Volume 65, Number 4 Winter 2023

# NEWS OF THE LEPIDOPTERISTS' SOCIETY

THE LEPIDOPTERISTS' SOCIETY
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## Inside:



NEWS OF THE LEPIDOPTERISTS' SOCIETY

**Volume 65, Number 4**
**Winter 2023**

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

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# Contents

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## Front Cover:

*Heliconius charithonia* egg cluster, Gainesville, Florida, behind the Florida Museum of Natural History, on *Passiflora incarnata*. Photo by Andrei Sourakov. See related article, page 198.

# Moth workshop for kids, anyone?

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Recently, we conducted a hands-on science event at the Florida Institute for Human and Machine Cognition (IHMC) in Ocala, about an hour south of Gainesville. One of us (AS) already had a talk prepared about moth biology in conjunction with the launch of his 2022 book, The Lives of Moths, so we decided to focus on moths. We thought we would share our experience here, as the members of the Lepidopterists' Society may want to conduct similar events elsewhere, and may perhaps find our notes useful.


**The setup:** The Science Saturdays workshops at the IHMC are 90-minute-long sessions for kids in 3rd-4th and 5th-6th grades. In order for the sessions to be age appropriate and properly challenging, 3rd and 4th graders participate in a different session from the 5th and 6th graders. The traditional talk format, which most scientists are used to, does not work because of attention span issues related to prolonged listening, especially among 3rd and 4th graders. In order to make science fun, it is important for the learning approach to be hands-on.

As the date approached, over 30 kids registered for each workshop session, with more on the waiting list. When they arrived, the kids in each session were divided into 6 groups of four or five students each, sitting at separate tables, ready for hands-on activities. At each table there was also a high school student "assistant to the instructors" whose role was to facilitate the activities at her/his table while allowing the younger participants to explore and learn in their own way.

**Scientific illustration:** In addition to the lecture about moth biology, we brought a number of spread moths and caterpillars. After a discussion (for about 15 minutes) of moth diversity, each table received one Atlas and one Luna moth in a unit tray. The task was to do a scientific illustration emphasizing the differences between the two species. Then we walked around, providing feedback on their drawings. Many of the drawings were surprisingly excellent and extremely diverse, ranging in style from "Picassos" to "Salvador Dalis." We explained why scientific illustration leads to improved observational skills, compared to merely looking at a specimen or photograph.

**Functional morphology:** Then, 15-20 minutes later, when the noise level increased, we returned to the lecture/discussion mode for another 20 minutes. This time, we talked about other cool things moths do, such as how different species avoid predation. We brought their drawings into the discussion. The fact that the Luna moths

have tails, while the Atlas moths don't relates to their defenses against bats. These were very well-informed kids, but there is always more that one can say about moths – the subject offers inexhaustible opportunities for teaching science.

**Microcosmos:** The next exercise involved looking at the moth world under microscopes. There are excellent and relatively inexpensive digital scopes equipped with screens that one can buy from Amazon for about $30 each. Six such scopes were purchased for the event, one for each table. This opened a tremendous world of wonder for the kids, who suddenly discovered that even a tiny moth which one can retrieve from a chandelier in one's home, or a caterpillar represents a world of diverse and unfamiliar-looking shapes and colors. We distributed smaller moths in small trays that easily fit under microscopes. Their task was to draw scales on wings, but they also got to view eyes, proboscis, antennae, and legs up close.

**Yucky stuff:** One shouldn't underestimate the attractiveness of "yuckyness" to kids. After we talked (during the next return to the lecture mode) about silk production by caterpillars, we stopped to distribute Luna Moth cocoons that we brought with us. We also had various live caterpillars on their preferred food sources, in clear plastic cups with clear lids with small holes for air circulation. Their mouth parts, spines, and poop (the technical name of which is "frass") were a real hit with the kids - especially the frass, and especially when examined under a microscope. After each group finished observing their live caterpillars, they traded with another group, for another type of caterpillar. This topic also segues well into caterpillar anatomy.

**Take home messages:** The final stretch of the presentation led us into a discussion of the ecological importance of moths and the perils of their recently observed decline. We also brought several collection drawers showcasing moths and other insects that the participants (and their parents) got to admire as they were leaving. We also talked briefly about iNaturalist and citizen science and how kids and their families can engage in observing moths at home.

**Acknowledgements:** Here we provide a few photos from this event, but you can visit Science Saturdays - IHMC | Institute for Human & Machine Cognition website for more information and photo galleries. We are grateful to IHMC for providing the venue and to the student volunteers from the Ocala high schools for their help during the event. Having one such volunteer at each table is essential for ensuring that the workshop goes smoothly and that kids get the help they may need.


# Testing ultraviolet light to survey caterpillars in southern Finland

David Moskowitz

75 Fleetwood Drive Suite 250, Rockaway, New Jersey, USA **dmoskowitz@ecolsciences.com**

During a trip to southern Finland in late August 2023, ultraviolet light was tested to locate caterpillars. Ultraviolet light is proving to be highly effective for caterpillar surveys in both the new and old world and for a broad suite of families and species (Meyer and McElveen 2021, Morningred et al. 2022, Moskowitz 2020, Moskowitz 2021, Moskowitz 2023, Tilley et al. 2023). Many caterpillars fluoresce when exposed to ultraviolet light (Moskowitz 2017, 2018) glowing brightly against the foliage at night or at least are more visible. Despite having only, a limited, internet-based knowledge of the Finnish flora, fauna and habitats, nocturnal surveys were very productive for locating caterpillars.

Surveys were conducted in Tuusula, Finland (August 24 - 27) and Espoo, Finland (August 29) using a UV Beast V3 flashlight with light at 385-395nm (uvbeast.com). The surveys in Tuusula were along forest edges and an overhead powerline, and in Espoo along trails in a park and along a roadside in a residential area.

During the surveys 13 species in five families (Erebidae, Geometridae, Noctuidae, Nolidae, Sphingidae) were found along with many unidentified early instar geometrids (Plates 1-5). Caterpillars were easily found by shining the ultraviolet light on the vegetation. Larger individuals were seen from at least as far away as six meters (Plate 6).

Plate 1. Top: *Acronicta alni* (Tuusula, FL, August 24, 2023); middle: *Acronicta aceris* (Tuusula, FL, August 25, 2023); bottom: *Acronicta megacephala* (Tuusula, FL, August 26, 2023).

Plate 2. Top: *Laothoe populi* (Tuusula, FL, August 26, 2023); middle: *Calliteara pudibunda* (Tuusula, FL, August 26, 2023); bottom: *Acronicta psi* (Tuusula, FL, August 27, 2023).

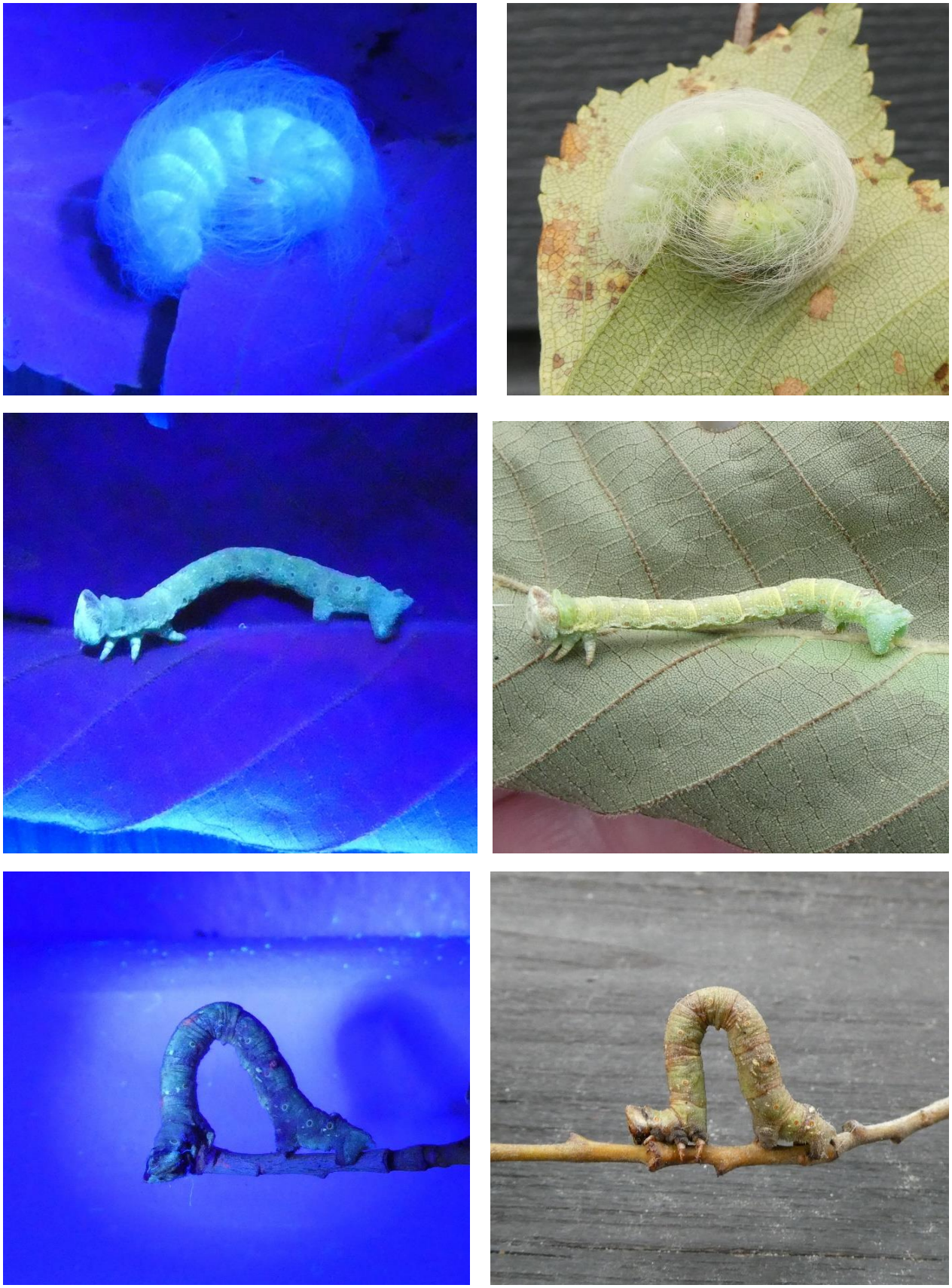

Plate 3. Top: *Acronicta leporina* (Tuusula, FL, August 27, 2023); middle: *Biston betularia* (Tuusula, FL, August 26, 2023); bottom: *Biston betularia* (Espoo, FL, August 29, 2023).

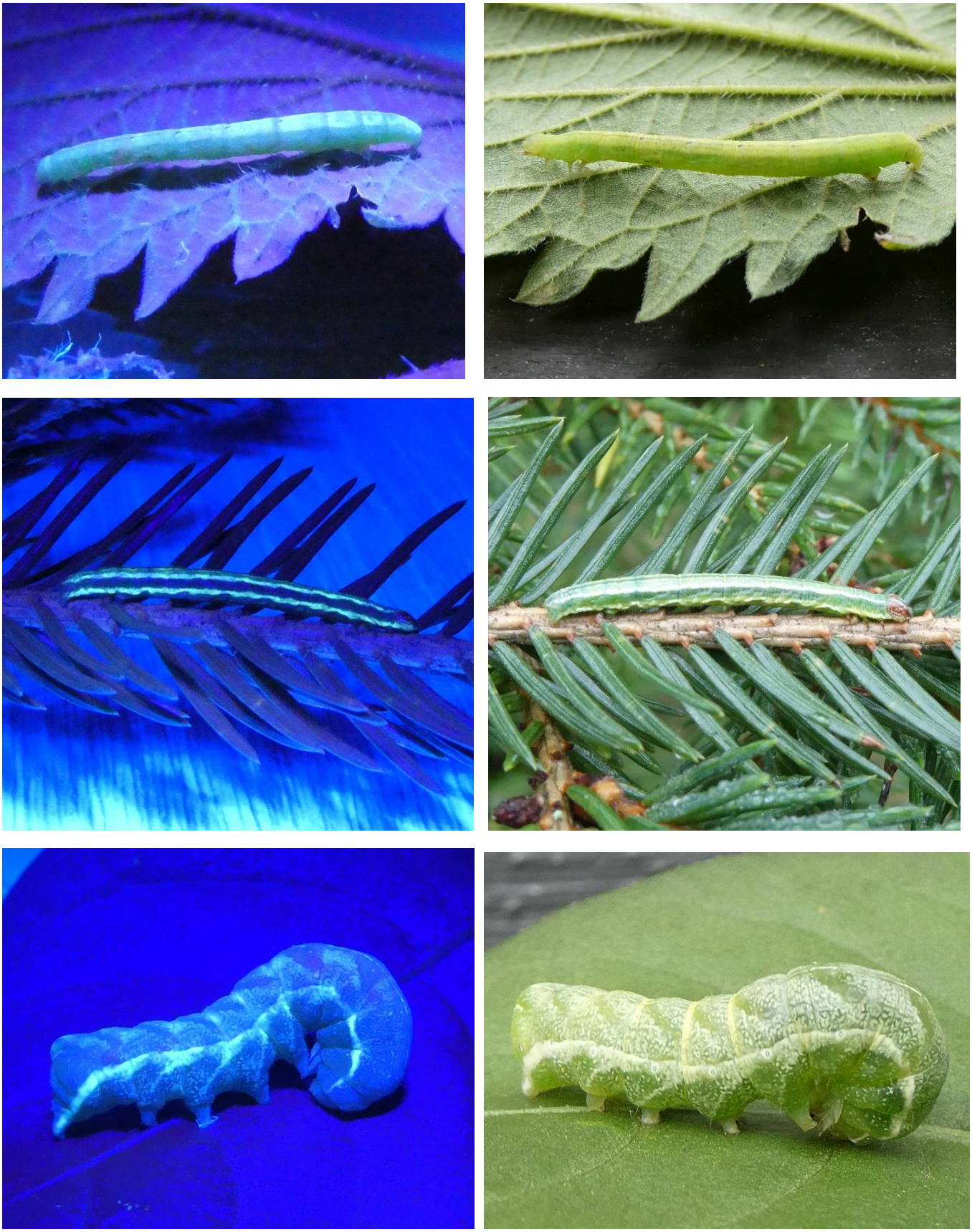

Plate 4. Top: *Cabera* sp.(Espoo, FL, August 29, 2023); middle: *Macaria liturata* (Tuusula, FL, August 26, 2023); bottom: *Abrostola tripartia* (Espoo, FL, August 29, 2023).

Finland has a rich caterpillar fauna with more than 2,600 species (FinBIF 2023) and approximately 1,800 - 2,000 in the southern coastal counties (pers. comm Jaakko Kullberg). Finland also has a very active Lepidopterists' community with about 1,300 active collectors (pers. comm Jaakko Kullberg). Caterpillar surveys with ultraviolet light may compliment these adult surveys and be useful for gaining a better understanding of many life history facets of the Finnish fauna including host plant and habitat selection, survivability, individual movement patterns and conservation opportunities.

## Acknowledgements

This paper is dedicated to the late Kimmo Silvonen who kindly shared his knowledge of Finnish caterpillars and helped identify the species. I am also thankful for the guidance provided by Jaakko Kullberg about the Finnish fauna and habitats. I appreciate the time provided by EcolSciences, Inc. to conduct this study.

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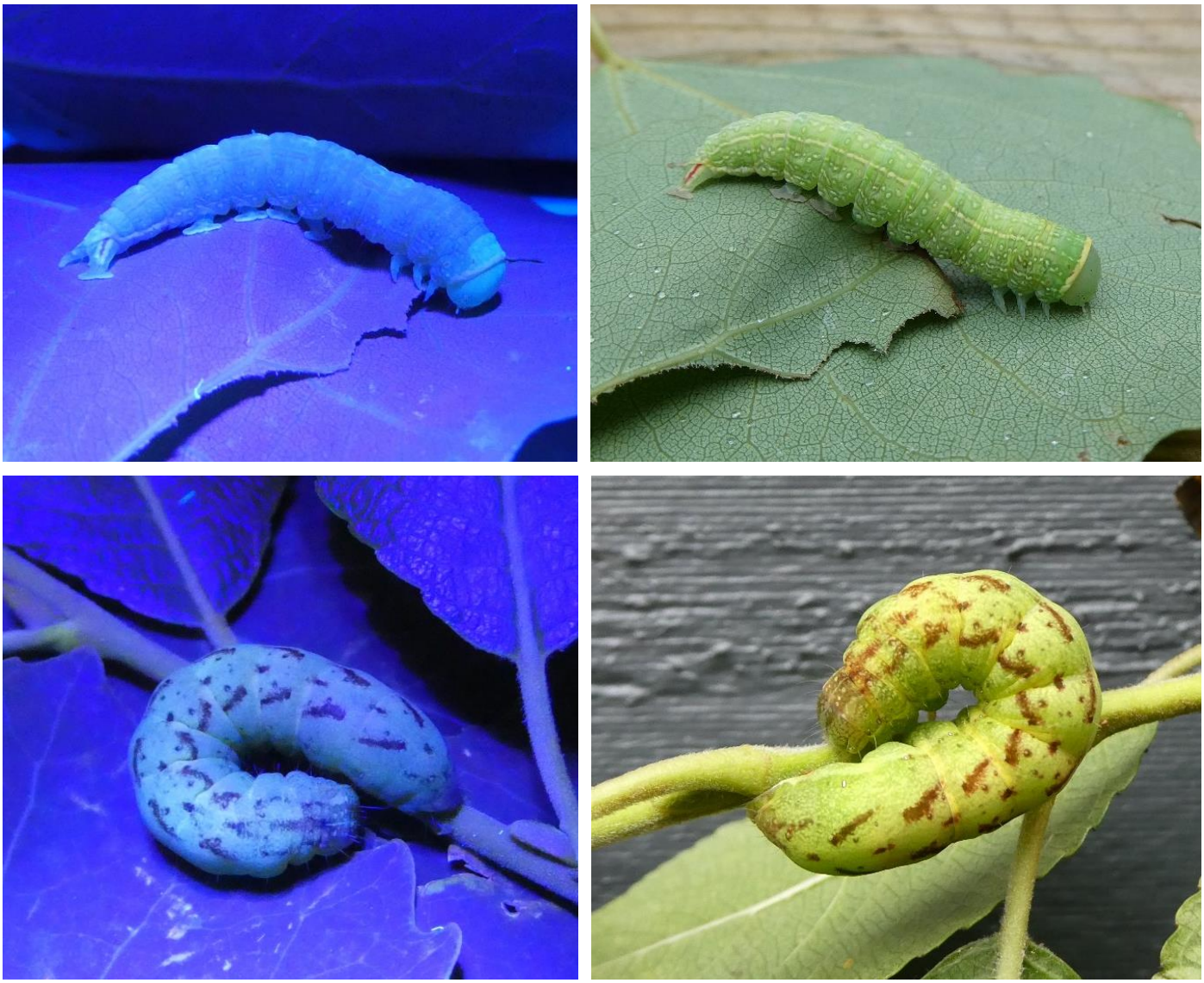

Plate 5. Top: *Pseudoips prasinana* (Tuusula, FL, August 27, 2023); bottom: *Lacanobia contigua* (Tuusula, FL, August 26, 2023).

Plate 6. Top left: *Laothoe populi* (Tuusula, FL, August 26, 2023) photographed from approximately 5 meters; top right: *Callitaera pudibunda* (Tuusula, FL, August 27, 2023) photographed from approximately 6 meters; bottom left: unidentified geometrid (Espoo, FL, August 29, 2023) photographed from approximately 2 meters; bottom right: *Callitaera pudibunda* (Tuusula, FL, August 26, 2023) photographed from approximately 1 meter.

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# The Marketplace

IMPORTANT NOTICE to ADVERTISERS: If the number following your ad is "653" then you must renew your ad before the next issue if you wish to keep it in the Marketplace!

## Publications, Books

**New book on moths of Colombia now available**

***Polillas de Colombia-Guía de campo*** (Moths of Colombia-Field Guide) by Rodrigo Bernal and Blanca Martínez, 700 pp., 15 x 23 x 2.8 cm. ISBN 978-958-49-9014-3.


