers from all over the world have visited the Museum website and helped us upload our specimen data (<https://www.ctahr.hawaii.edu/insectmuseum/Digitization%20project/digitization%20project.htm>). Digitization of existing specimen data, paired with systematic sampling, will be crucial to not only discovering the multitudes of new species that remain, but also to understanding the current status of already known species.

Unfortunately, there are few ongoing surveys for Lepidoptera, due to a lack of funding. Scattered, serendipitous fieldwork continues, but this is not a substitute for a concerted effort to census Hawaiian endemic Lepidoptera. Extinctions continue at a rapid pace as invasive plants and animals continue the centuries-old process of eliminating natives throughout the archipelago. There is great need to systematically identify biodiversity hotspots and initiate appropriate conservation actions, but until we conduct surveys, we won't know where to focus such efforts. Unfortunately, if more effective conservation is not initiated soon, ever-larger portions of the Hawaiian fauna will disappear, much of it without ever having been collected, catalogued, and described.



Hyposmocoma molluscivora larva attacking a native *Tornatellides* snail. (photos: Daniel Rubinoff)

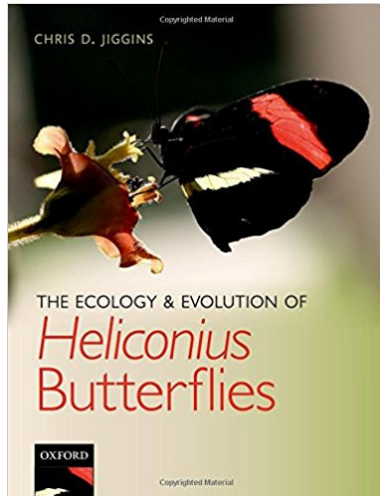


Left: 3rd instar *Manduca blackburni* larva in the process of molting. Above: *Manduca blackburni*, 5th instar larvae (gray/purple form) feeding on *Nicotiana*, an invasive weed. The native hostplant genus for *Manduca*, *Nothoestrum*, is critically endangered. (photos -- left: Will Haines, above: Christine Elliot)



Book Review

The Ecology and Evolution of Heliconius Butterflies (2017). By Chris D. Jiggins. Oxford University Press. Hardcover, 277 pages, \$98.50 (hardback).



This is a rather dense, technical book that provides a thorough summary of recent literature on the biology of *Heliconius* butterflies. It is not a field guide or a taxonomic treatment. Although it contains some nice plates with examples of mimicry and intraspecific geographical variation, it only illustrates about half of the species in the genus, even excluding some interesting taxa

that are discussed at length in the text, such as *H. heurippa*. The author is leader of a large research group at Cambridge University (U.K.), which has now plunged into the realm of *Heliconius* comparative genomics, with the aim of showing that many wing patterns are shared among species by means of hybridization and adaptive introgression of wing pattern alleles.

The book does a good job of describing *Heliconius* life history traits, particularly in relation to the group's adaptations related to larval host plants and adult pollen-feeding, as well as the function of wing colors and patterns in mate recognition, aposematism and mimicry. All in all, the "ecology" component is relatively clear, if rather brief.

The second half of the book is about genetics and development of wing patterns, the evolution of geographical races, and speciation. Chapters 8 and 9 were also published, in slightly modified form, elsewhere (Jiggins, 2017; Jiggins et al., 2017). The most challenging and controversial part of the book is Jiggins' views on the formation of geographical races and speciation. If you are interested in homoploid hybrid speciation, the Pleistocene refugium hypothesis, adaptive introgression and the shifting balance theory of evolution, all described in the context of genomic evidence (or referral thereto), then this will make for some interesting reading. If that sounds unappealing or unintelligible, then save your money.

The final "chapter" is an updated version of Gerardo Lamas' checklist for *Heliconius* and related genera, which includes all the new names and taxonomic changes that have been published in the 13 years since Lamas (2004). (Note that a relatively recent updated version of the entire Neotropical

checklist, as well as checklists for other regions, are available online at <http://www.ucl.ac.uk/taxome/gbn/>). Citations for nomenclatural changes and additions are not provided in the references section, so the interested reader must research them on her own. Jiggins clearly lacks an appreciation of the subtleties of systematics, as he has prevailed upon Lamas to include several polymorphic forms of *H. numata* as "subspecies," even though these interbreed and some of them are unstable heterozygote phenotypes.