Published in March 2023 by the Wildlife Conservation Society (WCS), Sociedad Antioqueña de Ornitología (SAO), and Jardín Botánico del Quindío. Printed by Panamericana Formas e impresos, Bogotá. Text is in Spanish. Price: USD $38 plus postage.

To place an order contact: Rodrigo Bernal at **rgbernalg@gmail.com** (wa +57 320 841 4010).

This is the first comprehensive moth identification guide ever published in print for a Latin American country and is one of the few in the world for a tropical country. It includes 2,065 species of Colombian moths. The text (in Spanish) accompanying each plate includes information on size, global and altitudinal distribution, occurrence in biogeographical regions and departments, abundance or rarity, and places where the species may be observed. For many species, information on ecology or other aspects and data regarding the individuals shown in the plate are included as well.

The guide is illustrated with beautiful color images of living individuals, taken by the authors and almost one hundred other people throughout the country, from the San Andrés archipelago and the Caribbean coasts to the Amazon River, and from the Pacific coast to the borders with Venezuela and Brazil. The species treated are grouped in 304 color plates and include 34 families, which cover the most common and striking moths that the reader may encounter on travels throughout Colombia.

There are also profusely illustrated introductory chapters explaining about moths and how they differ from butterflies, their classification, ecological importance, and survival strategies. Hints are given on the best way to observe and photograph moths in Colombia. 653

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

We now accept ads from any credible source, in line with the New Advertising Statement at the top of this page. **All advertisements are accepted, in writing, for two (2) issues unless a single issue is specifically requested.** All ads contain a code in the lower right corner (eg. 564, 571) which denotes the volume and number of the **News** in which the ad first appeared. **Renew it Now!**

**Note: All advertisements must be renewed before the deadline of the third issue following initial placement to remain in place.**

Advertisements should be under 100 words in length, or **they may be returned for editing.** Some leeway may be allowed at the editor's discretion. Ads for Lepidoptera or plants must include full latin binomials for all taxa listed in your advertisement.

The Lepidopterists' Society and the Editor take no responsibility whatsoever for the integrity and legality of any advertiser or advertisement. Disputes arising from such notices must be resolved by the parties involved, outside of the structure of The Lepidopterists' Society. Aggrieved members may request information from the Secretary regarding steps which they may take in the event of alleged unsatisfactory business transactions. A member may be expelled from the Society, given adequate indication of dishonest activity.

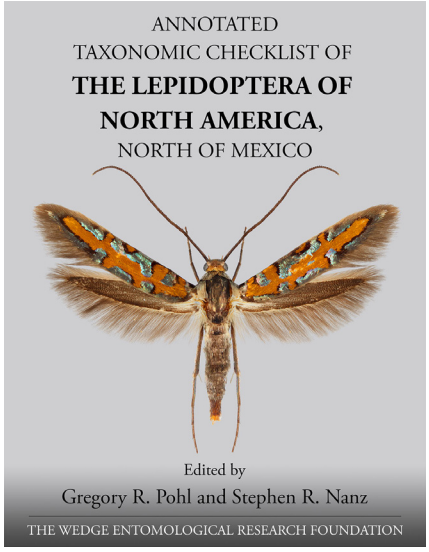
Buyers, sellers, and traders are advised to contact state department of agriculture and/or ppqaphis, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting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

No mention may be made in any advertisement in the **News** of any species on any federal threatened or endangered species list. For species listed under CITES, advertisers must provide a copy of the export permit from the country of origin to buyers. **Buyers must beware and be aware.**

## Wedge Entomological Research Foundation Announces New Publications

The Wedge Entomological Research Foundation (WERF) is proud to announce two upcoming publications. Both are currently available for pre-order at special promotional prices. It is expected that both volumes should ship in November.

The **Annotated Taxonomic Checklist of the Lepidoptera of North America, North of Mexico** is a modern update to the Hodges et al. "MONA" checklist published in 1983. All of the described Lepidoptera species that are known to occur in Canada, Greenland, and the continental United States of America are listed. The authors have endeavored to include information from all publications up to the end of December 2022, as well as from a few publications that were in press at that time. All valid scientific names, from order to subspecies, are presented following the most recent available classification. For all species-level names, the current genus, species name, author, date, and original genus are listed. All available (and many unavailable) synonyms are listed, as well as hundreds of misspellings, emendations, misidentifications, and misapplied names published in the past century.




A total of 13,084 species are reported, including one extinct species, one probably extinct species, 12 extirpated species, 151 strays, and 30 unverified records. An additional 192 excluded species that have been reported in error from North America are noted, as well as 26 nomina dubia. In total, over 36,700 taxon names are included in the list. A phylogenetic numbering system is employed for all valid species, and "MONA" Numbers from the previous checklist are also included. A total of 295 species are reported as introduced and 12 more are possibly introduced; 310 species are Holarctic, 9 more are possibly Holarctic, and another 55 species are either Holarctic or introduced. Brief synopses of the 93 families reported from North America are given, and over 1,600 references are cited, covering the vast majority of relevant taxonomic revisions pertaining to the North American Lepidoptera fauna. More than 2,000 taxon notes provide information on introduced species, misidentifications, erroneous records, details of recent additions, and details of recent taxonomic changes and differing interpretations. The index lists all scientific names of Lepidoptera mentioned in the list.

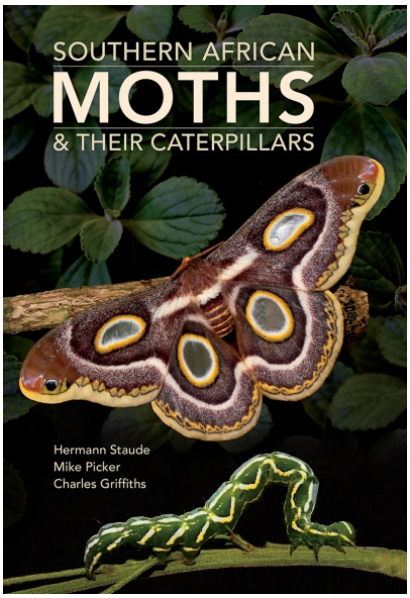
The list is edited by Greg Pohl and Steve Nanz, with an additional 27 authors contributing to the family chapters. The book will be printed as a 600 page soft-cover in 8.5 x 11" format. WERF has priced this volume so that it is affordable for every lepidopterist. **SPECIAL PRE-ORDER PRICING THROUGH THE END OF 2023 IS $30 USD (+ shipping)**. Regular pricing is $40 USD + shipping.

***Epiblema* Hübner, *Sonia* Heinrich, *Suleima* Heinrich, and *Notocelia* Hübner of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)** is the third volume by Wright and Gilligan treating Eucosmini of North America. The authors review a total of 83 species representing four genera in the tribe Eucosmini that occur in the contiguous United States and Canada. Diagnostic morphological features useful in species identification are emphasized. Included are 51 species of *Epiblema* Hübner, 15 species of *Sonia* Heinrich, 11 species of *Suleima* Heinrich, and 6 species of *Notocelia* Hübner. Twenty new species are described.


This volume is in the same format as the past two volumes in this series on *Eucosma* and *Pelochrista*. Species are numbered sequentially as they appear in the book and these numbers are also used to refer to the adult and genitalia plates. Several numbers are assigned to morphospecies or complexes that are not described. Each species account includes information on the taxonomy/synonymy, type information and discussion, morphological description, distribution, adult flight period, and biology (if known). The plates include 540 images of adults in full color and 612 genitalia drawings.

The book will be printed as a 280-page case-bound hard cover with dust jacket in 8.5 x 11" format. **SPECIAL PRE-ORDER PRICING THROUGH THE END OF 2023 IS $80 USD + shipping**. Regular pricing is $90 USD + shipping.

Please visit **www.wedgefoundation.org** to place your order. Orders and payment can also be sent directly to Kelly Richers, 9417 Carvalho Court, Bakersfield, CA 93311. Take advantage of these special prices available until the end of 2023! 653




**Southern African Moths and their Caterpillars**

by Hermann Staude, Mike Picker and Charles Griffiths.

Now available through Pelagic Publishing (and others).

For a limited time, readers can save 30% with offer code MOTH30 at **www.pelagicpublishing.com.**

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## Tropical Trips

### Overwintering Monarchs in Mexico

January 12-18, 2024 (7 days, 6 nights). Mexico City, Sierra Chincua Monarch Sanctuary, El Rosario Monarch Sanctuary, San Juan Teotihuacán Archaeological Site. An experience of a lifetime!

**Photography only!** For more information, contact me at **MarcCMinno@gmail.com.** 653

### Sulawesi, July-Aug, 2024 (Photography only)

Antonio Giudici will be leading a trip to Sulawesi for butterfly photography from July 27 to August 6, 2024. The total cost will be in the $2100 to $2400 range. For details, including flights, hotels, visas etc., contact Antonio Giudici at **angiud@yahoo.com.** Additional information is available at **www.AntonioGiudici.com** and **www.ThaiButterflies.com.** 654

*Papilio peranthus*

## Equipment

A chance to own a piece of classical American entomological history. For sale: Beautiful, handmade cabinet ordered by the Lepidopterist W. J. Holland when he was director of the Carnegie Museum of Natural History (1901-1922). The cabinet is composed of three parts that stack together: the top has nine drawers, and the middle and bottom parts have 30 drawers each (69 drawers total). Dimensions of cabinet: 78 inches tall, 55.25 inches wide, and 25 inches deep (the base adds 2.5 inches to this figure). Dimensions of drawers: 2.5 x 17 x 23.25 inches. The cabinets are mahogany framed, the glass-topped drawers have their fronts in cherry, and the interior and frames of the drawers are oak. The drawers have cork-lined pinning bottoms and seal well. All in all, this is an example of artisanal cabinet making. Many of the companion cabinets in the CMNH Lepidoptera section were destroyed to make way for modern compactors. Contact Phil DeVries for details and price (phil.devries@gmail.com), but consider that mass produced California Academy drawers without pinning bottoms are over $100 from Forestry supply (see https://www.forestry-suppliers.com/p/53599/52860/california-academy-science-insect-cabinet-drawer). 653

**Need a Butterfly Net...New or used**...

Preferably "Bioquip catalogue #7328NA - Insect Net, Aerial, 5' handle, 18" Dia. ring/bag. Net ring and handle are all that is necessary, but a net bag would be a plus. The 5 ft. handle/pole could be disassembled at about 18" from the bottom to make a shorter pole if desired or to remove and make easier to store or place in the car or truck. No problem if a solid 60"...I can convert. Name your price (but don't get too far out in the orbit). Email reply to Mike Fisher, **butterfliesofcolorado@hotmail.com**

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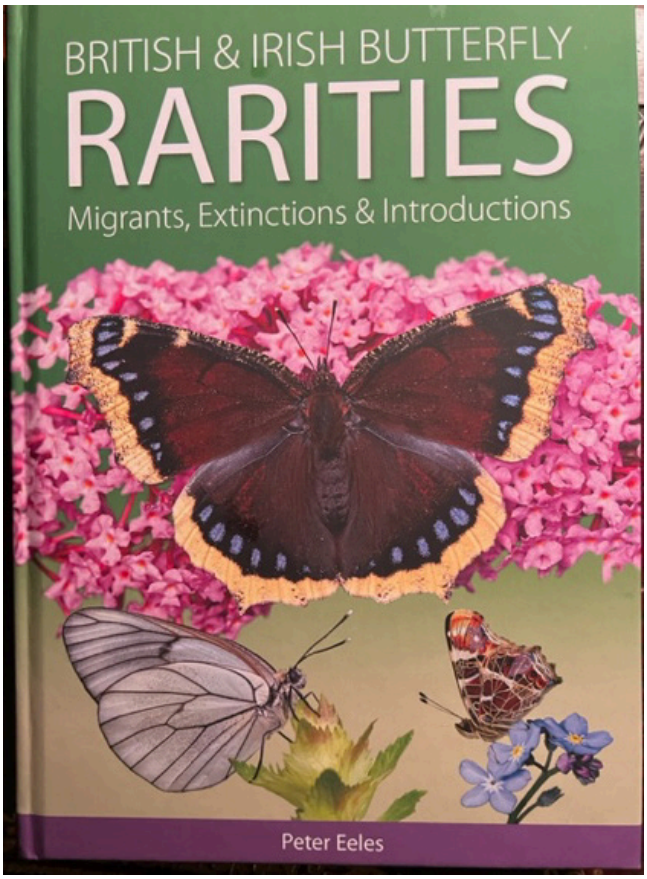
# Book Review




**BRITISH AND IRISH BUTTERFLY RARITIES: Migrants, extinctions and introductions.** Peter Eeles. 2023. Pisces Publications. 338 pp. ISBN 978-1-913994-10-5, £32.50. Distributed by NHBS (nhbs.com).

Last year I reviewed "Vagrancy in Birds" by Alexander Lees on Amazon.com. I said "I got this book because I have long been conscious of the need for such a compilation on Lepidopteran vagrants. Gathering the data for such a project is a monumental, indeed a daunting undertaking, and I thought this book might serve as a model of how to do it." The study of vagrancy, be it by birds or butterflies or whatever, is—contrary to a common perception—not a trivial obsession of collectors and amateurs. I pointed out in a 1988 paper that in the context of climate change, such records documented the potential permeability of barriers and thus the potential composition of future biota. I had trouble getting the paper published—the referees considered it a matter of trivia for amateurs—but I know I would not have such trouble today. The author of this book knows full well why it is important.

So we now have precisely the sort of book I wished for—and opulently produced and splendidly illustrated with photographs, maps and charts. The British butterfly fauna, the best-documented in the world, is currently pegged at 59 species. But another 62 have been recorded in the U.K. at least once. Some occur regularly in very low numbers; some have been recorded only once; and some occur at irregular intervals but may be common, and even breed, when they do. Thus the Mourning Cloak, known in the U.K. as the Camberwell Beauty after the village where it was first recorded in 1748 (since swallowed up by metro London) had "outbreak" years in 1789, 1793, 1820, 1846, 1872, 1976, 1995, and 2006. (My British postdoc Steve Courtney was oh, so thrilled to see it alive here in California, where it is common and resident!) There is an extensive treatment of the Monarch, which has been recorded in the U.K. more than 700 times even though it has no native host plants there. About 200 of these records date from 1995 and another 300 from 1999, but the first goes back to 1876. Of course, some of these might be due to releases. Someone has been releasing European butterflies, such as the Peacock, in Manhattan for years. None has become established. (Once when we were studying the Mexican Madrone Butterfly, *Eucheira socialis,* one male got loose and escaped the building. Sure enough, it was collected by a student in introductory Entomology and turned in in his collection, though he had no idea what it was.)

There is little likelihood that the data could be amassed for a comparable book just for California, let alone the United States. But this is a splendid demonstration of what can be achieved in the best of circumstances and it indeed offers a potential glimpse of a future fauna.

ARTHUR M. SHAPIRO, *Center for Population Biology, University of California, Davis, Davis, CA 95616.*

## Announcements, continued

*Continued from p. 187*

### 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, which may change venues and times year by year as the ATL often shares a venue with the Southern Lepidopterists' Society.

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.

# Update on the Seminole Crescent in Louisiana

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## INTRODUCTION/REVIEW

### Classification

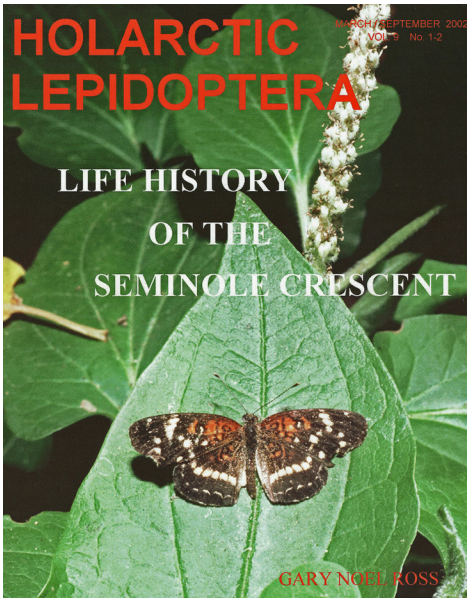
The Seminole crescent, 'Seminole' Texan crescent, or simply Seminole is officially classified as *Anthanassa texana seminole* (Skinner, 1911). The taxon is a subspecies of the Texan crescent, *A. texana texana* (W.H. Edwards, 1863). Some taxonomists even regard the insects as two separate species. The rationale is based on the differences in ecological niches as well as the differences in larval and pupal morphology. Current consensus, however, is to maintain subspecies status, i.e. *Anthanassa texana seminole*. The insect is included within the family Nymphalidae, subfamily Nymphalinae. [NOTE: Originally, *A. texana* was designated to the genus *Phyciodes* Hübner, 1819. In addition, some references (books and online sources) frequently include the Seminole crescent under the heading "Texan crescent."]

### Distribution

*A. t. seminole* is a relatively small butterfly that ranges throughout tropical/subtropical landscapes within the southeastern United States. The insect has been recorded from coastal South Carolina and Georgia, eastern, northern, and central Florida (there are no records from southern Florida or the Keys), and then westward through southern Alabama, Mississippi, Louisiana, and extreme central east Texas; the Florida Panhandle has usually been considered the epicenter for distribution. The butterflies are usually confined to small colonies concentrated in swampy habitats, i.e. drainage basins of streams/rivers bordered by relatively extensive and stable bottomland hardwood forests. Individual butterflies usually do not routinely wander far from their wetland habitats. In contrast, *A. t. texana* is more western, more widespread, and found in relatively dry habitats. That taxon ranges from Houston, Texas westward to southern California, then southward through much of Mexico and Guatemala. Strays are common, having been reported from as far north as central Illinois. Such individuals, though, do not survive the ensuing cold winters. In general, specimens west of Houston are considered to be the taxon *A. t. texana* whereas those east of Houston, the taxon *A. t. seminole*.

### History

Data on the life history of the species (*A. texana*) has been scanty. The vast majority of information is based on the more common western subspecies, *A. t. texana* (Kendall, 1959, 1964). The first detailed account of the immature stages of the eastern *A. t. seminole* subspecies dates from John Watts and Dale H. Habeck in 1991. But in 2002, one of us (GNR) published "Life History of the Seminole crescent, *Anthanassa texana seminole* (Lepidoptera: Nymphalidae)" in *Holarctic Lepidoptera*. Then in 2006, GNR published a popular version describing the life cycle of the species in *Audubon* magazine. Finally, in 2010, GNR published another lengthy/technical work on the species in *Southern Lepidopterists' News*. The three articles were based on research in south Louisiana. Locations included: (1) Bluebonnet Swamp Nature Center (East Baton Rouge Recreation and Park Commission—BREC) and several nearby residential communities (south Baton Rouge); (2) Pearl River Wildlife Management Area ("Honey Island Swamp" (St. Tammany Parish), administered by Louisiana Department of Wildlife and Fisheries); (3) Louisiana Department of Wildlife and Fisheries administration building (Baton Rouge); (4) outskirts of Houma (Lafourche Parish); (5) community of Alsen, (East Baton Rouge Parish), Petroprocessors, Inc. Superfund Cleanup Project of the Environmental Protection Agency; and (6) Indian Bayou Wildlife Management Area (St. Landry Parish), administered by Louisiana Department of Wildlife and Fisheries and U.S. Army Corps of Engineers. The majority of the research was conducted in the Baton Rouge area during the warm seasons of 2000, 2001, and 2002. Finally, Craig Marks (2018) in his *Butterflies of Louisiana,* presented a summary of known sightings of Seminoles from various parishes within the state—all within the southeast sector.




Front cover of the original publication describing GNR's 2000-2002 research on the life history of *Anthanassa texana seminole*. Special issue: 30 pages, 44 photographs. Photo by GNR.