References

- Jiggins, C. D., R. W. R. Wallbank, and J. J. Hanly. 2017. Waiting in the wings: what can we learn about gene co-option from the diversification of butterfly wing patterns? *Phil. Trans. R. Soc. B* 372:20150485.
- Jiggins, C. D. 2017. What can we learn about adaptation from the wing pattern genetics of *Heliconius* butterflies? Pp. 173-188 in T. Sekimura, and H. F. Nijhout, eds. *Diversity and evolution of butterfly wing patterns*. Springer Open, Singapore.
- Lamas, G., ed. 2004. *Atlas of Neotropical Lepidoptera. Checklist: Part 4A Hesperioidea - Papilionoidea*. Scientific Publishers/ Association of Tropical Lepidoptera, Gainesville.

Andrew V. Z. Brower, Evolution and Ecology Group, Dept. Biology, Middle Tennessee State University, Murfreesboro, TN 37132, USA; abrower@mtsu.edu



Geoff Martin, Daniel Rubinoff, and Natalie Dale-Skey



Chris Grinter, Todd Gilligan, and Jason Dombroskie
(both photos: James Adams at Lep Soc 2017)

Butterflies from Pond Inlet, Baffin Island, Nunavut, Canada

Takashi Hino

3-4-4 Wada, Higashitokorozawa, Tokorozawa, Saitama 359-0023, Japan takashihino@mua.biglobe.ne.jp

The Far North of North America is very attractive for butterfly lovers who have interest in Arctic species. I have great interest in *Colias* species in this area and have visited Alaska, Yukon and Nunavut. I did visit Baffin Island, Nunavut in July 2017. It is necessary to get a Wildlife Research Permit from the Department of Environment of Nunavut to collect butterflies in Nunavut. I made an application for the Permit and received it in advance. I visited Iqaluit, Pond Inlet and Clyde River. I have not seen any records and specimens from northern Baffin Island, therefore I would like to report the butterflies from Pond Inlet whose latitude is 72° 41' N.

I stayed there from July 11 to 16 and walked around to observe and collect butterflies near the town. The weather was mostly cloudy with some sunshine and occasional rain and snow. Although the temperature was lower than normal, I could observe some butterflies that emerged with the sunshine.

The typical habitat is the tundra slope whose altitude is less than 100m (Fig.1)

Four kinds of *Colias* species were observed:

- *Colias tyche boothii*: According to the Butterflies of Canada, it occurs from Baffin Island west along the Hudson Bay and arctic coast of the mainland. Though Pond Inlet is plotted on the distribution map as its habitat, I have not seen detailed records and pictures

of the specimen. I fortunately collected nine males and the dorsals of two typical specimens are shown in Fig.2. The characteristic orange color is observed, though a little paler than that from the west coast of Hudson Bay, e.g. Baker Lake and Rankin Inlet.

- *Colias palaeno*: According to the Butterflies of Canada, it occurs in southern Baffin Island, and Pond Inlet is not plotted on the distribution map as its habitat. I collected four males and they may be the northernmost records of this species. Both dorsal and ventral are shown in Fig. 3. They are close to the specimens that Jack Harry collected at Iqaluit several years ago and I think they are the same subspecies, *baffinensis*.
- *Colias hecla*: This species was not common and I collected four males and probably one female at the tundra slope near the town. A pair of the species is shown in Fig. 4. The male looks like *C. h. hecla* which Jack Harry collected at Iqaluit. The female does not look like normal *C. h. hecla* and may possibly be the female of *C. tyche boothii* or *C. nastes*.
- *Colias nastes*: This species was most common among the butterflies there and I could observe them even flying inside of the town. The typical habitat is the tundra plain or slope with yellow flowers of an arctic legume which is probably a hostplant of this butterfly. A field picture of *Colias nastes* paused on the ground is shown in Fig. 5. Some variation of the dorsal color is observed from gray to pale orange. The characteristic dorsals of two males and females are shown in Fig. 6. There is some uncertainty left for the identification of the females and I think some orange females may possibly be *Colias tyche boothii*.

Butterflies other than *Colias* species:

Lycaena phlaeas, *Oeneis polixenes*, *Boloria chariclea* and *Plebejus glandon* were observed. *L. phlaeas* is subspecies *feildeni* whose habitat is the Far North of North America. Pairs of *L. phlaeas*, *B. chariclea* and *P. glandon* are shown in Figs. 7, 8, & 9 respectively. Both dorsal and ventral of *O. polixenes* are shown in Fig.10.