## Habitat

*A. texana seminole* is the quintessential swampland specialist. The butterfly is tied to its core native hostplant, *Justicia lanceolata* (formerly classified as *J. ovata* var. *lanceolata);* in everyday parlance the plant is known as looseflower water-willow. The species is locally common within wetlands throughout south Louisiana and several other locales within the southeastern United States. In Louisiana, prominent canopy trees within typical habitats include bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Understory trees usually include boxelder (*Acer negundo*), Drummond red maple (*Acer rubrum* var. *drummondii*), pumpkin ash (*Fraxinus profunda*) and Carolina ash (*Fraxinus caroliniana*). Prevalent border trees are black willow (*Salix nigra*), sugarberry (*Celtis laevigata*), southern magnolia (*Magnolia grandiflora*), and water oak (*Quercus nigra*). Common *herbaceous* species capable of tolerating temporary submergence include Gulf swampweed (*Hygrophila lacustris*), pennywort (*Hydrocotyle sp.*), lizard's tail (*Saururus cernuus*), swamp smartweed (*Persicaria hydropiperoides*), panic grass (*Panicum* sp.), and of course, looseflower water-willow (*Justicia lanceolata*).

## Host Plants

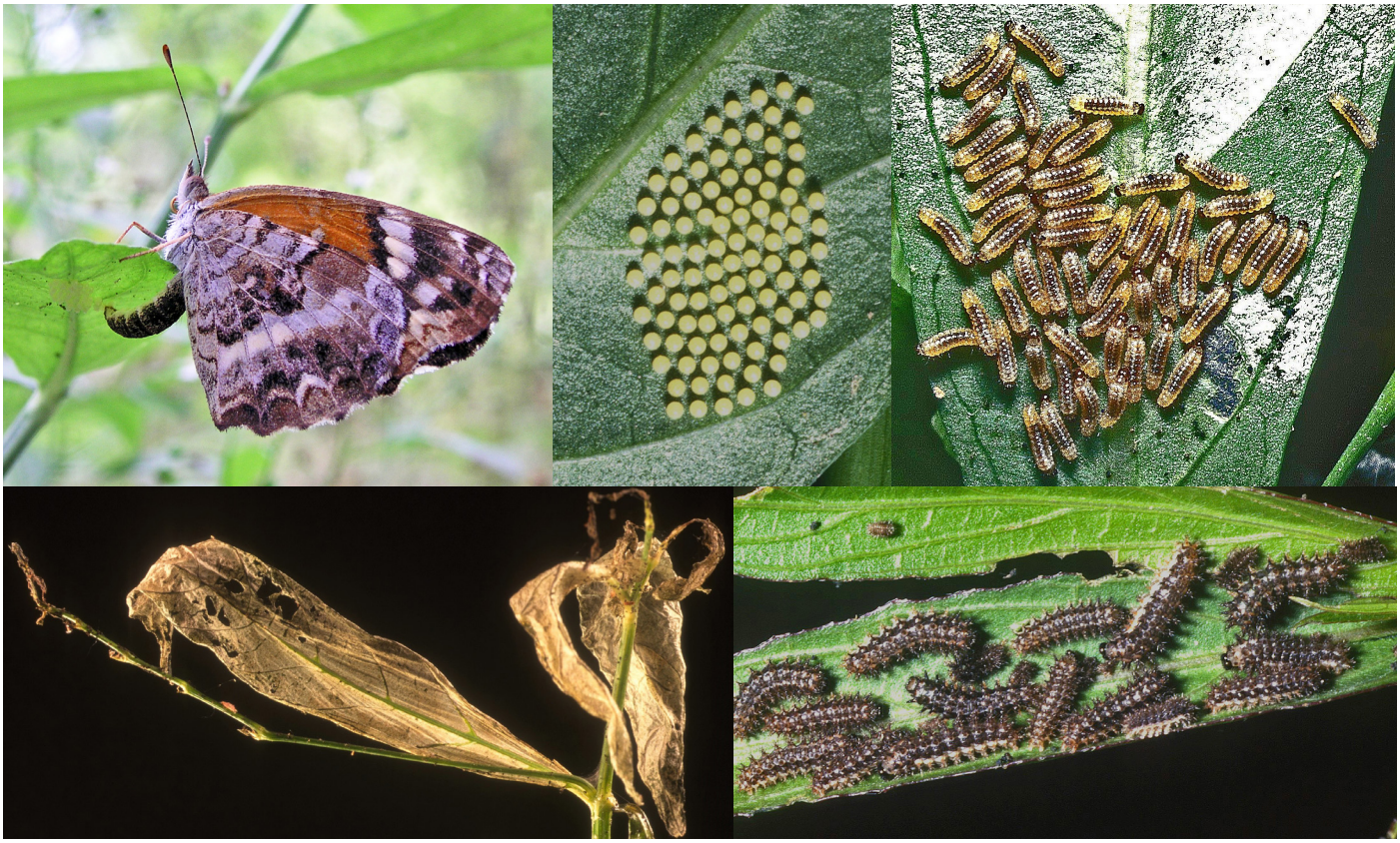
Larval food plants are restricted to the acanthus family (Acanthaceae), a large taxon composed of approximately 2,000 species (170-180 genera) distributed throughout much of the world's tropical habitats. Within the southern United States, many species have become ornamental additions to southern subtropical gardens. In Louisiana, the preferred native host is looseflower water-willow (*Justicia lanceolata*; see next page), a pioneer species that spreads by root extensions, and that is easily smothered out by more robust vegetation. *J. lanceolata* is a pervasive, frost-sensitive perennial that prefers shade, but can tolerate full sun provided the soil remains water-logged. The preferred microhabitat is the interface between dry land and persistent water. Too, plants can tolerate complete submergence for several days. Females are known to oviposit on branched foldwing (*Dicliptera brachiata*), a taller native but less common acanthus adapted to partial shaded and moist conditions throughout several regions within the Atchafalaya Basin. Strangely, in southern Alabama, P.H. Ogard and S. Bright in their book *Butterflies of Alabama* (2010), reported that female Seminoles shun *J. lanceolata*

Top row, left to right: Fresh male Seminole crescent nectaring on white snakeroot (*Ageratina altissima*). Note the loose wing/body scales (white specs). These easily detachable scales repel fresh adults to repel rain drops and to escape ensnarement from the swamp's ubiquitous spider webs. Bluebonnet Swamp Nature Center, EBR Parish. JEH. November 7, 2022; Fresh male Seminole crescent nectaring on blue mistflower (*Conoclinium coelestinum*). Bluebonnet Swamp Nature Center, EBR Parish. JEH. October 24, 2022; Fresh male Seminole crescent nectaring on climbing hempvine (*Mikania scandens*). Bluebonnet Swamp Nature Center, EBR Parish. JEH. June 27, 2023. Bottom Row, left to right: Male Seminole crescent resting on flowering host, looseflower water-willow (*Justicia lanceolata).* Bluebonnet Swamp Nature Center, EBR Parish. JEH. April 24, 2006; Pair of Seminole crescents mating (female above). BREC's Palomino Dr. Park, Central/Greenwell Springs, EBR Parish. Amanda Takacs. July 15, 2022; Pair of Seminole crescents mating. BREC's Frenchtown Rd. Conservation Area, Central/Greenwell Springs, EBR Parish. Brandon J. Johnson. July 4, 2023.

Colony of looseflower water-willow (*Justicia lanceolata),* family Acanthaceae, and the primary host for Seminole Crescent in southeast LA. INSET: Close-up of flower. Bluebonnet Swamp Nature Center, EBR Parish. GNR. May 2000.

in favor of *D. brachiata* even though the latter may be abundant.) [NOTE: *Hygrophila lacustris* is usually an abundant species throughout the wetlands where *A. texana seminole* has been recorded. Yet not a single investigator has confirmed the plant to be a host for the butterfly.]

That said, *A. texana seminole* is opportunistic. Furthermore, females do not confine themselves to a narrow home range when their populations are high. Individuals, for example, are prone to travel into urban neighborhoods where they take advantage of acanthus ornamentals in residential gardens. Indeed, both *A. t. seminole* and *A. t. texana* have been nicknamed "city butterflies." Cultivars include: hummingbird plant/firecracker plant (*Dicliptera suberecta*), shrimpplant (*Justicia brandegeeana*), mohintli/Mexican honeysuckle (*Justicia spicigera*), yellow jacobinia (*Jacobinia aurea*), Brazilian-plume (*Jacobinia carnea*), and Britton's wild petunia/Mexican petunia (*Ruellia caerulea*). The widespread usage of exotic acanthus combined with the propensity for pregnant females to wander from their natural habitats offer southern gardeners unique opportunities to create long-term breeding colonies on their home turfs.



Top row, left to right: Female Seminole ovipositing clutch of eggs on the undersurface of fresh leaf of looseflower water-willow. Bluebonnet Swamp Nature Center, EBR Parish. JEH. April 24, 2006; Cluster of eggs on undersurface of looseflower water-willow. Clutch usually limited to 110-125 eggs. Bluebonnet Swamp Nature Center. EBR Parish. GNR. May 2000; First instar larvae remain clustered on the undersurface of fresh leaves of looseflower water-willow. Bluebonnet Swamp Nature Center, EBR Parish. GNR. May 2000. Bottom row, left to right: Leaf damage by first instar larvae. Only lower epidermis and mesophyll are consumed, creating a ghost-like appearance for the leaf. Bluebonnet Swamp Nature Center, EBR Parish. GNR. May 2000; Third instar larvae. Dispersal has begun. Bluebonnet Swamp Nature Center, EBR Parish. GNR. June 2000.

Upper left: Fifth instar larva. When disturbed, the caterpillar regurgitates a droplet of green mucilage before dropping to the ground to remain motionless for the next few minutes. Bluebonnet Swamp Nature Center, EBR Parish. GNR. June 2000; lower left: An assemblage of pupae. Brownish color acts as camouflage within shaded vegetation. Bluebonnet Swamp Nature Center, EBR Parish. GNR. August 2002; Below: Leaf damage due to feeding of late instar larvae. Host: hummingbird plant/firecracker plant (*Dicliptera suberecta),* an ornamental/exotic acanthus in a neighborhood garden. South Baton Rouge, EBR Parish. GNR. June 2000.

**Life Cycle**

*A. texana seminole* is probably multivoltine with 3-4 (possibly 5) generations per year. Following a relatively mild winter, first generation adults emerge in late April (early to mid May after a cold/lengthy winter). This is the time when the principle native host, *J. lanceolata*, along with the common swamp herbaceous lizard's tail (*Saururus cernuus*), begin to flower. Individuals of the last generation can be observed as late as mid November.

The species is colonial—usually 1-3 dozen individuals per deme. Males are consummate baskers in dappled sunrays after 10:00 CDT, and so are more commonly observed than females. At night, Seminoles perch with wings held vertically in the open atop leaves, not beneath leaves, and not on stems. At rest, a butterfly partially tucks its forewings inside its hind wings. This exposes the relatively loose scales so that they can serve as water repellents as well as escaping ensnarement from spider webs so ubiquitous in wetland habitats.

Females typically oviposit between 11:00 and 2:30 CDT when temperatures rise to 80 degrees F or higher. Preferred hosts are usually 8-10 inches in height and on dry soil (plants partially inundated are avoided), in shaded or semi-shaded habitats, and adjacent to a plant already hosting eggs or larvae. Eggs are deposited in circular clusters containing anywhere from a few (if the female is disturbed) to a maximum of 110 to 125 eggs. After ovipositing, a female will usually fly off and bask. During her reproductive cycle of 8-10 days, she will produce 4-6 clusters (some small, some large) with a cumulative total of 250-300 eggs.

Early instar larvae feed on the lower epidermis and middle mesophyll of tender leaves, leaving supporting tissues in tact but with a ghostly or lace-like appearance—indicative for *A. texana seminole*. Later instars consume the entire leaf except for occasional veins. The result is a more skeletonized appearance, equally characteristic. When feeding on large, exotic species of acanthus, larvae usually consume only small sections of leaves, causing the leaves to have a "Swiss-cheese" appearance—once again, telltale. Young larvae tend to remain clustered, whereas older larvae separate, often resting during the day within ground leaf liter. When disturbed, larvae tend to release their hold and drop to the ground where they remain in a coiled position for some time. Also, when disturbed, larvae often regurgitate droplets of green, mucilaginous liquid—presumably acquired from the sap of their hosts and that presumably act as a deterrent to potential predators. Under laboratory conditions, the exudate is resistant to fungus.

**Adult Behavior/Feeding**

Males and females are similar although females tend to be slightly larger, exhibit more subdued coloration with marginal light patches a bit more pronounced. Males are prone to bask, much more so than females; typical perches are sun-dappled leaves beneath a tree canopy. Residential

gardens hosting the butterfly on exotic species of acanthus tend to include landscape trees that provide partial shade. Whereas adults tend to fly relatively slow and close to the ground, they do seem to disperse readily. Many of these residential communities had no known connection to nearby wet venues. In fact, most residential demes were miles from any wetland and miles apart from each other. Hence the conundrum: How do adults locate these breeding sites so distanced from natural wetlands?

Whereas the more western nominate subspecies, *A. texana texana,* is ascribed as an avid visitor to flowers, *A. t. seminole* is quite the opposite. Only on rare occasions (usually during autumn) did we observe adults nectaring (see first set of images) — and always in sunny locales away from their shaded breeding sites. Plant nectar species are eclectic, but include lantana (*L. camara*), blue mistflower (*Conoclinium coelestinum*), asters (*Aster* sp.), oppositeleaf spotflower (*Acmella oppositifolia* var. *repens*), and dotted smartweed (*Polygonum punctatum*), climbing hempvine (*Mikania scandens*), and white snakeroot (*Ageratina altissima*). When feeding, adults often hold their wings vertically—probably to avoid overheating in direct sunlight, and to conceal the otherwise striking coloration of their dorsal wings.

During the warm seasons of 2000-2002, the primary study area was BREC's Bluebonnet Swamp Nature Center—a 101 acre public-accessible recreation and conservation area within the city limits of Baton Rouge visited by approximately 30,000 persons per year. During the early summer of 2000, Baton Rouge experienced an abnormal drought. Absent precipitation, standing water disappeared from the swamp. In several of the bare areas that remained slightly moist, a blue-green color developed—evidence of a biofilm of cyanobacteria (formerly called "blue-green algae"). At the time, GNR observed during late afternoon on two occasion, several female butterflies (and a single male) that appeared to be feeding either on this film or perhaps on the nutrient-rich moisture impregnating the film from below. Which ever the case, "puddling"--a behavior restricted to male butterflies congregating on damp soil to obtain salts/minerals used in their reproductive systems—did not seem to be involved. The conclusion was that *A. t. seminole* is an opportunistic feeder, exploiting at times not only various flower nectars but nutrient-rich moisture within microbiotic crusts—the latter, in 2002, a first report for the world of lepidoptera.

Female Seminole imbibing from a biofilm (cyanobacteria) that is encrusting dried earth in the dry swamp. The unique food source could be an adaptation to life in a flower-poor, swampy habitat. Bluebonnet Swamp Nature Center, EBR Parish. GNR. June 2000.

**NEW DATA**

*A. texana seminole* proved to be a breeding resident in the Bluebonnet Swamp Nature Center in Baton Rouge during the initial study of GNR between early 2000 and the autumn of 2002. Later, JEH continued to monitor the swamp on a weekly (sometimes daily) basis, and noted that the butterfly continued to be relatively common until 2006 when it then seemingly "disappeared." But in 2008, there was a resurgence in observations. JEH noted one adult during March but no immature stages. The following year, March 2009, another individual was spotted. But again, the species vanished in spite of diligent monitoring and an on-site exuberance of the primary native host, *Justicia lanceolata.* Furthermore, JEH periodically checked the internet (primarily (iNaturalist) for reports by others. Again, none surfaced.

But conditions changed beginning in 2021. Sightings began to become more numerous, and in most cases, photographs accompanied the posts for documentation. In two instances, a relatively sizable number of fresh butterflies were seen—an indication of a population "eruption." In no cases were immature stages observed. Although 2023 appeared to be a potential bonanza for Seminoles, the summer/fall months experienced unprecedented heat and drought (the drought was technically labeled "Extreme Drought.") All wetlands either shrank in size substantially, or dried completely. As a consequence, repeated attempts to discover adult butterflies or immature stages proved woefully unproductive; at best, only an individual or two were occasionally observed. Theory? Populations within any given habitat are inconsistent over time.

Below are the raw data that we have compiled based on two decades of observations through November 2023. The list, reflects what was reasonably possible, considering humankind's foibles. Nonetheless, the data should prove valuable—and we hope, even inspirational—for future researchers. (All observations are of adults; no larvae or pupae were reported.)

1. June 17, 2021. Atchafalaya Basin, St. Martin Parish. Brad Moon and Dave Patton. One female.

2. February 19, 2022. BREC's Frenchtown Road Conservation Area. Central, EBR Parish. Andre Moncrieff. Several individuals observed during morning.


Top row: Entrance to the public recreational/conservation-oriented Bluebonnet Swamp Nature Center in metropolitan Baton Rouge. Of the 101 acres, approximately 50 percent consist of bottomland hardwood forest. GNR. October 12, 2023; Wildflower meadow behind visitor center of the Bluebonnet Swamp Nature Center. Swamp sunflower (*Helianthus angustifolius*) dominates. Baton Rouge. GNR. October 12, 2023. Bottom row: Flooded section of Bluebonnet Swamp Nature Center. Looseflower water-willow thrived in the interface of water and more elevated dry land. Baton Rouge. GNR. June 2000; Breeding site for GNR's original research. Increased sedimentation from nearby new construction raised substrate in swamp. Record-breaking droughts during recent years further reduced water level, prompting the expansion of panic grass, smartweed, and Gulf swampweed. Water-willows couldn't compete. Virtually no hosts or Seminole adults were observed in this microhabitat during recent years. GNR. October 19, 2023.

3. May 8, 2022. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink. One individual. First observed in swamp since March 2009.

4. May 20, 2022. West Feliciana Parish. Eamon C. Corbett ("eamonccorbett"). One individual.

5. June 8, 2022. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink and Gary Noel Ross. Two males.

6. June 12, 2022. Beaver Creek Golf Course. Near Port Hudson, EBR Parish. Jeff Newell. Several individuals.

7. July 15, 2022. BREC's Palomino Drive Park. Central, EBR Parish. Amanda Takacs. Several individuals, including a mating pair.

8. August 30, 2022. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink. One male.

9. October 11, 2022. Burden Research Plantation (Louisiana State University), EBR Parish. Jesse Dufrens ("jdufr"). Single butterfly.

10. October 26, 2022. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink, Sean Golden, and Karen Pinsonat. At least two individuals observed during previous two weeks.

11. October 29, 2022. Walker, Livingston Parish. Kaity Craven. At least one individual.

12. October 30, 2022. BREC's Frenchtown Road Conservation Area. Central, EBR Parish. Jerry Seagle. At least one dozen individuals between 9 am and noon.

13. February 26, 2023. BREC's Frenchtown Road Conservation Area. Central, EBR Parish. Jerry Seagle. Three individuals (at least one female) nectaring on dewberry and basking on leaf at approximately 9:30 am.

14. March 2, 2023. 14001 Patterson Road (Coast Guard land), Orleans Parish, near Algiers and Tarrytown; across the Mississippi River from Chalmette. Area 4 feet below sea level, swampy vegetation. Eric Guidry, James W. Beck, and Zach Lemann. Several individuals.

15. April 17, 2023. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink. One male.

16. May 25, 2023. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish, John Hartgerink and associates. A dozen plus fresh individuals. First eruption of the year.

17. June 11, 2023. BREC's Frenchtown Road Conservation Area. Central, EBR Parish. Brandon J. Johnson. Single individual.

18. June 24, 2023. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish, John Hartgerink and associates. Second eruption of the year.

19. July 4, 2023. BREC's Frenchtown Road Conservation Area. Central, EBR Parish Brandon J. Johnson. At least 6-10 adults, including a mating pair, were observed between the hours of 10:00and 11:00 CDT in the back of the site near the boundary of the Amite River.

20. August 6, 2023. Burden Museum and Gardens (Louisiana State University), EBR Parish. Brandon J. Johnson. Several adults observed along low sections of Palmetto Trail and Magnolia Beech Trail within the "Trees and Trails" sector of facility.