Fig.1. Typical habitat of butterflies at Pond Inlet

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Fig.2. Male dorsals of *Colias tyche boothii* from Pond Inlet



Fig.3. *Colias palaeno* males from Pond Inlet. Right: dorsal, Left: ventral



Fig.4. A pair of *Colias hecla* from Pond Inlet. Right: male, Left: female



Fig.7. A pair of *Lycaena phlaeas feildeni* from Pond Inlet. Right: male, Left: female



Fig.8. A pair of *Boloria chariclea* from Pond Inlet, Right: male, Left: female

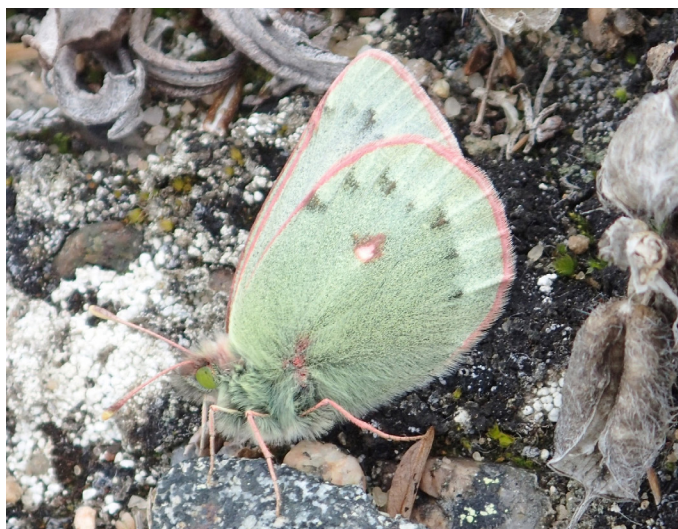


Fig.5. *Colias nastes* paused on the ground



Fig.6. *Colias nastes* dorsals from Pond Inlet. Right: males, Left: females



Fig.9. A pair of *Plebejus glandon* from Pond Inlet, Right: male, Left: female



Fig.10. *Oeneis polixenes* males from Pond Inlet, Right: dorsal, Left: ventral

Butterflies from Pond Inlet, Baffin Island, Nunavut, Canada -- Hino

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References

- Asahi, J. 2012. Butterflies of Baffin Island, Nunavut, Canada Collected by Jack L. Harry. *Butterflies (S. fujisanus)* (60) : 5-19.
- Layberry, R.A., P.W.Hall, and J.D.Lafontaine. 1998. The butterflies of Canada. University of Toronto Press, Toronto, Ontario, CANADA. 280pp.
- Verhulst, J.T. 2000. *Les Colias du Globe*. Monograph of the Genus *Colias*. Goecke & Evers, Keltern, Germany.

Membership Updates

Chris Grinter

Includes ALL CHANGES received by 8 November 2017. 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.*

Hugo Alejandro Benitez: Km 12 San Miguel Azapa, Facultad de Ciencias Agronomicas. Universidad de Tarapaca. Arica, CHILE 100000 (hugobenitez@gmail.com)

Neal A. Bringe: 30633 Longhorn Circle, Elizabeth, CO 80107 (nealb@truevine.net)

Chris Carvalho: 17717 SW Washington Drive, Aloha, OR 97078 (drcool@msn.com)

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

James F. Elder: 1367 East 48th Pl, Tulsa, OK 74105 (jfeok@aol.com)

Christine Harrison Elliott: University of Hawaii Manoa, 3050 Maile Way, Gilmore Hall Rm 310, Honolulu, HI 96822 (chelliot@hawaii.edu)

Jennifer Furchak: 31 Chamber Lane, Manalapan, NJ (furchak2@gmail.com)

Laura E. Gaudette: 1721 NE 75th St, Gainesville, FL 32641 (gaudettelaura@gmail.com)

John Gorey: P.O. Box 5071, Silver City, NM 88062 (johnpgorey@gmail.com)

Norman Handfield: 1100 Ozias-Leduc, Mont-St-Hilarie, Qubébec CANADA J3H 4X7 (nhandfield@sysmic.com)

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

Zachary MacDonald: 306 10808 71 Ave NW, Edmonton, Alberta CANADA T6E 0X7 (zmacdona@ualberta.ca)

Patricia Reeves Morgan-Hodge: P.O. Box 734, Eastsound, WA 98245

Teagan Marie Mulford: 172 N 600W, Provo, UT 84601 (teaganmulford@gmail.com)