21. October 8, 2023. BREC's Bluebonnet Swamp Nature Center, BR, EBR Parish. John Hartgerink. Two males.

The current data adds several previously unrecorded breeding sites within southeast Louisiana. Major localities are: (1) Burden Museum and Gardens (440 acres), (2) Frenchtown Road Conservation Area (496 acres), and (3) Palomino Dr. Park (149 acres). The first is barely three

Top to Bottom: Burden Museum and Gardens. Dry, but typically flooded habitat accessed by "Trees and Trails." Seminoles were observed by Brandon J. Johnson (BJJ) along nearby low sections of "Palmetto Trail" and "Magnolia-Beech Trail." Highway I-10 is just beyond the tree line. Pictured on boardwalk: BJJ (proximal), STG, and JEH (distant). Baton Rouge, EBR Parish. GNR. October 22, 2023; Authors (GNR, left, JEH, right) photographing within a newly discovered small colony of water-willows within a drainage channel beside the "Magnolia-Beech Trail." Currently dry, the microhabitat was being overrun by Gulf swampweed (*Hygrophila lacustris*) although a few water-willows were in bloom. Burden Museum and Gardens, EBR Parish. Sean T. Golden. October 22, 2023; Close-up of blossom of flowering looseflower water-willow. Note deep cracks in parched earth. Burden Museum and Gardens. Baton Rouge, EBR Parish. Brandon J. Johnson. October 22, 2023.

miles (airline distance) NNE of Bluebonnet Swamp Nature Preserve; the last two are only a few miles east of Baton Rouge, within close proximity to each other.



(1) Burden Museum and Gardens is a working agricultural/research station, public friendly, and an award-winning urban green space that is a mecca for national/international tourists as well as local residents. The extensive property is owned and operated by Louisiana State University Agricultural Center. Located off Essen Lane and adjacent to the I-10 highway system that connects Baton Rouge and New Orleans, "Burden" (as it is often referred to) embraces the beauty of Louisiana's land and its cultural heritage. Highlights include: Rural Life Museum, Windrush Gardens, Ione Burden Conference Center, Steele Burden Memorial Orangerie, a children's playground augmented with a pollinator and herb garden, "Trees and Trails" for hiking, All-American Rose Garden, camellia garden, and greenhouse/propagation sheds for training Master Gardeners. In addition, ponds, creeks, gazebos, sculptures, and large plots of fall sunflowers accent the park-like landscape. For wildlife conservation, approximately 150 acres remain forested—including swamp wetlands. Each year, the center accommodates familial and holiday celebrations, plant sales, as well as special community and educational events in keeping with its mission.

Top to Bottom, left: New visitor/educational building at entrance to Frenchtown Road Conservation Area. Area is known to harbor breeding colonies of Seminoles. Located approximately 15 miles east of Baton Rouge. Central/Greenwell Springs, EBR Parish, LA. GNR. September 19, 2023; Entrance to Palomino Drive Park, a public recreational area located in the rear of a small residential community only a few miles from Frenchtown. The park backs up to the Amite-Comite River basins. Seminoles are known to breed at the site. Central/Greenwell Springs, EBR Parish, LA. GNR. September 19, 2023; Recreational area at Palomino Drive Park. The small pond attracts families within the community for recreation, especially fishing, tennis and basketball. Drought of 2023 reduced the volume of the pond by at least fifty percent. Central/Greenwell Springs, LA, EBR Parish. GNR. September 19, 2023. Below: Close-up of blossoming anglestem primrose-willow (*Ludwigia leptocarpa*) a rich source of nectar and pollen for pollinators. The species is water tolerant and thrives at the pond's edge (alongside the tall cattails -- *Typha* sp.). GNR.

During the original 2000-2002 study, GNR noted that several of the ponds and creeks near Windrush Gardens were bordered by *Justicia lanceolata*, the Seminole's primary host in LA. No Seminoles in any stage were discovered, though. To introduce a new colony, GNR released 21 laboratory reared Seminoles to the property. Repeated checks during subsequent days revealed a handful of adults on the wing but no eggs or larvae on the hosts. Unfortunately, a lengthy dry spell ensued followed by personnel mowing and applying herbicide to the venues for cosmetic reasons. As a result, the season ended with an unproductive introduction.

In 2023, Brandon J. Johnson (BJJ), an associate of the Burden complex, noted a handful of adult Seminoles along the hiking trails within the facility designated "Trees and Trails." The primary area for the sightings was the "Palmetto Trail." In October, GNR, JEH, BJJ, and STG (Sean T. Golden, Program Aide at Bluebonnet Swamp) visited Burden. As with other wetlands, the low areas of the forested acreage were completely devoid of standing water although a few areas remained damp. Happily, we located several microhabitats that appeared to be ideal for water-willows; we even located a damp area beside the "Magnolia-Beech Trail" in which we identified a small colony of water-willows. The plants appeared to be unhealthy: small with leaves shorter and thinner than normal, although a very few specimens did sport a single flower. The ground was deeply cracked and had been seriously invaded by more sturdy/aggressive species such as Gulf swampweed (*Hygrophila lacustris*) and swamp smartweed (*Persicaria hydropiperoides*). We deduced that the water-willows were being outcompeted. Sadly, we observed no evidence of past larval feeding. After several hours of searching we all vowed to return during the spring of 2024 to reassess the habitat.

(2 and 3). The Amite-Comite ecosystem is a unique wetland comprised of extensive bottomland hardwood forests, including flooded swamps, that flank the two rivers. Located in extreme northeast East Baton Rouge Parish, this geographic locale seemingly hosts the most appropriate long-term breeding sites for *A. texana seminole* within Louisiana. (Oddly, only a few records exist for the Atchafalaya Basin, the nation's largest swamp wetland. This absence might be attributed to the region's relatively inaccessibility coupled with a scant number of interested investigators.) But the Amite-Comite River basin is not easy to access. Frenchtown Road Conservation Area and Palomino Drive Park (both BREC facilities) lie within this ecosystem. But the Palomino Drive site is situated in the rear of a small suburban subdivision. The park, therefore, provides recreational opportunities such as tennis/basketball courts and a pond for family fishing; hence, the park is not a major conservation area. Nevertheless, wildflowers are common along the edges of the forest, And along the margins of the fishing pond, the native, invasive, and wetland specialist anglestem primrose-willow (*Ludwigia leptocarpa*) grow and entice pollinators such as *A. texana seminole* from surrounding regions.

## SUMMARY/CONCLUSIONS

Current data indicate that southeastern Louisiana (especially Bluebonnet Swamp Nature Center, Burden Museum and Gardens, and Frenchtown Road Conservation Area) should now be considered a major breeding site for *A. texana seminole*—in addition to the Florida Panhandle. The data additionally reinforce most hypotheses advanced during previous publications: (1) Population sizes vary considerably from year to year with several years of hiatus not unusual; (2) The taxon is definitely multi-brooded with adults often flying into the cool of autumn; (3) Whereas adults do tend to wander into surrounding dry residential neighborhoods and breed on exotic species within the family Acanthaceae, long distance movements (migrations) do not occur; (4) Females use a variety of native and exotic acanthus species as hosts.

The species exhibits extreme periodicity. Although the primary factor for these population fluctuations remains unknown, observations indicate that there is a direct interplay between breeding and water levels within the wetland habitats. For example, the native *Justicia lanceolata* host thrives best at the interface between terra firma and persistent water. If any particular year—or even more importantly, several consecutive years—is exceptionally wet, the plants become submerged for long periods of time. While the host has adapted to periodic inundations (water-tolerant), immature stages (eggs/larvae/pupae) of the butterfly will probably drown. And because females oviposit in large clusters, an entire clutch could be wiped out by a single flood.

On the other hand, if any given year is exceptionally dry, the pioneering hosts could (1) easily colonize new ground, or (2) be smothered out by competing vegetation. Heat and drought can be unprecedented, inexorable. In recent years, throughout the summer and fall months, daytime temperatures often exceeded 100 degrees F and rainfall was minimal. Not surprisingly, absent sufficient precipitation, the *entire* Bluebonnet Swamp dried. Many trees dropped a high percentage of their leaves, and the foliage of many secondary plants wilted and in some cases, crinkled and turned brown. The majority of of the water-willows defoliated even though their stems remained green, and seemingly, still viable. In contrast, the panic grass, swamp smartweed and Gulf swampweed exploited the dry ground by expanding into what previously was the domain of the water-willows. As a consequence, the butterfly's host was crowded out. (On earth that was not covered by the "invaders," a few water-willows continued to survive, even generating a flower bud.)

Although many of the currently documented colonies of *A. t. seminole* are within formal conservation areas, those habitats have changed—even during the last several years. Consider: Residential and commercial construction on the fringes of these protected areas has accelerated exponentially over the last decade or so. More concrete, more

asphalt, more erosion, and more lawns all reduce microhabitats for native hostplants. In addition, with reduced opportunities for soil absorption, rain runoff becomes more turbulent and more heavily laden with sediments, and even potentially toxic chemicals employed to control weeds and insects in adjacent landscapes. Result? Larvae can be smothered, drowned, and easily dislodged and transported to inappropriate microhabitats, and hostplants are often directly drowned, indirectly smothered by sediments, or even killed by toxic chemical residues.

Current home gardens featuring exotic species of acanthus in residential neighborhoods are often unstable for both larvae and native hostplants on a long-term basis because homeowners are unaware of the butterfly-acanthus connection. This can be offset by increased media. If coupled with programs to educate professional lepidopterists along with the training of recreational butterfliers, recreational birders, and homeowners near lowlands, then data collected could prove crucial for the future management of the butterfly species and its primary hostplant. Finally, because the butterfly is known to wander from its native habitats into residential gardens featuring exotic species of acanthus, those persons with an interest in butterfly and hummingbird gardening can plant and maintain plantings to accommodate the beleaguered butterfly.

Case in point: Bluebonnet Swamp. The inner-city recreational/conservation area is small (101 acres) and encircled by dozens of residential neighborhoods and an equally sizable assortment of smallish commercial enterprises and offices. Even if a few of those landscapes could be augmented with readily available exotic acanthus perennials--shrimpplant (*Justicia brandegeeana)*, Brazilian-plume (*Justicia carnea*), Britton's wild petunia (*Ruellia caerulia*), and mohintli/Mexican honeysuckle/King's crown (*Justicia spicigera*), to name a few—then Seminoles would have dependable breeding sites. But the management of the BREC's Bluebonnet Swamp Nature Center does not consider the introduction of non-native (exotic) plants in keeping with the facility's directives.

Bottom line: *Anthanassa texana seminole* is tenuous even in its prime habitats. The insect, nonetheless, has demonstrated amazing resilience to unfavorable environmental factors. Furthermore, the species seems to be amenable to human management, that is, allured into residential settings to breed on non-native, perennial hosts. With the increasing interest in "citizen science," the butterfly is a good candidate to engage local communities near wetland venues. To sum up, we theorize that within southeast Louisiana, the revitalization of the species should be possible with just a bit of human ingenuity. Only time will tell.

## FUTURE RESEARCH

The following areas of investigation would provide vital data on the butterfly's life history:

1. What is the impact of rapid water runoff following a heavy rain into the butterfly's habitats?
2. In what stage does the species overwinter? (In Alabama, the species is reported to overwinter as "partially grown larvae." Is this true for Louisiana?
3. If adults overwinter, when do they mate and when do females begin ovipositing?
4. If pupae overwinter, what triggers adult emergence, mating, and oviposition for a new generation?
5. What is the typical number of generations per year? (Existing data include sightings during all months except November and January.)
6. Could pathogens such as microbial bacteria, viruses, and fungi, and/or predators such as spiders and dragonflies play a crucial role in the butterfly's population dynamics?
7. Why have no reports of larvae or pupae surfaced subsequent to the initial research in 2000-2001? Are the recent reports indicative of critically low population numbers?
8. Why does the butterfly avoid ovipositing on Gulf swampweed, another member of the acanthus family, that is more robust than water-willow? Furthermore, the species is common within virtually all wetlands in south LA. Is this lack of data simply human oversight?
9. What is the chemical composition of the green exudate of larvae? Does the substance actually possess anti-microbial properties? If so, how specifically do larvae benefit?
10. Identification of adult food preferences in early spring when flowers in wetlands are minimal, and herbaceous annuals in surrounding venues can be quite profuse. Current data indicate that during spring and summer, adults exhibit no interest in flowers—even those in nearby sunny meadows. In contrast, during fall, adults are often attracted to flowering herbaceous annuals in nearby open habitats. Although feeding on microbiotic crusts could supply vital nutrients in spring, no observers have reported this phenomenon beyond the initial report by GNR in 2002. Should the original report be retracted?
11. During those years when populations are seemingly non-existent, how does the species maintain itself? Do a few individuals continue their activities in the reduced and isolated habitats that can be viewed as refugia, sanctuaries?
12. What are the effects of "Global Warming" on the butterfly and its hosts? For example, is increased heat and drought now being experienced on breeding sites, particularly Bluebonnet Swamp within confined to a metropolitan setting having negative effects on the butterfly's life cycle?
13. Possible implementation of an educational program that focuses on convincing homeowners and business in the vicinity of recorded breeding colonies of Seminoles with exotic species some local conservation organization in order to entice homeowners to augment their landscapes with exotic species of acanthus. The program could be initiated by a local conservation organization. The goal would be to encourage female Seminoles to oviposit on hostplants that are sustainable. Can human management be a viable option to avoid extinction of the subspecies?

14. Implement educational programs that entice professional ornithologists and recreational birders to supplement their gardens with exotic species of acanthus, most of which are attractive to hummingbirds. With an established zeal for the natural world, the possibility of discovering a rare butterfly breeding in such close proximity would make for a "EUREKA! moment."
15. Encourage nature-minded citizens to join iNaturalist and report their personal sightings so that their discoveries can be shared by peers and professionals alike.

Many unknowns and challenges, to be sure. But with a new wave of young, budding conservationists who are expressing an alarm regarding "Global Warming" and its potential for an approaching "Armageddon," some answers and practices may be on the horizon. Only time will tell.

## PHOTOGRAPHS

Images bearing the initials GNR were taken originally (2000-2002) with a Canon AE-1, 35 mm SLR camera loaded with Kodachrome 64 slide film. Later, the images were digitized with a Nikon Super Coolscan 5000 ED. Minor adjustments such as cropping and lighting were facilitated with Adobe Photoshop Elements 15 Editor. More recent images were taken with a digital camera: PENTAX X70 equipped with a 24x lens designed for 12 megapixels. Images bearing the initial JEH were taken with a (1) digital Olympus C5050Z and 3.5-105 mm zoom lens, (2) a digital Canon EOSR5 and EF100-400 mm lens, and (3) a Canon EOS Digital Rebel XT 8.0-megapixel and 70.0-300.0 mm lens.

## ACKNOWLEDGEMENTS

Over the more than two decades of research behind this report, numerous people have graciously assisted; we thank them all. During the last decade, however, a few individuals deserve special recognition. These are: Eamon C. Corbett, Sean T. Golden, Eric Guidry, Brandon J. Johnson, Zachary Lemann, Brad Moon, Jeff and Carol Newell, Karen D. Pinsonat, Jerry Seagle, and Amanda Takacs.

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(*Continued on page 200*)

# The correct male-female association for *Eupithecia longispinata* Ferris (Geometridae)

Clifford D. Ferris

Research associate: McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, FL 32611; C. P. Gillette Museum of Arthropod Diversity, Department of Agricultural Biology, Colorado State University, Fort Collins, CO., USA. **cdferris@uwyo.edu**

I described *Eupithecia longispinata* (2022, plate 237) based upon specimens that I and Jim Vargo (Mishawaka, IN) separately collected in August, 2021 at light at two sites above 8,000 ft. (2400 m) in the Sacramento Mts., Otero Co., NM approximately ten miles west of Weed. I tentatively associated males with the only female collected. In August, 2023, Vargo revisited his collecting site and found both sexes of *E. longispinata* abundant. The accompanying figure illustrates adults and associated genitalia of this species. The dorsal forewings of both sexes have a black discal spot surrounded by a white ring and a submarginal disjunct line of white horizontal V-shaped spots. The identification now remains unknown of the moth that I incorrectly placed as the female of *E. longispinata*.

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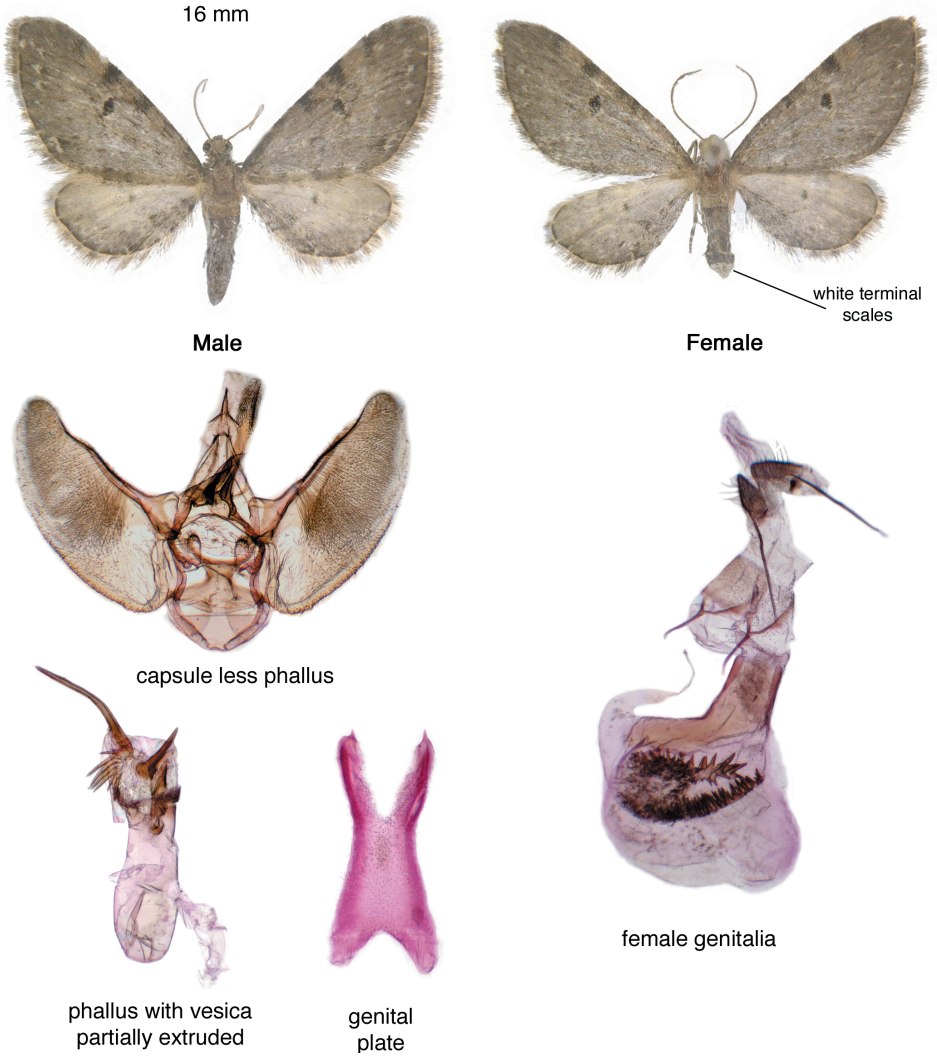


*Eupithecia longispinata*, adults and respective genitalia as labeled.

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

# *Announcements*: Call for Season Summary Records

The Season Summary database is on the Lepidopterists' Society home page (http://www.flmnh.ufl.edu/lepsoc/). The value of the online database increases as your data gets added each year. For your 2022 field season, report range extensions, seasonal flight shifts, and life history observations. Reports of the same species from the same location provides a history. However, do not report repeated sightings of common species. Report migratory species, especially the direction of flight and an estimated number of individuals. Send this information to your Zone Coordinators -- they and their contact information appears on the inside back cover of the "News". The states covered by each zone are in the (most recent) Season Summary. Please have your data to the Zone Coordinator(s) no later than **December 31, 2023**. All of these records may be useful in the future. BE AWARE that some of these records will go IN THE DATABASE, but may NOT appear in the printed Season Summary.

## 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.

## 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.

Brian Scholtens and Jeff Pippen.