Kristy L. Morley: 1803 Pine Street, Norristown, PA 19401 (morleyk100@yahoo.com)

Luis E. Parra: Depto. de Zoología, Facultad de Ciencias Naturales y Oceanográficas, Universidad de Concepción, Casilla 160-C., Concepción CHILE 4070386 (luparra@udec.cl)

Mike Patterson: [redacted by req.] (mpatters@pacifier.com)

JoAnne Russo: P.O. Box 250, Saxtons River, VT 05154 (sukirusso@yahoo.com)

Corinne Wallace: 27523 NE 31st Ct, Redmond, WA 98053 (Corinne.Wallace10@gmail.com)

James J. Weber: 6808 Jester Wild Dr, Austin, TX 78750 (jweber@austin.rr.com)

Linda Williams: 1329 Campbell Cir, Liberty, MO 64068 (lkwilliams@kc.rr.com)

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

Alistair Ballantine: Dr. Vio & Partners. Room 1006, 10/F., Worldwide House, 19 Des Voeux Road, Central, HONG KONG (ansbvio@gmail.com)

Wayne R. Dawes: 13826 Serrano Pl, Hanford, CA 93230

Diane M. Debinski: 310 Lewis Hall, Montana State University, Bozeman, MT, 59717 (debinski@iastate.edu)

Paul Dennehy: 14 West Lawn St, Danville, PA 17821 (dennepj10@gmail.com)

Cristina Francois: 2168 Santa Fe Trail, Sierra Vista, AZ 85635

Ken D. Frank: 2508 Pine Street, Philadelphia, PA 19103 (kenfrank1111@gmail.com)

Riley Joseph Gott: 307 SW 16th Avenue Apt 422, Gainesville, FL 32601 (rgott.95@gmail.com)

Maria Fernanda Guanga: 600 W 141 Street Apt 2, New York, NY 10031 (mguanga@student.sjcnj.edu)

Tobin J. Hammer: PO Box 3042, Eldorado Springs, CO 80025 (tjhammer@gmail.com)

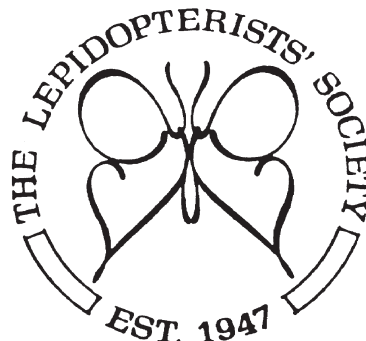
Richard W. Holzman: 110 Cutler Way, Greenville, SC 29615 (rwthingvl@gmail.com)

John Kemner: 5516 Helen Street, Apt 2, Austin, TX 78751

John H. Lane: 10782 Lorenson Rd, Auburn, CA 95602 (jlane@fsgrassvalley.org)

David Lee Myers: 681 Nepenthe Road, Ashland, OR 97520 (david@davidleemyersphoto.com)

Luis Santiago-Rosario: 561 Magnolia Wood Ave, Baton Rouge, LA 70808 (lsanti1@lsu.edu)



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Rare aberration in the Prometheus Moth, *Callosamia promethea*

Tor Hansen

P.O. Box 775, North Truro, MA 02652 torhansen46@gmail.com

Going back to April 29, 2017, I need to relate a discovery of a Prometheus Moth female that emerged from my own livestock, F2 generation, reared indoors on young potted Spicebush trees (genus *Lindera* species *bezoin* (hopefully untreated by herbicides)) here in Onset, Mass. in my sunlit living room. It was reared from fertile eggs, courtesy Don Adams, from a female mated with a wild male Prometheus Moth, and showing heretofore unseen phenotypic variation. This female moth is smaller than the usual Prometheus. What is all the fuss? Most promethea moths, males & females do not show secondary "eyespot" on the dorsal and ventral forewings. However this female shows an additional eyespot, obviously smaller, but quite evident a smaller "satellite" replica, an identical echo of the adjacent primary eyespot at the distal tip of each wing, making four false eyespots in all. These same "snake-eyespot" are likened to suggest an actual snake eye that may cause fright and perhaps deter a predatory mouse, for example. When coupled with adjacent reddish curving wing scale patterns that resemble bloody teeth lines in a snake's mouth, the overall bluff adds to the repelling effect. This may be especially true when the moth wings are fanned, potentially instilling more fear causing a chipmunk or bird to avoid the moth, preventing an attack. No proof of this theory exists, but the wing scale patterns merit discussion, and may have contributed evolutionarily to the long term survival of this and other Saturniid Moths. This new eyespot aberration may lead others to examine Saturniid moths in worldwide collections to see if this morphological mutation is apparent in other species, heretofore unknown in any other giant silk moth.