## Lep Soc Statement on Collecting

The Lepidopterists' stance on collecting is discussed fully in The Lepidopterists' Society Statement on Collecting Lepidoptera. This is available online at: **https://www.lepsoc.org/content/statement-collecting**

## Lep Soc Statement on Diversity

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

## Searching The Lepidopterists' Society Season Summary on SCAN

Brian Scholtens and Jeff Pippen

Part of what we are now doing as a society is contributing all our Season Summary records to SCAN (Symbiota Collections of Arthropods Network), a larger effort to assemble and make available occurrence records of insects and other arthropods to the greater scientific community and the public in general. Each year we now upload all of the submitted Season Summary records to this site. In addition, several years of back records are also hosted here, and we hope to continue adding past years as that is possible.

Now that our Season Summary is available online, we provide below a simple set of instructions about how to use the SCAN database to search our available records. This process is easy, but not immediately obvious when you start exploring the site. To get started you can go directly to the SCAN site using the link below, or you can access it through The Lep Soc webpage using the link under Season Summary. Then just follow the set of instructions below to access, search and download any data from the Season Summary. The first two instructions set up the search feature to search only the Lepidopterists' Society records. If you would like to include other databases, you can select them in addition to our database. Have fun and explore a bit. There are lots of interesting datasets on the site, including quite a few from major and minor collections as well as some important personal collections. Have fun exploring our data and those in the other databases.

1) Go to: **https://scan-bugs.org/portal/collections/index.php**
2) Click on Select/Deselect All to deselect all databases
3) Scroll to near the bottom of the list and select Lepidopterists' Society Season Summary
4) Go back to the top and click on Search
5) Choose whatever criteria you would like and tell to complete search
6) Records will be displayed
7) Click on the icon in the upper right if you would like to download records
8) Click on appropriate choices – this will download comma separated or tab separated data, which can be compressed or not
9) Click Download Data

## Positions Available at the McGuire Center

The McGuire Center for Lepidoptera and Biodiversity, University of Florida, Gainesville, FL, is hiring a Lepidoptera Collections Manager, an Assistant Curator, and a Graduate Research Assistant.

Please, visit the McGuire Center's website **https://www.floridamuseum.ufl.edu/mcguire/** for updates.

## The Ron Leuschner Memorial Fund for Research

The 2024 cycle of the Ron Leuschner Memorial Fund for Research on the Lepidoptera is now open for applications. Each year, the Society will fund up to 3(+) grants for up to $500 each to undergraduate or graduate students depending on merit. Applicants must be members of the Lepidopterists' Society. Applications are due **January 15, 2024**. The application must include submission of the application form, posted on the Lep Soc website at **https://www.lepsoc.org/content/awards**, a brief (500 word maximum) proposal, and a letter of recommendation or support from the student's academic advisor or major professor. Additional information about the research fund or a copy of the application can also be obtained by writing to Dr. Shannon Murphy. Submit all of the above to Shannon Murphy at **Shannon.M.Murphy@du.edu**. Snail mail applications should be sent to Shannon Murphy, Associate Prof., Boettcher West 302, Dept. of Biological Sciences, University of Denver, 2050 E. Iliff Avenue, Denver, Colorado 80208. Successful applicants will be notified by March 15. The review committee consists of members of the Lepidopterists' Society, including the previous year's successful candidates (who are thus not eligible for a new award in the subsequent year's competition). Award recipients will be expected to produce a short report for the committee at the conclusion of their year of funding, which summarizes the positive impact of the award on their research. Recipients must also acknowledge the Fund's support in any publications arising out of the funded work.

## Mix Family Award for Contributions in Lepidoptera

In honor of Nancy, John, Lin, and Joe Mix, the Lepidopterists' Society is pleased to announce the establishment of the "Mix Family Award for Contributions in Lepidoptera." This award will be used to honor an amateur lepidopterist (someone not professionally employed as an entomologist) who has contributed the most to the field of Lepidoptera in the view of the Awards Committee. Outstanding short-term or long-term accomplishments will be considered, and may include, but are not limited to, contributions to outreach and education, collaboration with colleagues, novel research and discoveries, building an accessible research collection, or leadership within the Society. Nominations are allowed from any member of the Lepidopterists' Society and the nominee must also be a member of the Society in good standing.

To nominate anyone for the Mix Family Award, please write a short letter to the Executive Council outlining the contributions that the person has made and why they should be considered for the award. Photos, attachements, or links can be included. Letters should be emailed to **info@lepsoc.org** no later than **April 1, 2024**. More details may be forthcoming. This award will be presented in alternating years with the Karl Jordan award.

## DeWind Awards from The Xerces Society

Joan Mosenthal DeWind was a pioneering member of the Xerces Society. In Joan's memory, Bill DeWind established this student research endowment fund.

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The Xerces Society offers annual awards to support students pursuing educational research in Lepidoptera conservation. This year, the awards will be $10,000 each, with two awards available. We're investing in the future of our planet and our field by sponsoring the next generation of butterfly and moth conservationists through these grants. Apply today for a 2024 award!

**Submission Requirements:**

The Joan Mosenthal DeWind Awards are given to students who are engaged in studies and 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.

Submission Deadline: The submission deadline is Sunday, **January 7, 2024**, at 11:59 PM Pacific Standard Time (PST). Award winners will be announced by March 31, 2024, with initial award payments received by recipients by June 2024.

For full award information and instructions visit **https://xerces.org/dewind**. Our FAQs page can be viewed here: **https://xerces.org/dewind/faqs**.

## The Southern Lepidopterists' Society

The SLS was established in 1978 to promote the enjoyment and understanding of butterflies and moths in the southeastern United States. Regular membership is $30.00. Student and other membership categories are also available. With membership you will receive four issues of the SLS NEWS. Our editor J. Barry Lombardini packs each issue with beautiful color photos and must-read articles. The SLS webpage (http://southernlepsoc.org/) has more information about our group, how to become a member, archives of SLS NEWS issues, meetings and more.

Please write 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 69th Lane, Gainesville, FL 32653.


## Karl Jordan Medal Award 2023
## John Wesley Brown

John Wesley Brown was born 18 December 1951 in San Diego, California. He married Jenné (Poody) Latislaw, a fellow San Diego native, on 6 October 1979. Together they have two grown children (John and Allisen) and two grandchildren (Ari and Samara).

John received his BS in Zoology from San Diego State in 1983. During his undergraduate career, he worked as an assistant in the Entomology Department of the San Diego Natural History Museum. He received his PhD from the University of California, Berkeley in 1988 under the guidance of Jerry Powell, who is responsible for steering John's interests from butterflies to tortricid moths.

Following a one-year Smithsonian Postdoctoral Fellowship, John worked at LACM as a technician and then as an environmental consultant in San Diego. When Ron Hodges retired from the USDA in 1996, John was encouraged to apply for his position as a research entomologist with the Systematic Entomology Laboratory. John worked for the USDA at the National Museum of Natural History, Smithsonian Institution for 18 years before retiring in 2014. Despite being retired, he still goes into work everyday when not traveling.

Dr. Brown's service to the scientific community is exemplary. He has been a member of more than 18 professional organizations, serving in numerous leadership and editorial positions. He has been especially active in the Lepidopterists' Society, Entomological Society of Washington, Entomological Society of America, American Association for Zoological Nomenclature, Washington Biologists' Field Club, Wedge Entomological Research Foundation, Xerces Society, and Zootaxa. He was a co-founder of TORTS (Troup of Reputed Tortricid Systematists) and editor of its newsletter for 20 years. He served in several positions in the Lepidopterists' Society including President (1999-2000), Vice President 1996-1997), Member of the Executive Council (1989-1991), and Journal Editor (1992-1994), and played key roles in the organization of three annual meetings.

John has conducted numerous workshops focused on identification of tortricid agricultural pest species. Sharing his knowledge with students and fellow researchers around the world had led him to lecture in Mexico, Canada, Brazil, Peru, Romania, Germany, South Korea, and Australia. He has been a key instructor and organizer in Neotropical Lepidoptera courses as well as a regular instructor for the Lepidoptera Course at the Southwestern Research Station in Portal, Arizona.

John's expertise in Tortricidae and other Lepidoptera has led to many grants and contracts to organize and database specimens at the USNM, especially types and their images and genitalia slides, and to promote other collection improvements projects, as well as conduct regional Lepidoptera inventories. The latter have included studies on the fauna of La Selva, Costa Rica; Naval Air Station Miramar, California; Plummers Island, Maryland; and the Great Smoky Mountains National Park. John's efforts and collaborations with other tortricid workers have yielded two especially important online resources: T@RTS: Online World Catalogue of the Tortricidae (stemming from the 2005 print version) and a Food Plant Database of the Leafrollers of the World.

John has authored or co-authored 235 publications, including general interest articles, notes, peer-reviewed taxonomic revisions, book chapters, and at least 10 monograph-length revisions and/or lists, with 144 publications specifically on Tortricidae. His publications have resulted in names and taxonomic descriptions of an astounding two families, 37 genera, 427 species, and three subspecies of Lepidoptera. In recognition of all the above accomplishments, the Committee is pleased to award Dr. John Brown with the with the Karl Jordan Medal.

## Society of Kentucky Lepidopterists

The Society of Kentucky Lepidopterists is open to anyone with an interest in the Lepidoptera of the great state of Kentucky. Annual dues are $15.00 for the hard copy of the News; $12.00 for electronic copies. The meeting (just completed) this year was November 17-18. Follow the Society's facebook page for updates on future meetings and potential field trips at **https://www.facebook.com/societykentuckylep/**.

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

## Donation Appraisal Committee

## Call for volunteers

At the Society's annual meeting in Cullowhee, Western Carolina in June 2022, Kelly Richers presented a paper about the need for a committee to appraise the donation of collections to institutions, independent of a donee or receiving entity. His intention was to assess the impresions of the attendees to see whether such a group might be needed and if so, whether the Lepidopterists' Society might be the entity to do so for Lepidoptera. The response from the audience was overwhelmingly positive. I could not attend the annual meeting, so I missed his presentation, but Kelly later approached me to reiterate his idea.

As a result, in October 2022 I appointed a new committee, the **Donation Appraisal Committee**, with the following role :

1. Explore the viability of, and parameters of an appraisal committee responsibilities.
2. Explore the legal ramifications of the involvement of the Lepidopterists' Society and/or individual members in appraisals.
3. Explore and determine the scope and steps to follow for getting Lepidoptera collection appraisers within the Society (i.e. ability level of appraisers, non-affiliation with institutions, rules, government regulations).

The committee shall be composed of seven (7) members. Much of the committee's work can be done by email and remotely. People who occupy institutional positions (such as curators or collections managers) whereby they may deal with or accept specimen donations should not volunteer or participate in the committee due to potential conflicts of interest.

The concept of this committee was spear-headed by Kelly Richers. As President (at the time) I merely formalized setting up the committee following his suggestions. This initiative was presented to the Executive Council in October 2022 and was well received. I intended to publish in a late 2022 issue of the *News* a notice (such as this one) announcing the formation of the Committee and requesting volunteers, but missed that due to unforseen personal circumstances. This was discussed again at the EC meeting of July 19, 2023 in Billings, Montana.

The following Lep Soc members have already indicated an interest in being committee members: Kelly Richers (Chair), Debbie Matthew Lott, Hugh McGuinness, John Beck. As such, three more Committee members are needed. This notice is a call for volunteers who would be interested to serve. Those interested are invited to contact our new President, Ivonne Garzón.

Jean-François Landry, Past President

## Annotated catalog of the ghost moths (Hepialidae) of the world

John R. Grehan, Carlos G.C. Mielke, John R.G. Turner, and John E. Nielsen. 2023. A revised world catalogue of Ghost Moths (Lepidoptera: Hepialidae) with taxonomic and biological annotations. *ZooNova* 28: 1-313.

This publication builds and expands upon the pioneering world list of Hepialidae in the Exoporia catalogue published in 2000 by Ebbe Schmidt Nielsen, Gaeden Robinson, and David Wagner. The new catalog covers 82 genera and 701 species of Hepialidae *sensu stricto*, arranged in alphabetical order. Each species record comprises the original taxonomic work, synonyms where applicable, general distribution, type locality and type depository where known, and literature pertaining to illustrations of the adult, morphology, biology, and host plant records (for the Hepialidae as a whole, ranging across fungi, mosses, ferns, gymnosperms, and angiosperms). The literature survey spans nearly 400 years, from 1634 to the present, and comprises 1,793 references for publications examined by the authors. An introductory section includes brief comments on taxonomy, early (European) literature, ecology and conservation, some brief biographies of some past contributors to the knowledge of Hepialidae, and a list of food sources (fungi, plants) with records of hepialid species for each food source. Illustrations include several regional plates of example species, and where some new taxonomic changes are made (along with explanation of justification).

This work represents a 5+ year-long effort to provide a comprehensive resource for lepidopterists, especially for the earlier literature that will provide a historical context for the development of knowledge about the Hepialidae. We anticipate the citations for habitat, biology, and larval feeding sources will be of particular interest to a range of biologists including ecologists, behaviorists, insect-host evolution, and those working on pest management or conservation. The catalog is an open access resource available at Afriherp.org. We invite and encourage researchers and data base specialists to freely use any of the catalog content in whatever way is found to be useful.

John Grehan, Carlos Mielke, John Turner, John Nielsen

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

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

(*Continued on page 171*)

# *Digital Collecting:*
# Butterflies of the Kingdom of Bhutan

Bill Berthet[1] and Sonam Dorji[2]

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Map of Bhutan

We had a 20-day adventure through East, Central, and Western Bhutan, led by my passionate naturalist guide Sonam Dorji, who specializes in butterflies, birds, biodiversity, and community education. Sonam and others promote biotourism to help develop Eastern Bhutan in a responsible manner. My other guide was Tashila, a college educated guide specializing in the history of the major Dzongs and other important cultural insights. He made us comfortable with his driving skills on treacherous roads. Tashila was helpful in locating butterflies, birds, and mammals. He even assisted supporting me in very awkward positions to photograph the Common Blue Apollo *Parnassius hardwickii*. My thanks go out to both of them!


Sonam and Tashila

The Bhutan trip was from August 21 to September 9, 2023. This butterfly photography holiday took over three years to "make happen." I was ragged after a 2½ hour flight from Jacksonville, FL to JFK, then a 13½ hour flight from New York To Delhi. So, upon arrival, I trudged over to the T2 terminal for my 2 hour Indigo domestic flight to Guwahati. I was charged $48.50 US for my overweight carry on. Later I had to manage 6 trays of stuff when security demanded I take every item out of the camera bag. I kept my wits about me and we managed to secure all trays in a safe place for repacking. I met Sonam at Guwahati airport in Assam, and I spent the night at Lords Inn.

August 21: I took an Indian Taxi from Guwahati (Assam), stopping about 3 hours later to get a departure stamp from India. Then on to the Bhutan border. Bhutan is a tiny Himalayan, mostly Buddhist, kingdom 190 miles wide with an amazing rise in elevation from 97m to 7570m south to north, all within 90 miles. The population of Bhutan is under 800,000. The country is squeezed between India and China, and both countries have massive populations and economies. This situation has presented opportunities but also many threats in recent decades. The governing body is aiming to cut its fossil fuel dependency on India by moving to electric cars, banning export logging and moving toward achieving 100% organic production. Despite its challenges, in terms of spiritual and environmental issues Bhutan remains a model for the world.

Sonam took me past a long line of men up the stairs to the head honcho's office. He spoke English so we got along great. It took about 20 minutes of paper work. I started reading a very large Bhutan "Believe" leaflet, which the head honcho later gave me as a gift. This leaflet is chock full of info about Bhutan.

Tashila transferred my luggage from India into Bhutan, placing the luggage in his Hyundai Creta SUV. I closed my eyes, back seat to myself. Reality started to settle in, as we headed north up the Samdrup Jongkhar Hwy (170m)

The spread of food at the restaurant in Wamrong.

*Archaeoattacus edwardsii.*

to Trashigang area (2400m). We later turned a corner on the main highway and noticed some moth activity near one of the lights that were still on. I photographed the largest moth in Asia: *Archaeoattacus edwardsii.* I enjoyed watching this huge moth flapping its nine inch wingspan for about 100 yards before it landed. I have observed 7 ½ - 8 inch wingspans of *Ornithoptera samson goliath* females nectaring on Impatiens in the Arfaks in W. Papua, but the sheer overall size of this moth was quite striking. Leaving the heat and chaos of India behind, we stopped at a Bhutanese restaurant in Wamrong (2130m) for a huge spread to choose from. I opted for the pizza (delicious, owner said it was an old family recipe); the rest of the food was devoured by Sonam and Tashita. We left with full bellies and a celebratory Coca-Cola in hand.

Later in the afternoon we passed over Kharung La (2350m) and arrived at Karma Thegsum Dechenling Goemba (monastery). We watched the monks and common butterflies of the area. We were supposed to spend the night, but because of ceremonies at the monastery, we had to implement plan B. We drove further north past Yongphula airport (2650m) and Sherubtse College to the excellent Lingkhar Lodge near Kanglung for three nights.

We were greeted by a Capped Langur. These primates are mostly arboreal and leaf eating, and regularly descend cliffs to get minerals from natural salt licks. Their forage diet lacks minerals, which therefore needs to be obtained from the soil. When alarmed, they scamper upwards and flee by brachiating from tree to tree.

Capped Langurs. Left -- single individual; right -- multiple individuals at a salt lick.

The vine *Aristolochia griffithii.*

*Papilio paris.*

August 22: We drove about 45 minutes, stopping at a large curve in the road near the Yongphula airport. Dense fog had set in, with no sight of better weather. Around 9:45 we dropped Sonam off to work the airport area. Tshewang Norbu, Sonam's assistant in the field went to a second location, while I stayed at the best viewing spot, where the vine *Aristolochia griffithii,* foodplant for *Bhutanitis ludlowi*, was growing. I did find a *Troides helena* early instar caterpillar feeding on one of the leaves.

At about 10:15 a.m., I got glimpses of several dark *Papilio paris* rapidly flying down the ridge, mixed in with a colony of hairstreaks. Around 11:00 a.m., a small rapidly flying "grey ghost" dive-bombed near me in dense fog. About 15 minutes later, I saw another Ludlow's Bhutan Glory at a different location with similar flight behavior.

August 23: Before leaving, I asked Sonam to check his Brown Gorgon *Meandrusa sciron* spot. On the way Tashi slammed on the breaks, having seen a pair of recently road killed *Butanitis ludlowi*. I bolted out of the car as Tashi kept an eye on traffic. The first thing I noticed was how large the forewing was on the female. I kept thinking about flight behavior and weather conditions. Having photographed and observed B. *thaidina* in Yunnan and Sichuan provinces in China and later *B. lidderdalii* in western Bhutan, both species seem to have a waif-like flight, drifting/gliding with the wind from the ridges down waterfall filled gullies looking for nectar along the way. *B. ludlowi's* second flight period is in August (with one recent observation of a worn specimen on September 3) towards the end of the monsoon season. With constant rain and foggy

The Brown Gorgon, *Meandrusa sciron*; road killed pair of *Bhutanitis ludlowi*.

Top: left -- *Bhutanitis ludlowi*; right -- *B. lidderdalii*. Bottom: *B. thaidina*.

days it has adapted to flying in these conditions. The first flight period is in May-June, and more observations are needed to delineate the exact flight time of this first flight.

Ludlow's Bhutan Glory has a flight with a rapid deep wing beat and frequent gliding. The forewings provide all propulsion while the hind wings are unpowered during normal flight and trail behind the butterfly. When flying the greyish undersides blend in with the surroundings. Unlike many swallowtail butterflies, *B. ludlowi* does not continuously flutter its wings while feeding. *Viburnum cylindricum* flowers are the most commonly used adult nectar source. Both *Bhutanitis* species in Bhutan have the ability to fold their forewings into the white viburnum blooms allowing the wind to travel above and underneath the body with little disturbance while nectaring in windy conditions. In 2012, Ludlow's Bhutan Glory (*Bhutanitis ludlowi*) was named the national butterfly of Bhutan.

The Kaiser-i-Hind, *Teinopalpus imperialis*.

For several years Sonam has been recording observations on *Bhutanitis lidderdalii,* a butterfly found all over Bhutan at an altitude of 2000m and above. It also has two broods, May-June and September to early November. It is quite resistant to cold weather and can fly in heavy downpours. On August 27, 2021, back at Shoskom Hill, Sonam observed a very worn *B. ludlowi* in new habitat from a different district and outside the protected system of Bhutan, and had several more observations in August 2022. On September 3, 2022 Sonam observed a fresh *B. lidderdalii* and old *B. ludlowi* flying together at Shoskom Hill. And on September 10. 2023 Sonam videod a nectaring *B. lidderdalii* pressing it's forewings into the white Viburnum blooms, as indicated above.

August 24 of 2021, Sonam found a road killed Kaiser-i-Hind *Teinopalpus imperialis* in this area in Bhutan, but has yet to observe a live specimen. On April 24, 2019 Antonio Giudici and myself (Bill) hiked 4k up Doi Pha Hom Pak mountain (2157m) in N.E. Thailand and saw *T. imperialis* along with 5 or 6 other species zipping back and forth on a sunny morning along a 300m or so open area with plenty of *Quercus grafittii,* the Kaiser's host tree, growing nearby. The Brown Gorgon was the bully of the group but could not keep up with the blazing speed of *imperialis*. Having Brown Gorgons around could indicate T. i*mperialis* is nearby.

August 2023: Swallowtail & Birdwing Butterfly Trust (Greenwings) provided a grant to Sonam Dorji to produce a short film on the Bhutan Glory (*Bhutanitis lidderdalii*) and Ludlow's Bhutan Glory (*Bhutanitis ludlowi*) at a site in Bhutan which he discovered in 2021 where both species fly in the same location in September. He received a permit from the Royal Government of Bhutan Ministry of Energy & Natural Resources Dept of Forests & Park Services to film the life cycles of *B.litterdalii, B. ludlowi,* & *T. imperialis*.

The next morning I had a custom made breakfast with the ex-home minister of Bhutan. He owned the joint. I left him a copy of News of the Lepidopterists' Society to read that piqued his interest. We had a blast, talking about New York, and him beating me at Backgammon. He loved throwing those dice.

August 24: In the morning we went looking for B. *ludlowi,* though the weather was constant rain. We stopped at the National Hand-


Above, left: Yarns dyed with (mostly) plant derived pigments; right: a colorful Kira designed with numerous colored yarns.

loom Development Project, with the intent of visiting their showroom. The entrance gate was locked, but two women we had passed on the road earlier had the key. We went back and picked them up to open up the gate. The shop had numerous examples of Kiras made from colored cotton cloth embellished with various designs using different colors of dyed silk. I purchased one for the asking price of 20,000nu.($250.00).

Traveling north to the town of Trashigang (Auspicious Mountain), we then headed west on the National Hwy, stopping at the immigration checkpoint near Chamzam. We drove along numerous switchbacks, nicknamed the Yadi Loops. If the stars align, you might get a glimpse of the Himalayan Monal or the Satyr Tropogan in the pristine forested areas. And you may see several troops of wild Assamese Macaques that are wary of humans, not at all like the begging monkeys in India.

We passed over Kori La (2400m) into Mongar that like most towns in Eastern Bhutan are at the tops of ridges or hills, notably different to many towns in the west that are situated in valleys. Late that afternoon in the driving rain we arrived at Trogan Villa, a really well thought out "birding" lodge with a very helpful manager and good cook.

The next morning we backtracked along the main highway to a muddy side road in Saling, filled with swarms of puddling butterflies including Red Lacewing *Cethosia biblis*. This was the first partially sunny day of this trip.

That night, Sonam set up a moth light and got several large moths and other insects. Since it rained heavily, we decided to take the next day to relax. This was still monsoon

Top: Himalayan Monal. Middle: Satyr Tropogan. Bottom: Assamese Macaque.

Left: *Cethosia biblis*. Top right: impressive longhorn beetle; bottom right: *Xyleutes persona*.

Left: *Aethopyga nipalensis*, Green-tailed Sunbird; right: *Myzornis pyrrhoura*, Fire-tailed Myzornis Warbler.

season, and I was the only guest. A month later the rain would diminish, producing sunnier weather, and this place would be packed with birders from all over the world.

Invigorated, we kept heading west on the national highway, crossing over Thrumshing La (3750m), marking eastern from central Bhutan, then entering In Situ Rhododendron Gardens. Featured here are over 20 species of Rhododendrons blooming from the end of March to late May. Birds we saw here included the Fire Tailed Myzornis and Green-tailed Sunbird. The road conditions were sketchy, with quick descents along narrow roads clinging to the side of a rock cliff. There were numerous streams and waterfalls leaping out into the roads, and the ever-present fog and clouds.

We made our way into the foot of the Chokhor Valley to the major trading center of the region Jakar. It was the weekend, and we stopped at an archery tournament outside the small town of Chhumig. We watched the men dressed in their Ghos trying to hit a target at 145m (over 470 ft) using a compound bow with carbon shaft arrows. If they hit the target they added a ribbon to their belt and did a little group dance in celebration. In the meantime other observers were sitting outside the "bar-restaurant" to join in on the festivities -- some good old fashioned social entertainment.

We stayed 4 nights at the Norbu Lingka Resort near Trongsa, experiencing great hospitality, good food, and a wonderful view. There was a personal garden to observe birds, bees, and butterflies. Thanks to the manager, who got online from his phone for my music requests while dancing in the restaurant. We were "stuck" here for two days as the main road was blocked. Dynamite was used twice to break open a very large fallen boulder.

August 30: Monsoon season was starting to weaken. There were sunny days ahead, but road conditions were still unpredictable. The main road was clear, and we left early from Trongsa taking the main road south in central Bhutan, bypassing Zhemgang towards Panbang. Not far down the road we observed a small troop of the subspecies *Trachypithecus geei bhutanensis* having grey limbs and a larger tail. This was an example where Golden and Capped Langur's interbreed in the temperate north. Further south we ran across several troops of Golden Langur's that slowly headed back into the trees to avoid us.

We stopped at the checkpoint in Tingtibi before entering Royal Manas National Park, the oldest nature preserve in the Kingdom of Bhutan. Its incredible biodiversity includes hundreds of rare animal and plant species. The park is the most biologically diverse protected area in the kingdom as well as one of the most outstanding nature preserves worldwide. It occupies broad low lying alluvial terraces in the foothills of the outer Himalayas. There is a wide range of climatic conditions within the park due to the substantial variations in altitude and the influence of the seasonal monsoons. During the monsoons, the park can experience thunderstorms and extremely heavy rainfall. Diversity of vegetation types present in the park included Tropical Monsoon Forests, Sub-Tropical, Warm and Cool Broadleaved Forests and Evergreen Oak Forests.

Royal Bengal Tiger, Asian Elephant, Greater One-horned Rhinoceros, Clouded Leopard, Gangetic Dolphin and Golden Langur are found in the park. More than 365 species of birds have been officially recorded in the Park of which 16 are endemic. About 50 species of reptiles include the Vine Snake, Flying Snake, the Banded Krait and King

Left: *Trachypithecus geei bhutanensis*, a hybrid between Capped and Golden Langur's. Right: a Golden Langur troop.

Cobra. Many of the park's more than 900 types of plants have commercial, medicinal, traditional or religious significance. We checked in at Pantang Eco Lodge in the late afternoon then headed further south, stopping at Twin waterfall to look for the Yellow Gorgon *Meandrusa payeni* and whatever else decided to turn up.

August 31: We enjoyed ginger tea the next morning outside on the porch observing a Great Hornbill making a rukus in a large tree nearby. Passing Twin waterfall, we drove south to the old farm road towards Bjoka, that was hopping with butterflies including Long Banded Silverline *Cigaritis lohita*, Common Gem *Poritia hewitsoni*, Contiguous Silverline *Cigaritis zhengweilie,* Commodore *Parasarpa zayla*, Constable *Dicchorrhagia nesimachus*, Common Red Forester *Lethe makara*, Angled Red Forester *Lethe chandica*, and Yellow Owl *Neorina hilda*. It was the best day for numbers and diversity of butterflies this trip.

September 1: I spent the early morning fishing for the The Golden Mahseer, (similar to a golden scaled cross between a Tarpon and Snook). I had a one day permit, fishing one spot, and paid for an additional trained fishing guide. I brought along a telescoping medium heavy fishing pole with a Penn spinning reel spooled with 15lb test braided line. After about 5 casts using a 3/8 ounce weight in the shape of a fish with spinner, "wham" the fish hit. My guide was busy trying to adjust the drag but the fish was too strong, got out into the roaring flow of the river, and the line snapped. The guide said the fish weighed somewhere around 35 lbs. I fished for another 1½ hours, but there was not another bite. I gave both fishing rigs and an assortment of lures to my grateful guide, who also is the general manager of the Pantang Eco Lodge. He later sent me pictures of him with a fish he caught using his "new" rig.

We passed a group of children going to school. An elderly

Top Row: Yellow Gorgon (*Meandrusa payeni*), *Parasarpa zayla, Dicchorrhagia nesimachus*. Middle Row: *Cigaritis lohita, Poritia hewitsoni, Cigaritis zhengweilie*. Bottom Row: *Lethe makara, L. chandica, Neorina hilda*.

Above: fishing hole for the Golden Mahseer. Below: my guide with the Golden Mahseer he caught with gear I left with him.

gentleman was walking along the road to Zhemgang where we were looking for the Golden Langur's salt lick. The langur's foliage diet lacks minerals and salts that can be obtained from these salt licks. We stopped by a group of 7 adults working on an old belt driven machine turning a centrifuge making maise into cornflakes, The machine operator was nice enough to give me a large bag filled with very warm corn flakes that I snacked on. I gave the rest to the manager of the hotel, who was waiting to greet me with hot ginger tea. We arrived back at Norbu Lingka Resort in Trongsa, a great day!

September 3: We headed west to Pele la (3420m) looking for the Common Blue Apollo *Parnassius hardwickii*. We spent several hours watching them zip around during a sun filled afternoon amongst alternating sheer rock outcroppings and yellow composite filled slopes. As Tashi and I were leaving, one Apollo landed about 25 ft. ahead. Trouble was, the open wing position was parallel to the road about 6 feet below, Tashi slowly inched his way down the steep ravine getting a foothold of a piece of well rooted

Above: Phobjikha Valley. Below: Black Necked Cranes that make the Phobjikha valley their home.

vegetation along the way. Standing about 10 feet below I slowly follow his footsteps and then while he was holding me, I got off a couple of clicks. Tashi and I shared a celebratory Coke, then picked up Sonam before driving into a violent hail storm about 20 minutes later.

September 4: We went back to Pele la for a ventral shot of P. *hardwickii*. The scenery was beautiful. About an hour later one landed about 50 feet away. I ran with binoculars in hand to find the best angle; about 10 feet away I got 2 clicks before the butterfly took off. That was the only opportunity for this butterfly on that day.

Monsoon season turned into very fair weather. The rainy season was a pain, especially with road conditions and looking for butterflies, but the cloud formations were a natural beauty all to themselves.

The Blue Apollo, *Parnassius hardwickii.*

Grateful for the success with the Common Blue Apollo, we continued driving west to Phobjikha, a bowl shaped valley about 4 kilometers long on the western slopes of the Black Mountains. A large flock of Black Necked Cranes winters here, making this

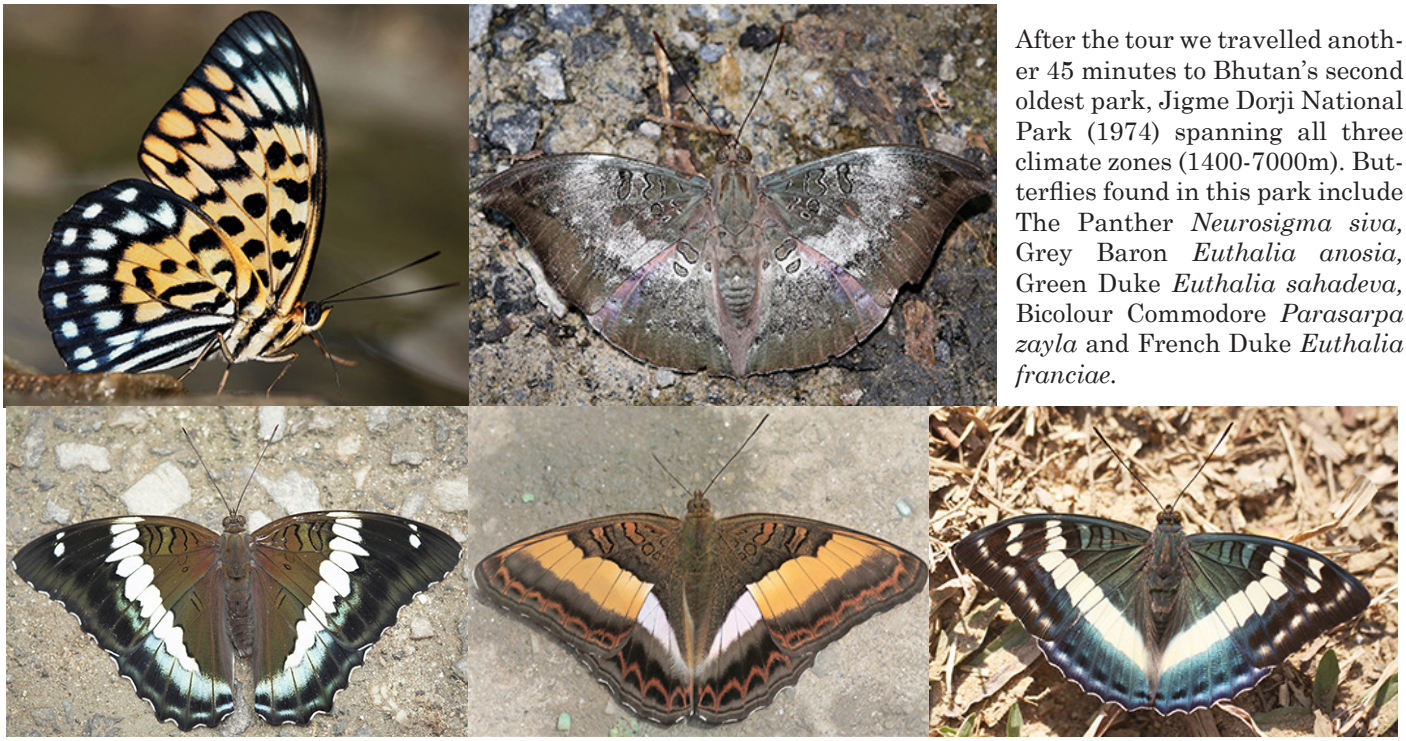
Left: The Punakha Dzong temple. Right: riverbank habitat in Jigme Dorji National Park, some very good butterfly habitat.

one of the most important wildlife preserves in the country. Gantey potatoes are the regions primary cash crop and one of Bhutan's exports to India. We had an excellent meal at the Phobjikha Resort, with a room overlooking the Black Necked Cranes roosting area.

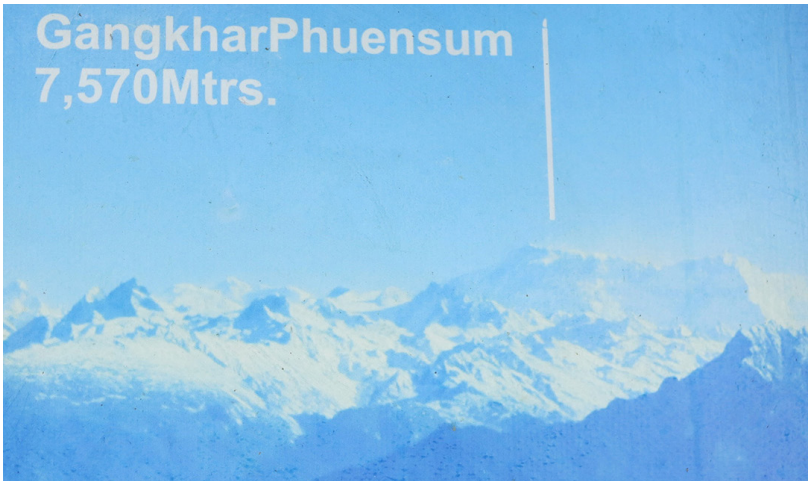
Early the next morning, we continued through terraced rice fields and squiggly roads to a hydropower plant and solar windmills. Bhutan is the world's first, and only, carbon-negative country thanks to its focus on clean energy and environmental protection. Countries that are defined as carbon-negative absorb more carbon than they produce, rendering the net amount released negative. This is partially due to around 70% of the land begin covered in trees, which absorbs carbon, and Bhutan's strict environmental sustainability initiatives. One form of clean energy that has allowed Bhutan to achieve this status is hydropower. Hydropower is one of the country's major exports and a main economic driver.

We spent 2 nights at the 4 Boutique Hotel room with a beautiful view of the Male River and Punakha. In the morning we took a tour of Punakha Dzong, the second temple built in Bhutan, arguably the most beautiful, especially the dark room where all of Bhutan's kings have been crowned. The quality of architecture and material used in construction, colorful interior with the numerous statues, and the many Thangka paintings reminded me of parts of the Forbidden City in Beijing. If you visit, bring a flashlight.

After the tour we travelled another 45 minutes to Bhutan's second oldest park, Jigme Dorji National Park (1974) spanning all three climate zones (1400-7000m). Butterflies found in this park include The Panther *Neurosigma siva,* Grey Baron *Euthalia anosia,* Green Duke *Euthalia sahadeva,* Bicolour Commodore *Parasarpa zayla* and French Duke *Euthalia franciae.*



Top Row: The Panther (*Neurosigma siva*), The Grey Baron ( *Euthalia anosia*). Bottom Row: The Green Duke ( *Euthalia sahadeva*), The Bicolored Commodore (*Parasarpa zayla*), the French Duke (*Euthalia franciae*).




Heading west towards Thimpu, we had a hot chocolate at Dochu la (3140m). On a clear day you may get a view of Gangkhar Phuensum (24,981ft), then visit a family run handmade paper making factory (using Daphe Bark). Downtown Thimpu has no traffic lights (just traffic people). The Royal Takin Preserve is nearby, as is The National Textile Museum. We then crashed at Khangkhu Resort with views of the Paro airport for 2 nights.

Early the next morning we found a restaurant that had good food, with brightly colored furniture and views of a waterfall, on the way to Chhasilakha below the Chhukha hydroelectric power plant looking for more Bhutan Glory *Bhutanitis lidderdalii* in the gully areas. The first one sailed by right at 9:00. We stayed until 12:00, seeing several more. Parts of the road were treacherous and could have been closed down at any time. We were glad to get back to Paro for the night.

September 8: This was the last full day in Paro. We visited the National Museum built in 1649. Some of the walls are 9 feet thick. They have an impressive collection of Thankas, both ancient and modern, depicting important teachers and saints, as well as fearsome festival masks.

Dungtshe Lhakhang was built around 1433 to subdue a demoness. A pilgrim path winds clockwise passing some of Bhutans finest murals, representing heaven, earth, and hell. Later we checked out the numerous souvenir shops and then visited the Paro farmers market, where we saw *Ophiocordyceps sinesis* for sale. *Ophiocordyceps sinesis* is an entomopathogenic fungus that feeds on the body of ghost moth (*Hepialus fabricius*) caterpillars underground. This fungus grows above 3,500m in parts of Tibet, China, Bhutan, India, and Nepal. The mushroom's bright tendrils grow out of the caterpillar's head and up through the soil. By the time the mushroom is mature, there is little caterpillar left, other than the mummified remains. The fungus is used in traditional Chinese (and other cultures') medicines to boost sex drive, slow the aging process, and increase brain function. Recent prices for A+ quality Bhutan *sinesis* is around $55.00 a gram.

September 9: We left Bhutan on Druk Airlines, a 2-hour flight from Paro to New Delhi, taking off in the rain. A quick liftoff from the runway is necessary to navigate through the mountains that surround the airport. Just a handful of pilots are specifically trained for these takeoffs and landings.


Top to Bottom: Takin in the Takin preserve; *Bhutanitis lidderdalii*; Dugtshe Lhakhang; *Ophiocordyceps sinensis* on *Hepialus fabricius* caterpillar.