This smaller than average Prometheus female shows the benefits of rearing multiple generations, as it is under these circumstances where one may find the oddball aberrants among the multitudes of individuals that are reared. It is also among these circumstances that rare recessive alleles that are being carried by individuals may show up in the homozygous condition, as often close relatives may be mated in order to obtain F2 and further generations.

Thus in its rarity, my photograph, sent to professional taxonomists Tom Emmel and Charles Covell, Jr. at the McGuire Center., Univ.

of Florida, confirms this external aberration as yet new to science. In addition to overall arrangement of wing margins, central "V" markings, and post-median line, the wing configurations show a distortion or stretching of the normal wing scale patterns. More precise location of the new smaller eyespots places them between M-2 & M-3 forewing veins. Throughout the genera of Saturniid silk moths we find the larger adjacent eyespot located between veins M-1 & M-2. Hopefully, repeated visits to various museums will find more specimens with similar aberrations and illuminate the advent of this intriguing eyespot pattern.



Normal (top) and the aberrant (bottom) female Prometheus moths

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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:

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The Lepidopterists' Society
9417 Carvalho Court
Bakersfield, CA 93311

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(outside U.S., for above add 5\$ for Mexico/Canada, and 10\$ elsewhere)

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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

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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

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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
59 4 Winter	Nov. 15, 2017
60 1 Spring	Feb. 15, 2018
2 Summer	May 10, 2018
3 Fall	Aug. 15, 2018

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

Michael M. Collins (1st VP)
215 Prospect Street
Nevada City, CA 95959
(530)265-8046, michaelmerlecollins@comcast.net

Jean-François Landry
Agriculture and Agri-Food
Canada, 960 Carling Avenue
Ottawa, Ontario K1A 0C6,
CANADA, (613)759-1825
Jean-Francois.Landry@agr.gc.ca

Annette Aiello
Smithsonian Tropical
Research Institute
American Embassy
PANAMA 9100 Panama
City Place, Washington, D.C.
20521-9100, (507)212-8022
aielloa@si.edu

Secretary

Michael Toliver
Division of Math and
Science, Eureka College
300 E. College Ave.
Eureka, IL 61530-1500
miketol@eureka.edu

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

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Season Summary Zone Coordinators

Refer to Season Summary for Zone coverage details.

Chief Season Summary Coordinator and Editor

Leroy C. Koehn
3000 Fairway Court
Georgetown, KY 40324
(502) 542-7091
lepstraps@aol.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



Above: Beauty on Beauty, *Zygaena* near *loniceræ* on *Iris latifolia*, subalpine zone, Bielsa Valley, Ordesa y Monte Perdido National Park, Spanish Pyrenees; right: views of the habitat in the park. (photos: Danusia Antonowicz.)

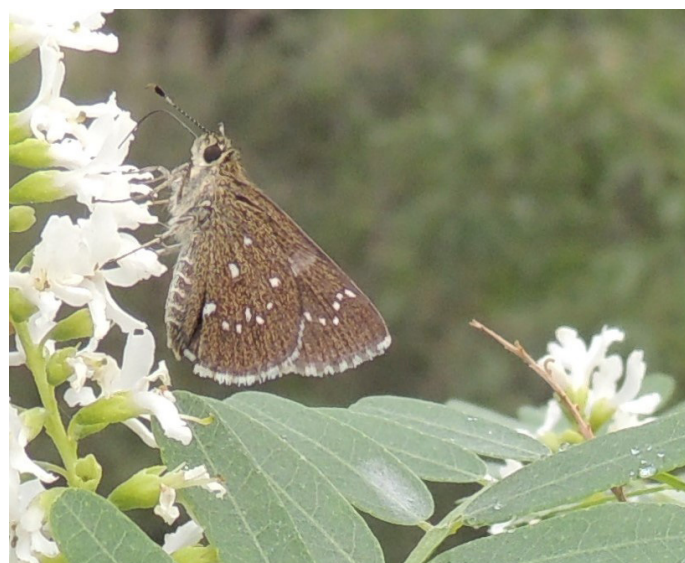


Image of *Amblyscirtes elissa* from Florida Canyon, Arizona, just after the 2017 Lep Soc meeting. (photo: Mike Toliver)