# Biology of the Zebra Longwing butterfly (*Heliconius charithonia*) and its sexually dimorphic UV-vision

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**Abstract:** Oviposition and mating behaviors of the Zebra Longwing butterfly (*Heliconius charithonia*) are discussed in the context of its recently discovered sexually dimorphic UV-vision. A hypothesis is proposed of how sexually dimorphic UV-vision may benefit both males and females. While the loss of UV vision in males of this and other pupal-mating species may be tied to pupa-searching behavior, the preservation of UV vision in females may be tied to the unique way in which species with dimorphic UV-vision oviposit. Egg clusters that result from several oviposition events constitute a strong visual signal, which includes not only yellow colors but also UV-fluorescence (blue) and perhaps additional shorter wavelengths.


Fig. 1. Biology of the Zebra Longwing butterfly (*Heliconius charithonia*): (A) Dry leaf-mimicking pupa, cryptic in the midst of surrounding vegetation, (B) Pupal mating behavior; In this case, both males that were guarding the female pupa penetrated it with their abdomens, and one of them mated with the pharate female inside; the other missed the target and clasped onto the side of female's abdomen, (C) Female in flight searching *Passiflora 'incense'* (*incarnata* X *cincinnata*) hostplant for previously laid eggs, (D) Oviposition, in which a female is adding to the previously-existing egg cluster, (E) A typical for *H. charithonia* egg cluster that results from several oviposition events.

The article by Chakraborty *et al.* (2023) published in August in the Proceedings of the National Academy of Sciences represents a remarkable piece of research describing female-only sex-limited UV vision in the Zebra Longwing butterfly (*Heliconius charithonia*). This discovery merits further consideration in light of the unique behavioral traits of this species – one of the best-known and widespread butterflies in the United States.

The article notes that the observed phenomenon of sex-limited UV vision may be linked to pupal mating – a fascinating behavior, in which males visit the pupa and mate with the pharate female inside when the latter is ready (e.g., Estrada *et al.*, 2010) (Fig. 1A-B). How could pupal mating favor sex-limited visual traits? Males spend a significant amount of time searching for the dry-leaf-like pupae in the dark understory, usually in the shade, where acute monochrome vision is much more important than UV vision. While they guard the pupae, they must leave it occasionally to feed and sleep, but they resume their vigil daily (Sourakov, 2008). So, from the male-centric perspective, males could benefit from the loss of UV vision if there were a tradeoff for improved monochrome vision.

There is an alternative explanation that accounts for how the divergence between males and females described by Chakraborty *et al.* might benefit both sexes. The answer lies in the way *H. charithonia* females (and others in the clade that have dimorphic UV vision) oviposit: these butterflies lay only 1-2 eggs at a time, but they are nevertheless gregarious, sometimes even communal, egg-layers. The eggs are bright yellow, and UV vision would make them more conspicuous to female's eyes. Even with numerous shoots of passion vine around, I noticed that females of *H. charithonia* prefer to lay their own eggs where eggs are already present. This behavior results in clusters of sometimes over 20 eggs, which leads to higher rates of survival in caterpillars (Fig. 1C-D).

The evolutionary benefit of gregarious oviposition has to do with overcoming hostplant defenses. For example, *Passiflora lobata* in Costa Rica has microscopic hooks that trap and kill *Heliconius* caterpillars, but the larvae of *H. charithonia* are able to dodge these defenses by spinning webs over them, a behavior that is only possible when the young caterpillars work as a team (Gilbert, 1971).

Gregarious oviposition by more than one female in a single place has been described in *H. hewitsoni* (a member of the same clade as *H. charithonia*) by Reed (2003). A quick search for photos of eggs of other species in this clade (*H. sapho*, *H. sara*, and *H. erato*) revealed an oviposition behavior typical of *H. charithonia* in all of them. On the other hand, photos of species from the clade with monomorphic UV-vision, revealed oviposition either of 1-2 isolated eggs (*H. melpomene*, *H. cydno*, *H. ismenius*, and *H. hecale*), or, in the case of *H. doris*, egg-laying in a cluster. Either way, these oviposition modes do not call for more acute vision.


Fig. 2. Eggs of Zebra Longwing (*Heliconius charithonia*): (A) Egg cluster that results from several oviposition events constitutes a strong visual signal, (B) Chorion in white light and (C) in UV light, demonstrating fluorescence of egg surface.

Both UV-reflectance and UV-fluorescence have been demonstrated to be important for birds' and butterflies' vision-based behaviors, and these signals are frequently associated with yellow colors (to the human eye; Hausmann *et al.*, 2003.; Yoda *et al.*, 2021). Based on UV-fluorescence microscopy of *H. charithonia* egg chorion (Fig. 2), I strongly suspect that there is more than meets the eye to the egg clusters of these butterflies.

This connection between dimorphic UV vision and the gregarious egg-laying behavior of *H. charithonia*, along with the tie-in to pupal mating, makes a compelling case for why the divergence Chakraborty *et al.* (2003) describe may have taken place.

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# Membership Updates

*Chris Grinter*

Includes ALL CHANGES received by November 15, 2023. Direct corrections and additions to Chris Grinter, **cgrinter@gmail.com.**

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

**Raul J. Alva**: [red. by req.] (rjalva@satx.rr.com)
**Michael Butler**: 968 Dorcas Bay Rd., Tobermory, ON CANADA (thomas.ormond@gmail.com)
**Evelyn M. Foley**: [red. by req.] (evelyntomology@gmail.com)
**Ronald R. Nelson**: 2847 S 9th St., Milwaukee, WI 53215 (sphinxnelson@aol.com)
**Patty L. Pasztor**: 126 Calumet Pl., San Antonio, TX 78209 (agarita@me.com)
**Benjamin Rosen**: [red. by req.] (ben.rosen2000@gmail.com)

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

**Robert B. Butler**: 13801 York Road, Cockeysville, MD 21030 (mnbbutler@aol.com)
**Charles E. Harp**: 1656 3rd Street SW, Loveland, CO 80537 (cehmoth@aol.com)
**Steve Heinz**: 828 Lafayette St., Denver, CO 80218 (heinzsteve@yahoo.com)

# References for Ross, Seminole Crescent in LA, continued

*Continued from p. 182*


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https://www.alabama.butterflyatlas.usf.edu/species/details/14/
Louisiana Butterflies and Moths
Louisiana Insects and Arachnids
Louisiana Lepidoptera
USDA Plants Database


[NOTE: *News of the Lepidopterists' Society* is available online. In addition, the two original/technical publications on *Anthanassa texana seminole* by GNR (referenced within) are available on-line free as PDF files. To access: GOOGLE Seminole Texas Crescent and then scroll down to "Florida Online Journals" and "Southern Lepidopterists' Society."]

# Metamorphosis

**Dedication to Jerry A. Powell at Lep Soc Meeting/ Pacific Slope Meeting, in Billings, MT**

This year's meeting of the Pacific Slope Section of the Lepidopterists' Society is dedicated to Dr. Jerry A. Powell, who died on July 8 at the age of 90. In many respects, Jerry set the highest standard among our region's Lepidopterists. He was an internationally respected Lepidopterist whose research accomplishments and publications enlightened the general public as well as the scientific community. His and co-author Paul Opler's 2009 Moths of Western North America, the first guide to all families of moths of our region, is a wealth of knowledge for all who are interested in moths. As past president and one of its founders, Jerry organized many of the meetings and initiated many of the activities and awards that are now traditions of the Pacific slope section.

Jerry was a native Californian. As a teen, he was greatly influenced by Charles "Harbie" Harbison, who ran the Junior Scientist program at the San Diego Museum of Natural History. The program included an array of nature studies including marine biology, fossil hunting, and, of course, insect collecting. When a couple of the older boys brought in some tiger moth cocoons, something inside Jerry told him "This is it". Harbie recommended the entomology program at UC Berkeley because of its high reputation and rich curriculum. He earned his B.S. there in 1955 and his PhD in 1961 for his research on tortricine moths. Soon afterwards, Jerry began a long and distinguished career at Berkeley as a professor of entomology. In addition to instructing entomology courses, he was the major professor of a long list of graduate students of systematic entomology. Several of those former graduate students honored him in a special session of the 2018 national meeting of the Lepidopterists' Society.

Most of Jerry's research was field oriented. He and his students collected and reared thousands of caterpillars to determine host plant associations and identify feeding strategies. He sometimes investigated the integrity of putative species by conducting hybridization experiments or seeing if the morphology or feeding preferences of the early stages provided diagnostic characters that were not apparent in the adult moths. He was also fond of compiling inventories of Lepidoptera at a diverse range of study sites, especially so after retiring. Study sites included California dune systems, some of the university's natural reserves, most of the California Channel Islands, and his backyard. After fire swept through two of his study sites, he documented the recovery of the fauna. He gained national attention when he discovered the invasive and potentially destructive Light Brown Apple Moth in his backyard. Future researchers may return to his study sites to document changes.

Jerry Powell and Kelly Richers on Santa Cruz Island, CA, 2015

Jerry was a collector. His moths were housed in the Essig Museum rather than in a personal collection, and he almost always ate his lunch in the museum while curating specimens. He also collected golf balls with logos, and quirky catch phrases that he repeated when appropriate. Jerry initiated one of the first butterfly counts, the Berkeley count, when they were first proposed by the Xerces Society followed by the Mt. Diablo count a couple of years later. Both counts continue to this day. He also started hosting a mid-winter open house for Lepidopterists at Berkeley's Essig Museum of Entomology to give the public weekend access to the collection and to provide an informal setting where professional Lepidopterists could socialize with hobbyists, and where attendees might get specimens identified or give short presentations. These open houses are now a winter tradition and rotate among the Essig Museum, the Bohart Museum at UC Davis, and most recently, the California Academy collection in San Francisco.

He loved his profession, most of his graduate students and, above all else, his wife and his family. He will forever be missed.

John De Benedictis and Kelly Richers

## James Allan Scott (Sept. 15, 1946 - May, 2023)

James Allan Scott was born on September 15, 1946 in Boulder, Colorado to Glenn and Juanita Scott, as Glenn was attending school on the GI Bill. He subsequently grew up in Lakewood, Colorado where his father worked as a geologist for the US Geological Survey. He developed an early interest in the outdoors during camping trips and on outings with his family to fish, collect arrowheads, hunt for gems and minerals, and hunt for antique bottles. He was interested in butterflies at an early age and that interest developed into a passion the lasted throughout his life. After graduating from high school James attended the University of Colorado, where he originally pursued a degree in physics before deciding to pursue his passion in entomology. He graduated in January 1968 with a BA with distinction in Zoology and a membership in Phi Beta Kappa. He briefly attended the University of Kansas and worked as a student assistant before transferring to the University of California Berkeley under a National Science Foundation Graduate Fellowship. He obtained a PhD in entomology in 1972 with a thesis on hilltopping and mate seeking behavior in butterflies.

James worked in the entomology department at the University of California, Davis until 1975 where he conducted studies on enzyme genetics of yellow-fever mosquitoes, and built a matrix computer program to model their genetic polymorphism. He then worked at the International Biological Program at Colorado State University building FORTRAN computer models to study impact of arthropods on grassland ecology. Since 1979 James was self-employed. He had a small business raising and selling insects, and also authored "The Butterflies of North America, A Natural History and Field Guide" and published Papilio.

James died at home in Lakewood in May, 2023 at age 76. He was preceded in death by his parents, Glenn and Juanita Scott, who he cared for in their later years. He will be greatly missed by his surviving family: his sister Jeannie Pestorious in Albert Lea, MN, his sister Kathleen in Windsor, CO and his nieces Kelly Walsh, Jennifer Holt, and Jessica Bell and their families.

Professionally, James was always willing to donate his time and expertise where needed. During his teens he volunteered at the Denver Natural History Museum (now the Museum of Nature and Science) working with their butterfly collection. In recent years he spent many months volunteering to help with the butterfly collection at Colorado State University. He was a fervent advocate for environmental issues, frequently corresponding with US Fish and Wildlife and other government agencies and congressional representatives regarding issues of threatened and endangered species.

James was a wonderfully unique individual who, despite his Aspergers, still managed to show those in his life he loved them. His affection came in the form of childlike honesty, but was no less impactful, and having an honest opinion was equally humbling and appreciated in this world of glossing over hard truths. He always felt slightly out of step in the world but continued marching to the beat of his own drum. In his personal life he was always there for his family when needed--,whether it was doing carpentry work building a duplex, remodeling a basement, or helping clear out decades of accumulated belongings at an elderly person's home. As James's younger sister, I have many favorite memories: pony rides on his back, playing yard games with neighborhood children, playing **very** competitive board games, being taught how river meanderings start by using a hose in the sandbox, clambering over rock talluses above Loveland pass, catching butterflies, following female butterflies to locate food plants, competitive raspberry picking in Southern Colorado, wrapping Christmas presents in the shape of animals, baking bread and pies, being a patient and loving uncle to his nieces, and a thousand more. He will be missed.

Kathy Fagerstone

## A Publication Addendum for James A. Scott

James A. Scott, Ph.D., published a total of 136 scientific papers, notes, book chapters, and book reviews. His first (1968) and last (2021) papers were published in the ***Journal of the Lepidopterists' Society***. Although his scientific work appeared in more than 15 different journals, most of his papers were published in the ***Journal of Research on the Lepidoptera*** (30) and in the ***News*** (22) and ***Journal*** (18) ***of the Lepidopterists' Society.*** His desire to publish longer treatises and multi-topic summations of his work led him to found his own publication venue: ***Papilio (New Series)*** in 1981, which issued 32 numbers between 1981 and 2020, all of which are currently available as free PDFs from Mountain Scholar (Digital Collections of Colorado): **https://hdl.handle.net/10217/195583**. Scott also wrote five chapters for four different books and contributed sections or vignettes to two others.

His book, ***The Butterflies of North America, a Natural History and Field Guide*** (Stanford University Press, hardback, 1986; paperback, 1992), was a monumental undertaking (483 pages; 64 color plates, 71 text figures, 679 distribution maps) that summarized Scott's views on the distributions and relationships among the species, subspecies, and forms of butterflies found north of Mexico. Two decades later a digital version of the book was published as a CD-ROM (Hopkins Technology, 2006). Scott described his book, which treated 679 species, as more an original work on natural history than an ordinary field guide. In addition to identification, his goal was to summarize information on the natural history of all species of North American butterflies in ways that are both scientifically accurate and easily accessible to everyone. ***The Butterflies of North America***, along with his 2014 book-length monograph

of butterfly pollination ecology: ***Flower Visitation by Colorado Butterflies (40,615 Records) with a Review of the Literature on Pollination of Colorado Plants and Butterfly Attraction (Lepidoptera: Hesperioidea and Papilionoidea)*** [Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University], are milestones in our understanding of butterfly natural history.

James held many strong opinions about butterflies, the nature of scientific research, and the state of the world. He expressed many of these ideas with original cartoons (some published), as argumentative letters to colleagues and publishers, and in person. In 2012 he self-published a book under the pen name Oliver Wyker entitled ***Fixing America: Solutions to Fix the Major Problems Afflicting the United States – Solutions Based on Common Sense, Facts, and Science*** (Amazon.com. Paperback, 498 pages).

Before his death, James donated his library of books, reprints, unpublished papers, drafts and revisions, field notes, annotated maps, and correspondence to the C. P. Gillette Museum of Arthropod Diversity, where he frequently volunteered his time and expertise to sort and identify specimens. Most books in his extensive library are heavily annotated with corrections, links to other publications or field notes, and editorial asides. Even his copies of his own publications are heavily annotated, illustrating that his quest to understand the behavior, ecology, and evolution of butterflies was a life-long endeavor to be constantly updated after every field trip, conversation, or collaboration. All of these materials are archived in the Bruner Family Library of the C. P. Gillette Museum of Arthropod Diversity at Colorado State University. A future publication will catalog and describe all of these items, which will be available for study on site in Fort Collins, Colorado.

Boyce A. Drummond, Librarian, Bruner Family Library, Gillette Museum of Arthropod Diversity, Colorado State University

## Rae Leroy Letsinger (1937-2018)

A belated remembrance of a notable Missouri lepidopterist. Rae Letsinger was born in Sarcoxie, Missouri, on 17 October 1937, the only son of William Roy Letsinger and Susan D. Hasselbring Letsinger. After graduating from Sarcoxie High School in 1955 he joined the U.S. Air Force, serving at Thule Air Force Base in Greenland and on the DEW line and at Roswell Air Force Base, New Mexico, as a specialist in instrument landing systems; he was discharged in 1959. In 1960 he began working at the Gilbert H. Wild & Son plant nursery in Reeds, Missouri, near his home of Sarcoxie in southwest Missouri. In the early 1970s his niece asked for help collecting butterflies for a school science project—and the rest is history. He joined The Lepidopterists' Society in 1971 and remained a member until his death. He became an ardent insect collector, especially moths, and with no formal training became an expert in collecting, mounting, and identifying his specimens, with the mentorship of fellow collector, author, and friend, the late J. Richard Heitzman of Independence, Missouri. Rae did not stop at collecting moths. He had "an enormous record collection," and a huge library of thousands of books. "He was a speed reader with a phenomenal memory, not only of the stories but actual quotes from every book he had ever read." (FindaGrave.com)

Rae's passion for native plants and the insects that feed on them was memorialized when his sister Joan purchased the naming rights for "The Rae Letsinger Prairie" in Newton County, southwest of Sarcoxie. The Missouri Prairie Foundation purchased this 68-acre original, unplowed prairie in 2020.

Rae died on 1 November 2018 in Joplin, Missouri. His collection of some 23,000 insects, mostly moths, has been deposited in the Enns Entomology Museum, University of Missouri, Columbia.

The following sources of information on Rae are gratefully acknowledged:

Davit, Carol. 2020. The Rae Letsinger Prairie. **https://moprairie.org/2020/09/25/the-rae-letsinger-prairie/**

Find a Grave: **https://www.findagrave.com/memorial/194421600/rae-l-letsinger**

Missouri Prairie Foundation, The Rae Letsinger Prairie. **https://moprairie.org/project/the-rae-letsinger-prairie/**

Julian P. Donahue

Ray Letsinger and his moth collection, courtesy of his family via the Missouri Prairie Foundation (https://moprairie.org/project/the-rae-letsinger-prairie/)

# Glacial highlands house abundant skippers at Viper Bugloss

Tor Hansen

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

Take a stroll along Old Dewline Road just a little southeast from Highland Lighthouse in North Truro, Cape Cod, and keep eyes peeled for skippers stirring at an interesting addition to our native flora, namely a jolly raceme covered with elaborate pink & blue blossoms, Viper Bugloss (*Echium vulgare*). Alien to New England, likely origins indicate Bugloss is a guest on the proverbial gardener's wheelbarrow, and certainly has foreign roots in Mediterranean Europe. It is now distributed across the mid-west as well, and possibly scattered about roadside margins by passing hubcaps.

Botanical lore has it, since the fruit resembles the head of a poisonous snake, that our precursors considered *Echium* an antidote, or even cure, for snake bite. Bugloss from the Greek means "Ox Tongue". The dashing flowers have a larger open upper petal and protruding red stamen suggestive of the open bovine mouth (Readers' Digest "Wildflowers"). Bugloss has spread to 46 states and Canada. Mammalian herbivores avoid *Echium* because the plant is armed with piercing hairs. Beekeepers consider Bugloss as a good honey plant, however (according to Klemow 2002) its honey may be mildly toxic since it contains pyrrolizidine alkaloids, and thus may be damaging to the liver.

What butterfly diversity they attract is nothing short of astonishing. Find Old Dewline Road off Highland Road and park next to the ball field as if attending Payomet theater for another grand concert under the stars. Walk across to find an access road that leads to the Paved Paws Radar Station heralded by the huge soccer ball-like globe well beyond where the Bugloss grows in the grassy road shoulders. The service road was paved for heavy equipment to build & maintain the radar installations required to detect incoming aircraft and/or missiles during the cold war years. Engineered by The United States Air Force, another service road leads to a maze of ranch style cabins to house the station personnel and families, today long abandoned and overgrown with Black Cherry bushes, ideally suited for cuttings that yearly fed my burgeoning Cecropia Moth larvae. One may bypass another road to The NAC facility, although this leads to a national park research lab, also rimmed with milkweeds and scrub oak home to assorted gossamer wings like Edward's and Banded Hairstreaks, and Polyphemus Moth larvae.

Periodically a lawn mower is deployed to mow in close-cut stubble the entire roadside margins, and with the fastidious cutting so characteristic of Air Force pride, so go the rich nectar oases, so needed by a dozen species of skippers, hairstreaks, angle wings, buckeyes, swallowtails, and monarchs. Also completely destroyed are the leather-leafed (blunt), *Asclepias amplexicaulis*, milkweeds very much ideal nectar wells for the denizen lepidoptera and pollinating bees. What will it take to convince the maintenance staff to safeguard the nectar yielding weeds and wildflowers adapting to the sandy soil over time enriched into topsoil, indeed an outgrowth from the millennia when ice ages created these glacial highlands? This request may indeed call for a cogent weed-wacker who carefully mows to the exact margin around the butterfly oases, that in years to come will be to the credit of the United State Air force that engineered the project.

Left: Service Road to Radar installation where bugloss grows in shoulder. Right: Bugloss flowers growing in uncut roadside margin.

Seven skippers sip nectar simultaneously at Blunt Milkweed.

Many skippers thrive in mini-gene pools. Since they are aerodynamically agile acrobats, they can fly out to explore the edge of their territory, or search for other nectar sources sometimes at quite an outward bound distance. For example, my observations find that over several years certain species appear to be in a state of flux. An excellent example is the Dusted Skipper (*Atrytonopsis hianna*) that may appear inhabiting the Smock Windmill/ Drummer Boy Park in Brewster one spring, but absent the next; likewise another Dusted Skipper mosaic may be present and thriving in numbers at the Old Dewline Radar mosaic but absent the next. However butterfly mosaics have a way of remaining innocuous and not always omnipresent. Did I simply miss them on one of the few days I had in the field when I could break away from the work a day world?

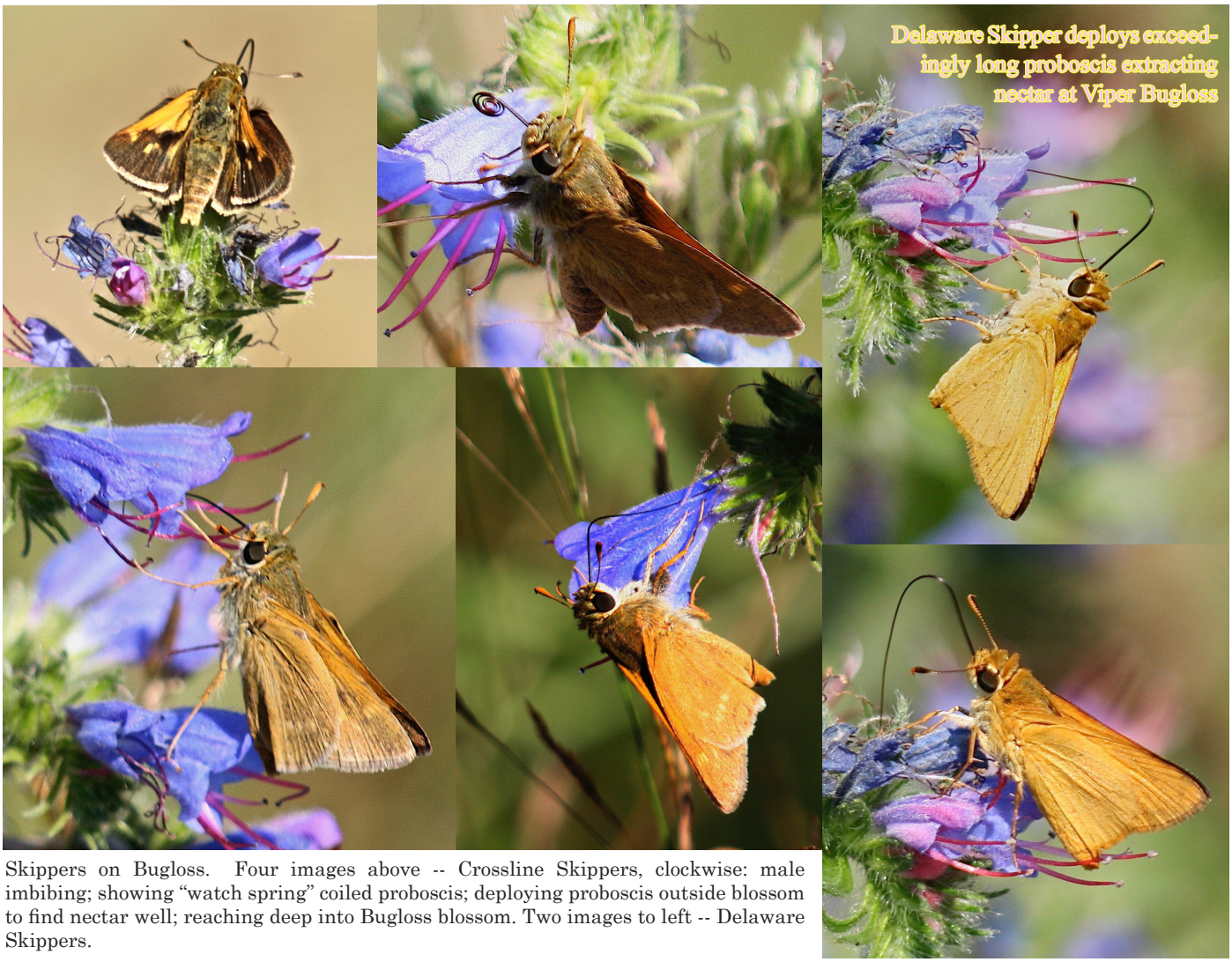
On close inspection the weedy margins are grassland woodland edges surrounded by pitch pine and oak woodland, supporting small clusters of common milkweed (*Asclepias syriaca*), and later in summer Spotted Knapweed, also a blazing nectar source, that energize many species. Although these weeds do proliferate away from the mower's cutting zone as well, their perpetual presence in the heretofore margins provides milkweed and bugloss that seriously enhance the survival chances of healthy burgeoning populations (mosaics) of assorted butterflies. I see our role as cognizant stewards going one better, to support butterfly oases wherever we can safeguard and restore them, thus linking more closely isolated mosaic habitats, and fostering stronger gene pools. Peruse the works of Ernst Mayr (Evolution and the Diversity of Life 1076 Belknap Press Harvard), to further clarify how speciation proceeds utilizing allopatric and sympatric population dynamics.

Left: Dusted Skipper (without diagnostic dot) sipping nectar from Bugloss. Top right: Dusted Skipper with white spot on hindwing underside; bottom right: Dusted Skipper (dorsal), showing partial white eye ring.

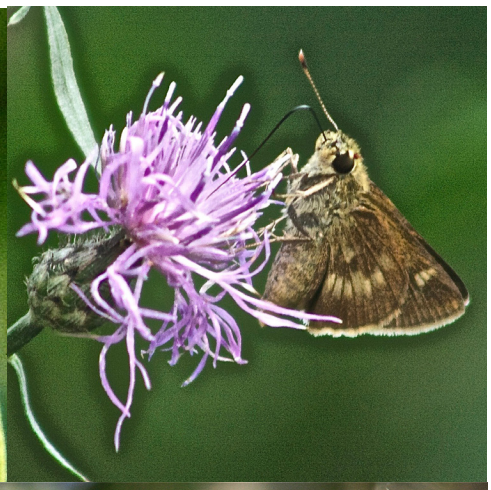
Left to right: male Delaware & Dunn Skippers imbibing; Crossline Skipper imbibing, while a Dunn skipper arrives; Crossline Skippers probing nectar in Blunt Milkweed.

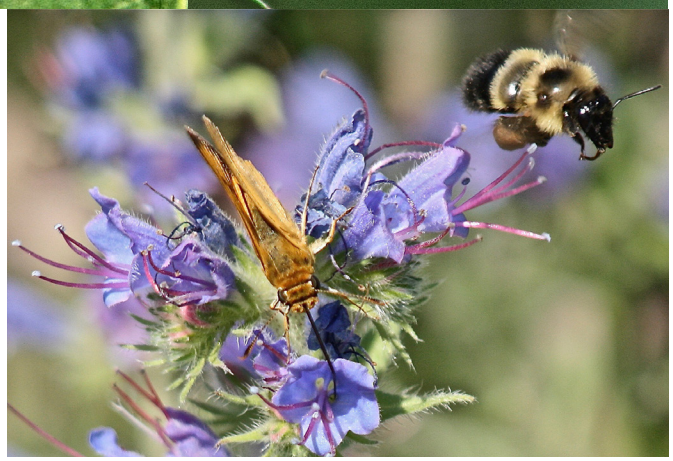
Viper Bugloss seeded in service road shoulder.

Species texture or mixture of known populations depends largely on consistent nectar sources and flora for larval requirements. Not far away also in North Truro is The Highland Golf Links surrounding the Highland Lighthouse, and the borders host various nectaring flora where skippers abound with other leps (short for Lepidoptera). Golfers can tee off and in one stroke reach my best example of species diversity on Cape, a grassy knoll crowned in long standing milkweed & cow vetch, in the fields of the former Horton's Camping Resort, hosting as many as 41 species in a single year. Here assorted hairstreaks, sulphurs, angle wings, swallowtails and various skippers have thrived for generations perhaps millennia. Only a mile away as the crow flies similar skipper species thrive at the same radar mosaic. Are the two populations separate (allopatric = isolated) and linked by adventurous vanguards? In contrast zoology has designated a word that describes adjacent populations (sympatric) that describes overlapping populations, thus are given to ease of interbreeding or directly accessible gene pooling. As the terms apply I find several skipper species consistently present nectaring at milkweed around the NAC lab and here at the Dewline




Skippers on Bugloss. Four images above -- Crossline Skippers, clockwise: male imbibing; showing "watch spring" coiled proboscis; deploying proboscis outside blossom to find nectar well; reaching deep into Bugloss blossom. Two images to left -- Delaware Skippers.



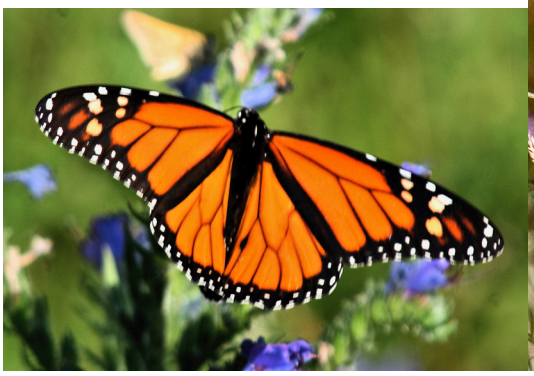


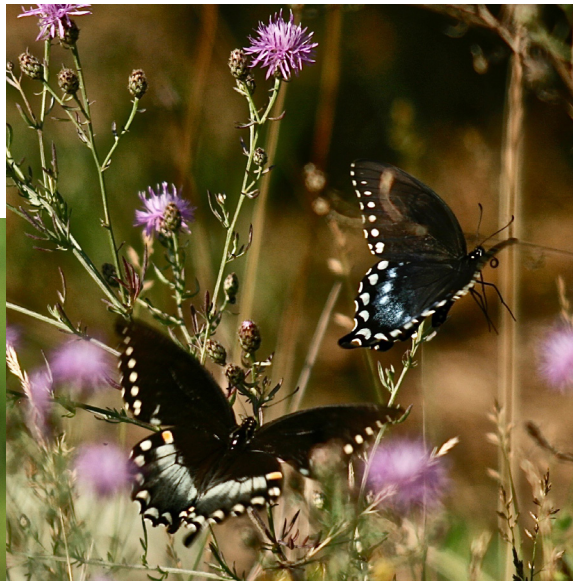
Top left: Skippers like this Dunn can carry pollinium from one milkweed, cross-pollinating to another milkweed. Top right: Northern Broken Dash imbibing at Spotted Knapweed. Right: Delaware finding nectar while bumblebee gathers pollen; note pollen basket on hindleg of bumblebee.

radar, nectaring at milkweed and bugloss. They fit the allopatric mosaic model, imbibing at Bugloss as well. The only Bugloss I know on all of Cape Cod grows at this Dewline mosaic.

One can muse how so many look-alike skippers evolved from common ancestry. For example Dusted and Hobomok Skippers (*Poanes hobomok*), wherein their ventral wings show great similarity in dark scales edged in frosty shades of gray-violet. Frequently seen together are "the three witches", comprised of Dunn (*Euphyes vestris*), Northern Broken Dash (*Wallengrenia egeremet*), and Little Glassy Wing (*Vernia verna*). Other skippers abundant here at Bugloss and Blunt Milkweed, include Yellow-Patch (*Polites peckius*), Crossline (*Polites origenes*), European (*Thymelicus lineola*), oh so golden Delaware (*Anatrytone logan*), and Silver-spotted Skipper (*Epargyreus clarus*) …an aerial trailblazer whose larvae forage on black locust, that ingeniously construct folded leaf tents complete with anchoring silken tent lines to escape prowling predatory wasps! *E. clarus* thrive where black locust trees were introduced by farmers to change sand into rich topsoil by nitrogen fixation.

In order to safeguard and restore depleted habitats and butterfly populations, especially new property owners and those wanting to improve their own utopian dreams whether backyard gardens or industrial workplaces, please consult with local naturalists and those in authority who can inform the curious as to what flora to keep before changes cause a decrease in biological diversity, or the annihilation of mosaics under study. Case in point: Horton's Camping Resort changed ownership after the passing of manager Bob Horton, and with it was the removal of all the milkweed crowning his hilltop picnic site. Also there are clumps of native prickly pear cactus, *Opuntia humifusa*, that provide nectar for Dunn Skippers and sweat bees. Restoring the insect diversity there is next to impossible: Restoration will take years to replenish the flora. Fulfillment comes when butterfly gardens, and retention of key flora provide the joy that springs into halcyon grandeur. Their preservation here depends on our appreciation of how skillfully these skipper navigate to carefully extract nectar to gather the fast energy to suffice flight demands and prolong their lives. Special thanks goes out to co-author Mark Mello of our book "Butterflies





Left: Monarch finding nectar at Bugloss. Right: Spicebush Swallowtails also imbibe at the three aforemnetioned plants, and here eagerly participate in a courtship chase.

Left: Sweat Bee & Flame Copper at Spotted Knapweed. Right: Flame Copper imbibing at Spotted Knapweed likely pollinating in return.

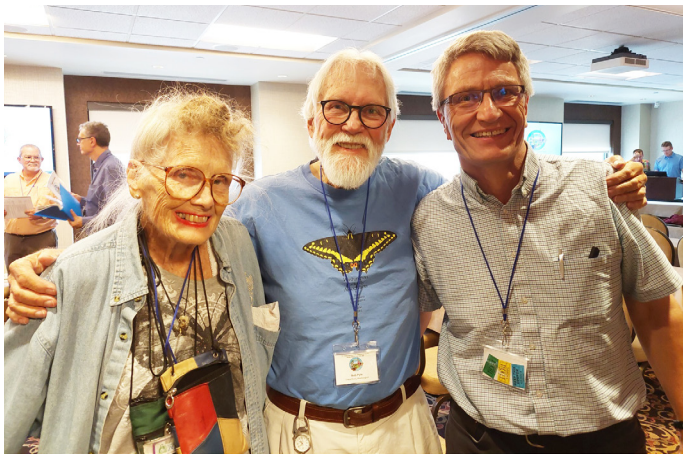
Across Cape Cod", Patriot Press, Hyannis 2004 for his keen meticulous attention to details, exceptional flight period data accumulation, factual text, species accounts and habitat information, so to emphasize the value of awareness to preserve our natural heritage. My thanks also to the late editor Alison Robb for her articulate and cumulative inclusions.

JoAnne Russo and Michael Sabourin at the 71st Annual Lep Soc meetings in Billings, MT, July, 2023. Image by James Adams.

Ernest Williams and Bob Pyle. Image by Ernest Williams (or at least his phone/camera).


Left: James Adams, Ben Mous, and Caitlin LaBar, at the BBQ at the Montana Audubon Center, Billings, July 21, 2023. (Moose Drool sounds particularly appetizing). Right: Yours truly (James Adams) taking a swing at *Oeneis chryxus* on Clay Butte, Park Co., Wyoming, July 22, 2023. Images by Jeff Pippen.

# More Lep Soc Meeting Images!

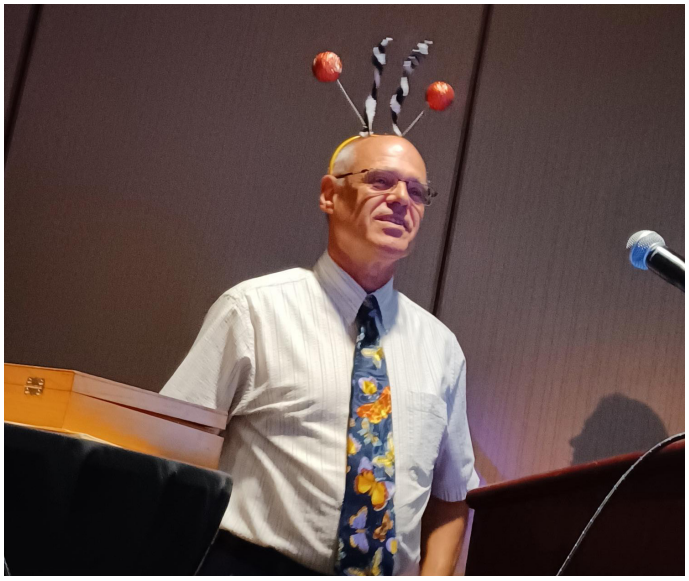


Left: Suzette Slocomb, Bob Pyle and Felix Sperling. Right: A crew in the field! Greg Pohl, Mat Seidensticker, Chuck Harp, and Jean-François Landry. Images by Greg Pohl.

Markku Savela, Andrew Dang, David Ewer and Carolyn Sevier. Image by Nancy Ewer.

Alberto Zilli, Alessandro Giusti, and Nancy Ewer. Image by Nancy Ewer (or at least her phone/camera).

*Euphydryas editha* on the Beartooth. Image by James Adams.



Jean-François Landry with the antennae. Image by Chuck Harp.

## Membership

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

Kelly Richers, Treasurer
The Lepidopterists' Society, 9417 Carvalho Court, Bakersfield, CA 93311; ***kerichers74@gmail.com***

### Dues Rate

| | |
|---|---|
| Active (regular) | $ 45.00 |
| Affiliate (same address) | 10.00 |
| Student | 20.00 |
| Sustaining | 60.00 |

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

| | |
|---|---|
| Life | 1800.00 |
| Institutional Subscription | 60.00 |
| Air Mail Postage, **News** | 15.00 |
| ($30.00 outside North America) | |

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

## Change of Address?

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

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

## Missed or Defective Issue?

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

## Memoirs

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

**Submissions of** potential new Memoirs should be sent to:

Kelly M. Richers
9417 Carvalho Court
Bakersfield, CA 93311
(661) 665-1993 (home)
***kerichers74@gmail.com***

## 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 announcments 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
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## Submission Guidelines for the News

Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgable 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/inch$^2$ 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 upcoming volumes must reach the Editor by the dates below:

| Issue | | Date Due |
|---|---|---|
| 66 1 | Spring | February 15, 2024 |
| 2 | Summer | May 12, 2024 |
| 3 | Fall | August 15, 2024 |
| 4 | Winter | November 15, 2024 |

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

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

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# Season Summary Zone Coordinators

Refer to Season Summary for Zone coverage details.

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*Heliconius charithonia* larva, pupa, Gainesville, Florida, behind the Florida Museum of Natural History, developed on *Passiflora incarnata*. Images by Andrei Sourakov; related article, page 198.

Ben Mous, collecting on the slopes of Clay Butte, Park Co., Wyoming, July 22, 2023, during the 71st Annual Meeting of the Lep Soc. Image by James Adams.

Left, top to bottom: *Bhutanitis lidderdalii* (three images); *Bhutanitis ludlowi* larvae on *Aristolochia griffithii*. Images by Bill Berthet; related article, page 188.